The Sundarbans (Bangladesh) (N 798) Progress Report

On the decisions of 43COM.7B.3 of the World Heritage Committee on

the Sundarbans World Heritage Sites

Ministry of Environment, Forest and Climate Change
Government of the Peoples’ Republic of Bangladesh

January 2020
Executive summary

This report contains responses of the state party (i.e. the Government of the Peoples’ Republic of Bangladesh) to each decision of 43 COM 7.B 3 of the World Heritage Committee, current and future conservation initiatives for better management of the ecosystem, and potential major restorations and development activities near the property. In response to the recommendations, concerns and requests given in the Decisions of 41 COM 7B.25 and 43 COM 7.B 3 of the World Heritage Committee, the Government of Bangladesh has taken steps on the conservation and management of the Sundarbans, the world’s largest continuous mangrove forest, in line with national policies, plans and programmes.

The Government reassures that it has not given any permission to any large-scale industry adjacent to the Sundarbans World Heritage property since the decision of 41COM 7B.25. Selection of the consulting firm for conducting a Strategic Environmental Assessment (SEA) has been finalised and the contract has been signed. The SEA will be conducted by the. The contracting firm - Centre for Environmental & Geographic Information Services (CEGIS), Bangladesh (in association with Integra Consulting, Czech Republic) has already started their activities to conduct the SEA.

The government has taken a number of additional measures and programmes such as Expansion of Protected Area, SMART Patrolling, Activities for Dolphin conservation Expand the coverage of dolphin protected Area (PA) in and around the Sundarbans, Tiger Conservation Project (TCP), Bangladesh Tiger Action Plan and National Tiger Recovery Programme, Strategy for the Sundarbans under Bangladesh Delta Plan 2100 to monitor and further improve the ecological management of the property as well as the whole mangrove area.

The transboundary cooperation between India and Bangladesh has improved the status of biodiversity of the Sundarbans Heritage area. The countries have agreed to conduct studies to develop indicators to measure health of the ecosystems of the Sundarbans and to identify impacts of climate change on its ecosystems. The 2nd bilateral meeting with India is expected to be held in Bangladesh tentatively on February 2020 and already a proposal has been sent to the Indian Government.

The country is receiving its due share under the Ganges water sharing treaty of 1996 and to optimize its uses the government has taken many water conservation activities. Environmental Impact Assessment (EIA) is being done before any dredging programme.

The ‘National Oil Spill and Chemical Contingency Plan (NOSCOP)’ has been finalised and waiting for the final approval of the Cabinet Division to provide a complete set of instructions that must be followed by all participating agencies in order to prevent, control and manage oil and chemical spillage emergencies in a coordinated way. Its implementation will help to respond immediately in cases of oil and chemical spill emergencies.

The government reiterates that all the concerns will be addressed during the SEA. The Maitree Super Thermal Power Project at Rampal has been approved through a rigorous EIA and the plant has ensured that all pollution control measures would be in place.
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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFD</td>
<td>Bangladesh Forest Department</td>
</tr>
<tr>
<td>BTAP</td>
<td>Bangladesh Tiger Action Plan</td>
</tr>
<tr>
<td>BWDB</td>
<td>Bangladesh Water Development Board</td>
</tr>
<tr>
<td>CREL</td>
<td>Climate Resilient Environment and Livelihood</td>
</tr>
<tr>
<td>DCT</td>
<td>Dolphin Conservation Team</td>
</tr>
<tr>
<td>DoE</td>
<td>Department of Environment</td>
</tr>
<tr>
<td>ECA</td>
<td>Ecologically Critical Area</td>
</tr>
<tr>
<td>ECR</td>
<td>Environment Conservation Rules</td>
</tr>
<tr>
<td>ECNEC</td>
<td>Executive Committee of the National Economic Council</td>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>EPZ</td>
<td>Export Processing Zone</td>
</tr>
<tr>
<td>FD</td>
<td>Forest Department</td>
</tr>
<tr>
<td>FGD</td>
<td>Flue Gas De-sulphurisation System</td>
</tr>
<tr>
<td>FTRT</td>
<td>Forest Tiger Response Team</td>
</tr>
<tr>
<td>GRRP</td>
<td>Gorai River Restoration Project</td>
</tr>
<tr>
<td>LPG</td>
<td>Liquid Petroleum Gas</td>
</tr>
<tr>
<td>MoEFCC</td>
<td>Ministry of Environment, Forest and Climate Change</td>
</tr>
<tr>
<td>MPA</td>
<td>Mongla Port Authority</td>
</tr>
<tr>
<td>MSTPP</td>
<td>Maitree Super Thermal Power Project</td>
</tr>
<tr>
<td>NOSCAP</td>
<td>National Oil and Chemical Spill Contingency Plan</td>
</tr>
<tr>
<td>NCSS</td>
<td>National Committee for Saving the Sundarbans</td>
</tr>
<tr>
<td>NTRP</td>
<td>National Tiger Recovery Programme</td>
</tr>
<tr>
<td>OUV</td>
<td>Outstanding Universal Value</td>
</tr>
<tr>
<td>PA</td>
<td>Protected Area</td>
</tr>
<tr>
<td>PPR</td>
<td>Public Procurement Rules</td>
</tr>
<tr>
<td>SDBC</td>
<td>Sustainable Development and Biodiversity Conservation in the Sundarbans</td>
</tr>
<tr>
<td>SEALS</td>
<td>Sundarbans Environmental and Livelihood Security</td>
</tr>
<tr>
<td>SEA</td>
<td>Strategic Environmental Assessment</td>
</tr>
<tr>
<td>SRF</td>
<td>Sundarban Reserve Forest</td>
</tr>
<tr>
<td>SMART</td>
<td>Spatial Monitoring and Reporting Tool</td>
</tr>
<tr>
<td>SMP-I</td>
<td>Management of the Sundarbans Mangrove Forests for Biodiversity Conservation and Increased Adaptation to Climate Change</td>
</tr>
<tr>
<td>SIZ</td>
<td>Sundarbans Impact Zone</td>
</tr>
<tr>
<td>SW</td>
<td>South-west Region</td>
</tr>
<tr>
<td>TCC</td>
<td>Tiger Co-ordination Committee</td>
</tr>
<tr>
<td>TCP</td>
<td>Tiger Conservation Project</td>
</tr>
<tr>
<td>ToR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>VTRT</td>
<td>Village Tiger Response Team</td>
</tr>
<tr>
<td>WCSC</td>
<td>Wildlife Conservation Society</td>
</tr>
<tr>
<td>WHS</td>
<td>World Heritage Site</td>
</tr>
<tr>
<td>ZLD</td>
<td>Zero Liquid Discharge</td>
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</tbody>
</table>
1. Introduction

The Sundarbans, the world’s largest continuous mangrove forest, is a national pride for Bangladesh. The Sundarbans Reserve Forests (SRF) has three wildlife sanctuaries that covers 1,39,700 ha which was declared as World Heritage Site in 1997. In June 2017, the State Party has extended the area of this 3 (three) Wildlife Sanctuaries to 3,17,950 ha from 1,39,700 ha to facilitate undisturbed breeding ground for the Bengal Tiger and other wildlife in the Sundarbans and World Heritage Site (WHS). At present, this three wildlife sanctuary area covers 52% out of the total area of SRF. According to the Wildlife (Conservation and Security) Act, 2012, there is no access to the sanctuary area for the resource collectors - living around the vicinity of the Sundarbans and any kind of economic activities are strictly prohibited within the wildlife sanctuaries. To further protect the Sundarbans the government has declared a ten kilometers radius area around the SRF as Ecologically Critical Area (ECA) in 1999. To avoid the confusion of boundary of the ECA, a revised promaulgation was issued in 2017 which lists the smallest units (Mauza) of the boundary of the ECA. These efforts have been protecting the property from possible threats that may affect the Outstanding Universal Value (OUV) of the property.

The local community in the Sundarbans Ecologically Critical Area (ECA) has been dependent on agro-based economic activities such as aquaculture and hatchery, paddy processing for rice production, betel-nut processing etc. The Mongla Port was established in Southern part of Bangladesh in 1954. Various kinds of secondary and tertiary economic activities emerged in the region after establishment of the Port. An export processing zone (EPZ) was developed in 1998 in the region to utilize the port facilities.

The Government of Bangladesh is committed to deliver its highest effort to take all measures to protect and conserve its integrity as a whole. The decisions adopted during the 43COM 7.B 3 in Baku, Azerbaijan in 2019 and 41st session of the world Heritage committee in Krakow, Poland in 2017, are being compiled by the Government of the People’s Republic of Bangladesh. The Government is taking a number of additional measures to maintain and improve the existing diversity and richness of the ecosystem of the property as well as the entire Sundarbans area. The following part of the report is composed of two parts- Part A covers the responses of the decisions of 43COM 7.B 3 of the World Heritage Committee and Part B covers additional information on relevant measures.
2. Part A: Response to the decision of the World Heritage Committee

Government of Bangladesh has prepared a comprehensive response on the decisions of 43 COM 7.B.3 of the World Heritage Committee. The responses to each decision are as follows:

2.1. Decision no. 1-2
1. Having examined Document WHC/19/43.COM/7B.Add,

2. Recalling Decision 41 COM 7.B.25, adopted at its 41st session (Krakow, 2017),

Response
A comprehensive response on the decision of 41 COM 7.B.25 has already been sent to the WHC in December 2018.

2.2 Decision no. 3

Welcomes the formation of an India-Bangladesh Joint Working Group (JWG) of the Sundarbans and requests the State Party of Bangladesh to keep the World Heritage Centre informed of the concrete actions and outcomes that arise from the JWG and how these will strengthen the long-term protection of the property’s Outstanding Universal Value (OUV)

To improve the trans-boundary cooperation between Bangladesh and India on conservation of the Sundarbans, the first meeting of India-Bangladesh Joint Working Group (JWG) was held in India on 21 July 2016. Initiatives have already been taken by the Ministry of Environment, Forest and Climate Change (MoEFCC) on agreed action points of the aforesaid meeting. The MoEFCC has constituted a Working Group in Bangladesh side for working on the agreed action points and for arranging second bilateral meeting with India. The Second meeting is to be held in Bangladesh on 17-18 February 2020. In the meantime, the committee of Bangladesh side took part in several meetings regarding implementation of the Agreed Action Points of the first meeting of JWG. The progress of Bangladesh part is stated below (Table 1):


Table 1: progress of activities of Bangladesh side

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Agreed Action Points</th>
<th>Actions taken/Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Sharing of knowledge of flora and fauna in both parts of the Sunderbans through biodiversity mapping and evaluation study.</td>
<td>The following study has already been conducted in the Bangladesh Sundarbans regarding the fauna and flora of the Sunderbans for biodiversity mapping.</td>
</tr>
</tbody>
</table>

**Fauna**

Some of the Research/Survey has been conducted by Bangladesh Forest Department.

1) Under the Bengal Tiger Conservation project Tiger census (2018-19) was conducted through ‘capture camera trapping’ method and estimated 114 tiger population in the Bangladesh Sundarbans. It was 106 in tiger census conducted in 2015 with the same method (BFD,2019)

2) Under “Vulture Conservation Initiative” vulture survey conducted and recorded about100 White-rumped Vulture in the Sundarbans Bangladesh part (IUCN, 2016).


4) Under the Batagur baska Conservation project, Batagur Baska population has been increased more than 100 in the Batagur Baska Breeding Centre of Karamjol, Sundarbans through captive breeding programme

5) Under Dolphin project, some survey & Research work have been conducted in the Sundarbans & adjacent areas. It is to inform that 1070 hectares of Sundarbans (Dangmari, Chadpai and Dudhmukhi) was declared as Wildlife Sanctuary in 2012 for dolphin conservation. Moreover, the declaration of 03 new Dolphin Wildlife Sanctuary (Pankhali, Shibsha and Vodhra) with an area of 3427.0 hectares is on process.

6) Assessment of tiger carrying capacity in the Sundarbans has been conducted in 2019 and report preparation is on process.

**Flora**


<table>
<thead>
<tr>
<th>Sl no</th>
<th>Agreed Action Points</th>
<th>Actions taken/Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rahman et al. (2015) conducted a study on “Floristic Survey of Sundarbans Mangrove Forest of Bangladesh (2015)” and identified that Sundarbans Bangladesh part has 528 species of Vascular Plants, among them 345 species are herb, 89 species of shrub and 94 species of tree. Prain (1903) first recorded 334 species of Vascular Plants in the entire Sundarbans (Bangladesh and India), among them 203 species are herb, 81 species of shrub and 54 species of tree.</td>
<td></td>
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<tr>
<td>3.</td>
<td>Bangladesh Forest Research Institute conducted Regeneration Study on Sundarbans in 2019 at 33 Permanent Sample Plot (PSP) and recorded 32444 seedlings/Hectare which was 27414 seedlings/Hectare in 2018 (Siddiqui, 2019)</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>182 species were recorded in the Sundarbans during the survey conducted under the SEALS project of Forest Department. Besides, as per decision of the meeting 22 research proposals on fauna is under consideration from Bangladesh part for formulating common approach on Biodiversity Mapping of the Sundarbans and these proposals may be discussed in the 2nd meeting of JWG for selection of the best proposals.</td>
<td></td>
</tr>
<tr>
<td>04.</td>
<td>On Bi-annual meetings (could be held at field director level) On Monthly meetings (could take place at DFO level along with the meeting of security forces)</td>
<td>On Bangladesh part, officers have been nominated for the Joint Border Meeting.</td>
</tr>
<tr>
<td>Sl no</td>
<td>Agreed Action Points</td>
<td>Actions taken/Progress</td>
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<tr>
<td>05.</td>
<td>Reserving seats for personnel from Bangladesh in the nine months Diploma course in the wildlife Institute of India, Dehradun.</td>
<td>The cooperation for capacity building and research between Bangladesh Forest Department and Wildlife Institute of India (WII) has been established. In 2019-2020 fiscal year, 06 BFD officials have been participated at WII for 10 months diploma course on advanced wildlife management and three BFD officials have been enrolled for 03 months certificate course on wildlife management.</td>
</tr>
<tr>
<td>06.</td>
<td>Illegal exploitation of marine biodiversity using harmful gears.</td>
<td>Bangladesh Forest Department has already stopped to use illegal fishing gears inside the Sundarbans. During January 2019 to December 2019 a total of 372 fishing and crab harvesting gears were seized by the SMART patrol teams in the Sundarbans. Besides, Bangladesh Coast Guards, Department of Fisheries, Bangladesh Navy seized a significant number of illegal fishing gears in the coastal areas around the Sundarbans. For marine biodiversity conservation BFD has declared Swatch of no ground as Marine Protected Area with an area of 173,000 hectares. A management plan on Biodiversity conservation of Swatch of no ground is under consideration.</td>
</tr>
<tr>
<td>07 &amp; 08</td>
<td>Measuring the scale of dependency of adjacent community on Sunderbans ecosystem and study of the Sunderbans dependent community and their alternative livelihood. Study of the indicators to measure health of the ecosystems of Sunderbans</td>
<td>Proposal on “Modalities for study to measure health of the ecosystems of the Sundarbans” and joint modalities proposal on “Study of the Sundarbans dependent community and their alternative livelihoods” have been developed for Bangladesh part. This will be discussed on the 2nd meeting of JWG for working decision. Under different projects of Forest Department like SEALS project, CREL project, SDBC project, Bengal Tiger Conservation project, SMP-I project, Dolphin project, about 73840 individuals of Sundarbans dependent community received alternative income generation support/ training.</td>
</tr>
<tr>
<td>09.</td>
<td>Joint identification of research need,</td>
<td>Some research proposals and modalities proposal on “Impact of Climate Change on the Sundarbans ecosystem” has been developed. This will be discussed on the 2nd meeting of JWG</td>
</tr>
<tr>
<td>Sl no</td>
<td>Agreed Action Points</td>
<td>Actions taken/Progress</td>
</tr>
<tr>
<td>-------</td>
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<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td></td>
<td>joint research and incorporation of research findings in the Sunderbans management practice for the whole Sunderbans ecosystem.</td>
<td>for working decision.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In compliance with the principal Goal of Protocol on Tiger conservation, the last meeting regarding Trans-boundary Tiger Conservation was held in Kolkata, India on 20th December 2019. The Committee from both sides has decided to work together for conservation of Tigers of the Sundarbans.</td>
</tr>
</tbody>
</table>
2.3 Decision no. 4

Appreciates the confirmation that any future dredging of the Pashur River will be subject to an Environmental Impact Assessment (EIA), reminds the State Party that EIAs should be conducted in line with the IUCN World Heritage Advice Note on Environmental Assessment and include a specific section on the potential impact of the project on the OUV of the property, and also requests the State Party to ensure that any dredging within the property is conducted in compliance with strict conditions that safeguard the property’s OUV and further requests the State Party to provide information on dredging activities.

Response
As a mandatory part of the Bangladesh Environment Conservation Act 1995 and Environment Conservation Rules 1997, all dredging activities are subject to approval of Environmental Impact Assessment (EIA). In addition, the EIA should also follow the IUCN advice note. As a sea port, maintenance dredging is required to maintain the navigability of the Mongla Port on the Pashur River. Since 1979 Mongla Port has been performing maintenance dredging to keep the port operational. It is assumed that, by now, the maintenance dredging has been adopted by the river ecosystem.

The dredging is conducted complying with the recommendations of EIA safeguarding the property’s OUV. No dredging activities are being conducted during fish breeding seasons. Information on dredging activities in Pashur River is as follows:

2.3.1 Information on dredging activities

a. Ongoing Dredging Activities:

a.1. Outerbar Area

Currently, dredging is being carried out at two locations near the outer bar: a) dredging Location 1: 3.3 Million sq.m, and b) location 2: 4.36 Million sq.m. The dredging locations and potential dredged materials’ disposal locations are presented in the Annex A. EIA was conducted in line with the IUCN World Advice Note on Environmental Assessment and included a specific section on the potential impact of the project on the OUV of the property. The Dredging is being conducted ensuring the compliance of strict conditions that safeguard the property’s OUV. As per recommendations of EIA, the dredged material is being disposed at the south side of Dubla Island through constructing an embankment by Geo textile Tube. It will help to reclaim land for generation of a new mangrove community.

The revised EIA report of Proposed Dredging Project at the Outer Bar area of Pashur Channel is available in the Mongla Port Authority’s website. The URL link is:
The environmental study (of the EIA) finds that the proposed dredging in the Outer Bar area of Pashur Channel will not result any long-term significant adverse environmental impacts or any social impact to the local community. However, the likely negative impacts can be avoided through implementation of Environmental Management Plan. This report did not consider ‘The Swatch of No Ground’ as a disposal site because of its ecological importance and its declaration as a Marine Protected Area by the Government of Bangladesh.

It has been suggested to follow a comprehensive Environmental Management Plan (EMP) which will reduce impacts. Dredged materials will be disposed in designated location following environmental code of practice. Both Mongla Port Authority (MPA) and the contractor shall abide by relevant environmental rules and regulations for protection of aquatic fauna and flora.

b. Future Dredging Activities under the Mongla Port Authority:

b.1. Joymonirgol

A proposal for dredging of the Joymonirgol area (near the Mongla Port) has been submitted to the Department of Environment for EIA approval. In the Joymonirgol area a total of five spots is planned to be dredged (upon approval) which are:

South of Silo: 0.48 Million sq. m; Silo Jetty: 0.018 Million sq. m; Base Creek Area: 0.08 Million sq. m; Sultan Khal Area: 0.20 Million sq. m; and Karamjal Area: 0.22 Million sq. m.

The EIA was conducted in line with the IUCN World Advice Note on Environmental Assessment by Khulna University of Engineering and Technology in November 2019. The EIA included a separate chapter regarding OUV. All the dredged materials will be disposed on nearby land as per advice of the EIA. Currently it is waiting for the approval of DoE.

b.2. Inner Bar Area

In near future, to maintain the navigation, Mongla Port has a plan to dredge the following seven spots in the inner Bar area of the port (Table 2):
Table 2: Location and area of dredging of Inner Bar area

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Name of the location</th>
<th>Area (Million sq. m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Jetty Front</td>
<td>0.25</td>
</tr>
<tr>
<td>2.</td>
<td>Turning Ground</td>
<td>0.12</td>
</tr>
<tr>
<td>3.</td>
<td>Confluence Channel</td>
<td>1.13</td>
</tr>
<tr>
<td>4.</td>
<td>Mooring Buoy</td>
<td>1.0</td>
</tr>
<tr>
<td>5.</td>
<td>Base Creek Area</td>
<td>1.88</td>
</tr>
<tr>
<td>6.</td>
<td>Anchorage Area</td>
<td>1.6</td>
</tr>
<tr>
<td>7.</td>
<td>Harbaria Area:</td>
<td>0.50</td>
</tr>
</tbody>
</table>

EIA of Joymonirgol has included both Joymonirgol and Inner Bar dredging area, which is submitted to Department of Environment for approval.
Figure 1: Joymonirgol Dredging Area
Figure 2: Inner Bar Dredging Area
2.4 Decision no. 5

Welcomes the State Party’s actions, such as the implementation of the integrated freshwater inflow management plan, the implementation of Spatial Monitoring and Reporting Tool (SMART), the development of the Tiger Action Plan (2018-2027) and National Tiger Recovery Programme (NTRP), expansion of the wildlife sanctuaries and the adoption of Bangladesh Delta Plan 2100 to protect and expand the Sundarbans;

Response

An updated report on ecological monitoring of the property was given in the progress report of 41COM 7B.25 decisions in December 2018 as well as to the RMM of 2019. The updates on those programmes are as follows:

2.4.1. Spatial Monitoring and Reporting Tool (SMART) Patrolling in the Sundarbans:

SMART (Spatial Monitoring & Reporting Tool) based monitoring system is being implemented in the Sundarbans. This monitoring system become very much helpful to monitor and protect the resources (Floral, Fannal and aquatic) for the Sundarbans specially to protect wildlife poaching, smuggling and illegal fishing. Due to SMART patrolling wildlife poaching smuggling and illegal fishing become reduced appreciably.

SMART patrolling in the Sundarbans West Forest Division started in June, 2015 for the first time in Bangladesh. During the earlier years of the SMART implementation, the rate of offender arrest was about 1-2 arrest per month while the SMART patrol team’s arrest rate was more than 25 arrest per month during months of SMART patrolling.

To support the implementation of the SMART patrolling approach in the SRF-BFD and Wildlife Conservation Society (WCS) of Bangladesh with support from GIZ and inputs from Wild-Team (a local NGO) have jointly developed: 1) a SMART Operating Procedures (SMART-OPs) for Law Enforcement and Wildlife Monitoring in the Sundarbans, and 2) a Handbook for SMART Patrols in the Sundarbans Reserved Forest. The WCS of Bangladesh has also helped BFD for developing a configurable data model for data collection via Cyber Tracker-equipped handheld devices.

During January 2019 to December 2019 a total of 104 patrols were conducted along 77455 km channels during 650 days of patrol effort. During the patrolling, 15928 sightings of 23 key wildlife species were recorded. In this time period total 455 offenders were arrested. During the patrolling total 311 boats or transports and 372 fishing and crab harvesting gears, 121 cutting tools, 8 poison fishing were seized in the year 2019.

2.4.2. Bangladesh Tiger Action Plan (2018-2027):
Second generation Tiger Action Plan (2018-27) has been approved by the MoEF&CC. The Bangladesh Tiger Action Plan (BTAP) is a policy level document that offers a structured approach to achieve long-term conservation of tigers in Bangladesh. The first generation BTAP was for the period 2007-2017. It provides a vision, goals and objectives to guide an integrated and focused tiger conservation programme.

- The vision is to ensure ‘protected tiger landscapes in Bangladesh, here wild tigers thrive at optimum carrying capacities so as to perform their ecological role, and which continue to provide essential ecological services to mankind’.

- The main goals to address threats are to increase the current tiger population, maintain sufficient prey and habitat, and to address challenges are to improve conservation capacity, improve law enforcement, build capacity and proper mechanism for awareness and education programmes as well as community involvement, build capacity to conduct tiger conservation research and monitoring, and encourage collaboration.

- The implementation of this BTAP will ensure that the nation attempts to sustain the current tiger occupancy in over 6,017 sq. km. and increase the density in the Sundarbans from the current 2.17 to 4.50 tigers per 100 sq.km. within the next ten years. Systematic monitoring and evaluation of progress against the BTAP goals will be done to enable the adaptation of conservation activities.

Bangladesh Forest Department, under the Ministry of Environment and Forests, is the primary custodian of the forest and its wildlife, but the immense task of tiger conservation necessitates support and expertise outside the normal regime of forest management. Therefore, the establishment of a Bangladesh Forest Department-led platform that facilitates collaboration for the implementation of conservation activities will be fundamental to its success.

In compliance with the Tiger Action Plan (2018-2027) a project for Tiger conservation titled “Tiger Conservation Project (TCP)” in the Sundarbans (Project period: July, 2020 to June, 2023) is on process and expecting to start very soon after approval from the Government. The principle objectives of the project are to survey of tiger population through camera trapping, survey of population of tiger prey animals, relocation of tigers to the areas of Sundarbans where tigers are not naturally found, installation of satellite collar in tigers to monitor the translocated tigers, to measure the relative density of tigers in the Sundarbans through Khal (Cannal) survey, reduction of Human tiger conflict etc.

2.4.3. National Tiger Recovery Programme (NTRP):
As a party to the Global Tiger Recovery Program (GTRP), Bangladesh had produced its first version of the National Tiger Recovery Program (NTRP) in 2010 and the revised version has been prepared for the period of July 2017 to June 2022.

- The NTRP aims to present the incremental effort that Bangladesh needs to make in order to accelerate the implementation of the Bangladesh Tiger Action Plan (BTAP) with a focus on priority actions.
- The goal of NTRP of Bangladesh is: ‘by 2022, a demographically stable tiger population, greater than the current tiger population, under the scientific management and conservation in the Sundarbans.
- The priority actions to achieve the goal include building institutional capacity, engaging local communities, protecting habitats, and trans-boundary collaboration.

In compliance with the NTRP the following steps are taken from Bangladesh Government:

- With the joint collaboration of Forest Department, Police, Border Guard, Customs and Coast Guard a Wildlife Crime Control Unit (WCCU) has been established. It is playing a vital role in the protection and conservation of tiger and other wildlife.
- Tiger Co-ordination Committee (TCC) has been formed in national and regional level to control wildlife poaching and illegal trafficking and working effectively.
- To reduce the human-tiger conflict, 49 Village Tiger Response Team (VTRT) with 332 community people and a 3-member Forest Tiger Response Team (FTRT) has been formed and working at the Sundarbans Impact Zone (SIZ).
- Compensation Policy for wildlife victims, 2012 has been approved which is helping to reduce the human-tiger conflict in the Sundarbans Impact Zone.
- The GoB has become the member of CITES, GTI, GTF and SAWEN for the conservation of biodiversity of the country including the SRF.

2.4.4. Expansion of Wildlife Sanctuary:

With the objective of conservation of flora and fauna of the Sundarbans and to maintain and undisturbed breeding ground for wildlife, three wildlife sanctuaries encompassing an area of about 1,39,700 hectares were declared as Sundarbans East Wildlife Sanctuary, Sundarbans West Wildlife Sanctuary and Sundarbans South
Wildlife Sanctuary in 1996. This area of three Sanctuaries has been extended to 3,17,950 ha in 2017. Recently, three dolphin sanctuaries (Dhangmari, Chandpai and Dudhmkhi) measuring an area of 1070.0 hac have been established in 2012 at eastern portion of the Sundarbans for conservation of Ganges River dolphin and Irrawaddy dolphins. Now, the total area of wildlife sanctuary covers about 52% area of the Sundarbans. Collection/extraction or harvesting of all kind of resources is strictly prohibited inside these sanctuaries. Proposal for declaration of another three dolphin sanctuaries in and around the Sundarbans (Shibsha, Bhodra and Pankhali) measuring an area of 34,270.00 hac is under process.

2.4.5. Initiatives for Dolphin Conservation (including protected area declaration)

Waterways of the Sundarbans mangrove forest support the Endangered Ganges River dolphin and Vulnerable Irrawaddy dolphin, the last two remaining species of freshwater dolphins in Asia. 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.

Recently, three dolphin sanctuaries (Dhangmari, Chandpai and Dudhmkhi) measuring an area of 1070.0 hac have been established in 2012 at eastern portion of the Sundarbans for conservation of Ganges River dolphin and Irrawaddy dolphins. Proposal for declaration of another three dolphin sanctuaries in and around the Sundarbans (Shibsha, Bhodra and Pankhali) measuring an area of 34,270.00 hac is under process.

Considering the above-mentioned context Bangladesh Forest Department in partnership with the United Nations Development Programme in Bangladesh (UNDP-Bangladesh) and with support from the Global Environment Facility (GEF), has taken up a project titled 'Expanding the Protected Areas System to Incorporate Important Aquatic Ecosystems (EPASIIAE)’ in the Sundarbans.

Various activities have been implemented for conservation of Dolphin in the Sundarbans. Some of the major activities are mentioned below-
Introduction of an effective management system in the existing PA established for dolphin conservation in the Sundarbans:

The Forest camp staffs were provided training on GPS based patrolling in the camp area. One hundred and ten staffs of 8 (eight) sanctuary associated forest camps have been imparted training on dolphin biology and behavior with an aim to capacitate on dolphin conservation. Apart from these they have also been provided with fuel and other logistic support such as patrol vest, rain coat, GPS, fuel container, hand mike, torchlight etc. These efforts have already proved to be effective in the management of the sanctuary and the management effectiveness score has been increased.
Expansion of the coverage of dolphin PA in and around the Sundarbans

Through the support of the project the Sundarbans were surveyed to identify hotspots for dolphin. In the survey 6 (six) new hotspots and 4 (four) semi-hotspots are identified. Based on this study three new hotspots have been considered as to be declared as sanctuary (new) for dolphin.

![Figure 3: Proposed and existing Dolphin wildlife sanctuary in the Sundarbans](image)

Enhancement of alternative livelihood options for local fisher folk to reduce their dependency on aquatic resources

For reducing the excessive pressure on the aquatic resources the project has provided livelihood support (worth of BDT 40,000) for 1,000 (one thousand) households. They have been imparted training based on their choice, experience and willingness. After imparting training by the experts they are given supports. Most of the common trades are crab farming, goat rearing, van, small business tea stall, cloth business, tailoring etc.

Dolphin Conservation Team (DCT) formation is an iconic item of the project. Under the project 6 DCTs with 60 community people have been formed with the objective to help forest department for dolphin conservation by providing information on illegal activity (if there is any) in the dolphin sanctuary. Each DCT has 10 (ten) volunteers who are local inhabitants residing beside the sanctuaries.
2.5 Decision no. 6

Notes with great concern the likely environmental impacts of large-scale industrial projects on the property’s OUV, and urges the State Party to take all necessary mitigation measures to address the concerns previously expressed by the Committee and the 2016 joint World Heritage Centre/IUCN Reactive Monitoring mission;

Response

The Government of Bangladesh is dedicated to save the Sundarbans and its natural resources. The Government has not given environmental clearance or permission to the Orion power plant and Phase II of the Rampal power plant as well as to any large-scale industry adjacent to the Sundarbans World Heritage property since the decision of 41COM 7B.25 (2017). Caution has been taken before considering and approving any large-scale industry near the Sundarbans. The Maitree STPP Project in Rampal has been taken up after obtaining all requisite/statutory clearances such as Environmental Impact Assessment (EIA) and Environmental Management Plans as per the Bangladesh Environment Conservation Act 1995 and Environment Conservation Rules 1997 (amended in 2010) in 2013.

Before submission of EIA report, an Initial Environmental Examination (IEE) report was prepared from July-September 2010 and submitted to DoE. Based on the IEE report, approval of Location Clearance by DoE was given in May 2011. Before approval of EIA study for Maitree STPP of Rampal various comments, questions were raised by DoE, individuals, societies, researchers, journalists, Members of National Committee for Saving the Sundarbans (NCSS) etc. and all were addressed in the final approved EIA report. Public hearing/disclosure on EIA Report was also done in April’2013. EIA report was approved on 05.08.2013 by DoE, GoB. The study was carried out following the Environmental Impact Assessment Guideline of DoE and the World Bank that includes multidisciplinary tools and techniques of Physical, Water resources, Agriculture, Land and soil, Fisheries, Ecology and Socio-economic surveys and investigation. Participation of local people was ensured through RRA and PRA approach. Therefore, it is a complete participatory study. Environment Management Plan as per EIA is prepared and being implemented since 2013. Further, a separate EIA study for Coal Transportation was approved in Jan 2018 after due diligence in line with the rules and regulations of Bangladesh.
2.5.1. Current status of construction of the Maitree STPP, Rampal

Maitree STPP is being developed with all measures to safeguard the Sundarbans from potential hazards as recommended in EIA and RMM report in 2016. The Project is in 34th Month of its execution plan and achieved 46.09% physical progress.

State of the Art technologies for emission control have been adopted for construction of 2x660 MW Maitree Super Thermal Power Project, Rampal to mitigate any potential Environmental Impact to Air, and Water & Ground. The details of various measures adopted are as follows:

2.5.1. A. Air Pollution Control

- **Modern & Efficient Technology**: High steam temperature and pressure to increase plant efficiency, less quantity of coal burning per unit of electricity output which results in lesser fuel consumption and less greenhouse gas emission.
- Imported coal of High Calorific value, Low Sulphur and Low Ash content will be used.
- **Highly efficient wet limestone based Flue Gas De-sulphurisation System (FGD)**: Highly efficient Wet limestone based FGD System shall be used to capture SO\(_2\) to control the emission of SO\(_2\) within the limit of 200 mg/Nm\(^3\) as per WB/IFC guidelines. Further, high quality coal with low Sulphur content will be used for fuel. The average content of Sulphur in the coal will be around 0.6%.

  **FGD System for SO\(_x\) reduction:**
  - Wet Limestone, Forced Oxidation type FGD system shall be used to remove SO\(_x\) from flue gas.
  - Modern Japanese Technology based Double Flow Contact Scrubber type FGD of high efficiency shall be used.
  - To augment the cleaning of flue gas, very high purity limestone shall be used.

- Electrostatic Precipitator (ESP) of efficiency above 99% shall be used to collect the fly ash and to control emission of Particulate Matter (PM) within the limit of 50 mg/Nm\(^3\) as per WB/IFC guidelines. It is pertinent to mention, some of the dust particles are also being captured in the FGD during scrubbing process, before the flue gas is exited from the chimney.

- **Advanced Low NO\(_x\) Burner**: An effective and proven Low NO\(_x\) burner technology is being used for reduction of NO\(_x\) emission and control emission of NO\(_x\) within the limit of 510 mg/Nm\(^3\) as per WB/IFC guidelines.
Formation of NO\textsubscript{x} in combustion is related to source of N\textsubscript{2} from combustion air and organic fuel. Combustion at near stoichiometric air fuel ratio and at low temperature will result in less NO\textsubscript{x} generation.

Low NO\textsubscript{x} Tangential Firing system equipped with Closed Coupled Over Fire Air (CCOFA) and separate Over Fire Air (OFA), being used by BHEL (EPC contractor) has been developed by world pioneer in Steam Generator Technology, Alstom Power Inc. Alstom has a technology transfer with BHEL and Alstom is a qualified steam generator manufacturer (QSGM).

With this above technology of Low NO\textsubscript{x} firing system and low NO\textsubscript{x} burner, the emission of NO\textsubscript{x} will be maintained within the norms of international standards.

- **Chimney**: 275 m tall Chimney for wider dispersion of particulates leading to reduced ground level concentration.
- Provision of covered storage of coal & enclosed conveyors for elimination of fugitive coal dust.
- Dust extraction & suppression system in Coal Handling Plant.
- **Large scale afforestation** in and around the project which will improve overall environment/ambience and also act as a carbon sink. Maitree Super Thermal Power Project, Rampal has an agreement to plant two hundred thousand saplings of different species. Till date around 116,000 saplings have been planted. These saplings consist of Mangrove species, Golpata, Fruit/Medicinal Trees, and Coconut trees etc. BIFPCL is not only planting but also taking enough management care to ensure their growth.

2.5.1. B. Removal of fresh water from River Pussur & Water Pollution

- **Modern Induced Dart Cooling Tower (IDCT)**: Provision of IDCT for Closed Circuit Cooling Water System to reduce the overall water requirement.
- Make-up water requirement is only 0.05% of lean flow period in the lean season, through Pussur River; discharge will be about half of this make up water. However, the entire water system has been designed for efficient water use where a series of water re-use provision has been kept. The treated water will be tried to reuse or recycle as much as possible.
- No Thermal pollution of River water. As per design, the Temperature of discharge water shall never be more than two degree Centigrade (2°C) above river water temperature at the edge of mixing zone which is as per stringent IFC norms.
- Dry bottom ash system to reduce intake water requirement instead of conventional wet bottom ash system and facilitate utilization of dry bottom ash.
- **Effluent Treatment Plant and Sewage Treatment Plants** are provided so that no effluents from the plant are discharged to the river without treatment.
For Hg present in coal, the amount of Hg will be only in traces, a large part of which will be collected in the dry form in the dry ash handling system and the remnant shall be captured in the downstream FGD equipment.

2.5.1.C. Ground Pollution Control:

- **100% ash utilization** for this project is envisaged and accordingly required system for ash handling including Dry bottom ash instead of conventional wet bottom ash system is envisaged & under implementation. Ash management including design requirement of ash collection, transportation and loading to closed barge/ closed tanker for further utilization by ash utility is under implementation.

- Expression of Interest to buy dry ash from the plant has been received from nearby Cement companies of Bangladesh. It is found that demand of dry ash from the plant is 4-5 times more than 100% output.

- **High Concentration Slurry Disposal System (HCSD):** In addition, in the unlikely event of ash not being dispensed for a limited period, measures have been taken to collect and store the ash (during such period) through an advance technology i.e HCSD to an ash pond of 25 acres to mitigate any contingency.

  Feature of HCSD system is that after mineral transformation of settled dense ash slurry, ash stone is developed whose main features are:
  - No water leakage to surface and ground water systems
  - No dissolution of ash components.
  - Hazardous components remain embedded
  - No dyke breeching, leaching and contamination
  - No dusting and ash/water run off.

- High Concentration Slurry Disposal (HCSD) system is supposed to have no excess water. However, a recirculation system is envisaged for pumping any excess decanted water from the Dyke. Decanted water from ash pond of HCSD pond will be led to the plant area by using high capacity pumps and the same will be conveyed from ash dyke to plant area. This water will be further used in the project area.

- Suitable protection from back water of the river all around the ash dyke has been envisaged. On downstream (D/S) slope of the dyke embankment, stone pitching with inverted filter arrangement shall be provided from G.L. to HFL plus 1.0 m height of dyke embankment. Provision shall also be made to protect the upstream slope of embankment. Rock-toe with toe drain shall also be provided at the toe of the embankment all around the ash dyke. In addition to that, ash pond with impermeable liner in compliance with statutory guidelines is envisaged to further ensure no leaching of water to sub soil/ground water contamination.
2.5.2 Coal Transportation:

As per the condition stipulated in the EIA study approval letter of DoE for the proposed 2X660 MW Maitree STPP, BIFPCL has conducted Environmental Impact Assessment (EIA) study for Coal Transportation for Maitree STPP through third party and approved by DoE in January’2018. Imported coal of High Calorific value will be used. Total Coal requirement for both Units is 4 Million Ton per year.

On an average one or two lighterage vessel for carrying coal per day will come to Rampal Project site which is very less of the existing number of vessels that ply in the long established maritime route of Mongla Port daily.

Coal for Rampal Project will be transported using Purpose-built modern sea worthy vessel, tailor made as per IMO classifying norms covered vessels and environment friendly with very low effluent discharge, low SOx emission, low noise engine, GPS facility etc. Coal transshipment/ transfer to be done utilizing modern Environment friendly technology and best utility practices to ensure clean coal handling. Low noise vessels/ships will be used for coal carrying so that the animals of the river are not disturbed due to noise.

While carrying out the EIA study for Coal Transportation through the Pussur River, a sophisticated model (CALPUFF) has been used to determine the level of pollution at the World Heritage Site (Property). The result shows that the incremental level of pollutants (like SOx, NOx, PM10, PM2.5) at the Property is negligibly small and the cumulative level of these pollutants, considering the current base level and future additional pollution load from power plant, will remain very much within the limits (Table 3) specified by World Bank standards.

**Table 3: A comparative scenario of ground level concentration of pollutant ingredients before and after the project implementation at the tip of Sundarbans (Annual average)**

<table>
<thead>
<tr>
<th>Polluting Ingredients</th>
<th>Present Status (µg/Nm3)</th>
<th>Status after Project Implementation (µg/Nm3)</th>
<th>Bangladesh Standard(µg/Nm3)</th>
<th>World Bank/IFC Standard(µg/Nm3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>2.2</td>
<td>2.3</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>SOx</td>
<td>2.1</td>
<td>2.2</td>
<td>80</td>
<td>-</td>
</tr>
<tr>
<td>PM2.5</td>
<td>3.1</td>
<td>3.3</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>PM10</td>
<td>6.5</td>
<td>6.8</td>
<td>50</td>
<td>20</td>
</tr>
</tbody>
</table>
2.5.3 Measures taken During Pre-Construction and Construction

Environmental Management plan (EMP) is a part of approved EIA study. The main objective of the EMP is to guide the implementing agency to achieve sustainability of the project ensuring environmental conservation as per national and international standard.

The EMP includes mitigation, enhancement, compensation and contingency measures for each of the three phases of the project –

1. pre-construction,
2. construction and
3. Post construction/operation

The construction works of Maitree Super Thermal Power Project (MSTPP) is progressing well with preeminent prioritizing environmental and safety issues. The Engineering, Procurement and Construction (EPC) contractor has deployed a number of contractors and sub-contractors sequentially for completion of the project works within the stipulated time. A comprehensive checklist after due diligence has been developed to monitor the environmental compliance of different components e.g., Environmental and Social Management System and Action Plan; Labor and Working Condition; Community Health, Safety and Security; Biodiversity and Sustainable Management of Living Natural Resources. Further, special thrust has been given to following areas while implementing the EMP measures:

- Noise management plan
- Air Quality management plan
- Water Quality management plan
- Waste management plan
- Safety at site
- Occupational Health and Safety procedure
- Construction site management plan
- Community Development Activities

Project Implementation authority has appointed third party monitoring agency for regular monitoring of environmental parameters in and around the power plant area and also from Khulna to the Sundarbans. The scope of Third party monitoring agency is as follows:

- Monitoring the compliance of DoE guideline and giving their observations.
Specific monitoring parameters are being measured at locations in and around the project area and along the Pashur River up to Hiron point of the Sundarbans Reserve Forest.

The reports are being shared with Concerned Ministries and local Authorities. Till date 22 quarterly reports have already been submitted.

Environmental parameters viz air quality (particulate matter (24 hours continuous monitoring) at three locations inside the BIFPCL project area), discharge water quality and noise level are being monitored within the project area on monthly basis since April’2018 by third party monitoring agency under a separate contract by BHEL, (EPC contractor) and the monthly reports are being submitted to BIFPCL.

The Monthly and Quarterly Reports are being uploaded on www.bifpcl.com, the official website of BIFPCL, accessible to public.

As evident from above 2x660 MW Maitree Super Thermal Power Project, Rampal is being implemented with modern state of the Art Technological systems to meet most stringent standards of DoE, Bangladesh and World Bank/ IFC (Table 4).
### Table 4: Standards of Environmental Conservation Rules 1997, World Bank/IFC and Maitree Super Thermal Power Project

<table>
<thead>
<tr>
<th>Environmental Parameter</th>
<th>Bangladesh Standard</th>
<th>WB/ International Finance Corporation requirement</th>
<th>Maitree STPP parameters</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO₂</td>
<td>--</td>
<td>EHSG - TPP 200 to 850 mg/Nm³</td>
<td>200 mg/Nm³</td>
<td>For Maitree project, the parameters are kept much lower than permissible limit of World standards.</td>
</tr>
<tr>
<td>NOₓ</td>
<td>&gt;No Standard Exists for coal Power Plant. &gt;Boiler of Industrial Unit (600 mg/Nm³)</td>
<td>EHSG - TPP 510 mg/Nm³</td>
<td>510 mg/Nm³</td>
<td>For Maitree project, parameters are kept within permissible limit of World standards.</td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>150 mg/Nm³</td>
<td>EHSG - TPP 50 mg/Nm³</td>
<td>50 mg/Nm³</td>
<td>For Maitree project, parameters are kept within permissible limit of World standards and much lower than Bangladesh Standard</td>
</tr>
<tr>
<td>Noise Pollution</td>
<td>Day time noise: 50db(A) Night time noise: 40db(A)</td>
<td>G-EHSG - Residential areas Daytime:55db(A) Nighttime:45db(A)</td>
<td>Daytime: 50 dB(A) Nighttime: 40 dB(A) (Measured along the site boundary of the plant)</td>
<td>For Maitree project, the parameters are kept lower than permissible limit of World standards and within Bangladesh Standard</td>
</tr>
<tr>
<td>Increase of ambient River Water temperature at the edge of mixing zone</td>
<td>--</td>
<td>Not more than 3 Deg. Celsius</td>
<td>Not more than 2 Deg. Celsius</td>
<td>For Maitree project, norms are kept lower than permissible limit of World standards.</td>
</tr>
</tbody>
</table>

2.6 Decision no. 7  
Expresses concern that 154 industrial projects upstream of the property are currently active, and reiterates the Committee’s request in paragraph 4 of decision 41 COM 7B.25
and welcomes the commitment of the State Party to continue the Strategic Environmental Assessment (SEA) requested by the same decision

Response

The State party would like to reaffirm that there are only 20 (out of 24) red category industries operational in the Sundarbans ECA. Under the Bangladesh Environment Conservation Act 1995 and according to Rule 7 of the Environment Conservation Rules (ECR), 1997, for environmental clearance, any facility/industry/project/infrastructure/activity is categorized as Red, Orange (Orange A or Orange B) or Green on the basis of the range of impact on the environment, land area used for the activity/facility/industry/project/infrastructure and location of that activity/facility/industry/project/infrastructure. Actually, according to the Rule, the term ‘industry’ includes all activities/facilities/infrastructure that may have impacts (major or minor) on the environment. For example, according to the ECR 1997, an ‘industry’ ranges from a small shed for making handmade bamboo and cane products (as Green Category) to a large power plant (as a Red Category industry).

All existing 154 factories/farms/facilities/operations were established before 2016, mostly in the 1990’s and 2000’s (Annex B and C). The average number of employees in the Red Category industries is 172 (minimum 34; maximum 575) and in the Orange Category one is 16 (minimum 2; maximum 615).

The local community in the Sundarbans Ecologically Critical Area (ECA) has been dependent on agro-based economic activities such as aquaculture and hatchery, paddy processing for rice production, betel-nut processing etc. The Mongla Port was established in Southern part of Bangladesh in 1954. Various kinds of secondary and tertiary economic activities emerged in the region after establishment of the Port. An export processing zone (EPZ) was developed in 1998 in the region to utilise the port facilities.

A total of 130 factories, mills, cottage industries, agro-based livelihood activities under the Orange Category as well as 24 industrial facilities under the Red Category are situated in the EPZ and around the Sundarbans Ecologically Critical Area (ECA). Other than the Red Category industrial facilities all other facilities/operations are mostly small scale enterprises based on agrarian livelihood.

The Orange Category industries, as listed in schedule 1 (B) of the ECR 1997, are not large industries, rather, they are of the cottage industry types and provide agro-based livelihood facilities. There are 54 rice processing facilities, 14 fish farms/Ghers, eight ice factories, eight welding workshops, five betel-nut grading mills, one plastic factory for producing tooth brushes and pens, one small trolley bag factory, seven small saline water purifiers, six restaurants, three saw mills, five crab farms and hatcheries, two edible oil mills, one towel production factory, one poultry farm, two paper packaging
factories, one Bitumen storage facility, one cement/oven bag making factory, one paper cutting factory, two cellphone network towers, one plastic recycling factory, two small ice cream factories, three brick kilns and one Condensed Natural Gas (CNG) filling station (Gas station) in the list of 130 Orange (Orange A and B) Category factories/mills /farms/infrastructure/facilities. Most of them do not emit or discharge any air/water pollutants to the surrounding environment. Detail information of each of these facilities/factories/mills /infrastructures is Attached in Annex B and Table 5.

![Proportion of Red category industries](image)

Figure 4: Proportion of industries in the ECA.

One third (54) of the total 154 factories/farms/operations/facilities are small scale rice processing facilities (rice mills). Most of these 54 rice processing facilities remove husk and produce rice on a seasonal basis (after the harvest of paddy). Few mills also boil the rice before husking. There is no discharge to the water from the mills. The husking is confined within a room and hence, the impact is insignificant and do not have any impact on the OUV of the property. The husks are later sold for other uses in the rural areas.

![Halima Auto Rice Mill](image)

Figure 5: Halima Auto Rice Mill

14 fish farms/Ghers (shallow water bodies) have areas less than 10 acres. They produce fish and prawn, and do not pose any threat to the OUV of the property.
Domestic small-scale welding for making door and window frames is done in the eight welding workshops. The workshop’s solid wastes are locally sold for reuse. They also do not impact the surrounding air or water.

Figure 6: Welding workshop

Five betel-nut mills cut imported processed betel nuts into smaller pieces. However, the operation of all these betel-nut factories is closed because of revenue non-compliance. The ice factories produce ice cubes to preserve fish in the area. They do not pose any impact on the OUV of the property.

Seven saline water purifiers were established by a social development NGO named ‘Heed Bangladesh’ to supply drinking water to the community. They are managed by the community. They purify saline water of nearby surface water sources with simple technologies.

Figure 7: Sawmill

Three brick kilns, established in 1998, 2011 and 2012 respectively, are going to be closed because of the pollution potential of the existing technology. Earlier the Zigzag technology was allowed to produce bricks in all kilns. However, later, more advanced technologies which are cleaner and more energy efficient (such as Tunnel kiln technology) became available. The government has decided to phase out all kilns of
Zigzag technology by 2025 and replacing them with the improved and less polluting technologies. Currently, renewal of the environmental clearance of brick kilns are subject to the compliance of conditions provided by DoE.

Five small crab farms rear small crabs to full grown crabs. Of them, one farm also has a hatchery producing crab lets. They are confined and do not have impact on the OUV of the property.

![Figure 8: Crab farming](image)

The edible oil factories refine imported crude soybean oil following Zero Liquid Discharge (ZLD) technology. The two small ice-cream factories do not pose any threat to the environment.

The paper cutting and packaging factories are involved in the cutting, labeling and packaging of paper boxes. The cement bag factory is manufacturing cement oven bags from imported polypropylenes. The plastic recycling factory uses the one-time-used plastic bottles, plastic utensils, and other plastic materials as raw materials and produces plastic granules for further use in other plastic factories.

All these agro-based and non-agro-based facilities/factories are operating in small scale. The average land area of these Orange Category ones is 4013.5 with 16 people working on average. As they are more than 50 km away from the property they do not pose any threat to the OUV of the property.
Table 5: Status of existing Orange (A and B) category factories/mills/facilities/fish culture/infrastructure

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Type of Factories/mills/facilities/ fish farms and hatcheries</th>
<th>Total Number</th>
<th>Current Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Agro-based</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Rice processing facilities</td>
<td>54</td>
<td>1 Non-operational, 53 Operational</td>
<td>Regular monitoring is conducted</td>
</tr>
<tr>
<td>2.</td>
<td>Fish farms/Ghers</td>
<td>14</td>
<td>Operational</td>
<td>From fish farms/Ghers no significant discharge is visible. The area of fish farms/Ghers is less than 10 acres and hence it is in the Orange B category.</td>
</tr>
<tr>
<td>3.</td>
<td>Crab Culture and Hatchery</td>
<td>05</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Betel nut cutting units</td>
<td>05</td>
<td>Non-Operational</td>
<td>Because of revenue non-compliance</td>
</tr>
<tr>
<td>5.</td>
<td>Saw mills</td>
<td>03</td>
<td>Operational</td>
<td>No significant discharge is visible. Solid waste such as saw dust is sold by the owner for reuse</td>
</tr>
<tr>
<td>6.</td>
<td>Poultry</td>
<td>01</td>
<td>Operational</td>
<td>No significant discharge is visible. Chicken manure is sold by the owner for reuse</td>
</tr>
<tr>
<td>7.</td>
<td>Ice Factory</td>
<td>08</td>
<td>Operational</td>
<td>No significant discharge is visible</td>
</tr>
<tr>
<td>8.</td>
<td>Edible Oil mills</td>
<td>02</td>
<td>Operational</td>
<td>No discharge to air, water and soil because the mills adopted Zero Liquid Discharge (ZLD) plan.</td>
</tr>
<tr>
<td></td>
<td><strong>Non Agro-based</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Welding Workshops</td>
<td>08</td>
<td>Operational</td>
<td>PPE and Mask used.</td>
</tr>
<tr>
<td>Serial Number</td>
<td>Type of Factories/mills/facilities/fish farms and hatcheries</td>
<td>Total Number</td>
<td>Current Status</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------------------</td>
<td>--------------</td>
<td>---------------</td>
<td>----------</td>
</tr>
<tr>
<td>10</td>
<td>Saline Water purifier</td>
<td>07</td>
<td>2 not operational</td>
<td>Solid wastes reused.</td>
</tr>
<tr>
<td></td>
<td>Heed Bangladesh (an international NGO) installed these drinking water supply facilities using international fund. Due to lack of management capacity two purifiers are not operational.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Hotel (Restaurant)</td>
<td>06</td>
<td>Operational</td>
<td>Solid waste is managed according to the rules</td>
</tr>
<tr>
<td>12</td>
<td>Bricks Field</td>
<td>03</td>
<td>Operational</td>
<td>Appropriate measures are taken. They will be phased out and replaced by the latest environment friendly technology</td>
</tr>
<tr>
<td>13</td>
<td>Mobile network Tower</td>
<td>02</td>
<td>Operational</td>
<td>No discharge of pollutants to air, water and soil.</td>
</tr>
<tr>
<td>14</td>
<td>Ice cream</td>
<td>02</td>
<td>Operational</td>
<td>No significant discharge to air, water or soil.</td>
</tr>
<tr>
<td>15</td>
<td>Packaging factory</td>
<td>02</td>
<td>Operational</td>
<td>Solid waste stored separately and sold.</td>
</tr>
<tr>
<td>16</td>
<td>Paper cutting</td>
<td>01</td>
<td>Operational</td>
<td>No liquid discharge or emission is visible.</td>
</tr>
<tr>
<td>17</td>
<td>Trolley Bag Factory</td>
<td>01</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Cement bag</td>
<td>01</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Plastic factory for producing Brush and pen</td>
<td>01</td>
<td>Non-Operational</td>
<td>The owner closed the factory and handed over the land</td>
</tr>
<tr>
<td>Serial Number</td>
<td>Type of Factories/mills/facilities/ fish farms and hatcheries</td>
<td>Total Number</td>
<td>Current Status</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------------------------</td>
<td>--------------</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>20.</td>
<td>Towel Production</td>
<td>01</td>
<td>Operational</td>
<td>solid waste stored separately and sold</td>
</tr>
<tr>
<td>21.</td>
<td>Bitumen storage/ware</td>
<td>01</td>
<td>Non-Operational</td>
<td>Owner abandoned the activity</td>
</tr>
<tr>
<td>22.</td>
<td>Plastic recycling factory</td>
<td>01</td>
<td>Operational</td>
<td>No significant discharge to air, water or soil</td>
</tr>
<tr>
<td>23.</td>
<td>CNG filling Station</td>
<td>01</td>
<td>Operational</td>
<td>No significant discharge to air, water or soil</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>130</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*SPM: Suspended Particulate Matter, *PPE: Personal Protective Equipments

There are 24 Red Category industries in the Sundarbans ECA areas: six cement factories, seven LPG bottling plants, one cylinder manufacturing factory, one cigarette packaging factory, one petroleum refinery, two bulk petroleum storage facilities (currently closed), two ship-yards (currently closed), one jetty, one factory for assembling metal fencing, one artificial hair implant factory and one car-seat-heater assembling factory. The distance from the outer area of the Sundarbans Reserve Forest to the industries is from 5 to 10 km. Detail information of these RED Category industries is attached in Annex-C and Table 6. It is mentionable that the areas surrounding the SRF are not in abundance of fresh water. Industries developed in that area automatically have opted for technologies with water saving or recycling facilities. As water is scarce in the whole region little or no liquid discharge is common from most industries.

Seven LPG bottling plants use imported butane and propane as raw materials for bottling at the LPG plants. They do not have any liquid effluent from the factory. They also do not produce any air pollution outside the plants.

Two shipyards (currently closed) had applied for the environmental clearance in 2012. Although the site clearance was given initially, after considering the possible level of pollution the final clearance was cancelled later. Currently the lands are empty.
### Table 6: Status of existing Red category factories

<table>
<thead>
<tr>
<th>S. N</th>
<th>Type of Factories</th>
<th>Total Number</th>
<th>Current Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cement mills</td>
<td>06</td>
<td>Operational</td>
<td>According to ECR 1997, the compliance monitoring is continuing</td>
</tr>
<tr>
<td>2.</td>
<td>LPG Bottling</td>
<td>07</td>
<td>Operational</td>
<td>Quarterly Sox, Nox, SPM and other tests are being done by the DoE as a requirement of ECR 1997.</td>
</tr>
<tr>
<td>3.</td>
<td>Cylinder manufacturing</td>
<td>01</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Petroleum Refinery</td>
<td>01</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Petroleum Storage facility</td>
<td>02</td>
<td>Non operational</td>
<td>Only ‘Site Clearance’ was issued. Environmental Clearance was not issued.</td>
</tr>
<tr>
<td>6.</td>
<td>Shipyard</td>
<td>02</td>
<td>Non operational</td>
<td>Non-existent. Only ‘Site Clearance’ was issued. Environmental Clearance was not issued.</td>
</tr>
<tr>
<td>7.</td>
<td>Jetty</td>
<td>01</td>
<td>Operational</td>
<td>There is no significant pollution</td>
</tr>
<tr>
<td>8.</td>
<td>Cigarette packaging</td>
<td>01</td>
<td>Operational</td>
<td>There is no significant air pollution</td>
</tr>
<tr>
<td>9.</td>
<td>Artificial doll Hair</td>
<td>01</td>
<td>Operational</td>
<td>There is no significant pollution</td>
</tr>
<tr>
<td>10.</td>
<td>Car Seat Heater</td>
<td>01</td>
<td>Operational</td>
<td>There is no significant pollution</td>
</tr>
<tr>
<td>11.</td>
<td>Assembling metal fencing</td>
<td>01</td>
<td>Operational</td>
<td>Quarterly Sox, Nox, SPM test is being done by the DoE as a requirement of ECR 1997.</td>
</tr>
</tbody>
</table>

|       | Total                        | 24           |                |                                                                          |

Six cement factories are situated near Mongla port. Among them, five were built within 1991-2002 and one has been extended as a separate factory in 2010. They use imported clinker, Gypsum and Limestone to produce cement. These factories are approximately 6.30 km away from the boundary of SRF and 54 km away from the property. The DoE is regularly monitoring their air pollution status.

Two companies applied for site clearance for developing petroleum storage facilities. However, they did not comply with the conditions so the Department of Environment did not give the clearance to these storage facilities. They have been shut down.

Petromax Refinery Ltd was built in 2007 and equipped with modern machineries to safeguard the ambient environment. It uses imported condensate to produce Octane, Petrol, Diesels and Kerosene. The cylinder manufacturing factory is of dry nature (no liquid discharge) and produces CNG cylinders from imported steel sheets.
At the EPZ near Mongla Port there is one cigarette packaging factory, one factory for assembling metal fencing, one factory for artificial hair implant on plastic dolls and one car seat-heater assembling factory. Most of the factories in the EPZ are owned by overseas investors who are committed to follow the ECR 1997. A dedicated team of environment specialists monitor the environmental compliance issues in the EPZ area.

Government of Bangladesh has not issued environmental clearance to any large-scale industrial/infrastructural development adjacent to the Sundarbans World Heritage property since the decision of 41COM 7B.25 (2017). It is mentionable that Environmental Clearance is mandatory for large scale industries and projects as per Bangladesh Environment Conservation Act, 1995 (Amended 2010). For the purpose of issuance of Environmental Clearance Certificate, the industrial units and projects shall, in consideration of their impact on the environment, site, and plot size, be classified into the four categories. Industries and projects included in the various categories as specified in rule 7(2) of ECR, 1997 have been described in Schedule-1 of ECR, 1997 (Appendix-C). According to the ECR, 1997, large scale industries are of red category. They are, in general, given approval following national and global stringent environmental standards and procedures including necessary environmental monitoring. Further, for Ecologically Critical Areas there are additional conditions imposed on the industries/facilities/activities.

Upon decision from the WHC, an Expressions of Interest (EOI) to conduct a Strategic Environmental Assessment (SEA) of South West region of Bangladesh including the Sundarbans was invited by Bangladesh Forest Department (BFD) in September 2018 following Public Procurement Rules (PPR) 2008 of Bangladesh.

Fourteen EOIs proposals from international and national consulting firms were received for conducting SEA. The evaluation committee short-listed five firms in November 2018 and after getting approval of the short-listed firms Request For Proposals (RFP) were sent to the firms in February 2019. Out of five firms, four firms submitted both technical and financial proposal to BFD in April 2019.

Following PPR 2008, the evaluation committee first evaluated technical proposals and later on opened financial proposals to proceed for combined (technical + financial) evaluation. After completing combined evaluation, the evaluation committee recommended to start negotiation with the highest ranked firm (First position) in October 2019. In the meantime, a Technical Project Proposal (TPP) was prepared to fund all the activities of SEA and sent to the Planning Commission. The planning commission approved the TPP on 26 November 2019. Then MoEFCC appointed a Project Director (PD) to implement the project for conducting the SEA. On 05 December 2019, SEA Proposal Evaluation Committee (PEC) successfully negotiated with highest ranked consulting firm Centre for Environment & Geographic Information Services (CEGIS), Bangladesh in association with Integra Consulting, Czech Republic. The
Contract has been signed with CEGIS-Integra on 31st December 2019. The consulting firms have started their planned activities immediately after contract signing. Inception report is expected in first half of March 2020.

2.7 Decision no. 8

Requests that the State Party implement the relevant recommendations of the SEA to all current and future projects and recalls the obligation of the State Party to submit to the World Heritage Centre, for review by the Advisory Bodies, detailed information including Environmental Impact Assessments for development projects, which have the potential to influence the OUV of the property before they commence in accordance with Paragraph 172 of the Operational Guidelines before work commences or any irretrievable decision is made.

Response

The Government of Bangladesh has not given any Environmental clearance or permission to any large-scale industry adjacent to the Sundarbans World Heritage property since the decision of 41COM (2017). Terms of Reference of conducting SEA has already been shared with WHC (Annex D). EIA of future projects near the Sundarban ECA could be shared with IUCN, Bangladesh. The contract between the Bangladesh Forest Department and the Centre for Environment & Geographic Information Services (CEGIS), Bangladesh in association with Integra Consulting, Czech Republic has been signed to conduct the SEA. The contracting firm has already started their activities to conduct the SEA.

2.8 Decision no. 9

Regrets that the National Oil Spill and Chemical Contingency Plan has still not been finalized, and also reiterates its requests that the State Party ensure adequate provision of funding and human resources for the implementation of the plan once it is adopted, and provide further information and data on the monitoring of long-term impacts from recent shipping incidents involving spills of hazardous materials in proximity to the property;

Response

Final drafts (both English and Bangla) of the “National Oil and Chemical Spill Contingency Plan (NOSCP)” has already been prepared. It should be mentioned that the government has certain procedures to develop and finalise a national-level plan. After development of the Plan, rigorous stakeholder consultation was conducted and ministry level discussion has been done. As a mandatory requirement the Plan had to be translated into Bangla (our native language); and again it needed stakeholder
consultation. After rigorous consultation the final drafts were already been sent to the Cabinet Division of the Government for the final approval. The Final Draft version of the NOSCOP is attached herewith as Annex E.

The following clause in the NOSCOP provides provision of funding and human resources for the implementation of the plan,

“5.1.1.8.6 Finance Division of the Ministry of Finance will provide authorization for expenditure and funds for initial response and ensure adequate financial records are maintained.”

2.9 Decision no. 10

Requests that the State Party invites a joint World Heritage Centre/IUCN Reactive Monitoring mission to the property to assess the state of conservation, in particular the level of threats to the hydrological and ecological dynamics which underpin the OUV of the property and recommends that this mission takes place by the end of 2019;

Response

Upon the request of WHC the State Party invited the World Heritage Centre/ IUCN Reactive Monitoring Mission to visit the World Heritage Site in the Sundarbans. Accordingly the four members’ mission visited the property and the Rampal Power Plant and consulted with different stakeholders from December 10 to December 15. The mission inspected all areas according to their Terms of References. During the Sundarbans visit the Mission was briefed on updated management practices being implemented by the Forest Department such as Integrated Resource management Plans for the Sundarbans (IRMP) for 2010-20, Sundarban West Wildlife Sanctuary Management Plan (2015-2025), Community-based Resources Management Plan of the Wildlife Sanctuaries for Dolphins in Bangladesh Sundarbans (2019-2028), Fish Conservation/Management, Involvement of local community for conservation and monitoring, Alternative livelihood activities for Sundarbans dependent community under previously implemented projects of Forest Department and Forest inventory in the Sundarbans. The Mission also attended a consultation meeting with local community, local public representatives and local administrative authority. The Mission also met with the Third party in last day of their visit (Annex F).
2.10 Decision no. 11

Finally requests the State Party to submit to the World Heritage Centre, by 1 February 2020, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 44th session in 2020 so that the Committee can decide on whether or not to inscribe the property on the List of World Heritage in Danger.

Response

This report along with all implementation updates is submitted as per decision number 11 of 43 COM 7.B 3.

3. Public access to the state of conservation report

The state party requests that the full report should be uploaded for public access.
Part B: Additional Information

B1. Hydrological Dynamics of the Sundarbans

One of the largest mangrove forests in the world, the Sundarbans, lying in the delta of the mighty Ganges, Brahmaputra and Meghna, is crisscrossed by a complex net of rivers and streams of varying hydrological and morphological characteristics. These rivers, providing lifeline to the ecosystem of this vast mangrove forest, stems primarily from within the Ganges Delta (Siddiqi, 2001). The numerous rivers traversing in a dendritic fashion through the entirety of the south west region and through the Sundarbans, ultimately falling into the Bay of Bengal, forms the complete distributary system of the Ganges as a whole. Understanding the origin and flow path of these rivers thus mandate importance in order to fully comprehend the waterscape of the Sundarbans. Rivers exerting substantial influence on the ecosystem of the Sundarbans can be identified spatially from the western side in India to the eastern side in Bangladesh, from the Hoogly, Muriganga, through to the Madhumati and the Baleshwar. Table 7 culminates the major river system of the Sundarbans.

<table>
<thead>
<tr>
<th>Western (Indian) Side</th>
<th>Eastern (Bangladesh) Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hoogly</td>
<td>1. Mathabhanga</td>
</tr>
<tr>
<td>2. Muriganga</td>
<td>2. Gorai</td>
</tr>
<tr>
<td>5. Thakuran</td>
<td>5. Kapotaksha</td>
</tr>
<tr>
<td>6. Matla</td>
<td>6. Raimangal</td>
</tr>
<tr>
<td>7. Gosaba</td>
<td>7. Arpangaisa</td>
</tr>
<tr>
<td>8. Harinbhanga</td>
<td>8. Sibsa</td>
</tr>
<tr>
<td>9. Pashur</td>
<td></td>
</tr>
<tr>
<td>10. Baleshwar</td>
<td></td>
</tr>
</tbody>
</table>

The sources of fresh water in the Sundarbans are these upstream rivers which are all supplied annually through rainfall in the vast upstream catchment, generating the Ganges flow. Annual rainfall in the Sundarbans is in the range of 1640-2000 mm, rainfall increases from west to the east. Most rainfall occurs during the monsoon from May to October. Frequent and heavy showers occur from mid-June to mid-September. The Ganges thus occupies the most important basin in the Indian subcontinent. The total length of the Ganges from its source to its outfall into the sea is 2,525 km via Hoogly while about 2,500 km from source to meeting point to Brahmaputra at Aricha. The area of the total basin is 1,087,300 sq. km (Islam & Gnauck, 2008).

Historically Ganges along with the inter-connected rivers Hoogly, Shaptamukhi, Thakuran, Matla, Bidyadhari, Ichamati, Kopotakha, Mathabhanga, Gorai, Madhumati Rivers play a vital role in the supply of fresh water into the Sundarbans. The river Hoogly in the extreme west is the only river carrying freshwater from upstream of lower Gangetic delta in the Indian
Sundarbans. Due to upstream diversion and narrowing of the distributaries of the Bhagirathi - Hoogly in the Sundarbans, presently freshwater discharge in these rivers of Sundarbans are negligible or mostly absent except during monsoon months when downpour in the southern parts of Sundarbans occur (Banerjee, 1999).

Hoogly, the main river of West Bengal, forms the western border of the Sundarbans. Though it gets a continuous flow from the river Ganga/Ganges, it does not contribute much to feed the Sundarbans as very small quantity of Hoogly’s water passes through its system directly. The river Damodar flowing from Barddhaman is one of the important tributaries of the Hoogly River. The Churi River near Naida and the Ichamati-Kalindi River near the Northern 24 Parganas stem from the Bhagirathi and the Jalangi Rivers which are the distributaries of the Ganges in the Indian side. These rivers used to provide flow to the southern rivers in the Indian side of the Sundarbans. But over time, due to numerous reasons these flows subsided substantially.

Muriganga is a distributary of Hoogly River. Sagar, the largest island in the deltaic complex is separated by Muriganga from the main Sundarbans which flow along its eastern banks and carry a substantial amount of inflow along the western boundary of the Sundarbans. But like the Hoogly, this inflow also does not make much impact into conserving Sundarbans’s ecosystem.

The Saptamukhi River has lost its upstream connection with the Ganges during the 1200s and is presently connected with the Muriganga branch of Hoogly River (Ghosh, 2012). The Thakuran River which begins near Jayanagar in South 24 Parganas similarly lost its link with the upstream during the same period as that of Shaptamukhi and has a number of links to the Saptamukhi (Morgan and Mcintire, 1959).

The river Matla which originates at the confluence of the Bidyadhari, Khuratya River and the Rampur khal near the Canning town in south 24 Parganas ultimately flows through the Sundarbans (Ghosh, 2012). The freshwater discharge to this river from the upstream river Bhagirathi has been lost in recent times due to constant heavy siltation along with solid waste disposal from the nearby urban areas.

The Bidyadhari was a thriving branch of Bhagirathi River during the 1500s to the 1600s, but now serves only as a sewage and excess rainwater outlet for the city of Kolkata (Ghosh, 2012). The river bed of Bidyadhari is completely silted up and its condition has deteriorated to such an extent that it is presently considered as a dying river. Up till 1830, the East Kolkata Wetland was a backwater swamp and spill area of the river Bidyadhari (Bhattacharyya et al. 2012). But with the expansion of Kolkata along with its increasing demands for drainage and waste disposal has also led to rapid silting and reclamation of the East Kolkata Wetlands over the years thus affecting the river Bidyadhari.
Figure 9: Major River Systems connected to the Sundarbans
The inflow from Matla forms the Gosaba River which flows through numerous creeks and canals into the Sundarbans. This system and its numerous creeks flow through the mangrove forests. The Harinbhanga is the easternmost river in the Indian Sundarbans deltaic complex which forms a natural boundary between India and Bangladesh. Harinbhanga is also known locally as the Raimangal and in some places, the Ichamati.

The four major estuary systems encompassing the Bangladesh portion of the Sundarbans are the Raimangal, Arpangasia, Pashur and the Baleswar. Arpangasia off-takes from Kapotaksha River in South Bedkashi union of Kayraupazila of Khulna district and it falls into the Bay of Bengal through Naliyan Range union of the same upazila. Raimangal River flows around the Sundarbans in North 24 Parganas district in the Indian state of West Bengal and later through Satkhira District in Bangladesh. The Ichamati breaks up into several distributaries below Hingalganj the chief of which are the Raimangal, Bidya, Jhilla, Kalindi and Jamuna. Pashur is situated at Khulna and Bagerhat which offtakes from Kajibacha river and falls into the Bay of Bengal. A large part of this river flows through the Sundarbans and has joined the river Shibsa before falling into Bay of Bengal. The Baleshwar forms along the eastern border of Bagerhat District and the western border of Barguna District. Off-taking from Kalinganga River of Pirojpur the Baleshwar River flows south into the Haringhata River, which flows into the Bay of Bengal. All the rivers have low flow from February to April (dry season). On the other hand, high flow occurs in July to September (wet season).

From the western part of the India-Bangladesh boundary, there exists Kapotaksha and Mathabhanga Rivers which originates from the Ganges. These Rivers have lost their connection with the Ganges during the 1800s due to silitation. As a result, both these rivers contribute very little quantity of freshwater to the Sundarbans during the dry season (Islam & Gnauck, 2009). Contribution of flow from the Kapotaksha-Sibsa system, flowing though the Sundarbans contributes zero freshwater flow at present time into the mangrove forest.

Apart from Sibsa, the other tidal river systems which dominate the flow of the southern part of the Sundarbans are Pashur and Baleswar, where both are part of the Gorai-Modhumati river system. The central Gorai subsystem is maintaining weak connection with the Ganges and carries significant amount of freshwater during the dry season to the Sundarbans. The distribution of the Gorai River flows through the Madhumati and Nabaganga rivers at Bardia. Garai-Madhumati is the major spill river of the Ganges and carries about 12% of flow of the Ganges (Hussain and Acharya, 1994).

Since late 1900s, the upstream part of the Madhumati River has been declining while the Nabaganga River has been gradually taking its place (EGIS, 2001). In the easternmost side of the Sundarbans, the Baleshwar river system carry large amount of freshwater from Nabaganga during the dry season. Chandana-Barasia River is an offshoot of the Padma River. In the past this river was connected with Gorai and Kumar thus providing flow from Padma through Kumar to the river Madhumati. But this river has lost connection with Gorai and Kumar by shifting of river course and various flood-proofing structures.

Pashur River of the Sundarbans is connected with the Garai-Madhumati system as well through the river Nabaganga and flows through the middle part of the Mangrove forest thus supplying considerable amount of freshwater into the Sundarbans ecosystem.
Other noteworthy rivers along which ecological niches of the Sundarbans occur mainly are Malancha, Arpangsia and Selagang. These rivers to a lesser extent have indirect connections with the Ganges and receive its highest flow during the monsoon.

**B1.1. Initiatives for increasing freshwater inflow in the south west region**

**Availability of water in the Ganges**

The Government of the People’s Republic of Bangladesh and the Government of the Republic of India signed a Treaty on sharing the Ganges waters at Farakka on 12th December 1996 for a period of 30 years.

As per relevant provision of the treaty, both sides have been jointly measuring daily flow at Farakka below Farakka Barrage, in the Feeder Canal and at the Navigation Lock, since 01 January, 1997. The joint measurement takes place during 01 January through 31 May every year. After measurement at Farakka, the joint team stationed at Farakka suggests share of each country as per sharing arrangement (Annexure-I of the treaty) given below.

<table>
<thead>
<tr>
<th>Availability at Farakka</th>
<th>Share of India</th>
<th>Share of Bangladesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>70,000 cusecs or less</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>70,000 cusecs -75,000 cusecs</td>
<td>Balance of flow</td>
<td>35,000 cusecs</td>
</tr>
<tr>
<td>75,000 cusecs or more</td>
<td>40,000 cusecs</td>
<td>Balance of flow</td>
</tr>
</tbody>
</table>

Subject to the condition that India and Bangladesh each shall receive guaranteed 35,000 cusecs of water alternately during the three 10-day periods from 11 March to 10 May. Joint measurement is also being done at Harding Bridge site in Bangladesh to record flow at this station. The statements of share of Bangladesh at Farakka and flow observed at Harding Bridge during 01 January, 1997 to 31 May, 2019 are given in Annex G

**B1.2. Further Initiative to increase the freshwater flow in South West Region**

The Government of Bangladesh has recently approved Bangladesh Delta Plan-2100 (2018) to steer the opportunities and vulnerabilities created by the interface of water, climate change, natural disasters, environment, ecological balance, agriculture, land use and inland water management for national development. As a part of the strategy for preservation of the Sundarban, the BDP2100 puts emphasis on restoring the Gorai River to allow freshwater inflow that will wash away the adverse effects of saline intrusion in the Sundarbans and also the regular dredging and maintenance of Ghaciakhali and other channels in the Sundarbans.

The government has been implementing an integrated freshwater inflow management plan which includes regular capital and maintenance dredging/re-excavation of rivers, canals and water bodies to;

- Improve the flow of freshwater flow by reducing siltation/deposition.
- Maintenance flow
- Improve water quality
- Decrease salinity
- Improve connectivity
- Increase retention capacity
- Improve water volume for better marine life, flora and fauna,
Improve ecosystem etc.

Maintenance of the flow of the Gorai River, a main distributary of the Ganges, is imperative for freshwater supply to the south-west regions of Bangladesh which include the Sundarbans. The government of Bangladesh has been undertaking continuous initiatives for the restoration of the Gorai River. Although after the implementation of Gorai River Restoration Project (GRRP)-Phase I and II the flow increased, limited maintenance of the offtake reduced the flow again to the SW region. Hence, a new project titled “Gorai River dredging and bank protection” (2018 – 2022) has been approved by ECNEC on 23-10-2018 where 37.50 km river dredging has been proposed. The completion date of the project is June 2022. Recently, the dredging of Gorai offtake has been conducted which increased the freshwater flow significantly. Discharge observation is being conducted for monitoring the flow in the Ganges and also in the Gorai by the Bangladesh Water Development Board (BWDB). Monthly Maximum Discharge (m3/sec) in different years at Gorai Offtake (Gorai River) is presented in Figure 10. In 2019-20, the flow of November, has increased significantly compare to past three years due to river dredging activities.

Figure 10: Monthwise Discharge comparison at Gorai Railway Bridge (Source: Bangladesh Water Development Board, January 2020)

B.2. Ecological Dynamics of Sundarbans

B.2.1. Ecological Resources of Sundarbans-an Overview

The biodiversity of Sundarban includes at least 334 species of plants, 49 mammals, 59 reptiles, 8 amphibians, and 315 bird species (Aziz and Paul 2015; Iftekhar and Islam 2004). The vegetation within the area is dominated by halophytic species (Mukhopadhyay et al. 2015; Biswas et al. 2007). Sundari, Gewa, Goran and Passur are the dominant plant species. Of the total area of the Sundarbans, about 30% is comprised of a complex network of rivers and streams of varying depth and width (Islam et al. 2014). The majority of the vegetation in the area inundated by water twice a day during regular tidal flooding (Khan 2013). The salinity also varies within the Sundarbans and are less saline (oligohaline) on the eastern part and more saline (polyhaline) on the western part (Hoque et al. 2006). Beside this Northern river terrapin (Batagurbaska), Ganges River Dolphin (Platanista gangetica) and especially Bengal Tiger (Panthera tigris) are major endangered fauna. The habitat of all
these species depends on freshwater inflow, tidal range, depth, velocity, cross section and salinity of the river.

**Floral Composition and Dynamics of Sundarbans**

River hydrology shapes the coast in the mangroves like prograding, stable and eroding coasts. In Sundarbans, dominant vegetation species is Sundri (*Heritiera fomes*), Gewa (*Excoecaria agallocha*), Goran (*Ceriops decandra*) and Passur (*Xylocarpus mekongensis*). Recent habitat suitability study shows that Sundri (*Heritiera fomes*) and Passur (*Xylocarpus mekongensis*) preferred upstream habitats where salinity is low. Whereas, Gewa (*Excoecaria agallocha*) and Goran (*Cariops decandra*) preferred down-stream and mid-stream habitats where salinity is high.

Mangroves have one of the most unique reproductive strategies in the plant world. Once the propagule drops from the parent tree there is an obligate dispersal period which each species’ propagule must remain in the water. During this period embryonic development continues. Hence, freshwater flow from upstream plays a pivotal role in maintaining the floral composition and dynamics of sundarbans.
Figure 11: Thematic diagram of Eco-hydrological relationship of Sundarbans
Bengal Tiger—a Flagship Species of Sundarbans

It is important to note that the Sundarbans mangrove forest, the world’s largest contiguous mangrove forest and is also the world’s only mangrove forest with tigers. It is the largest remaining Bengal tiger habitats in the world (Dinerstein et al. 2007; McGregor 2010). The Bengal tiger (*Panther tigris tigris*) is one of the sub-species of tiger that is geographically restricted to Bangladesh, Bhutan, India, Nepal, and Myanmar (IUCN, 2015). The Bengal tiger also represents the largest remaining population (~67%) of wild tigers in the world (WWF, 2016). Being the top predator of this unique ecosystem, Tiger plays a significant role in mainitaining the proper dynamics of mangrove ecosystem.

![Bengal Tiger in the forest](Photo: Rakesh Narala)

Figure 12: An illusive Bengal tiger lying in the forest

Fishery Resources

Primary productivity in mangrove forests is the foundation of the fishery food web. Mangroves are highly productive ecosystems where primary productivity comes from the mangrove trees themselves, algae growing on tree roots and on the forest floor and phytoplankton in the water column (Hutchison et al. 2014). Additionally, mangroves may receive nutrients from external sources. All these sources contribute to enhance fisheries productivity in mangroves. Sundarban supports a wide variety fish biodiversity. In Sundarbans, there are about 53 species of Pelagic (i.e. *Pelagic fish* lives neither close to the bottom nor near the shore), 124 species of demershal fish (i.e. *Demersal fish* live and feed on or near the bottom of water bodies) are recorded (Sarker, 1989; Rainboth, 1991). Some of the dominant fish species are Pungus (*Pangasius pangasius*), Hilsha (*Tenualosailisha*), Bhetki (*Latescalcarifer*), Goda chingri (*Macrobrachiumrosenbergii*), Lotty
(Harpadon nehereus), Bagda (Penaeus monodon) and Mud crabs. Diadromous fishes (i.e. Diadromous fishes live in the ocean and return to fresh water to spawn) such as Hilsha comes to Sundarbans for spawning where salinity is low. In most cases, coastal or marine fishes prefers aquatic habitat where salinity is less than 22 ppt. Additionally, mangrove trees regulate water temperature by providing shade. Controlling high water temperature reduce stress on juvenile fishes and also further reduces the risk of predation by making prey less visible due to lower light availability (Hutchison et al. 2014).

Dolphin- a Flagship Species of Sundarbans

In Sundarbans, two types of Dolphins namely Ganges River Dolphin (Platanista Gangetica) and Irrawaddy Dolphin (Orcaella brevirostris) are available. Dolphin occurrences mainly depend on different habitat condition that includes water depth, fresh water flow, turbidity, temperatures as well as salinity. Changes of these variables largely influence their movement (Koss et al. 2012; Wakid 2009; Gomez and Cassini. 2015).

About 50% of total world population of Irrawaddy Dolphin (Orcaella brevirostris) species is located in Sundarbans. Their population is high when salinity ranges from 0-30 ppt and water depth is in between 2.5-18 m (Koss et al. 2012). In Contrast, Ganges River dolphin (Platanista Gangetica) prefers low salinity condition mainly around 10ppt. However, this species occurrence was also recorded at 23ppt. In terms of water depth, highest number of Ganges River dolphin was found in depths of 4.1-6 m (Wakid 2009). Site characterization of these two indicator species indicates any changes in salinity and water depth will alter their habitat suitability. A conceptual representation of habitat characterization of these flagship species are shown in Figure 13.
Conclusion and future projection

There is no large establishment or any development project is ongoing within this property as this falls within the state protected area which is declared as Sundarban East, West and Wildlife Sanctuary by the State Party under IUCN Management Category IV in 1996. In addition, the Government is not allowing any industry/project within the SRF boundary which ranges 51 km from the property to the boundary of SRF. The ECA area around the SRF ranges from 51 km to 61 km from the property. Although 24 Red Category industries have been established within this ECA area stringent compliance monitoring is in place. The Government is not planning to implement any large scale project/industry which might impact the OUV of the property before the SEA is conducted. The SEA is underway and all future projects/industries will depend on the results/recommendations of SEA of the Southwest region. It is also mentionable that, the dredging activities which are planned to be executed under Mongla Port Authority within the SRF for improvement of navigability of

Figure 13: Salinity and water depth requirement of Ganges River Dolphin (Platanista Gangetica) and Irrawaddy Dolphin (Orcaella brevirostris) of Sundarbans  (Source: CEGIS)
Pashur channel will be implemented after conducting appropriate Environmental Impact Assessment.

Bangladesh is considered a role model for development in the world. Over the past 10 years, the country has achieved rapid development through application of integrated plan of approach by the present government, reinforced with concrete vision to accommodate infrastructural shifts imparted by targeted development. Bold steps initiated by the present government precipitated throughout the hierarchy in that it galvanized widespread collaboration and unprecedented innovation to fast track the country’s rate of development. Bangladesh is well underway to fulfilling the visions of both 2021 and 2041 through visionary initiatives in multi-sectoral schemes, which culminated in the sustainable development agenda through striking a “right balance” between equitable national economic progress and human development.

Over the past 11 years, GDP has increased from 6.01% to 8.13%, Per capita GNI increased to US$1,909 in FY2018-19 from US$ 759 in FY2008-09 and annual average inflation has been reduced to 5.47% in 2019 from 12.3% in 2008. Total revenue in the last nine years has increased more than 4 times. Share of industrial sector to GDP increased to 35.14 percent in FY19 from 26.54 percent in FY09. Total investment to GDP ratio increased to 31.56 percent in FY19 from 26.2 percent in FY09.

Poverty and extreme poverty rates for Bangladesh in 2010 was 31.5% and 17.6% respectively whereas currently these values have been reduced to 21.7% and 11.3% respectively. The social security sector has also seen huge development and has increased by 173 folds from USD 4.4 million to USD 769.7 million. This has been reflected in the demographic statistics as average life expectancy has increased from 66.8 years in 2009 to the current 72.3 years and rate of maternal mortality has gone down from 76.1 to 59.2 per thousand live births. Along with the development efforts, Bangladesh is also giving its highest consideration to the protection of the sustainable water management, environment and biodiversity.

The Government of Bangladesh has recently adopted Bangladesh Delta Plan-2100 (BDP 2100), a hundred-year strategic plan that would help reach the nation in the resilient state through adaptive policymaking and policy implementation concerning climate change impacts and environmental degradation mitigations. The plan gives clear strategic pathways for the protection and expansion of the Sundarbans in the coming decades. To expand the Sundarbans, the government has already taken initiatives to create artificial mangrove forests. The forest will be expanded towards the eastern side across the coastal region. The following strategies have been formulated in BDP 2100 for expanding the Sundarbans, i.e. mangrove forests:

**Strategy 1: planting in all the layers of a forest at the same time**

This will be done by creating a multi-tiered structure. The advantage is that one does not have to wait for each step to complete before the next one can commence. This way, one can speed up the process of forest succession immensely, and create an established forest in no time at all.

**Strategy 2: Not being competitive against Nature rather being collaborative**
Instead of fighting against nature and pulling in the opposite direction to the natural flow, the strategy is to push in the same direction together and get to the same mature forest faster. The idea is working with Nature rather than against it, to complement Nature’s efforts, so that Nature works for people, and people work for Nature.

The following measures are suggested for the expansion of the Sundarbans as well as the mangrove forests under BDP 2100:
1. Using existing plants to build soil;
2. Introducing only hardy plants initially;
3. Raising the levels of organic matter in the soil artificially;
4. Substituting the plants of the forest succession stages with useful species.

**Strategy 3: Maintenance of perennial tidal flow**

Regular maintenance of required flow is critical for life and ecosystem to thrive in a mangrove setting such as the Sundarban. As the narrow but, relatively deeper dendritic channels of the forest are being silted up due to decreased upstream flow, regular dredging in channels such as Ghashiakhali and other channels whereas required has to be done.

Almost all the concerns raised by the National Committee for saving the Sundarbans (NCSS), a coalition of civil societies and non-governmental organizations of Bangladesh, have been raised before and we have adequately responded to those concerns repeatedly. Moreover, we have sent the WHC a detailed response report of the joint WHC-IUCN Reactive Monitoring Mission to the Sundarbans, Bangladesh in October 2016, Responses to Third party’s Positions in June 2018 and March 2019 and progress Report on the decisions of 41COM.7B.25 of the World Heritage Committee on the Sundarbans in November 2018 and May 2019 that provided in details about what the Government of Bangladesh has been doing for the conservation of the Sundarbans.

The recommendations of RMM mission of 2016, decisions adopted during the 41st session of the World Heritage Committee in Krakow, Poland in 2017 and during the 43rd session of the World Heritage Committee in Baku, Azerbaijan in July 2019 are being considered by the Government of the People’s Republic of Bangladesh. The Government is taking a number of additional measures to maintain and improve the existing diversity and richness of the ecosystem of the property as well as the entire Sundarban area.
References


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Annex A: Potential locations for dredging and dredged material disposal
### Annex B: List of the All Orange category (A and B) factories/mills/farms/infrastructures in Sundarbans ECA area (Bagerhat, Khulna and Satkhira District)

<table>
<thead>
<tr>
<th>Sl</th>
<th>Industry Name and Address</th>
<th>Date of Establishment</th>
<th>Mouza name (Land Area)</th>
<th>Class</th>
<th>Distance from Sundarban Reserve Forest</th>
<th>Distance from Sundarban World Heritage Site</th>
<th>Raw Material</th>
<th>Finished Product</th>
<th>Operation Status</th>
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<tbody>
<tr>
<td>1</td>
<td>Tara Exim Corporation, plot no13-14 Mongla EPZ, Mongla, Bagerhat.</td>
<td>17/10/12</td>
<td>Kamardanga. (EPZ) 6000 Sq.m</td>
<td>Orange-B</td>
<td>4.91 km</td>
<td>52.80 km</td>
<td>Imported Betel nut</td>
<td>Processed Betelnut</td>
<td>Operational</td>
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<td>2</td>
<td>Jahan Processing &amp; Export Ltd. Mongla EPZ Mongla, Bagerhat.</td>
<td>13/11/12</td>
<td>Kamardanga. (EPZ) 2000 Sq. m</td>
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<td>5.4km</td>
<td>53.34km</td>
<td>Imported Betel-nut</td>
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<td>3</td>
<td>M/s. Shaptarsi ltd. Mongla EPZ, mongla, Bagerhat.</td>
<td>14/02/13</td>
<td>Kamardanga. (EPZ) 4000 Sq. m</td>
<td>Orange-B</td>
<td>4.48km</td>
<td>52.33 km</td>
<td>Imported Betel-nut</td>
<td>Processed Betel-nut</td>
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<td>M/s. Tinupati Industries ltd. Mongla EPZ, mongla, Bagerhat.</td>
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<td>4.79 km</td>
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<td>Imported Betel-nut</td>
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<td>Areca nut Growers &amp; Processors ltd. Mongla EPZ, mongla, Bagerhat.</td>
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<td>52.48 km</td>
<td>Imported Betel-nut</td>
<td>Processed Betel-nut</td>
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<td>4.91 km</td>
<td>52.80 km</td>
<td>Local yarn</td>
<td>Tawal</td>
<td>Operational</td>
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<td>16/06/05</td>
<td>Buriranganga &amp;</td>
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<td>Mongla Port I/A, Mongla, Bagerhat.</td>
<td>18/02/10</td>
<td>Bidyarbon (02. acre)</td>
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<td>54.53km</td>
<td>Soyabean and palm oil</td>
<td>Soyabean and palm oil</td>
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<td>Buridanga &amp; Bidyarbon (10 acre)</td>
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<td>5.87km</td>
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<td>Misti Motso Khamar, Amratola, Mongla, Bagerhat.</td>
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<td>9.97 km</td>
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<td>Eastern Polymer Ltd, Mongla EPZ, Mongla, Bagerhat.</td>
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<td>Brush, pen</td>
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<td>Kamardanga. (EPZ) (2000 Sq.m)</td>
<td>Orange-A</td>
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<td>52.47 km</td>
<td>PVC, Jamroll &amp; art paper.</td>
<td>Paper pieces</td>
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<td>New Paradise Hotel Burirdanga Mongla, Bagerhat.</td>
<td>18/09/12</td>
<td>Burirdanga (800 Sq. ft)</td>
<td>Orange-A</td>
<td>7.37km</td>
<td>57.38 km</td>
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<tr>
<td>30.</td>
<td>Hridi Hotel &amp; Restaurant, Sehalabunia, Bhasani Road, Mongla, Bagerhat.</td>
<td>04/07/12</td>
<td>Sehalabunia (50 Decimal)</td>
<td>Orange-A</td>
<td>3.41 km</td>
<td>50.21 km</td>
<td>Food materials</td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>Al Modina Hotel &amp; Restaurant, BLS, Mongla, Bagerhat.</td>
<td>16/07/12</td>
<td>Sehalabunian (84 sq.y)</td>
<td>Orange-A</td>
<td>3.44 km</td>
<td>50.89 km</td>
<td>Food materials</td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>Sureshdog Hotel &amp; Restaurant, High Road, Mongla, Bagerhat.</td>
<td>11/01/12</td>
<td>Sehalabunia (800 Sq. f)</td>
<td>Orange-A</td>
<td>3.16 km</td>
<td>50.85 km</td>
<td>Food materials</td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>New Rahmania Hotel &amp; Restaurant, Tajmohol Road, Mongla, Bagerhat.</td>
<td>15/03/12</td>
<td>Sehalabunia (36 sq.y)</td>
<td>Orange-A</td>
<td>3.27 km</td>
<td>50.84 km</td>
<td>Food materials</td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>N/S Sahin Sweets, BLS Road, Mongla, Bagerhat.</td>
<td>11/01/12</td>
<td>Sehalabunia (36 sq.f)</td>
<td>Orange-A</td>
<td>3.41 km</td>
<td>50.86 km</td>
<td>Sugar &amp; Milk sweets</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>Sha Sekander Rice Mill, Madrasa Road, Mongla, Bagerhat.</td>
<td>14/11/12</td>
<td>Sehalabunia (1.765 Decimal)</td>
<td>Orange-A</td>
<td>3.49 km</td>
<td>50.97 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>36.</td>
<td>N/S Elma Rice Mill, Sehalabunia, Mongla, Bagerhat.</td>
<td>13/09/12</td>
<td>Sehalabunia (3.5 Deci)</td>
<td>Orange-A</td>
<td>3.24 km</td>
<td>50.13 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>37.</td>
<td>N/S Rasel Rice Mill, Meser Sha Road, Araji, Makordhol Mongla, Bagerhat.</td>
<td>13/12/12</td>
<td>Araji, Makordhol (13 Deci)</td>
<td>Orange-A</td>
<td>4.87 km</td>
<td>51.58 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>38.</td>
<td>Haolader Rice Mill, Hortokotora, Morejrong, Bagerhat.</td>
<td>02/02/16</td>
<td>Guatoka (33 Deci)</td>
<td>Orange-A</td>
<td>5.89 km</td>
<td>40.43 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>39.</td>
<td>N/S Binomy Ice Factory, Sehalabunia, Mongla, Bagerhat.</td>
<td>14/11/12</td>
<td>Sehalabunia (06 Deci)</td>
<td>Orange-A</td>
<td>3.26 km</td>
<td>50.35 km</td>
<td>Water</td>
<td>Ice</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>N/S Sumon Ice Factory, Tajmohol Road, Mongla, Bagerhat.</td>
<td>14/11/12</td>
<td>Sehalabunia (42.66 sq.y)</td>
<td>Orange-A</td>
<td>3.26 km</td>
<td>50.77 km</td>
<td>Water</td>
<td>Ice</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>Malika Engineering Workshop, Digraj, Mongla, Bagerhat.</td>
<td>19/03/14</td>
<td>Rolyarbon (200 sq.f)</td>
<td>Orange-A</td>
<td>7.33 km</td>
<td>57.19 km</td>
<td>Iron</td>
<td>Door, Window, Grill</td>
<td>Operational</td>
</tr>
<tr>
<td>Sl</td>
<td>Industry Name and Address</td>
<td>Date of Establishment</td>
<td>Mouza name (Land Area)</td>
<td>Class</td>
<td>Distance from Sundarban Reserve Forest</td>
<td>Distance from Sundarban World Heritage Site</td>
<td>Raw Material</td>
<td>Finished Product</td>
<td>Operation Status</td>
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</tr>
<tr>
<td>42</td>
<td>Abbus Sobahan Saw Mill, Madrasa Road, Mongla, Bagerhat</td>
<td>06/11/08</td>
<td>Sehalabunia (750 ac/ft)</td>
<td>Orange-A</td>
<td>3.68 km</td>
<td>51.09 km</td>
<td>Wood log</td>
<td>Different size of wood</td>
<td>Operational</td>
</tr>
<tr>
<td>43</td>
<td>Raj Abdul Latif Saw Mill, Madrasa Road, Mongla, Bagerhat</td>
<td>06/11/08</td>
<td>Sehalabunia (70 ac/ft)</td>
<td>Orange-A</td>
<td>3.92 km</td>
<td>51.27 km</td>
<td>Wood log</td>
<td>Different size of wood</td>
<td>Operational</td>
</tr>
<tr>
<td>44</td>
<td>Kazi Banglades Ltd. (Robi), Takalbari, Soronkhol, Bagerhat</td>
<td>26/01/12</td>
<td>Sototola (06 Deci)</td>
<td>Orange-A</td>
<td>3.24 km</td>
<td>22.40 km</td>
<td>-</td>
<td>network</td>
<td>Operational</td>
</tr>
<tr>
<td>45</td>
<td>M/S Sana Bricks (Zigzag), Chandaali, Sholohalia, Koyra, Khulna</td>
<td>01/01/2012</td>
<td>Sholohalia (About 02 Acre)</td>
<td>Orange-B</td>
<td>0.00 km</td>
<td>0.00 km</td>
<td>Soil, water, clay</td>
<td>Bricks</td>
<td>Operational</td>
</tr>
<tr>
<td>46</td>
<td>M/S Amir Bricks (Zigzag), Islampur, Koyra, Khulna.</td>
<td>1998</td>
<td>Sholohalia Islampur (About 1.5 Acre)</td>
<td>Orange-B</td>
<td>3.50 km</td>
<td>34.69 km</td>
<td>Soil, water, clay</td>
<td>Bricks</td>
<td>Operational</td>
</tr>
<tr>
<td>47</td>
<td>M/S Sohrab Bricks (Zigzag), Islampur, Koyra, Khulna.</td>
<td>01/06/2011</td>
<td>Sholohalia Islampur (About 02 Acre)</td>
<td>Orange-B</td>
<td>8.56 km</td>
<td>56.98 km</td>
<td>Soil, water, clay</td>
<td>Bricks</td>
<td>Operational</td>
</tr>
<tr>
<td>48</td>
<td>Saline water purification project 5, Koyra, Madinabad, Koyra, Khulna.</td>
<td>01/02/2012</td>
<td>Koyra (05 Decimal)</td>
<td>Orange-B</td>
<td>4.26 km</td>
<td>45.24 km</td>
<td>Saline water</td>
<td>Fresh water</td>
<td>Operational</td>
</tr>
<tr>
<td>49</td>
<td>Ad Din Pure Water Ad Din Poor Water</td>
<td>01/10/2016</td>
<td>Chalk Balbunia (01 Decimal)</td>
<td>Orange-B</td>
<td>9.19 km</td>
<td>69.24 km</td>
<td>Saline water</td>
<td>Fresh water</td>
<td>Operational</td>
</tr>
<tr>
<td>50</td>
<td>Md Bangladesh Water Refinery Acavua, Chalna, dakop, Khulna</td>
<td>04/08/2016</td>
<td>Pankhali (05 Decimal)</td>
<td>Orange-B</td>
<td>9.88 km</td>
<td>67.58 km</td>
<td>Saline water</td>
<td>Fresh water</td>
<td>Operational</td>
</tr>
<tr>
<td>51</td>
<td>Kn Vi Rice Mill Mothulli Bazar, Kamalapur, Gazalia, Pakeagchha, Khulna</td>
<td>05/10/2008</td>
<td>Kamalapur (05 Decimal)</td>
<td>Orange-B</td>
<td>9.74 km</td>
<td>64.56 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>52</td>
<td>Sazi Rice &amp; Flour Mill North Amirpur, Bogra Chowk, Pakeagchha, Khulna</td>
<td>15/05/2014</td>
<td>Nurpur Amirpur (06 Decimal)</td>
<td>Orange-B</td>
<td>5.06 km</td>
<td>62.95 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>53</td>
<td>M/S Jannat Semi-auto Rice Mill, Ula, Koyra, Khulna.</td>
<td>05/02/2014</td>
<td>Ula (03 Decimal)</td>
<td>Orange-B</td>
<td>4.11 km</td>
<td>56.37 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>54</td>
<td>M/S Shahana Auto Rice Mill, Mosjidkur,</td>
<td>01/02/2004</td>
<td>Mosjidkur (16</td>
<td>Orange-B</td>
<td>8.84 km</td>
<td>59.39 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>Sl</td>
<td>Industry Name and Address</td>
<td>Date of Establishment</td>
<td>Mouza name (Land Area)</td>
<td>Class</td>
<td>Distance from Sundarban Reserve Forest</td>
<td>Distance from Sundarban World Heritage Site</td>
<td>Raw Material</td>
<td>Finished Product</td>
<td>Operation Status</td>
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<tr>
<td>56</td>
<td>M/S Modina Semi Auto Rice Mill, Mudinabad, Koyra, Khulna.</td>
<td>01/07/2014</td>
<td>Mudinabad (63 Decimal)</td>
<td>Orange B</td>
<td>4.41</td>
<td>45.53</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>57</td>
<td>M/S Gazi Auto Rice Mill, Chanda Ali Khayaghat, Koyra, Khulna.</td>
<td>08/05/2008</td>
<td>Gholhalia (80 Decimal)</td>
<td>Orange B</td>
<td>8.47</td>
<td>57.03</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>58</td>
<td>M/S VI Auto Rice Mill, Gholahalla, Ghugrakati, Koyra, Khulna.</td>
<td>15/05/2009</td>
<td>Gholhalia (61 Decimal)</td>
<td>Orange B</td>
<td>8.45</td>
<td>About 56.98 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>59</td>
<td>M/S Ekota Auto Rice Mill, Islampur, Koyra, Khulna.</td>
<td>25/08/2007</td>
<td>Ghugrakati (10 Decimal)</td>
<td>Orange B</td>
<td>8.55 km</td>
<td>57 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>60</td>
<td>M/S Saleha Auto Rice Mill, Moszitkur, Amadi, Koyra, Khulna.</td>
<td>30/09/2007</td>
<td>Moszitkur (17 Decimal)</td>
<td>Orange B</td>
<td>8.85 km</td>
<td>59.42 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>61</td>
<td>Bismillah Auto Rice Mill, Achauva, Chalna Bazar, Dakope, Khulna.</td>
<td>08/02/2015</td>
<td>Pankhali (50 Decimal)</td>
<td>Orange B</td>
<td>10.50 km</td>
<td>67.75 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>62</td>
<td>Kurjo Auto Rice Mill, Saheber Abad, Dakope, Khulna.</td>
<td>12/12/2014</td>
<td>Saheber Abad (05 Decimal)</td>
<td>Orange B</td>
<td>8 km</td>
<td>6.40 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>63</td>
<td>M/S Sarna Rice Mill, Chalna Bazar, Dakope, Khulna.</td>
<td>05/02/2007</td>
<td>Pankhali (41.5 Decimal)</td>
<td>Orange B</td>
<td>10.58 km</td>
<td>68.40 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>64</td>
<td>Radha Ran Rice Mill, Chalna Bazar, Dakope, Khulna.</td>
<td>01/05/2008</td>
<td>Pankhali (05 Decimal)</td>
<td>Orange B</td>
<td>10.94 km</td>
<td>68.26 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>65</td>
<td>Srima Auto Rice Mill, Chalna Bazar, Dakope, Khulna.</td>
<td>01/05/2008</td>
<td>Pankhali (05 Decimal)</td>
<td>Orange B</td>
<td>11.35 km</td>
<td>68.38 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>66</td>
<td>M/S VI Vi Rice Mill, Ramnagar Bazar, Dakope, Khulna.</td>
<td>20/10/2012</td>
<td>Dhopadihi (03 Decimal)</td>
<td>Orange B</td>
<td>1.18 km</td>
<td>60.41 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>67</td>
<td>Saraje Rice Mill (not inactive), Kharia Thamshakhalli, Pakeghuta, Khulna.</td>
<td>15/05/2009</td>
<td>Thamshakhalli (02 Decimal)</td>
<td>Orange B</td>
<td>10.26 km</td>
<td>62.20 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>68</td>
<td>Mumun Rice Mill (not inactive)</td>
<td>25/04/2008</td>
<td>Gazalia (04 Decimal)</td>
<td>Orange B</td>
<td>10.63 km</td>
<td>65.48 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>Sl</td>
<td>Industry Name and Address</td>
<td>Date of Establishment</td>
<td>Mouza name (Land Area)</td>
<td>Class</td>
<td>Distance from Sundarban Reserve Forest</td>
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<td>Raw Material</td>
<td>Finished Product</td>
<td>Operation Status</td>
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<tr>
<td>69</td>
<td>M/S Nahar Rice Mill (not inactive) Gazalia, Pakgach, Khulna.</td>
<td>10/11/2007</td>
<td>Gazalia (2.5 Decimal)</td>
<td>Orange B</td>
<td>11.29 km</td>
<td>65.67 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>70</td>
<td>M/S Badra Rice Mill (not inactive) Chancellor, Koyra, Khulna.</td>
<td>31/01/2014</td>
<td>Vangarpol (02 Decimal)</td>
<td>Orange B</td>
<td>4.86 km</td>
<td>59.84 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>71</td>
<td>Gazi Rice Mill (not inactive) Naka, Koyra, Khulna.</td>
<td>01/01/2012</td>
<td>Naka (01 Decimal)</td>
<td>Orange B</td>
<td>10.39 km</td>
<td>60.19 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>72</td>
<td>M/S Satata Auto Rice Mill, Islampur, Koyra, Khulna.</td>
<td>30/08/2007</td>
<td>Shulhalla (10 Decimal)</td>
<td>Orange B</td>
<td>8.46 km</td>
<td>56.94 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>73</td>
<td>Valarr Rice Mill (Not Inactive) Moszidkur, Amadi, Koyra, Khulna</td>
<td>05/02/2008</td>
<td>Moszidkur (05 Decimal)</td>
<td>Orange B</td>
<td>9.18 km</td>
<td>59.71 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>74</td>
<td>Vic Bun Rice Mill (not inactive) Bhandarpole, Koyra, Khulna</td>
<td>01/02/2012</td>
<td>Vangarpol (08 Decimal)</td>
<td>Orange B</td>
<td>4.93 km</td>
<td>58.60 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>75</td>
<td>M/S Falal Rice Mill (not inactive), Moszidkur Amadi, Koyra, Khulna</td>
<td>01/08/2012</td>
<td>Moszidkur (04 Decimal)</td>
<td>Orange B</td>
<td>5.53 km</td>
<td>59.45 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>76</td>
<td>Bismilah Rice Mill (not inactive), Jagir Mahal, Cairo, Khulna</td>
<td>01/01/2012</td>
<td>Amadi (2 Decimal)</td>
<td>Orange B</td>
<td>9.82 km</td>
<td>47.30 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>77</td>
<td>VP Rice Mill (not inactive) Hadaubir, Channark, Koyra, Khulna</td>
<td>01/02/2007</td>
<td>Vangarpol (17 Decimal)</td>
<td>Orange B</td>
<td>3.24 km</td>
<td>58.52 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>78</td>
<td>Popular Rice Mill Ghatkhali Bazar, Bajua, Dakope, Khulna.</td>
<td>01/02/2012</td>
<td>Lawdop (05 Decimal)</td>
<td>Orange B</td>
<td>5.8 km</td>
<td>58.13 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>79</td>
<td>M/S Sonali Rice Mill Nurpur, SottAmirpur, Pakgachha, Khulna.</td>
<td>20/05/2016</td>
<td>Nurpur, Amirpur (02 Decimal)</td>
<td>Orange B</td>
<td>6.75 km</td>
<td>64.59 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>80</td>
<td>Bismilah Auto Rice Mill, Sholhalla, Koyra, Khulna.</td>
<td>01/01/2009</td>
<td>Sholhalla (30 Decimal)</td>
<td>Orange B</td>
<td>8.46 km</td>
<td>56.96 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>81</td>
<td>Pigoshkanti Rice Mill</td>
<td>01/09/2006</td>
<td>Chunkuri (03)</td>
<td>Orange B</td>
<td>7.15 km</td>
<td>61.80 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
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<td>Sl</td>
<td>Industry Name and Address</td>
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<td>Finished Product</td>
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</tr>
<tr>
<td>82</td>
<td>Charulata Rice Mill</td>
<td>01/02/2008</td>
<td>Bajua (27 Decimal)</td>
<td>Orange B</td>
<td>5.18 km</td>
<td>58.21 km</td>
<td>Paddy</td>
<td>Rice (Atap)</td>
<td>Operational</td>
</tr>
<tr>
<td>83</td>
<td>BG Black Tiger Agro Ltd.</td>
<td>01/02/2015</td>
<td>Dakope (9.35 Acre)</td>
<td>Orange B</td>
<td>2.39 km</td>
<td>61.79 km</td>
<td>Fry</td>
<td>Shrimp</td>
<td>Operational</td>
</tr>
<tr>
<td>84</td>
<td>Namirahchari</td>
<td>01/07/2011</td>
<td>Barukhali (02 Acre)</td>
<td>Orange B</td>
<td>9.02 km</td>
<td>66.18 km</td>
<td>Fry</td>
<td>Shrimp</td>
<td>Operational</td>
</tr>
<tr>
<td>85</td>
<td>N/S Sarderchharchi</td>
<td>01/04/2014</td>
<td>Khoirol (01 Acre)</td>
<td>Orange B</td>
<td>5.25 km</td>
<td>58.98 km</td>
<td>Fry</td>
<td>Shrimp</td>
<td>Operational</td>
</tr>
<tr>
<td>86</td>
<td>Red Star Hacharik Nursing</td>
<td>30/01/2014</td>
<td>Pankhali (2.45 Acre)</td>
<td>Orange B</td>
<td>12.42 km</td>
<td>68.76 km</td>
<td>Fry</td>
<td>Shrimp</td>
<td>Operational</td>
</tr>
<tr>
<td>87</td>
<td>Masum Syilmiphchhari Ltd.</td>
<td>30/01/2007</td>
<td>Pankhali (1.44 Acre)</td>
<td>Orange B</td>
<td>9.83 km</td>
<td>66.59 km</td>
<td>Eggs</td>
<td>Fry Fry</td>
<td>Operational</td>
</tr>
<tr>
<td>88</td>
<td>Chillicream Factory</td>
<td>01/07/2014</td>
<td>Maharajpur (05 Decimal)</td>
<td>Orange B</td>
<td>3.09 km</td>
<td>46.37 km</td>
<td>Milk, sugar, barley, water, salt, gas</td>
<td>Ice cream</td>
<td>Operational</td>
</tr>
<tr>
<td>89</td>
<td>Chihotolcream milk</td>
<td>05/11/2015</td>
<td>Amadi (12 Decimal)</td>
<td>Orange B</td>
<td>8.74 km</td>
<td>58.59 km</td>
<td>Milk, sugar, barley, water, salt, gas</td>
<td>Ice cream</td>
<td>Operational</td>
</tr>
<tr>
<td>90</td>
<td>Popular Rice Mill</td>
<td>01/02/2012</td>
<td>Loudop (0.05 Decimal)</td>
<td>Orange A</td>
<td>5.83 km</td>
<td>58.13 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>91</td>
<td>Itu Rice Mill</td>
<td>25/02/2014</td>
<td>Chunkuri (.07 Decimal)</td>
<td>Orange A</td>
<td>7.04 km</td>
<td>61.64 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>92</td>
<td>Seumitra Rice Mill</td>
<td>15/01/2014</td>
<td>Loudop (.04 Decimal)</td>
<td>Orange A</td>
<td>3.85 km</td>
<td>55.36 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>93</td>
<td>Sat Rice Mill</td>
<td>02/01/2014</td>
<td>Harintana (.03 Decimal)</td>
<td>Orange A</td>
<td>1.98 km</td>
<td>57.08</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>94</td>
<td>Al Amana Rice Mill</td>
<td>02/07/2014</td>
<td>Amadi (05 Decimal)</td>
<td>Orange A</td>
<td>8.75 km</td>
<td>58.30 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>Sl</td>
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<tr>
<td>95</td>
<td>Sardar Rice Mill Saheber Abad, Dakop, Khulna.</td>
<td>01/01/2014</td>
<td>Dakop (.02 Decimal)</td>
<td>Orange-A</td>
<td>7.93 km</td>
<td>65.43 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>96</td>
<td>Ananya Rice Mill Barakhalisha, Chalna Bazar, Dakop, Khulna.</td>
<td>01/03/2012</td>
<td>Pankhali (.03 Decimal)</td>
<td>Orange-A</td>
<td>11.86 km</td>
<td>69.12 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>97</td>
<td>Shuvrrad Roy Rich Mill, Khona, dacop, Chalna, Khulna.</td>
<td>25/06/2013</td>
<td>Barakhal (.03 Decimal)</td>
<td>Orange-A</td>
<td>9.39 km</td>
<td>66.87 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>98</td>
<td>Japoran Rice Mill Dakop, Chalna. Khulna.</td>
<td>26/08/2008</td>
<td>Pankhali (.03 Decimal)</td>
<td>Orange-A</td>
<td>13.25 km</td>
<td>70.10 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>99</td>
<td>Subashi Rice Mill Rammagar, Dakop, Khuuna.</td>
<td>25/09/2011</td>
<td>Dhupadhi (.03 Decimal)</td>
<td>Orange-A</td>
<td>2.61 km</td>
<td>61.50 km</td>
<td>Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>100</td>
<td>M. Villorboi Koida, Koyra, Khulna</td>
<td>15/10/2016</td>
<td>Koida (01 Decimal)</td>
<td>Orange-A</td>
<td>0.00 km</td>
<td>56.65 km</td>
<td>Water</td>
<td>Ice</td>
<td>Operational</td>
</tr>
<tr>
<td>101</td>
<td>Modina Ice Factory Koyra Bazar, Koyra, Khuuna.</td>
<td>02/08/2015</td>
<td>Madinabad (02 Decimal)</td>
<td>Orange-A</td>
<td>4.18 km</td>
<td>45.81 km</td>
<td>Water</td>
<td>Ice</td>
<td>Operational</td>
</tr>
<tr>
<td>102</td>
<td>Modina Ice Factory Deolia Bazar, Medinabad, Koyra, Khulna.</td>
<td>20/11/2016</td>
<td>Madinabad (03 Decimal)</td>
<td>Orange-A</td>
<td>4.05 km</td>
<td>46.49 km</td>
<td>Water</td>
<td>Ice</td>
<td>Operational</td>
</tr>
<tr>
<td>103</td>
<td>Sarker Workshop Shurikhal, Koyra, Khulna.</td>
<td>25/06/2014</td>
<td>Natundanga (02 Decimal)</td>
<td>Orange-A</td>
<td>5.98 km</td>
<td>63.07 km</td>
<td>Iron leaf, rod, angle, etc</td>
<td>Other welding with gate, grille, window preparation</td>
<td>Operational</td>
</tr>
<tr>
<td>104</td>
<td>Bismillah Engineering Workshop Koyra Bazar, Koyra, Khuuna.</td>
<td>28/12/2011</td>
<td>Madinabad (01 Decimal)</td>
<td>Orange-A</td>
<td>About 6.0 km (Full mouza)</td>
<td>4.49 km</td>
<td>Iron leaf, rod, angle, etc</td>
<td>Other welding with gate, grille, window preparation</td>
<td>Operational</td>
</tr>
<tr>
<td>SI</td>
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<tr>
<td>105</td>
<td>Vi Vi engineering workshop Bamia, Koyra, Khulna</td>
<td>01/04/2008</td>
<td>Koyra (04 Decimal)</td>
<td>Orange-A</td>
<td>8.98 km</td>
<td>55.30 km</td>
<td>Iron leaf, rod, angle, etc</td>
<td>Other welding with gate, grille, window preparation</td>
<td>Operational</td>
</tr>
<tr>
<td>106</td>
<td>Shaleha Engineering Workshop Koyra Bazar College Road, Koyra, Khulna Cairo</td>
<td>07/01/2008</td>
<td>Koyra (03 Decimal)</td>
<td>Orange-A</td>
<td>4.06 km</td>
<td>45.64 km</td>
<td>Iron leaf, rod, angle, etc</td>
<td>Other welding with gate, grille, window preparation</td>
<td>Operational</td>
</tr>
<tr>
<td>107</td>
<td>Samarjan Welding Workshop Bajua, Charanabad, Dakop, Khulna</td>
<td>01/07/2011</td>
<td>Bajua (02 Decimal)</td>
<td>Orange-A</td>
<td>5.26 km</td>
<td>58.19 km</td>
<td>Iron leaf, rod, angle, etc</td>
<td>Other welding with gate, grille, window preparation</td>
<td>Operational</td>
</tr>
<tr>
<td>108</td>
<td>M/S Rima Plastic Cutting Factory Chandikhali, Pokieghata, Khulna.</td>
<td>15/03/2011</td>
<td>Mukhali (03 Decimal)</td>
<td>Orange-A</td>
<td>9.86 km</td>
<td>63.15 km</td>
<td>Abandoned utensils for bottles and plastic</td>
<td>Stomach bottles and plastic recycling</td>
<td>Operational</td>
</tr>
<tr>
<td>109</td>
<td>M/S Runa Steel Workshop College Road, Koyra, Khulna.</td>
<td>01/01/2008</td>
<td>Koyra (1.2 Decimal)</td>
<td>Orange-A</td>
<td>4.08 km</td>
<td>45.66 km</td>
<td>Rainsheet, leaf color</td>
<td>Steel Furniture</td>
<td>Operational</td>
</tr>
<tr>
<td>110</td>
<td>Amjad Hossain Saw Mill, Moszidkur, Amadi, Koyra, Khulna</td>
<td>01/02/2003</td>
<td>Moszidkur (03 Decimal)</td>
<td>Orange-A</td>
<td>8.95 km</td>
<td>59.39 km</td>
<td>Collected Round wood</td>
<td>Round wood 70 Sft</td>
<td>Operational</td>
</tr>
<tr>
<td>111</td>
<td>Sana saw mill Ghugrakati bazar, Ghugrakati, Koyra, Khulna.</td>
<td>13/10/2004</td>
<td>Ghugrakati (05 Decimal)</td>
<td>Orange-A</td>
<td>9.81 km</td>
<td>55.48 km</td>
<td>Collected Round wood</td>
<td>Round wood 80 Sft</td>
<td>Operational</td>
</tr>
<tr>
<td>112</td>
<td>Tackerhat saw mill Amadi, Jaygir Mahal, Koyra, Khulna.</td>
<td>03/04/2005</td>
<td>Amadi (4 Decimal)</td>
<td>Orange-A</td>
<td>9.93 km</td>
<td>56.89 km</td>
<td>Collected Round wood</td>
<td>Round wood 75 Sft</td>
<td>Operational</td>
</tr>
<tr>
<td>113</td>
<td>M/S Gine auto rice mill, Ishwaripur, Shyamnagar, Satkhira.</td>
<td>01.07.06</td>
<td>Ishwaripur (4,791.6 Sq.F)</td>
<td>Orange-B</td>
<td>9.65 km</td>
<td>37.56 km</td>
<td>Ripe Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
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<tr>
<td>114</td>
<td>Arab Hatchery, Dinatikhalai, Kalbari, Munshiganj, Shyamnagar, Satkhira.</td>
<td>01.09.16</td>
<td>Porakatla (940.89 Sq.F)</td>
<td>Orange-B</td>
<td>0.83 km</td>
<td>34.75 km</td>
<td>Eggs of shrimp</td>
<td>Minnow of Shrimp</td>
<td>Operational</td>
</tr>
<tr>
<td>115</td>
<td>Sundarbanmatatshaparakala, Munshiganj, Shyamnagar, Satkhira.</td>
<td>12.02.15</td>
<td>Munshiganj (3,96,396 Sq.F)</td>
<td>Orange-B</td>
<td>0.00 km</td>
<td>34.64 km</td>
<td>Minnow of shrimp</td>
<td>Adult Shrimp</td>
<td>Operational</td>
</tr>
<tr>
<td>116</td>
<td>New Jamuna shrimp hatchery and culture, Kalbaribazar, Munshiganj, Shyamnagar, Satkhira.</td>
<td>01.01.16</td>
<td>Munshiganj (1,01,059.2 Sq.F)</td>
<td>Orange-B</td>
<td>0.42 km</td>
<td>35.11 km</td>
<td>Eggs of shrimp</td>
<td>Minnow of Shrimp</td>
<td>Operational</td>
</tr>
<tr>
<td>117</td>
<td>Farid nine stars agro (BD) Ltd. (Crab cultivation), West porakatla, Vamia, Burigoalini, Shyamnagar, Satkhira.</td>
<td>01.02.14</td>
<td>Porakatla (2,17,800 Sq.F)</td>
<td>Orange-B</td>
<td>0.43 km</td>
<td>35.13 km</td>
<td>Brood crab</td>
<td>Adult crab</td>
<td>Operational</td>
</tr>
<tr>
<td>118</td>
<td>Farid nine stars agro (BD) Ltd. (Crab processing), West porakatla, Vamia, Burigoalini, Shyamnagar, Satkhira.</td>
<td>01.03.15</td>
<td>Porakatla (8712 Sq.F)</td>
<td>Orange-B</td>
<td>0.41 km</td>
<td>35.13 km</td>
<td>Adult crab</td>
<td>Processed Crab</td>
<td>Operational</td>
</tr>
<tr>
<td>119</td>
<td>Crabesco Ltd. (Crab cultivation), Kalbari, Burigoalini, Shyamnagar, Satkhira.</td>
<td>10.02.16</td>
<td>Burigoalini (9,92,040 Sq.F)</td>
<td>Orange-B</td>
<td>0.55 km</td>
<td>35.16 km</td>
<td>Brood crab</td>
<td>Adult crab</td>
<td>Operational</td>
</tr>
<tr>
<td>120</td>
<td>Japan fast trade Ltd., Niddumur, Burigoalini, Shyamnagar, Satkhira.</td>
<td>31.03.16</td>
<td>Burigoalini (3,245.22 Sq.F)</td>
<td>Orange-B</td>
<td>1.58 km</td>
<td>35.16 km</td>
<td>Brood crab</td>
<td>Adult crab</td>
<td>Operational</td>
</tr>
<tr>
<td>121</td>
<td>Naobekiganomukhakakra hatchery and value chain unnayanprakalpa, Burigoalini, Shyamnagar, Satkhira.</td>
<td>01.03.16</td>
<td>Burigoalini (9,169.38 Sq.F)</td>
<td>Orange-B</td>
<td>0.43 km</td>
<td>35.13 km</td>
<td>Brood crab</td>
<td>Adult crab</td>
<td>Operational</td>
</tr>
<tr>
<td>122</td>
<td>M/s Asha petroleum, Bangshipur, Shyamnagar, Satkhira.</td>
<td>01.01.12</td>
<td>Bangshipur (14,374.8 Sq.F)</td>
<td>Orange-B</td>
<td>9.65 km</td>
<td>37.32 km</td>
<td>Diesel, Petrol etc.</td>
<td></td>
<td>Operational</td>
</tr>
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<tr>
<td>123</td>
<td>Al gasjali ice-cream factory, Bangshipur, Shyamnagar, Satkhira.</td>
<td>01.08.06</td>
<td>Bangshipur (1,960.2 Sq.F)</td>
<td>Orange-B</td>
<td>6.51 km</td>
<td>34.16 km</td>
<td>Milk, water, sugar, freon gas etc.</td>
<td>Ice-cream</td>
<td>Operational</td>
</tr>
<tr>
<td>124</td>
<td>M/s Habib rice mill, Kashimari, natun bazar, Shyamnagar, Satkhira.</td>
<td>28.01.15</td>
<td>Kashimari (653.4 Sq.F)</td>
<td>Orange-A</td>
<td>9.78 km</td>
<td>43.72 km</td>
<td>Rice</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>125</td>
<td>Sheikh rice mill, Natthail bazar busstand, Shyamnagar, Satkhira.</td>
<td>18.11.08</td>
<td>Ramzan nagar (871.2)</td>
<td>Orange-A</td>
<td>3.48 km</td>
<td>30.58 km</td>
<td>Ripe Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>126</td>
<td>M/s Gazi rice mill, Dhumghat, Shyamnagar, Satkhira.</td>
<td>09.02.11</td>
<td>Dhumghat (435.6 Sq.F)</td>
<td>Orange-A</td>
<td>5.62 km</td>
<td>33.29 km</td>
<td>Ripe Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>127</td>
<td>Farzana rice mill, Ishwaripur, Shyamnagar, Satkhira.</td>
<td>05.11.08</td>
<td>Ishwaripur (1306.8 Sq.F)</td>
<td>Orange-A</td>
<td>0.11 km</td>
<td>28.94 km</td>
<td>Ripe Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>128</td>
<td>Mayer doa rice mill, Haoalvangi bazar, Shyamnagar, Satkhira.</td>
<td>12.02.07</td>
<td>Atulia (435.6 Sq.F)</td>
<td>Orange-A</td>
<td>9.09 km</td>
<td>41.89 km</td>
<td>Ripe Paddy</td>
<td>Rice (perboiled)</td>
<td>Operational</td>
</tr>
<tr>
<td>129</td>
<td>Nahid Workshop, Munshiganj, Kalinagar, Shyamnagar, Satkhira.</td>
<td>08.08.07</td>
<td>Munshiganj (653.4 Sq.F)</td>
<td>Orange-A</td>
<td>0.12 km</td>
<td>33.37 km</td>
<td>Iron rod, Angel, Baretc, Door, Window, Grill etc.</td>
<td>Network</td>
<td>Operational</td>
</tr>
<tr>
<td>130</td>
<td>Nahid Workshop, Munshiganj, Kalinagar, Shyamnagar, Satkhira.</td>
<td>13.05.07</td>
<td>Kashimari (435.6 Sq.F)</td>
<td>Orange-A</td>
<td>12 km</td>
<td></td>
<td></td>
<td></td>
<td>Operational</td>
</tr>
</tbody>
</table>
### Annex C: List of Red category industries in Sundarbans ECA area (Bagerhat, Khulna and Satkhira District)

<table>
<thead>
<tr>
<th>SL</th>
<th>Industry Name and Address</th>
<th>Date of Establishment</th>
<th>Mouza name (Land Area)</th>
<th>Class</th>
<th>Distance from Sundarban Reserve Forest</th>
<th>Distance from Sundarban World Heritage Site (SWHS)</th>
<th>Raw Material</th>
<th>Finished Product</th>
<th>Operation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pace tobacco industries (BD) ltd. Mongla EPZ Mongla, Bagerhat.</td>
<td>30/06/10</td>
<td>Kamar dang (EPZ) 8000 Sq.m</td>
<td>Red</td>
<td>5.1 km</td>
<td>51 km</td>
<td>processed tobacco</td>
<td>Cigarette</td>
<td>Operational</td>
</tr>
<tr>
<td>2</td>
<td>YCL International industries ltd. Mongla EPZ Mongla, Bagerhat.</td>
<td>15/11/12</td>
<td>Kamar dang (EPZ) 8000 Sq. m</td>
<td>Red</td>
<td>5.1 km</td>
<td>51 km</td>
<td>Collected unused hair</td>
<td>Artificial hair</td>
<td>Operational</td>
</tr>
<tr>
<td>3</td>
<td>Ta and Pa Engineering products ltd. Mongla EPZ Mongla, Bagerhat.</td>
<td>18/01/12</td>
<td>Kamar dang (EPZ) 8000 Sq.m</td>
<td>Red</td>
<td>5.1 km</td>
<td>51 km</td>
<td>Imported Net Fiber glass mass, rib lath, angel band etc.</td>
<td>Car parts, wire harness and soft heating pad</td>
<td>Operational</td>
</tr>
<tr>
<td>4</td>
<td>Kotoobuki Bangladesh ltd. Mongla EPZ Mongla, Bagerhat.</td>
<td>25/09/14</td>
<td>Kamar dang (EPZ) 8000 Sq. m</td>
<td>Red</td>
<td>4.9 km</td>
<td>51 km</td>
<td>Cable ware, pvc tube, pvc tape, cable tie and game</td>
<td>Car parts, wire harness and soft heating pad</td>
<td>Operational</td>
</tr>
<tr>
<td>5</td>
<td>Mongla Oil Instalation. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>14/05/13</td>
<td>Burir da-nga &amp; Biddarbaon. (30 acre)</td>
<td>Red</td>
<td>5.70 km</td>
<td>53 k.m</td>
<td>Imported petroleum</td>
<td>Storage Petroleum</td>
<td>Non Operational</td>
</tr>
<tr>
<td>6</td>
<td>Dubai Bangladesh Cements mills ltd Mongla port industrial area, Mongla, Bagerhat.</td>
<td>09/10/2000</td>
<td>Burir danga, Biddarbaon. (10 acre)</td>
<td>Red</td>
<td>6.00 km</td>
<td>53 k.m</td>
<td>Clingkar, Gypsum, Limestone,Slag and fly ash</td>
<td>Cement</td>
<td>Operational</td>
</tr>
<tr>
<td>7</td>
<td>Holcim Cement (Bangladesh) ltd plot no- 18, Mongla port industrial area, Mongla, Bagerhat.</td>
<td>23/08/2000</td>
<td>Burir danga, Biddarbaon. (10 acre)</td>
<td>Red</td>
<td>6.00 km</td>
<td>53 k.m</td>
<td>Clingkar, Gypsum, Limestone,Slag and fly ash</td>
<td>Cement</td>
<td>Operational</td>
</tr>
<tr>
<td>8</td>
<td>Holcim Cement (Bangladesh) ltd (Jetty) plot no- 18, Mongla port industrial</td>
<td>23/12/13</td>
<td>Burir danga, Biddarbaon (5000 sq.m)</td>
<td>Red</td>
<td>6.00 km</td>
<td>53 k.m</td>
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<td>Operational</td>
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<tr>
<td>Sl.</td>
<td>Industry Name and Address</td>
<td>Date of Establishment</td>
<td>Mouza name (Land Area)</td>
<td>Class</td>
<td>Distance from Sundarban Reserve Forest</td>
<td>Distance from Sundarban World Heritage Site (SWHS)</td>
<td>Raw Material</td>
<td>Finished Product</td>
<td>Operation Status</td>
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<tr>
<td>9</td>
<td>United Refinary and Bulk Storage ltd. Mongla port industrial area Mongla, Bagerhat.</td>
<td>04/12/05</td>
<td>Burirda-nga, Bidarban-son. (10 acre)</td>
<td>Red</td>
<td>6.10 k.m</td>
<td>53km</td>
<td>Imported petroleum</td>
<td>Storage petroleum</td>
<td>Not Operational</td>
</tr>
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<td>10</td>
<td>Petromax Refinary ltd. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>31/08/09</td>
<td>Burirda-nga, Bidarban-son. (10 acre)</td>
<td>Red</td>
<td>6.30 k.m</td>
<td>53km</td>
<td>Local Gas condensate</td>
<td>Octane, Petrol, Diesels, Kerosene.</td>
<td>Operational</td>
</tr>
<tr>
<td>11</td>
<td>Teledata Marine Solutions. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>19/1299</td>
<td>Burirda-nga, Bidarban-son. (10 acre)</td>
<td>Red</td>
<td>6.20 k.m</td>
<td>53km</td>
<td>Imported Propane and Butane.</td>
<td>LPG Bottling</td>
<td>Operational</td>
</tr>
<tr>
<td>12</td>
<td>Omera Petroleum ltd. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>22/05/12</td>
<td>Burirda-nga, Bidarban-son. (10 acre)</td>
<td>Red</td>
<td>6.20 k.m</td>
<td>53km</td>
<td>Imported Propane and Butane</td>
<td>LPG Bottling</td>
<td>Operational</td>
</tr>
<tr>
<td>13</td>
<td>Petrede LPG ltd. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>23/04/98</td>
<td>Burirda-nga, Bidarban-son. (10 acre)</td>
<td>Red</td>
<td>6.20 k.m</td>
<td>53km</td>
<td>Imported Propane and Butane</td>
<td>LPG Bottling</td>
<td>Operational</td>
</tr>
<tr>
<td>14</td>
<td>Sundarbans industrial complex ltd. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>06/07/10</td>
<td>Burirda-nga, Bidarban-son. (10 acre)</td>
<td>Red</td>
<td>6.30 k.m</td>
<td>54km</td>
<td>Imported still sheet</td>
<td>LPG cylinder</td>
<td>Operational</td>
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<tr>
<td>15</td>
<td>Bashundhara industrial complex ltd. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>10/09/02</td>
<td>Burirda-nga, Bidarban-son. (10 acre)</td>
<td>Red</td>
<td>6.30 km</td>
<td>54km</td>
<td>Chingkar, Gypsum, Limestone,Slag and Fly ash</td>
<td>Cement</td>
<td>Operational</td>
</tr>
<tr>
<td>16</td>
<td>Bashundhara industrial complex ltd (Extension)</td>
<td>07/11/10</td>
<td>Burirda-nga, Bidarban-son. (10 acre)</td>
<td>Red</td>
<td>6.30 km</td>
<td>54km</td>
<td>Chingkar, Gypsum, Limestone,Slag and</td>
<td>Cement</td>
<td>Operational</td>
</tr>
<tr>
<td>Sl.</td>
<td>Industry Name and Address</td>
<td>Date of Establishment</td>
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<tr>
<td>1</td>
<td>Mongla port industrial area, Mongla, Bagerhat.</td>
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</tr>
<tr>
<td>17</td>
<td>Meghna Cements mills ltd. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>28/02/91</td>
<td>Burredanga, Bidarbaon (10 acre)</td>
<td>Red</td>
<td>6.30 k.m</td>
<td>54km</td>
<td>Fly ash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Rashudikhara UP Gas ltd. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>15/02/98</td>
<td>Burredanga, Bidarbaon (10 acre)</td>
<td>Red</td>
<td>6.40 k.m</td>
<td>54km</td>
<td>Imported Propene and Butane</td>
<td>LPG Bottling</td>
<td>Operational</td>
</tr>
<tr>
<td>19</td>
<td>Mongla Cement Factory. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>14/02/91</td>
<td>Burredanga, Bidarbaon (10 acre)</td>
<td>Red</td>
<td>6.30 k.m</td>
<td>54km</td>
<td>Clingkär, Gypsum, Limestone, Fly ash and Fly ash</td>
<td>Cement</td>
<td>Operational</td>
</tr>
<tr>
<td>20</td>
<td>SKS LPG ltd. Mongla port industrial area, Mongla, Bagerhat.</td>
<td>07/07/14</td>
<td>Burredanga, Bidarbaon (10 acre)</td>
<td>Red</td>
<td>6.40 k.m</td>
<td>54km</td>
<td>Imported Propene and Butane</td>
<td>LPG Bottling</td>
<td>Operational</td>
</tr>
<tr>
<td>21</td>
<td>Navana LPG ltd. Bidarbaon, Digraj, Mongla, Bagerhat.</td>
<td>29/04/13</td>
<td>Bidarbaon, Digraj (07 acre)</td>
<td>Red</td>
<td>8.90 k.m</td>
<td>61km</td>
<td>Imported Propene and Butane</td>
<td>LPG Bottling</td>
<td>Operational</td>
</tr>
<tr>
<td>22</td>
<td>Decan LPG ltd. Bidarbaon, Digraj, Mongla, Bagerhat.</td>
<td>19/09/12</td>
<td>Bidarbaon (5.20 acre)</td>
<td>Red</td>
<td>9.40 k.m</td>
<td>64km</td>
<td>Imported Propene and Butane</td>
<td>LPG Bottling</td>
<td>Non-Operational</td>
</tr>
<tr>
<td>23</td>
<td>Sunmarine Shipyard ltd. Chilla,Joymoni Goal, Mongla, Bagerhat.</td>
<td>22/03/12</td>
<td>Joymoni Goal, (200 acre)</td>
<td>Red</td>
<td>1.50 k.m</td>
<td>42km</td>
<td>Imported Still/Iron Sheet</td>
<td>Shipbuild and ship repair</td>
<td>Non-Operational</td>
</tr>
<tr>
<td>24</td>
<td>Sundarbanis Shipyard ltd. Shelabunia, Bidarbaon, Mongla, Bagerhat.</td>
<td>13/03/12</td>
<td>Bidarbaon (134,647 Decemal)</td>
<td>Red</td>
<td>9.00 k.m</td>
<td>63km</td>
<td>Imported Still/Iron Sheet</td>
<td>Shipbuild and ship repair</td>
<td>Non-Operational</td>
</tr>
</tbody>
</table>
Annex D: Terms of References for conducting SEA

File attached separately.
SECTION 6
Terms of Reference (ToR)

Government of the People's Republic of Bangladesh
Ministry of Environment, Forest and Climate Change
Bangladesh Forest Department

Terms of Reference (ToR) for
Selection of Consulting Firm (International or National-International JV) for Conducting the Strategic Environmental Assessment (SEA) for Conservation of South West (SW) region of Bangladesh including the Sundarban.

Prepared by
Bangladesh Forest Department
1. Introduction

The Sundarbans has both local and global significance due to its diversity, uniqueness, and richness of the ecosystem. An overall plan of approach is being initiated by the present government, reinforced with concrete vision to accommodate infrastructural shifts imparted by rapid development. This is to ease-in changes and shifts into nature and ecosystem and to ensure environmental sustainability; fulfilling the visions of both 2021 and 2041. In this context, the present government has taken a visionary initiative to undertake a comprehensive Strategic Environmental Assessment (SEA) for the sustainable conservation of Sundarbans. This study aims at striking a dynamic balance between the biodiversity of the Sundarbans and the current development drive.

Since inception in 1971, the nation has strived for gradual development and sustenance. It culminated in the drive for the country's sustainable development agenda through striking a "right balance" between equitable national economic progress and human development. Bold steps initiated by the present government precipitated throughout the hierarchy in that it galvanized widespread collaboration and unprecedented innovation to fast track the country's rate of development. In pursuit to achieving middle income status, the nation has established new development paradigm through innovative approaches to bring about a cohesive and integrated management system to ensure long-term sustainability, backed by integrated environmental strategies. Thus an SEA is necessary for assessing the cumulative environmental impact and providing way forward for development.

Strategic Environmental Assessment (SEA) involves the environmental evaluation of proposed policies, plans and programs. According to the Organization for Economic Co-operation and Development (OECD), "SEA comprises analytical and participatory approaches to strategic decision-making that aim to integrate environmental considerations into policies, plans and program, and evaluate the inter linkages with economic and social considerations." Thus, in line with this directives, the present government has prioritized environmental considerations, for the overall development of the Southwest region.

The SW region is blessed with the Sundarbans, the largest mangrove forest in the world. This vast forest is also a wildlife sanctuary located at the delta of the Ganges river on the Bay of Bengal. The Sundarbans has been declared as a Ramsar site in 1992 and part of the Sundarbans has been recognized as a UNESCO World Heritage Site in 1997. The Sundarbans has received recent global attention in lieu of the current drive towards development and existing and future challenges. Subsequently, UNESCO WHC requested the State Party, Bangladesh, to undertake a comprehensive Strategic Environmental Assessment (SEA) (Decision 38 COM 7Bb.64 and 39 COM 7B.8) to assess the direct, indirect and cumulative impacts at a landscape and regional scale and to uphold its Outstanding Universal Value (OUV).

The South West region is rapidly developing to achieve the national visions and goals and subsequently, the government has formed policies, plans and programs (PPP) for development of the area through contribution from both public and private sectors. An SEA is pivotal in assessing the integrated impacts and to further contribute towards formulation of PPPs and influence the decision making process. The SW region of Bangladesh, being a
highly prospective region for development thrusts, is however, lagging behind in comparison with the present development trajectory. The present government has thus taken this initiative for the socio-economic development of the region and at same time to ensure balance between development and the conservation of natural resources on a priority basis. This SEA will cover the PPPs related to seven sectors namely, water, power, tourism, urbanization, industry, transportation/communication and shipping.

1 SEA Project Area

The setting of the study features the south-western region of Bangladesh, consisting of a rich coastal region and is home to the Sundarbans, the largest contiguous natural mangrove forest in the world. Figure 1 illustrates the study region. Bangladesh is situated at the tail-end of the mighty Ganges-Brahmaputra-Meghna (GBM) river basins and as such, drains the entirety of flow generated within these basins. Being part of a network this massive, the country holds contrasting hydrological features which prompted its division into eight unique hydrological regions during the formulation of the National Water Management Plan (NWMP) in 2001.

The study region comprises the South West hydrological region, fed primarily through the Ganges River System. This region is criss-crossed by a complex network of rivers and streams of varying hydrological and morphological characteristics providing lifeline to the ecosystem of the region including that of the Sundarbans. Flow from Ganges emanate downstream through the Gorai-Madhumati system, Kapatakshya system, Mathabhanga system etc. The four major river systems flowing through the Sundarbans are the Raimangal, Arpangasia, Sibsa-Passur and the Baleswar.

Being primarily dependent on the Ganges flow, temporal decrease of downstream freshwater flow combined with progressing salinity intrusion resulting from climate change induced sea level rise has rendered this region vulnerable to natural disasters and has also greatly affected the ecosystem as well as livelihood of the people. Any future development scheme for the region has to be implemented keeping in mind the possible long-term as well as short-term impact it might exert on the biodiversity and ecological balance of the region, especially the Sundarbans. A strategic environmental plan will therefore greatly help in reinforcing a secured future for the region.
Figure 1: Map of the South-Western Region
2 Objective
The following specific objectives have been formulated for carrying out the SEA study:

i. Consideration of environmental consequences for the existing PPPs and integrating it into future PPPs with a view to promoting sustainable development for conservation of the Sundarbans;

ii. Simultaneous assessment of the impacts of development initiatives on existing bio-physical settings and socio-economic conditions to facilitate support for the transition towards resource efficient economy;

iii. Identification of key stakeholders relevant to selected sectors and consultation meetings to obtain knowledge on existing bio-physical settings and socio-economic conditions, impacts and potential strategies;

iv. Development of alternative strategies to minimize the direct, indirect as well as cumulative impacts on the Sundarbans;

v. Administer environmental performance management to both public and private sectors in accordance with future development activities; and

vi. Formulation of a comprehensive framework in the form of a strategic environmental plan for the SW region to support decision making through assessment of policies, plans and programs that will affect the environment of the region and in particular the Sundarbans.

3 Scope of Works

i. Identify relevant development policies, plans and programs through screening for water, power, industry, tourism, transportation/communication, urbanization and shipping sectors up till 2041 for both public and private segments;

ii. Conduct pre-screening beforehand to rapidly narrow down list of PPPs to determine whether the PPP will be taken to the next level of screening.

iii. Scoping to identify the effect on existing environmental and socio-economic conditions due to development initiatives and perform subsequent assessment for the Sundarbans;

iv. Review of selected existing policies, laws and institutions relevant to the seven sectors as well as past national and international SEA studies for deeper understanding of the process and possible type of outcomes;

v. Identify key environmental issues and challenges imposed by both natural and human interventions that significantly impact the conservation of the Sundarbans;

vi. Development for pertinent objectives, indicators and targets for each environmental issues and identify specific criteria against which the performance of each selected PPP will be evaluated;
vii. Establish baseline on the current status of the Sundarbans in line with the seven sectors with respect to a selected period;

viii. Identify environmental and ecological parameters for Sundarbans forest which will be indicators in determining impacts;

ix. Identify the present and potential sources of pollution as well as pollutant carriers that are important for conservation of the Sundarbans;

x. Estimate probable future pollution levels and their impacts through internationally accepted standard mathematical modeling tools and techniques and prepare an environmental quality benchmark with projections for future levels of pollution;

xi. Identify key stakeholders pertinent to each individual sector on the basis of the relevant challenges, issues and impacts of development initiatives through consultation of relevant agencies and expert judgment;

xii. Integrate the outcomes of the consultative meetings with stakeholders within the scoping process to obtain clear knowledge on relative bio-physical and socio-economic issues;

xiii. Conduct multi-level stakeholder consultations at local and national level to identify the sustainability criteria for determining strategic alternative options;

xiv. Assess the potential direct, indirect and cumulative impacts due to policies, plans and programs relevant to water resources, industry, power, communication/transportation, urbanization, tourism and shipping sectors;

xv. Recommend strategic alternative measures for formulation of future PPPs as well as adjustment of existing PPPs;

xvi. Integration of environmental principles such as polluter pay principle and the precautionary principle into the development, appraisal, and selection of PPPs;

xvii. Identify suitable alternatives by considering the strategic aims of the selected PPPs;

xviii. Provide an Environmental Management Plan (EMP) with identified strategic alternative measures; and

xix. Establish monitoring protocol and prepare comprehensive environmental auditing plan.
3.1 Documents to be submitted with the proposal

a) Original copy of Joint venture signed agreement on non-judicial stamps.
b) Certification from the implementing agency for completion/ongoing of SEA by the consulting firm (at least for those SEA works mentioned in the EOI proposal).
c) Report of at least one completed SEA work by the firm mentioned in the EOI proposal.

4 Approach and Methodology

4.1 SEA Conducting Approach
The SEA will evaluate and simultaneously improve the management of existing as well as emerging risks to the Sundarbans. It will be carried out in accordance with the OECD guidelines, through a multi-tiered approach which will include conceptualization of the study, identification of policies, plans and programs as well as issues to be addressed, consulting pertinent stakeholders, development of baseline situation, and formulation of strategic alternatives approaches in developing a concise decision aiding tool.

The SEA will be conducted in accordance with the eight World Heritage Impact Assessment Principles that covers certain aspects such as ensuring rigorous environmental assessment of multi-dimensional impact of development programs with strategic alternatives through formulation of an environmental management plan, backed up by a structured monitoring and auditing plan.

4.2 Methodology

4.2.1 Screening
Screening will be carried out to identify PPPs to establish whether the relevant PPPs are to undergo a SEA. Pre-screening will be performed based on a series of questions to determine whether the PPP will be taken to the next level of screening. The selected screened-in PPPs will then be screened to assess potential environmental significance in respect to the probability, duration, frequency, reversibility of impacts, its cumulative nature etc.

4.2.2 Scoping
Scoping will be carried out to maintain focus of the study on pertinent issues that will be determined. This will be through a series of tasks stated below:

4.2.3 Determining key elements
The key elements such as goals, objectives and strategic aims of selected PPPs will be narrowed down to focus on the activities that are to follow from their implementation. Elements will be identified through processes such as from relevant documents, brainstorming sessions between relevant government and non-government agencies as required. Strategic aims under individual PPP may include the development of projects, investment in new technologies etc.

4.2.4 Determination of environmental issues
Upon successful identification of key elements, the potential impact of implementation of those elements on the specific aspects of the environment will be determined. This will be done through consultation with environmental agencies and experts. The relevant significance of these effects and their follow up investigations will be prioritized. Environmental issues that are necessary for the SEA will be determined.

4.2.5 Literature Review for Secondary Information
The study will identify and review existing policies, laws and institutions relevant to the study. The institutional arrangements at the national level will also be reviewed with the intention of identifying those that will affect the Sundarbans. Review of relevant SEA studies will be carried out for understanding of the process and possible type of outcomes.

4.2.6 Development of Objectives, Indicators and Targets
For each of the environmental issues to be investigated, specific criteria will be identified against which the performance of each selected PPP will be evaluated. The criteria will include setting environmental objectives to provide benchmark for the environmental effects. Indicators will be devised which will provide a qualitative measurement of the progress towards achieving the objective. Specific targets will be set for each objective to obtain a quantitative means of evaluation.

4.2.7 Preliminary Identification of Alternatives
Potential alternatives will be identified taking into account the objective and scope of the selected PPPs and will be considered during development of preferred option. This will include identifying the purpose and over-arching objectives of the PPPs, broadening of the scope to identify a range of alternatives and development of criterion for selecting the best feasible alternative. The identified alternatives will be compared based on the level of impact they are potentially expected to impart on the environment. Final selection will also include the economic and social factors pertaining to each alternative.

4.2.8 Preparation of Scoping Report
A detailed scoping report will be developed to inform pertinent stakeholders about key elements of the PPPs, environmental issues to be addressed and suitable alternatives in aim of generating interim feedback that will help in developing the final SEA report.

4.2.9 Stakeholder Identification and Analysis
Stakeholder mapping will be done to identify pertinent stakeholders based on whether they will influence the implementation of proposed policies, plans and programs or in turn, be affected by it. Identification of stakeholders will be done via reviewing policies and plans in singing out institutes that will influence implementation as well as those institutions that will be affected through implementation. Standard social tools (such as FGD, PCM) will be used for stakeholder analyses.

4.2.10 Consultation with Stakeholders
The SEA scoping process will start through consultative meetings among the different stakeholders relevant to the seven sectors as well the Forest Department and Department of Environment. This will be done specifically to get a better understanding of the main objectives of the PPPs. This will be done to establish the environmental, socio-economic and institutional issues that need to be addressed in the planning process.

4.2.11 Site Visits
The consultative meeting will be followed by field visits to the study area. The purpose of the visit will be to observe the features on the ground and establish facts that needs to be considered in the SEA scoping process. These include sensitive ecological features, land use practices and environmental and socio-economic challenges.

4.2.12 Key Informant Interview
Key informants will be identified by the experts of the MoEFCC. They will consist mainly of BFD and DoE officials, officials from the Local Government, Ministry of Forest officials, government officials from Power Development Board and Bangladesh Water Development Board and officials from the related public and private agencies. Public representatives for the region will also be interviewed. Other officials from associations such as the Chamber of Commerce and NGOs among others will also consulted.

4.2.13 Address Potential Environmental Impacts
This will include getting an understanding of the existing state of the environmental system with respect to the aspects that may be affected by the PPP. This will be followed by analyzing how the environment is likely to be impacted by implementation of PPP and alternatives. These changes will be cross-referenced with environmental policies, objectives and standards identified during scoping. Finally, any adverse impact will be addressed and subsequently benefits will be maximized through revision. This process will include the following tasks.

4.2.14 Establish Environmental Baseline
Environmental baseline on the current status of the seven selected sectors and the Sundarbans will be established though collection of necessary information regarding potential impacts of PPP implementation. This will be done through initially assigning a suitable year period as the baseline and will commence in parallel with the scoping process. Data will be collected from existing secondary sources. Field surveys will be conducted for collecting primary data.

4.2.15 Predicting Impacts of PPPs and Assessment of Significance
Direct, indirect and cumulative impacts of PPP will be assessed on biological, physical and socio-economic system. Impacts will be assessed in respect to base condition using internationally accepted standard mathematical modeling tools and techniques. Potential impacts on the environment due to implementing PPP will be identified and described. This will include the nature and extent of change, the frequency of impact and probability of recurrence. Upon identification, it will be possible to consider what implication this might exert on the environment in determining its relative significance.

4.2.16 Mitigation of Impacts
Strategic measures will be provided for impacts based on their level of significance. It will involve preventive measures as well as reduction of magnitude or probability of occurrence. Measures will also be placed to remedy effects after occurrence. The strategic measures will firstly focus on avoiding potential negative impacts and secondly aim at reducing unavoidable residual impacts.

4.2.17 Finalization of SEA
4.2.17.1 Harmonization of Findings
The SEA Consultants team will synthesize and harmonize the study findings via workshop. This will ensure that key environmental and socio-economic aspects will be captured and documented clearly and logically.
4.2.17.2 Development of Alternative Plans and Programs
The consulting firm shall develop Alternative plans and programs for each sustainability criterion that will guide the overall planning approach in achieving the objectives. This will culminate in the form of a sustainability framework as guidance for future interventions as well as a level through which existing PPPs will be assessed.

4.2.17.3 Preparation of SEA Report
A detailed SEA report with sector wise Environmental Management Plan (EMP) will be developed by the firm which will include the systematic methodology followed, list of consultation and stakeholders, summary of elements and outcomes of PPPs and provide strategies. It will describe current baseline environment and developed indicators, objectives and targets. It will provide means of incorporating strategic measures into the development of PPPs and summarize findings and provide monitoring guidelines.

4.2.17.4 Development of Framework for Monitoring and Auditing
A comprehensive monitoring and auditing framework will be developed for the implementation schemes to evaluate whether the sustainability criterion is being met to potential and to ensure adherence to formulated guideline which will incorporate timely adjustment to the developed program, if and when required.

4.3 SEA Consultancy Outputs
- Screening and scoping Report
- SEA report with Strategic EMP for selected sectors
- Monitoring and Auditing framework

4.4 Consultant’s Qualification, Experience & ToR

<table>
<thead>
<tr>
<th>S L</th>
<th>Proposed Professionals</th>
<th>Nos</th>
<th>Qualification, Experience &amp; Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. International Consultant</td>
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</tbody>
</table>
| 1  | Environmental Advisor/Team Leader | 1.  | Minimum PhD degree in Environmental Science/Forestry/Forest Ecosystem, Water Resources Engineering/Environmental Engineering. At least 15 years of working experience. Should have experience working as a team leader or Deputy team leader. Should have working experience in at least one completed SEA project. ToR/ Responsibilities:  
  - Take full responsibility for all aspects of planning, liaison and reporting;  
  - Select best suited approach and options for carrying out the EA.  
  - Guide and supervise the consultants in carrying out the environmental, social and related activities; |
<table>
<thead>
<tr>
<th>No.</th>
<th>Role</th>
<th>Qualification</th>
<th>ToR/Responsibilities</th>
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</thead>
</table>
| 2   | Air Quality Expert            | Minimum PhD degree in Environmental Science/Environmental Engineering/Environmental Chemistry. Should have at least 15 years of working experience as air quality expatriate natural resources sector. | - Coordinate the whole SEA activities;  
- Analyze and interpret the historical data as well surveyed data.  
- Review policy, plan and programme of 3 sectors out of 7 sectors  
- Attend meeting as and when required by the designated representative of Project Proponent; and  
- Finalizing all reports and plans  
- Assessment of Environmental Baseline on Air Quality, Acoustic Environment, Physical Environment;  
- Plan, measure and report of air pollutants such as CO, NO, SO, dust particles and other elements required for SEA project area  
- Carrying out Air Pollutants Dispersion Modeling;  
- Assessment of Impacts on Air Quality, Ambient Noise, and Workers Health and Safety |
| 3   | Environmental Modeler         | Minimum PhD degree in Environmental Science/Environmental Engineering. At least 15 years of working experience. Should have experience working as air quality expert. Experience working in similar geographic area. | - Assessment of Environmental Baseline on Air Quality, Acoustic Environment, Physical Environment;  
- Assessment of Impacts on Air Quality, Ambient Noise, and Water quality due to development works in the SW region,  
- Carrying out GIS modeling on air quality, noise, water quality  
- Carrying out Dispersion Modeling; |
### B. National Consultant

<table>
<thead>
<tr>
<th>No.</th>
<th>Position</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| 1   | Deputy Team Leader/ EIA Expert/NRM Expert | Minimum Master's degree in Environmental Science/Environmental Management/Environmental Engineering/Forestry/Hydrology/Mangrove ecosystem/ Water resources engineering. At least 15 years of experience in the field of natural resources, Climate change, Hydrology and well understanding of the Assessment studies, coastal and coastal afforested areas. ToR:  
* Fully responsible for all aspects of planning, liaison and reporting;  
* Guide and supervise the study team while carrying out the Environmental, social and related activities;  
* Coordinate the study activities;  
* Analyze and interpret the historical data as well real time surveyed data.  
* Select best practice approach and options for carrying out the SEA.  
* Attend meeting as and when required by the designated representative of Project Proponent; and  
* Incorporate comments on final report etc.  
* Finalization of review of policy, plan and programme of relevant 4 sectors out of 7 sectors.  
* Finalization of all reports and plans |
| 2   | Environmental Expert                  | Minimum Master degree in Environment Science / Environmental Management / Forestry / Climate change. At least 10 years of experience in the field of Environment/ Forestry/Climate change. Also should have experience in conducting Impact Assessment Studies, working in the coastal areas, polders etc. ToR/Responsibilities:  
* Coordinate to collect and assess field data of on air quality, water quality, noise, soil and other climatic factors  
* Environmental Risk Assessment  
* Identification of relevant pollution abatement measures, mitigation measures and Environmental Management Plan |
<table>
<thead>
<tr>
<th>3</th>
<th>Climate Change Expert</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development of Relevant Environmental Monitoring Plan</td>
<td></td>
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<tr>
<td></td>
<td>Identify, evaluate and quantify environmental impacts</td>
<td></td>
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<tr>
<td></td>
<td>Analyze and interpret the historical meteorological data</td>
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</tbody>
</table>

Minimum Master degree in Environment Science / Environmental Management / Forestry / Climate change. At least 12 years of experience in the field of Environment / Forestry / Climate change.

**TOR**

- Identify, evaluate and quantify climate change impacts on SW region
- Coordinate the climate change related activities and data collection;
- Analyze and interpret the historical climate data.
- Project next 20 years climate change scenario
- Assist developing EMP
<table>
<thead>
<tr>
<th>No.</th>
<th>Position</th>
<th>Experience</th>
<th>ToT/Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Power and Energy Expert</td>
<td>1</td>
<td>Minimum Bachelor degree in Electrical Engineering. At least 10 years of experience in Power sector.</td>
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<td></td>
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<td><strong>ToT/Responsibilities:</strong></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Developing elaborate Methodology, Work Plan and Study Implementation Schedule to collect power and energy related information;</td>
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<td></td>
<td>- Analysis of Environmental Performance Standards’ Requirements in Power sector; and</td>
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<td></td>
<td></td>
<td>- Analysis of Environmental Legislative Requirement in power sector</td>
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<td></td>
<td></td>
<td>- Preparing boiler decommissioning plan</td>
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<td>- Describe environmental and safety plan for decommissioning</td>
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<td>- Support environmental experts in preparing safety plan during mechanical installation</td>
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<td></td>
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<td>- Identify pollution abatement measures required for the proposed power plant</td>
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<tr>
<td>No.</td>
<td>Position</td>
<td>Additional Qualifications</td>
<td>ToR/Responsibilities</td>
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<tr>
<td>5</td>
<td>Land use expert</td>
<td>Minimum Bachelor degree in GIS/Remote sensing/ Urban and Regional Planning/Geography OR Bachelor degree in forestry with a Diploma in Geospatial sciences. At least 12 years of experience in land use planning.</td>
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<tr>
<td></td>
<td></td>
<td>• Land use map preparation and future planning of SEA project area,</td>
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<td></td>
<td></td>
<td>• Developing Overall elaborate Methodology, Work Plan and Study Implementation Schedule for collection of land use information;</td>
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<td></td>
<td></td>
<td>• Analysis of Environmental Legislative Requirement in land use policy</td>
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<tr>
<td>6</td>
<td>Hydrologist/Hydrodynamic Modeler</td>
<td>Minimum MSc. in Water Resources Engineering/Hydrology. At least 10 years of working experience in Hydrological and Hydrodynamic modelling using 2D, 3D modeling tools.</td>
<td>ToR/Responsibilities:</td>
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<tr>
<td></td>
<td></td>
<td>• Assessment of Hydrological Baseline Condition</td>
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<td>• Assessment of Impacts on Hydro-morphological condition.</td>
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<td></td>
<td></td>
<td>• Inventory of existing water resources of the project areas</td>
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<td></td>
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<td>• Carry out impact assessment and preparing EMP.</td>
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<td></td>
<td>• Hydrological modeling for next 22 years.</td>
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<td>No.</td>
<td>Role</td>
<td>Requirements</td>
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<tr>
<td>7</td>
<td>Water Navigation expert</td>
<td><strong>Minimum B. Sc. in Marine Engineering/ Navigation/ Water Resources Engineering. At least 10 years of working experience in related field including river morphology</strong>&lt;br&gt;<strong>ToR/ Responsibilities:</strong>&lt;br&gt;• Assessment of River navigation baseline condition of the in the SW region&lt;br&gt;• Impact assessment of existing and future vessel movements in SW region including Sundarban&lt;br&gt;• Identify impacts of water navigability and&lt;br&gt;• Prepare carrying capacity of rivers and canals of SW region including Sundarban</td>
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<tr>
<td>8</td>
<td>Transportation expert</td>
<td><strong>Minimum Bachelor degree in Transportation/Communication Engineering. At least 10 years of experience in relevant sector.</strong>&lt;br&gt;<strong>ToR/ Responsibilities:</strong>&lt;br&gt;• Assessment of Baseline Condition of the Transportation sector in SW region;&lt;br&gt;• Assessment of Impacts on Transportation sector;&lt;br&gt;• Identify impacts due to development of Transportation sector; and&lt;br&gt;• Preparing relevant environmental management plan</td>
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<tr>
<td>9</td>
<td>Tourism Expert</td>
<td><strong>Minimum Bachelor degree in Tourism and Hospitality Management / Urban and Regional Planning/Forestry/Environmental Sciences. At least 10 years of working experience. Must have knowledge and working experience in Tourism development. Working experience in the coastal areas will be preferable</strong>&lt;br&gt;<strong>Responsibilities:</strong>&lt;br&gt;• Assessment of Baseline Condition of the Tourism sector in SW region;&lt;br&gt;• Assessment of Impacts on Tourism sector;&lt;br&gt;• Identify impacts due to development of Tourism sector in SW region; and&lt;br&gt;• Preparing relevant environmental management plan</td>
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</table>
| 10 | Policy and Institutional expert | 1 | Minimum Master degree in Economics/Development planning/Development economics/Development studies. At least 15 years of working experience. Must have working experience related to Governance and Public Policy, Institutional Development Responsibilities:  
- Collect information on policy and legal aspects of Bangladesh particularly for seven sectors.  
- Review international relevant policy in connection with EA; and  
- Review forest, environment and seven sectors policies.  
- Suggest policy implementation strategies/procedures of seven sectors. |
| 11 | Water Quality/Pollution Expert | 1 | Minimum M. Sc in Water Resource Development/Environmental Science/Environmental Management. At least 10 years of working experience. Must have experience working as Water Quality Specialist, Environmental Modeler, Monitoring of social and environmental parameters. Working experience in coastal areas. Well knowledge of environmental parameters in compliance with Project Performance Standard of IFC and DOE guidelines. Responsibilities:  
- Plan and Assessment of Water Quality parameters such as Temperature, pH, EC, salinity, DO, BOD, COD, TSS, Turbidity, major nutrients, Trace metals, Heavy metals, Pathogens phytoplankton diversity and other required parameter in the study area  
- Preparing ambient water quality of both surface and ground water  
- Assessing impacts on water quality due to discharge of wastewater  
- Carrying out thermal plume modeling (if necessary) |
<p>| 12 | Noise Pollution Expert | 1 | Minimum B.Sc. in Environmental Science/Management/sonography. At least 10 years of working experience. Must have working experience in impact analysis of air, noise. Working experience in coastal areas. Well knowledge of environmental parameters in compliance with Project Performance Standard of IFC and DOE guidelines |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Role</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| 13  | Forest Management Expert    | Minimum B.Sc. in Forestry. At least 15 years of working experience. Must have working experience in Sundarbans. **Responsibilities:**  
  - Preparing baseline of the forest, flora and fauna of SW region;  
  - Compare all existing and previous management plans of Sundarban and suggest guideline to prepare future management plan of Sundarban considering SW region  
  - Assessment of impact on forest due to development and human intervention |
| 14  | River Morphologist          | Minimum MSc in Water Resources Engineering/River Engineering/River Morphology. At least 15 years of working experience. Should have experience working in River Morphology, River Engineering, Hydrology  
  **Responsibilities:**  
  - Analyse the available data on the channel cross-sections and flow velocities in the different rivers of the SW region to understand the prevailing morphological processes of the system.  
  - Analyse the available data on the channel cross-sections and flow velocities in the different rivers of the SW region to understand the prevailing morphological processes of the system.  
  - Analyse the available historical tidal water level data close to the navigation route and preferably near the shoals.  
  - Analyse the time-series satellite images of the rivers of the navigation routes in order to assess decades-scale stability of the rivers.  
  - Predict the future development of the rivers |
in the navigation route
| 15   | Economist | 1 | Minimum Masters in Economics/Natural Resource Economist/Forest economics. At least 15 years of experience in economic analysis. Feasibility study financial Analysis; Responsibilities:  
- Appraisal of project worthiness in terms of economic viability;  
- Elaboration of the feasibility level cost estimates, contingency amounts, detailed price escalation estimates on the expected implementation schedule, administration cost and tax and duties shown as separate line items and the method of calculation of these costs;  
- Estimation of benefits, the benefits will include profit from extra agriculture as a result from reduced flood damage and drainage congestion, higher cropping intensities and use of high yielding varieties based on cropping prepared by agronomist, estimates for BCR, EIRR;  
- Assessment of costs arising out of migration measures (or external dis-benefits);  
- Conclusion of socio-economic viability of each planning option and the project as a whole; and  
- Assist the team leader in preparation of final report. |
| 16   | Sociologist/Anthropologist | 1 | Minimum Master degree in Sociology/Anthropology or relevant discipline. At least 12 years of experience in socio-economic analysis. Should have work experience in coastal area/Sundarban. Responsibilities:  
- Collect information related to the project from all possible secondary sources and conduct field survey to collect primary data regarding existing physical, ecological and socio-economic/Anthropological conditions.  
- Miscellaneous task as and when required. and  
- prepare EMP measures. |
| 17 | Fisheries specialist | Minimum Master degree in Fishery/Aquatic Science/ Marine science . At least 15 years of experience in Fish production / culture/ habitat/ Migration analysis and impact studies. Should have Experience working in the coastal areas 
Responsibilities:
- Inventory of present fisheries situation, ascertain negative impacts, and suggest mitigation measures. Identifying potential fish breeding ground
- Assessment of impact on breeding ground
- Compile and analyze necessary information related to fish culture, spawning of fishes such as spawning time, river condition, weather condition, water quality, habitat of mother fish, etc. concerning the rivers within the study area;
- Assess vulnerabilities of proposed plan on fisheries resources and suggest remedies, mitigation program and any other step to be taken up for conservation of fisheries resources in the project area;
- Assist the team leader in proposing scopes to future development of Fisheries resources. and
- Miscellaneous tasks as and when required. |
| 18 | Agronomist | Minimum Master degree in M.S in Agriculture/Agricultural Engineering/Agronomy. At least 15 years of experience in agriculture planning, crop modeling, crop water demand assessment, irrigation water management 
Responsibilities:
- Collection and analysis of existing agricultural data and information from secondary sources;
- Carry out comparative study between present agriculture and level of production with the future to assess the financial and economic feasibility of the project;
- Assessment of present agricultural situation with areas and cropping patterns based on soil type and fertility status, farming practices those influences the present cropping patterns, present cost of cultivation, availability livestock, present irrigation use and method of application, present availability |
of extension services, present average yield per hectare, present use of fertilizer and pesticides;

- Carry out baseline condition of land resources and agricultural practices in the project area.

- Assessing the impacts of the proposed interventions on land resources and agricultural practices including cropping pattern, agricultural input use and crop production.

- Developing mitigation plan, enhancement plan and monitoring plan in respect of land resources and agricultural practices.

- Prepare EMP measure;

- Preparation of crop suitability map for the area;

<table>
<thead>
<tr>
<th>19</th>
<th>Wildlife Specialist</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>Bachelor degree in Forestry/Natural resources management with a PG diploma in wildlife management/Masters in Wildlife science/wildlife management. At least 10 years experience in Wildlife management. <strong>Responsibilities:</strong></td>
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<tr>
<td>- Carry out baseline condition of wildlife resources in SW region including Sundarban.</td>
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<td>- Identifying threats for wildlife in the study area</td>
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<tr>
<td>- Assessing impacts of exiting and future development works on wildlife resources.</td>
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<tr>
<td>- Developing and preparing Management plan of wildlife resources of study area.</td>
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<tr>
<td>20</td>
<td>Botanist</td>
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<td>21</td>
<td>Mangrove Ecologist</td>
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<tr>
<td>Total</td>
<td></td>
<td>21</td>
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</tbody>
</table>
List of Experts/Professionals

Total time frame of this study project is 18 (eighteen) months. Following professionals from multi-disciplinary organizations will be involved to implement the project. The team composition is indicative, so the consultant can suggest alternative proposal on team composition for better output of the project.

<table>
<thead>
<tr>
<th>SI</th>
<th>Proposed Professionals</th>
<th>Nos.</th>
<th>Input Man Months</th>
<th>Field Visit Days (% of man month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. International Consultant</td>
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</tr>
<tr>
<td>1.</td>
<td>Environmental Advisor/Team Leader</td>
<td>1</td>
<td>12</td>
<td>14%</td>
</tr>
<tr>
<td>2.</td>
<td>Air quality Expert</td>
<td>1</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>3.</td>
<td>Environmental Modeler</td>
<td>1</td>
<td>5</td>
<td>15%</td>
</tr>
<tr>
<td>Total (International)</td>
<td>3</td>
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<tr>
<td>B. National Consultant</td>
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<tr>
<td>1.</td>
<td>Deputy Team Leader/EIA Expert/NRM Expert</td>
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<td>10%</td>
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<tr>
<td>2.</td>
<td>Environmental Expert</td>
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<td>12%</td>
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<td>3.</td>
<td>Climate Change Expert</td>
<td>1</td>
<td>10</td>
<td>12%</td>
</tr>
<tr>
<td>4.</td>
<td>Power and Energy Expert</td>
<td>1</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td>5.</td>
<td>Land use expert</td>
<td>1</td>
<td>8</td>
<td>15%</td>
</tr>
<tr>
<td>6.</td>
<td>Hydrodynamic Modeler/Hydrologist</td>
<td>1</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>7.</td>
<td>Water Navigation expert</td>
<td>1</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td>8.</td>
<td>Transportation expert</td>
<td>1</td>
<td>7</td>
<td>10%</td>
</tr>
<tr>
<td>9.</td>
<td>Tourism expert</td>
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<td>5</td>
<td>15%</td>
</tr>
<tr>
<td>10.</td>
<td>Policy and Institutional expert</td>
<td>1</td>
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<td>11.</td>
<td>Water Pollution Expert</td>
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<td>Noise Pollution Expert</td>
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<td>Forest Management expert</td>
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<td>14.</td>
<td>River Morphologist</td>
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<td>Economist</td>
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<td>16.</td>
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<td>Agronomist</td>
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<td></td>
<td>Wildlife specialist</td>
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<td>20</td>
<td>Botanist</td>
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<tr>
<td>21</td>
<td>Mangrove ecologist</td>
<td></td>
<td>9</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Total (National)</td>
<td>21</td>
<td>172</td>
<td></td>
</tr>
</tbody>
</table>
Information requested by RMM

1) Court order regarding establishing industries in the ECA area

According to Writ Petition No.12467/2017 filed by an NGO-'Saving Sundarban Foundation' at the High Court Division, the Hon'ble Court has given an interim order in 2017 not to accord permission to any new industrial enterprises within a radius of 10 km from Sundarbans Reserve Forest. Since then no permission is given by the Department of Environment to any large-scale industry at the ECA area.

2) Monitoring and enforcement activities of DOE in the Sundarbans ECA:

DoE is continuously monitoring all industries in the Sundarbans ECA area. In 2019, more than BDT 5.00 million has been charged as compensation against six Cement Factories of Mongla Port Industrial area because of violating the limit of SPM prescribed in the Environmental Conservation Rules, 1997.
Annex E: National Oil and Chemical Spill Contingency Plan (NOSCOP)

File attached separately.

Final DRAFT

National Oil and Chemical Spill Contingency Plan (NOSCOP)

Ministry of Environment, Forest and Climate Change
Government of the People’s Republic of Bangladesh

December 2019
National Oil and Chemical Spill Contingency Plan (NOSCOP)

Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh

December 2019
Oil and chemical spillage is critically detrimental to the environment and difficult-to-control. Consequently, pollution-causing from oil spillage is of gravest concern throughout the coastal and seas region around the globe. This is especially true for Bangladesh due to its strategic location in the Bay of Bengal as important shipping routes for sizable master vessels and tankers carrying goods and Oils from different locations around the Globe. This is also important since Bay of Bengal abounds in rich marine biodiversity including fish and aquatic other lives which are very sensitive to adverse effect of pollution. Not only delta is source of life to ecologically essential and unique species, but also human livelihood dependent on the area and the location of world’s largest mangrove forest – the Sundarban, home to rare flora and fauna, makes the area extremely important requiring protection from pollution. Given the nation’s current state of economic growth, industrial activities have increased that have access to the waters, trade has increased with growing numbers of shipping routes being used rigorously both nationally and internationally, and ports have become busier. Amongst all the processes, risks of spillage of hazardous materials in transportation or storage have increased over the years. Recent observation of spillage incidents has necessitated an imperative to reinforce pollution reduction actions. Hence the National Oil and Chemical Spill Contingency Plan (NOSCOP) has been prepared as part of national and regional effort which formulates an instructional, guiding and informative procedure to tackle oil and chemical spillage emergencies for Bangladesh.

The National Oil and Chemical Spill Contingency Plan (NOSCOP) outline allocation of functional responsibilities to the various Ministries and Departments of the Government of Bangladesh for oil and chemical spill response.

This National Oil and Chemical Spill Contingency Plan (NOSCOP) and other guidelines referenced during the development of this template include those produced by South Asian Cooperative Environmental Program (SACEP), the Regional Oil and Chemical Pollution Contingency Plan for the SAS (South Asian Seas) member countries and some national plans by SAS countries.

The intention of the preparation of this document of national plan is to place an open access to all relevant government organizations (ministries/departments), industries (private and public), entrepreneurs, including civil society to develop a comprehensive, practical national Plan, that allows the implementation of response measures while maximizing environmental protection. To achieve this objective, emphasis has been given to the followings to country-specific:

a. resources at risk (sensitive area, ecologically critical area, PA area, fishing ground of Bay of Bengal, Coastal resources sea beaches, mangrove forests, its resources and biodiversity, including tigers, turtle, dolphins etc.);

b. sources and causes of spills

c. ambient conditions (local conditions include current velocity, tide and other meteorological factors);

d. legal framework and other relevant factors, like routes, ways of shipments, loading and unloading, safety precautions, rules & regulations of Bangladesh Coast Guard,
e. International agreement (SACEP, MARPOL, UNCLOS, CLC-1990 etc.) by Bangladesh Government being considered when developing this National Plan.

The plan approaches crisis management in two levels of application. It sets forth a comprehensive risk management framework, and clearly defines roles and responsibilities for the sector-specific agencies. The legal framework under which, the Government of Bangladesh is vested with the responsibility of the plan, and all policy action specifics are laid out in this plan as well.

Successful implementation of this plan is critical to the continued cooperation and collaboration between and among the partners. I ask for continued commitment and cooperation from all stakeholders as we move forward to developing and implementing NOSCOP.

Abdullah Al Mohsin Chowdhury
Secretary
Ministry of Environment, Forest and Climate Change (MOEFCC)
Phone: 9540481
Fax: 9540210
Email: secretary@moef.gov.bd
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## GLOSSARY

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>BCG</td>
<td>Bangladesh Coast Guard</td>
</tr>
<tr>
<td>BFRI</td>
<td>Bangladesh Fishery Research Institute</td>
</tr>
<tr>
<td>BIWTA</td>
<td>Bangladesh Inland Water Transport Authority</td>
</tr>
<tr>
<td>BIWTC</td>
<td>Bangladesh Inland Water Transport Cooperation</td>
</tr>
<tr>
<td>BN</td>
<td>Bangladesh Navy</td>
</tr>
<tr>
<td>BSC</td>
<td>Bangladesh Shipping Corporation</td>
</tr>
<tr>
<td>CLC</td>
<td>Convention on Civil Liability for Oil Pollution Damage (CLC Convention) 69 &amp; CLC Protocol 76/92</td>
</tr>
<tr>
<td>CMP</td>
<td>Crisis Management Plan</td>
</tr>
<tr>
<td>CMS</td>
<td>Crisis Management System</td>
</tr>
<tr>
<td>CMS</td>
<td>Convention on Migratory Species</td>
</tr>
<tr>
<td>CPA</td>
<td>Chittagong Port Authority</td>
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<tr>
<td>DoE</td>
<td>Department of Environment</td>
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<tr>
<td>DoF</td>
<td>Department of Fisheries</td>
</tr>
<tr>
<td>DoS</td>
<td>Department of Shipping</td>
</tr>
<tr>
<td>ECA</td>
<td>Ecologically Critical Area</td>
</tr>
<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>EI</td>
<td>Environmental Impact</td>
</tr>
<tr>
<td>EOC</td>
<td>Emergency Operations Centre</td>
</tr>
<tr>
<td>ETA</td>
<td>Estimated Time of Arrival</td>
</tr>
<tr>
<td>Flash Point</td>
<td>The lowest temperature at which the vapors above a volatile liquid form a combustible mixture with air.</td>
</tr>
<tr>
<td>FS</td>
<td>Forest Specialist</td>
</tr>
<tr>
<td>GoB</td>
<td>Government of the People’s Republic of Bangladesh</td>
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<tr>
<td>IAP</td>
<td>Incident Action Plan</td>
</tr>
<tr>
<td>IMDGcode</td>
<td>International Maritime Dangerous Goods code</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>IMSF, CU</td>
<td>Institute of Marine Science &amp; Fisheries, Chittagong University</td>
</tr>
<tr>
<td>In-Situ Burning</td>
<td>A controlled ignition of oil, other hydrocarbon products, and oil spill debris at the site of the spill. For offshore spills the burning of the floating oil may occur with or without fire-resistant booms.</td>
</tr>
<tr>
<td>MARPOL</td>
<td>International Convention for Prevention of Maritime Pollution from Ships</td>
</tr>
<tr>
<td>MFAG</td>
<td>Medical First aid guide</td>
</tr>
<tr>
<td>MSDS</td>
<td>Materials Safety Data Sheet.</td>
</tr>
<tr>
<td>MSRC</td>
<td>Marine Spill Response Corporation</td>
</tr>
<tr>
<td>MoEFCC</td>
<td>Ministry of Environment, Forest and Climate Change, Government of Bangladesh</td>
</tr>
<tr>
<td>MPA</td>
<td>Mongla Port Authority</td>
</tr>
<tr>
<td>MPA</td>
<td>Marine Protected Area</td>
</tr>
<tr>
<td>NAADC</td>
<td>North American Aerospace Defense Command</td>
</tr>
<tr>
<td>NDRCC</td>
<td>National Disaster Response Coordination Centre</td>
</tr>
<tr>
<td>NEBA</td>
<td>Net Environmental Benefit Analysis</td>
</tr>
<tr>
<td>NOCS Committee</td>
<td>National Oil and Chemical Spill Control Committee</td>
</tr>
<tr>
<td>NORAD</td>
<td>Norwegian Agency for Development Cooperation</td>
</tr>
<tr>
<td>ODA</td>
<td>Overseas Development Assistance</td>
</tr>
<tr>
<td>OPRC</td>
<td>Oil Pollution Preparedness, Response and Cooperation</td>
</tr>
<tr>
<td>OSC</td>
<td>On-Scene Commander</td>
</tr>
<tr>
<td>OSSC</td>
<td>Oil Spill Service Centre</td>
</tr>
<tr>
<td>PA</td>
<td>Protected Area</td>
</tr>
<tr>
<td>PAH</td>
<td>Polynuclear Aromatic Hydrocarbon</td>
</tr>
<tr>
<td>POLREP</td>
<td>Pollution Report</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinyl Chloride</td>
</tr>
<tr>
<td>RP</td>
<td>Responsible Party. The RP of an incident is the person, business, or entity that has been identified as owning the vessel or facility that caused the spill. The term does not imply criminal negligence</td>
</tr>
<tr>
<td>SAS</td>
<td>South Asian Seas</td>
</tr>
<tr>
<td>SACEP</td>
<td>South Asia Cooperative Environment Programme</td>
</tr>
<tr>
<td><strong>SCUBA</strong></td>
<td>Self-Contained Underwater Breathing Apparatus</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>SITREPS</strong></td>
<td>Situation Reports</td>
</tr>
<tr>
<td><strong>SOP</strong></td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td><strong>UNCLOS</strong></td>
<td>United Nations Convention on the Law of the Sea</td>
</tr>
<tr>
<td><strong>UNEP</strong></td>
<td>United Nations Environment Programme (currently UN Environment)</td>
</tr>
<tr>
<td><strong>VHF</strong></td>
<td>Very High Frequency</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td>A measure of the resistance to flow that a liquid offers when it is subjected to shear stress; higher values indicate thicker, slower-moving materials. For example, gasoline has a lower viscosity than diesel</td>
</tr>
<tr>
<td><strong>VOC</strong></td>
<td>Volatile Organic Compound</td>
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</table>
National Oil and Chemical Spill Contingency Plan (NOSCOP)

**Goal**
This document is the official contingency plan that must be followed according to protocol and hierarchy for immediate response in cases of oil and chemical spill emergencies. This document also serves as a guide for long-term planning and preventive mechanisms that all stakeholders may refer to.

**Custodian**
The Ministry of Environment, Forest and Climate Change of Bangladesh Government is the custodian of this plan.

**Amendment**
Consulting with all stakeholders, amendment or all revisions will be made by the custodian of this plan—the Ministry of Environment, Forests, and Climate Change, Bangladesh. This plan will be updated every five years or it could be amended as and when necessary. Once updated, details must be distributed among all stakeholders as early as possible. Changes in the plan may include but not limited to:

- Policy update
- Technology update
- Manpower and resource update
- Regional opportunities and/or limitations update
- Hierarchy update
- Others

**Distribution**
After every amendment and update, the plan must be distributed to the following institutions. This list itself is subject to change according to change in organization of the mitigation efforts.

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<th>Type</th>
<th>Organization</th>
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<td>Government and Non-government</td>
<td>1. Cabinet Division</td>
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<td>organizations</td>
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<tr>
<td></td>
<td>3. Public Security Division, Ministry of Home Affairs</td>
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<td>5. Department of Environment (DoE)</td>
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<td>6. Department of Fisheries (DoF)</td>
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<td>10. Payra Port Authority (PPA)</td>
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<td>11. <strong>Bangladesh Navy (BN)</strong></td>
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<td></td>
<td>12. <strong>Bangladesh Coast Guard(BCG)</strong></td>
</tr>
<tr>
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<td>13. <strong>Border Guard Bangladesh</strong></td>
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<td></td>
<td>14. <strong>Bangladesh Inland Water Transport Authority (BIWTA)</strong></td>
</tr>
</tbody>
</table>
15. Bangladesh Shipping Corporation (BSC)
16. Department of Shipping (DoS)
17. PetroBangla
18. Bangladesh Petroleum Corporation (BPC)
19. BAPEX
20. Eastern Refinery Ltd (ERL)
21. Deputy Commissioners/Upazilla Nirbahi Officers
22. Bangladesh Police
23. Bangladesh Ansar and VDP
24. Local Government Institutions
25. National Disaster Response Coordination Center (NDRRC)
26. IMSF, CU and NGO dealing with waste and related environmental issues
27. Bangladesh Fire Service and Civil Defense
28. Road Transport and Highways Division
29. Bridges Division
30. Relevant Stakeholders

| International | SACEP, SAS Governments |
| Relevant Contacts | Private national and international petroleum and chemical companies using Bangladeshi waters |

**Sponsors**

The document is prepared with support, direction and funding of the following patron agencies:

- Ministry of Environment, Forests and Climate Change (MoEFCC)
- Department of Environment (DoE)
- Bangladesh Coast Guard
- Bangladesh Navy
- South Asian Cooperative Environmental Program (SACEP) for South Asian Seas (SAS) countries (Bangladesh, India, Maldives, Pakistan and Sri Lanka)
- Norwegian International Development Agency (NORAD)
- International Maritime Organization (IMO)

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- South Asian Cooperative Environmental Program (SACEP)
  - For non-commercial educational distributions
EXECUTIVE SUMMARY

The specific objectives of the National Oil and Chemical Spill Contingency Plan of Bangladesh are:

i. To provide a complete set of instruction that must be followed by all participating agencies in order to prevent, control and manage oil and chemical spillage emergencies in a coordinated way.

ii. To list all the tools, materials and resources held by relevant agencies, and to record all the important contact addresses for communication during contingency mitigation efforts.

The plan comes as a developmental progress of the efforts of the Government of Bangladesh to minimize/reduce and control oil and chemical spill incidents, avoid pollution and risks, and also a result of the joint effort of South Asian Seas (SAS) regional contingency plan overseen by SACEP.

The plan is sponsored by International Maritime Organization (IMO) and SACEP and prepared by the Ministry of Environment, Forests and Climate Change (MoEFCC) supported by Bangladesh Coast Guard, Bangladesh Navy, Port Authorities, South Asian Cooperative Environmental Program (SACEP), and government of SAS countries (Bangladesh, India, Maldives, Pakistan and Sri Lanka).

The plan sets out by defining all its objectives and spelling out all the authorities those will act together. The custodian of the plan is Ministry of Environment, Forests and Climate Change (MoEFCC), Bangladesh. Hence, MoEFCC is the central agency that will act as command and communication center issuing instructions and requests in case of emergencies. Any change to the plan must be approved by MoEFCC, and distributed every time to relevant stakeholders for the concurrence. Besides, it has to be uploaded in the websites of MoEFCC, DoE and relevant other ministries/departments/organizations.

The necessity of the plan is illustrated in introduction with scientific and historical background. Since oil and chemical spillage poses high risk to the environment, terrestrial and aquatic animals, the ecosystem, human health, flora and fauna of Bangladesh. The industries along our coastlines and river bank are very active with expansions of shipping routes in the waterways connecting Bay of Bengal and the ports. A lot of boats and ships play through it without taken adequate safety measures to prevent spillage and puts the entire location at risk. Therefore, a comprehensive contingency plan is required to put effective mitigation systems in action in long and short terms in case of any contingency.

In the scope, the plan mentions the geography of the coastal region, sea divisions in the Bay of Bengal where all economically and environmentally important zones are laid out with topography. The legal framework under which the Government of Bangladesh will act in national and international perspective is detailed in this section as well.

Organization with clearly spelled out roles is of vital importance for swift and precise action. As a result there is a need for a hierarchy and chain of command which the agencies can rely on for effective action. In the distribution of authority section, the instrumental agencies which can provide full support and resources in a contingency situation are mentioned. This includes all the policing and defense organizations.
government and non-government agencies critical during and post operations, which also includemitigation process.

The plan approaches the crisis management plan in two levels of application:

1. Policy and Strategic Level
2. Operational Level

In **policy and strategic level**, the plan defines a hierarchy which brings all facilitator agencies together who would provide equipment, resources, expertise, manpower and communication. This further includes how the nation will prepare beforehand through resource management, training, risk identification, monitoring and policy application.

In the **operational level**, the plan lays out formation of an on-site team which would directly engage pollution mitigation. This includes in situ roles and responsibilities according to need of time and on hand expertise. The team has to be deployedin moments depending on location. This part also includes DoE, MARPOL and SACEP notification and international alert systems.

A **NEBA** (net environmental benefits analysis) will be carried out to evaluate the spillage. Specific instructions on how to carry out NEBA have been provided with requirement of resources. Depending on the size, nature and location of the spillage, the **tier-identification matrix** will be used to decide on actions, such as methods of containment, dispersants, etc. Detail on where to procure equipment has been provided. As for **logistics**, the plan mentions how resources are to be made available physically with transportation, customs and facilities for the team on-site. To manage the **after-effects**, coastline protection and monitoring activities have to be put in place as detailed in the plan.

The plan continues into the transactional details that have to be maintained throughout the entire process and how to do it with record keeping, **accounting**, legal claims and insurance procedures.

Finally, the plan ends its description by referring to a series of **appendices**. This is a very important part of the plan. It contains Maritime Boundary of Bangladesh, National and International Policies-Rules-Regulations-Agreement, Terms of References of NOCS Committee and On-Scene Commander, Urgent International Contacts, Reporting Format and Record of Amendments. This part is always evolving and needs to be updated as more resources are made available for the contingency.
1. PART 1: INTRODUCTION

Oil and chemical spills are one of the gravest detrimental incidents that can occur to the environment. They are long-lasting disasters that can affect large areas of land, coast and sea and underlying terrestrial and aquatic ecosystems. Spills can have several different effects. Initially it smothers organisms physically, particularly due to heavy oil and chemicals. Smothering may restrict an organism’s respiration, feeding and thermal regulation. Oil and chemical may be absorbed into the organism’s organs, tissues and cells which can put the organism’s life at risk. In case of large spills, significant change can be observed in the ecosystem. There may be loss of important organisms which bind the ecosystem together by its individually specialized functions. This can have disastrous effects on dependent organisms and the food chain. Spilt oil and chemical may also cause loss of habitat for organisms. The aggregate cost of an oil and chemical spill, both monetary and environmental, is enormous to any country since the effects are very long-lasting. This is even truer for a country like Bangladesh where rare and diverse habitats and ecosystem exist.

Spills also present perilous risk to the human health through direct and indirect exposure. In direct exposure, a variety of health effects may develop when the oil and chemical spill occurs close to where people live or work, and may come in contact with humans through breathing gaseous oil and chemical compounds and/or oil and chemical compounds adsorbed on particulate matter (dispersed through air). Another exposure pathway may relate to activities in contaminated ground (e.g., soil and water) or through skin absorption when touching spilled material. Indirect exposure may occur through consumption of contaminated food or water—especially relevant in the case of consumption of fish that have been in contact or in an oil spill polluted environment. This is because some oil components have ability to “bio-accumulate” in living organisms. This means that if a fish lives in a polluted environment, it will keep absorbing in its body some oil components (without excretion) which may reach concentrations several orders of magnitude higher than those of the surrounding waters. Through consumption of such polluted fish meat, humans may become seriously exposed to higher concentrations of oil components than in the surrounding environment or as compared to ingestion of the polluted water or bathing in the polluted water.

Exposure has direct effects on human health. Previous studies show consistent evidence of acute toxic effects, mainly neurological, ocular (eye), and respiratory, of those living in exposed communities and among clean-up workers. In case of particular chemicals associated with crude oil and chemical transport in the Bangladeshi coastal region, at high doses some chemical components cause respiratory, hepatic (liver), renal (urinary system), endocrine (hormonal system), neurologic, hematologic (vascular system), and other systemic effects, while even very low doses can cause mutagenic effects, with cancer of particular concern. In cases where a spill has been managed by dispersants, the dispersant themselves pose threat to the human health: highly toxic chemical ingredients such as benzene and polycyclic aromatic hydrocarbons (PAHs) can damage systems in the body, including DNA damage and mutations.

Bangladesh, specifically, is at high risk of damage in instances of oil and chemical spills. The country’s delta has sensitive and precious ecosystem at the mangrove forest and coasts. Being a river-floodplain-prolific country, there is high traffic movement in the waterways, both inland and deep sea. The pollution from blow-out, collision, stranding, and other marine accidents can threaten marine life in the inter-tidal zones, fisheries in the inter-tidal zones and floodplains, sea birds, recreational beaches and tourism with
The coastal belt of Bangladesh is one of the most economically important areas of the nation. The world famous mangrove forest (the Sundarban) and three seaports—Chittagong, Mongla and Payra lie in the region. Besides this, shrimp culture and fisheries are important activities in the region, and noticeably influences foreign currency earning. Furthermore, the Bangladeshi coast, its EEZ in the Bay of Bengal, area of High Sea within national maritime border is close to multiple international shipping routes that expose the country to possible spillage incidents. Considering the additional ship-breaking activities and proximity of oil, petroleum and chemical processing industries on the coastal belt present substantial commercial activity and hazards that may cause spillage.

The country has seen multiple cases of spillage situation (Appendix F) which prompts the country and the region to setup a detailed framework and guidelines for all agencies, organization and stakeholders concerned that must be active in responding to spillage events, leading in remedial action and prevention in the long-term.

The preparation of a National Oil and Chemical Spill Contingency Plan is, therefore, necessary to identify the national capabilities and resources in order to establish an organizational structure to combat marine pollution so that focal points and lead agencies are identified and guided effectively.

2. **PART 2: SCOPE**

2.1 **Functional aspects of contingency plan**

2.1.1 The contingency plan is action-oriented, covers aspects such as reporting, communication, alerting, assessment, operations, administration, finances, public relations and arrangements.

2.1.2 The plan assigns the responsibility for various tasks to be undertaken by the relevant government departments and agencies, identifies trained personnel, equipment, and resources, and means of accessing them. Physical resources may be specialized multi-purpose pollution combating equipment such as vessels, aircraft and communication systems.

2.1.3 This plan intends to delineate functions of various departments and agencies concerned for the operational responsibility to marine and coastal incidents which could result due to spillage of oil and chemical into water.

2.1.4 The plan also provides the framework of co-ordination of integrated response by various government departments and agencies to protect the environment from the deleterious effects of pollution by oil and chemicals. It derives from the regional contingency plan developed by SACEP in SAS region and specifies response plans in context of Bangladesh. In an effort to direct all stakeholders properly respond to spillage situations the plan suggests ways to increase capability and effectiveness of the response through coordinated resource utilization and capacity improvement measures, both material and human. In case where support from neighboring countries and regional cooperation is required, this plan specifies appropriate communication systems.
2.2 Materials, substance and chemicals covered under scope

2.2.1 It is important to note that the NOSCOP addresses emission and/or spillage the following substances: all kinds of oil including but not limited to crude oil and its derivatives, petrol, diesel, coal and its industrial derivatives, all forms of chemicals including but not limited to industrial chemical compounds, acids, fertilizers, etc.

2.2.2 In this plan, ‘oil and chemical’ refers to all of the aforementioned hazardous substances and the plan must be implemented in crises pertinent to these substances.

2.2.3 In case of ambiguity about a substance not listed above but may be considered hazardous to human, animal and agricultural health and the ecosystem, the plan should be employed upon discretion of NOSCOP participating agencies since the same principles underlying the guidelines will be applicable to any spillage crises in general.

2.3 Geographic and topological scope of the plan

2.3.1 Geographically, the plan is applicable to all areas within the national boundaries under jurisdiction of the Government of Bangladesh.

2.3.2 The plan will be put on effect in any area where oil and chemical spillage occurs and surrounding area where spillage may spread. This includes, but not limited to: coastal areas adjacent to the Bay of Bengal, the delta, all rivers and floodplains and waterways of the country, the Sundarban, all physical establishments that are responsible or affected by spillage, the exclusive economic zones (EEZ), territorial sea, high seas, beaches and estuaries.

2.4 National and international policy implemented by the plan

2.4.1 The legal framework under which, Bangladesh Government and International Authorities operate are detailed in Appendix B.

3. PART 3: OBJECTIVES

3.1 General objectives of the plan

The objectives of the plan are to:

3.1.1 Develop appropriate and effective systems for the detection and reporting of spillage of oil and chemicals;

3.1.2 Specify operational chain of command that would ensure prompt response.

3.1.3 Specify appropriate response techniques are employed to:

3.1.3.1 Prevent, control, and combat oil and chemical spillage and pollution, and

3.1.3.2 Dispose recovered material in an environmentally accepted manner.
3.1.4 Identify key resources and specify logistics procedure.

3.1.5 Ensure adequate protection is provided to the public health and welfare, and the marine and aquatic environment, both in short and long-term basis.

3.1.6 Ensure that complete and accurate records are maintained of all expenditure to facilitate cost of recovery.

3.1.7 Serve as a standard reference of information for crisis management.

3.1.8 To list all the tools, materials and resources held by different agencies, and to record all the important contact addresses that will help during contingency mitigation efforts.

4. PART 4: DISTRIBUTION OF AUTHORITY

4.1 Central Agency

4.1.1 Ministerial Level: The Ministry of Environment, Forests and Climate Change (MoEFCC) will be the nodal ministry for coordinating the emergency response in case of an oil or chemical spill disaster.

4.1.2 Executive Level: Department of Environment (DoE) will provide necessary executive, technical and secretarial support to MoEFCC for an effective coordination in case of the incidence of the emergency.

4.2 Central Contact Personnel

4.2.1 The Secretary, MoEFCC will be the central leaders for the initiative.

4.3 Participating and responsible stakeholders of the plan

4.3.1 The government departments and agencies who will act as resource agencies as required to provide all-out support to the actions of the coordinating authority are as follows:

<table>
<thead>
<tr>
<th>1. Cabinet Division</th>
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<tr>
<td>2. Public Security Division, Ministry of Home Affairs</td>
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<tr>
<td>3. Security Services Division, Ministry of Home Affairs</td>
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<td>4. Ministry of Local Government Division</td>
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<td>5. Ministry of Defense</td>
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<td>6. Ministry of Shipping</td>
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<td>7. Ministry of Foreign Affairs</td>
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<td>8. Ministry of Finance</td>
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<td>9. Health Services Division, Ministry of Health and Family Welfare</td>
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<td>10. Ministry of Agriculture</td>
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<td>11. Ministry of Industries</td>
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<td>12. Division of Employment and技能</td>
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<td>13. Division of Environment</td>
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<td>14. Division of Forests</td>
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<td>15. Division of Environment, Forests and Climate Change (MoEFCC)</td>
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<td>16. Division of Fisheries</td>
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<td>17. Division of Shipping</td>
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<td>18. Division of Home Affairs</td>
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<td>19. Division of Finance</td>
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<td>20. Division of Health</td>
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<td>21. Division of Family Welfare</td>
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<tr>
<td>22. Border Guard Bangladesh</td>
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<tr>
<td>23. Bangladesh Coast Guard</td>
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<tr>
<td>24. Bangladesh Petroleum Corporation (BPC)</td>
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<tr>
<td>25. Eastern Refinery Limited</td>
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<tr>
<td>26. Forest Department</td>
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<tr>
<td>27. Bangladesh Forest Research Institute</td>
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<tr>
<td>28. Department of Fisheries</td>
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<tr>
<td>29. Bangladesh Fisheries Research Institute</td>
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<tr>
<td>30. Department of Shipping</td>
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<td>31. Bangladesh Shipping Corporation</td>
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</tbody>
</table>
12. Ministry of Disasters Management and Relief
13. Ministry of Water Resources
14. Ministry of Railway
15. Ministry of Fisheries and Livestock
16. Ministry of Industries
17. Armed Forces Division
18. Department of Agricultural Extension
19. Bangladesh Police
20. Bangladesh Fire Service and Civil Defense
21. District Administration
22. Local Government Institutions
23. Bangladesh Ansar and VDP
24. Riverine Police
25. Bangladesh Navy
26. Chittagong Port Authority
27. Mongla Port Authority
28. Payra Port Authority
29. Road Transport and Highways Division
30. Bridges Division
31. Armed Forces Division
32. Department of Agricultural Extension
33. Bangladesh Police
34. Bangladesh Fire Service and Civil Defense
35. District Administration
36. Local Government Institutions
37. Bangladesh Ansar and VDP
38. Riverine Police
39. Bangladesh Navy
40. Chittagong Port Authority
41. Mongla Port Authority
42. Bangladesh Inland Water Transport Authority (BIWTA)
43. Bangladesh Meteorological Department
44. Bangladesh National Authority for Chemical Weapons Convention (BNACWC)
45. University of Dhaka (Department of Zoology, Oceanography and other relevant departments)
46. University of Rajshahi (Department of Zoology and other relevant departments)
47. Bangladesh Agricultural University, Mymensingh (Relevant departments)
48. Sylhet University of Science and Technology (Relevant department)
49. Bangladesh Oceanic Research Institute (BORI)
50. University of Chittagong (Institute of Marine and Fisheries Science-IMFS)
51. University of Khulna (Department of Environment)
52. Bangabandhu Sheikh Mujibur Rahman Maritime University (BSMRMU)
53. Bangladesh Institute of Maritime Research and Development (BIMRAD)
54. Any other agency concerned

4.3.2 During an emergency or crisis all the agencies will extend co-operation by providing resources and expertise.

4.3.3 They will be coordinated by requests of central committee named National Oil and Chemical Spill Control (NOCS) Committee to be formed and headed by the Secretary MoEFCC and Director General of the Department of Environment as member secretary. The other members of the committee are as follows:-

(1) Chairman, National River Protection Commission
(2) Chairman, Chittagong Port authority
(3) Chairman, Mongla Port authority
(4) Chairman, Payra Port authority
(5) Chairman, Bangladesh Inland Water Transport Authority (BIWTA)
(6) Director General, Bangladesh Coast Guard
(7) Director General, Border Guard Bangladesh
4.3.4 The terms of reference for National Oil and Chemical Spill Control-NOCS committee are included in Appendix C.

4.3.5 Responsibility of individual agencies will be defined in a more elaborate Incident Action Plan (IAP) according to specialization of those agencies.

5. PART 5: CRISIS MANAGEMENT PROCEDURE

5.1 POLICY AND STRATEGIC LEVEL

5.1.1 Organization
5.1.1.1 In case of any emergency or issues related to oil and chemical spill, the Secretary of Ministry of Environment, Forests and Climate Change as the Chairperson of the NOCS committee must be contacted first.

5.1.1.2 The Chairperson will assemble National Oil and Chemical Spill Control (NOCS) Committee and Committee will coordinate with first responders in the area and alert all related organizations necessary to prepare resources and expertise depending on the situation.

5.1.1.3 NOCS Committee would lead all the relevant national organization under a single command structure or umbrella and will comprise of competent representative from relevant national organizations (Figure: 1).

Figure 1: Organization of response management

5.1.1.4 Other persons and organizations may be co-opted as appropriate and as desired by the NOCS committee. Its role is primarily to direct the response, but also includes planning, preparedness, monitoring, response operations and ensuring that other agencies, such as BCG, BN will play an appropriate part in support of action.

5.1.1.5 The Chairperson of the NOCS committee will organize the experts from different organizations of environmental pollution and its impacts on ecosystems. The experts will advise NOCS committee to mitigate the pollution.
5.1.6 In support, at the operational level, there will be an On-Scene Commander (OSC) deployed by the NOCS committee. In case of marine, coastal, inland waterways, railways, or other places, OSC would be deployed from Bangladesh Coast Guard, Bangladesh Navy, Border Guard Bangladesh, and other relevant government organizations as whereas oil and chemical spillage/pollution occurred. The terms of reference for the OSC are included in Appendix D. The NOCS committee can change the terms of reference for the OSC as and when necessary.

5.1.7 Resources will be co-opted as necessary and the beach-cleaning task will involve resources from e.g., Public Works Department, Civil Contractors or others specified in case of national emergency.

5.1.8 Roles and responsibilities of each ministry or agency will be pre-pointed during the meeting of NOCS Committee. For example:

5.1.8.1 The port authorities will be responsible for the response of accidents within port limits.

5.1.8.2 Oil and petroleum exploration and production corporations will be responsible for instituting preventive, precautionary, and other measures for monitoring, controlling and combating an oil/chemical spill contingency in their area of operations.

5.1.8.3 The Bangladesh Navy and Bangladesh Coast Guard will make their facilities and resources available to address the situation, such as – aircrafts, ships, logistics support, and manpower.

5.1.8.4 Ministry of Shipping will provide waterways resources necessary, such as tug boat or assessment boats, and Energy and Mineral Resources Division will arrange tank barges and store recovered oil. Director General, Department of Shipping, Ministry of Shipping, will be responsible for all negotiations with the vessel, cargo owners, and insurers and will also conduct all negotiations regarding compensations and indemnification.

5.1.8.5 Ministry of Environment, Forests and Climate Change will provide scientific advice regarding species at risk, ecosystem sensitivity, restriction of fishing activities, use of dispersant chemicals, beach cleaning methods, etc.

5.1.8.6 Finance Division of the Ministry of Finance will provide authorization for expenditure and funds for initial response and ensure adequate financial records are maintained.

5.1.2 Preparation

For the nation to be prepared to provide adequate response in case of spillage incidents and preventively control future spillage, following issues are necessary to address:
5.1.2.1 Resources of the country and nature of spill

5.1.2.1.1 With the current resources that Bangladesh has, the nation is unable to manage large-scale spillage at the sea and the coastal belt. Regional cooperation is required and if such an incident occurs, assistance must be sought immediately from SAS countries, SACEP and IMO to arrest spillage at the shortest possible time and manner, because the spillage may adversely affect other countries as well. Remedial efforts must be international, utilizing all available resources regardless of national boundaries and policy limitations.

5.1.2.1.2 The regional contingency plan must be maintained simultaneously with the national plan to ensure maximum effectiveness. Both plans must be updated regularly according to new addition of resources, manpower, expertise and technology.

5.1.2.1.3 The key point is collaboration when it comes to national action, recognizing that the damage that needs to be controlled requires full strength of the region and prompt communication and action.

5.1.2.2 Identification and monitoring of risk sources

5.1.2.2.1 Since the Bay of Bengal, its coast and the national waterways are transport routes for important commercial activities and also different chemically risky industries are situated close to the shoreline and waterways, it is necessary to monitor and regulate activities regularly in these regions.

5.1.2.2.2 As much as the Government is responsible in handling spillage crises, the owner of the source of spillage is more responsible to prevent and control spillage. At the end of the day owner of the source, whether public or private, is absolutely responsible for the damage caused in all areas of the physical, environmental, health and financial.

5.1.2.2.3 Owners of all water vessels, exploration operations, ports, harbor facilities, terminals and pipelines that transport or handle hydrocarbons or other potentially hazardous substances must submit emergency response plan to DoE.

5.1.2.2.4 The local plan should be consistent with and be coordinated with the central national and regional plans. Meetings of NOCS committee will be required to review local plan requirements with agencies that oversee contingency planning. These agencies will ensure that a plan is compliant.

5.1.2.2.5 For obtaining clearance of activity, local plans must include adequate system of personnel and equipment to handle spillage according to scale of their operation, describe how the crisis management system would work
without flaw and provide a declaration or copies of insurance certificates.

5.1.2.6 In case of shipping, all vessels must carry Standard Operating Procedures (SOP) to manage spillage. It must be in accordance with guidelines developed by MARPOL 73/78 and IMO and should include a reporting procedure, list of authorities to be contacted, detailed description of the action to be taken immediately by persons onboard to reduce discharge of oil and chemicals, procedures and point of contact on the ship for coordinating onboard activities with national and local authorities in combating the pollution.

5.1.2.7 Marine traffic including oil tankers, cruise liners, cargo vessels, small and medium sized boats using ecologically important waterways are one of the risk factors and industries including oil processing, ship-breaking and chemical manufacturing being the other, it is necessary to maintain a dynamically updating map, list and database to identify and monitor major risk concerns periodically to check conformity with health and safety standards.

5.1.2.8 The database would contain important contact information that would be useful in expediting the communication and action process during crises. The map/database must also include lists of critical ecological concerns such as administrators at the Sundarban, fisheries owners and fishing communities living along the coast who must be alerted immediately to take necessary action to protect human health and overall environment in case of spillage emergencies.

5.1.2.9 This process should also take in consideration international shipping routes that connect Bangladesh directly and indirectly and the frequency of usage of this route by vessels transporting risky materials.

5.1.2.3 Capacity development

In addition to having a contingency plan, the capacity to respond to emergencies effectively over time must be increased.

5.1.2.3.1 Capacity must be increased in areas of expertise on knowledge and technology, apparatus and machinery available.

5.1.2.3.2 While resources from the Bangladesh Navy, Bangladesh Coast Guard and Port Authorities such as aircrafts, ships and tugboats will be availed extensively during emergency response management, increasing number and capacity of these vehicles, oil/chemical mitigating equipment should be of concern in national budget and resource allocation planning.

5.1.2.3.3 Training of the people who would participate in crises mitigation efforts is necessary so that they are aware of
up-to-date on knowledge and technology that is available for proper and efficient oil and chemical control.

5.1.2.3.4 Training must be at national, regional and international level with necessary mock runs to keep the skills learnt updated. Large scale exercises must be carried out between regional countries to enhance coordination between the participating international teams. Meetings for coordination may be held annually.

5.1.3 Jurisdiction and legal proceedings

5.1.3.1 If an illegal discharge takes place within a port area of Bangladesh/Out of Port area or any other territorial water body of Bangladesh, the port authority andDoE will consider whether prosecution action is appropriate under the International Convention for Prevention of Pollution from Ships, MARPOL 73/78, and/or under national laws and regulations or application of both at a time.

5.1.3.2 If foreign ship discharges oil while passing through the territorial waters of Bangladesh, the port authority/BN/BCG who will report the incident to the Flag State of the vessel concerned along with any photographs or evidence and request that the matter be investigated further.

5.1.3.3 Port Authority will analyze all actions by a damaged vessel, will carefully assess any salvage agreement between the master of the Vessel and any Salvage Company, and will be prepared at all times to intervene under the Merchant Shipping Act or Supreme authority according to regulations.

5.1.3.4 As such the NOCS Committee can use this power to give final authoritative direction when an accident has occurred to the ship/facility that presents significant danger to the environment and requires urgent response directions in this respect should preferably be in writing and the commands executed through the OSC on-site.

5.1.3.5 The Port Authority will inform the incident of spill or damage immediately to the NOS Committee and the Port Authority will seek the cooperation from Bangladesh Navy, Bangladesh Coast Guard or another agency to contain the pollution and damage to the environment.

5.2 Operational Level

5.2.1 Assembling On-site Response Team
5.2.1.1 Once crisis management efforts are activated, the NOCS committee will assign roles from internal and external organization to form the team below with stated responsibilities:

(1) On-scene commander (OSC): Key personnel driving the remedial effort in field. To be assigned depending on scenario/jurisdiction by the National Oil and Chemical Spill (NOCS) Committee. For coastal region it may be the Coast Guard Commander; for high seas it may be the Navy Commander; for a port it may be the Harbor Master of Port, for inland waterways competent personnel from relevant organization and so on.

(2) Deputy on-scene commander (DOSC): A personnel either chosen by the NOCS committee or OSC to aid the OSC in management efforts. Must be competent and at authoritative ranking.

(3) Information Officer (IO): Collects and disseminates information. Provides data relating to the incident to as much detail as possible. Works as a focal point of communication between strategic and on-field command.

(4) Health and Safety Officer (HSO): A safety specialist designated to ensure that the spill location and initial containment site are safe for workers. This Officer also advises the On-Scene Commander of any special safety requirements and ensures that all work is conducted in a safe manner and that all accidents are properly documented.

(5) Liaison Officer: Coordinates and summons help from support agencies and facilitates and expedites international assistance. Liaises with all relevant stakeholders, quick response in case of emergency and in need of regional/international support technical assistance.

(6) Operations Officer (OpO): Oversees the administration of Transportation, Storage, Procurement and Finance, and Technical Services (Engineering & Communications), maintaining regular contact with the OSC.

(7) Cleanup Supervisor (CS): Coordinates the spill response activities of a large spill including managing the Response Team. For marine spills, a Marine Cleanup Supervisor and a Shoreline Cleanup Supervisor might be needed. Ensures sufficient personnel and equipment are assigned to land or water based recovery locations and oversees access, site preparation and disposal. Must be a technical expert in sound procedural choice for the environment.

(8) Environment Officer (EO): Administers environmental affairs, including confirming mandatory regulatory agency’s conditions/directions and ensuring technical environmental expertise as required. Monitoring of the effectiveness of the spill response.
(9) Security Officer (SO): Maintains site security. Assists with evacuation and routing of logistics and transportation.

(10) Public Affairs Coordinator (PAC): If a spill is large, a Public Affairs Coordinator may be required to serve as the on-site contact for arranging tours and information gathering and dissemination for agencies, the public, and the media.

(11) Logistics Officer (LO): Coordinates communications and equipment, personnel and supply movements in a large spill. Activates a mobile command centre and ensures that its operational needs are met. Duties also include spill access, equipment expediting, accommodation, catering, evacuation, and arranging for technical and repair services.

(12) Environmental Advisor - Coastal & Marine (EA): Providing suggestions and recommendations to the NOCS Committee on the ecological impacts of the spilled oil/chemical pollution and possible adverse impacts in coastal and marine waters as well as on environmental regulations. Must be an expert with strong background/degree on coastal/marine pollution, eco-toxicology to guide the monitoring team to assess the impacts of oil/chemical pollution on marine water body, aquatic biota, and human health and will advise the authority for possible mitigation and clean-up operations.

(13) Meteorology Officer: Advises on water movement and effect of weather and climate.

(14) Legal Officer (Legal): Advises on insurance and liability concerns. Ensures that adequate analytical sampling is performed, as necessary, and that photographic, video, and written documentation of all spill response activities are conducted.

(15) Finance Officer (FO): Facilitates financial and other resources, arranges payments and controls invoicing. Ensures on-site cost and recovery accounting and a chronological record keeping of spill control events.

(16) Planning Officer (PO): Coordinates status reports on environmental monitoring and risk management, public security, communications and training.

(17) Forest Specialist (FS): Activated when spillage occurs in Sundarban and/or protected forest area only. The specialist must have ample particular knowledge of the flora and fauna and able to provide information on specific impacts to ecosystem of the forest and advise to the team.

5.2.2 Alert and notification system

5.2.2.1 As soon as a spillage incident occurs, the owner, captain or any person in charge of the marine means of transportation, the persons responsible for the transportation of oil and chemical located within seaports or the marine environment of Bangladesh and the officials of parties involved in oil and chemical transportation extraction are required to report immediately any oil/chemical spillage incident to the national and/or monitoring authorities.
5.2.2.2 Owners also include shoreline or coastal belt industries that release oil or chemicals into the waterways.

5.2.2.3 Vessel and ship masters and owners, given that either their vessel is causing spillage or have observed other vessel spilling while passing by, are obliged by Article 4, Oil Pollution Reporting Procedures, Section (10) (a) of the International Convention on Oil Pollution Preparedness Response and Co-operation, 1990 (OPRC) and Protocol I of MARPOL 73/78 to notify the nearest coast or territorial authority of a marine pollution emergency that has arisen.

5.2.2.4 While NOCS committee stands as the key coordinator, to centralize the appropriate communication system that can address urgency of the situation, 24/7-Response Command Centers may be developed in major port authority, Coast Guard and Navy locations to maintain continuous watch and easy accessibility. The centers will be manned by employees of associated local organization.

5.2.2.5 Although identifying private and government vessels are not connected by Cellphone or Satellite phone coverage in remote waters, all carry VHF radios. A dedicated channel may be set up for all vessels to report incidents to the 24/7 command centers.

5.2.2.6 The reporting forms provided in Appendix F and G will be used as required.

5.2.2.7 Any incident observed must be immediately reported to the NOCS committee or nearby command centers simultaneously, or any nearby port authority, Bangladesh Navy, Bangladesh Coast Guard, Border Guard Bangladesh, Bangladesh Police or any other nearby government office.

5.2.2.8 Each agency under the contingency Plan should have focal points with e-mail address and hotline to report the incident instantly.

5.2.2.9 In case the form is not available, the alert should include, at the minimum, the following details:

1. Location of the spill (by latitude and longitude if possible)
2. Nature of the spill (oil or chemical type)
3. Approximate quantity of pollutant
4. Source of the spill
5. Weather-sea state, and tidal conditions in the area
6. Initial actions taken; and
7. Identification of the reporter (name, contact number).
8. Nature of assistance required
9. Possible threat of damage

5.2.2.10 As soon as the alert is sent out the on-site team will be activated by direction of NOCS committee and OSC and the team will mobilize to respond to the situation. On-Scene Commander will monitor this and inform this.
5.2.2.11 By the time the on-site team is deployed the organizations concerned must be alerted to engage them in their due responsibilities.

5.2.3 Evaluation of the crisis

5.2.3.1 The aims of oil and chemical spill response are both to minimize the immediate damage to environmental and socio-economic resources and to reduce the time for recovery of affected resources. These can be best achieved by basing all oil spill responses on the process called Net Environmental Benefit Analysis (NEBA), meaning the measures undertaken should be those that will result in the greatest reduction of environmental damage for the available means and resources.

5.2.3.2 First responders and the response team on-site, apart from participating in urgent leakage prevention, should follow the NEBA procedure below to evaluate the spillage situation so that decisions can be taken on damage control quickly using the information collected.

1. Collect details on type, quantity, size and spreading area of the spill
2. Collect information about physical characteristics, ecosystem, human use of the environment, and other resources of interest in the area
3. Review previous spill experiences and experimental results which are relevant in the area and the response methods that were considered
4. In the bases of the aforementioned, predict the likely environmental outcomes of using the suggested response method
5. Predict similarly the likely environmental outcomes if the area is left for a natural clean up
6. Compare the advantages and disadvantages of the response option with those of a natural clean up
7. Oil and chemical should be contained and recovered mechanically if possible
8. Oil and chemical should generally be collected as close to the source as possible
9. Focus should be on preventing oil or chemical from reaching the shoreline
10. If mechanical recovery is not effective or possible, chemical dispersants should be considered based on a NEBA
11. Upon protecting shoreline resources, the level of priority should be based on its environmental sensitivity
12. All oil and chemical spill response efforts should be based on a NEBA
13. The natural breakdown processes should be utilized to the greatest extent possible, and
(14) Consider the “No response” option in conducting a NEBA, if applicable.

(15) Collect MSDS (Materials Safety Data Sheet) for OIL or Chemical to know the specification of Oil/Chemical and consult with IMDG (International Maritime Dangerous Goods code) and action for MFAG (Medical First aid guide) for the person on scene collecting Spilled Oil/Chemical in case of contact his skin/eyes etc.

5.2.3.3 Initial confirmation will be made by the local administration/authority, then Bangladesh Coast Guard or Bangladesh Navy using information gained by observation by the aircraft and surface vessel and an assessment as to the threat to the country’s water body will be made by the OSC, who will report directly to the NOCS committee.

5.2.3.4 The NOCS committee will arrange for surveillance of the oil slick and, by use of meteorological and hydrographic data, predict its probable movement (Hydrological circle of BWD Band Bangladesh Meteorological Department should be involved) in the planning process.

5.2.3.5 If the assessment shows that another state/country is likely to be threatened, the NOCS committee will inform that country/state and regional body (LOS C) in SACEP immediately.

5.2.3.6 For routine surveillance all pilots of aircraft and masters of ships and vessels should be instructed by the Civil Aviation, Seaport Authorities and other relevant authorities to report any sightings of oil in the sea or inland waterways for immediate onward transmission to the authorities. Instruction on surveillance is part of the NOSCOP as well as the Regional Contingency Plan.

5.2.4 Categorization of spillage and corresponding response

After evaluation, the spillage will be classified to decide appropriate response according to the criteria below.

5.2.4.1 A tier system is introduced to make definite judgment calls depending on size, location, vicinity and extent of spread of the spill.

5.2.4.1.1 Tier 1 – Small local spills

Small controllable spills that can be fully dealt with local contingency plan (developed in accordance with the national plan).

This covers privately owned operations and spills resulting from minor activities such as transfer and bunkering at jetties or piers. Assuming spillage is successfully mitigated using the organization’s own personnel and resources; there is no need to involve other parties apart from reporting and legal affairs.

As many as non-specialized vessels (in context of oil/chemical-spillage) protecting national waters must be equipped with
appropriate tools to respond to at-least Tier 1 incidents to maximize range and flexibility.

5.2.4.1.2. **Tier 2 – Medium spills**

This tier concerns spills that may be local or at some distance from the organization concerned. Generally this is applicable to cases where the local organization or authority can only partially control spillage effects. External resources are required for mitigation, which can be adequately dealt with by a national response.

5.2.4.1.3. **Tier 3 – Large spills**

This is a large spill which requires full resources of the nation where the volume of oil/chemical will possibly spread of a large area crossing international borders or foreign shores.

5.2.4.1.4. The matrix below specifies how the Tiers are categorized:

5.2.5 Spillage response and strategy

5.2.5.1. Once NEBA has been established to unilaterally understand the nature and extent of spillage, the following methods may be employed to control effects of the spillage. Whatever course of action is chosen, it must be with approval from NOCS Committee.

5.2.5.2. Since instantaneous effective action is necessary, it is important that all possible contingency-responding vessels are fitted with equipment appropriate for applying methods below—both for immediate response and post-incidents actions— as soon as possible and upgraded with time. This must be achieved through cooperation of relevant ministries and national and international agencies.
5.2.5.2.1 Mechanical Recovery at water body: Mechanical recovery constitutes the most common approach for combat of marine oil/chemical spills (assuming the chemical does not mix well with water). The mechanical recovery operation will typically involve the following components:

1. Booms for containment of oil/chemical
2. Skimmers for recovery of oil/chemical
3. Pumps
4. Oil/water/chemical separators
5. Temporary storage
6. Vessel for towing of booms and operation of recovery units
7. The operation may involve three or two vessels, depending on how the boom is deployed. The purpose of the boom is to concentrate and contain to avoid spreading the oil/chemical to a thick enough layer for effective recovery to take place. The effectiveness of booms to accumulate the oil is highly dependent on wave conditions, tow speed, boom configuration and oil properties.

5.2.5.2.2 Mechanical removal at shore: Shoreline cleanup by mechanical removal involves a wide range of different tools and techniques, reflecting the highly variable conditions that a shoreline area can represent. Techniques may be ranging from manually removal of oil/chemical using simple tools to the use of more advances beach cleaning machinery. Provided below is a non-exhaustive list of techniques/tools commonly applied to remove oil/chemical at a shoreline:

1. Manual sorbent application
2. Manual removal of oiled/chemical entangled materials (hand, shovel, rakes, etc.)
3. Manual cutting of vegetation
4. Low pressure flushing at ambient temperature
5. Vacuum trucks
6. Warm water / low pressure washing
7. High pressure flushing
8. Manual scraping
9. Beach cleaners
5.2.5.2.3 **Leave alone, but monitor:** Sometimes the best course of action is a decision not to clean up the spilled oil/chemical. If the oil/chemical is at sea, and not threatening shore or sensitive areas, it may be sufficient to monitor the spill while allowing the natural processes of dispersion and biodegradation to take course. This decision, of course, has to be taken after careful consideration of all the other alternatives.

5.2.5.2.4 **Bioremediation:** Bioremediation is the application of nutrients (fertilizers containing nitrogen and phosphorous) to the shoreline to accelerate the natural biodegradation of the oil. Oil/chemical biodegradation is the natural process by which microorganism oxidizes hydrocarbons, ultimately converting them to carbon dioxide and water. The process is limited by the availability of oxygen, moisture and nutrients needed by microbes. The use of non-native bacteria is not recommended as most areas have indigenous bacteria that are capable of degrading oil. Bioremediation is typically used as a final treatment step after completing conventional shoreline treatment or in areas where other methods are not possible or recommended.

5.2.5.2.5 **In-situ burning:** In case of flammable spillage, in-situ burning is carried out at shorelines by igniting the upwind end of the spread area and allowing the oil/chemical to burn downwind. The method is typically used on substrate or vegetation where sufficient oil/chemical has been collected to sustain ignition, if oil/chemical of a type that will sustain burning and local air pollution regulations allow. The method will kill surface organisms in burn area and residue may be somewhat toxic. The method will also cause local and time limited air pollution.

5.2.5.2.6 **Dispersant:** The use of dispersants will break up the oil film physically, thus reducing the smothering effect of a slick in plants and animals and they will also accelerate the oil biodegradation process. The use of dispersant is not recommended where physical recovery of oil is feasible. The choice of dispersant must be approved in writing by DoE, EO, EA, FS and OSC in accordance with the national contingency plan as well as regional plan. The Air Force and all agencies with required air craft must help in the efforts.

5.2.5.3 For these methods to be chosen and applied, the plan recommends dedicated oil and chemical contingency response vessels are stationed at Chittagong, Mongla and Payra Ports locations. Further vessels may be procured in time to serve other major locations.

5.2.5.4 These vessels must be fitted with state-of-the-art oil and chemical response equipment as required to apply methods aforementioned.
5.2.6 Resource Management and Logistics

5.2.6.1 Complexity of spillage mitigation efforts depend on the scale of the incident. In order to execute a successful operation, following resources are required at minimum and must be made available during action:

1. Primary oil/chemical spill equipment: booms, skimmers, spray equipment, dispersant, absorbents, oil storage, radio communications
2. Auxiliary equipment: tugs and work boats, aircraft, vacuum trucks, tanks and barges, loaders and graders, plastic bags, tools, protective clothing, communications equipment
3. Support equipment: aircraft, communications, catering, housing, transport, field sanitation and shelter
4. Sources of manpower: contractors, local authorities, caterers, security firms, volunteers
5. Experts and advisors: environment, forest and wildlife, safety, auditing
6. Aircraft usage of airports (National/regional/coastal) will be required for landing and unloading of certain aircraft and, for fueling by all aircraft
7. Availability and deployment of marine crafts
8. Seaport docking and cargo handling facilities and, where necessary, water transport
9. Immigration, Health and Customs arrangements
10. Food, accommodation, medical and public health services

5.2.6.2 While list above mentions basic requirement, international collaboration and assistance through provision of resources and technical expertise as stated in the regional contingency plan is necessary and in that context resources from neighboring countries should be availed to the greatest possible extent to allow effective action.

5.2.7 Spillage after-effects and damage mitigation

While efforts are made to control and collect oil/chemical at the waterways and shoreline, the state of public health, flora, fauna and the ecosystem in the area require special attention.

5.2.7.1 Resources should be made ready by local health administration to assess oil/chemical exposure effects, possible contamination and diseases and whether specialized medical aid is necessary.

5.2.7.2 Local administrators of the Department of Forest should assess the extent to which the organisms in the area is affected, report in and advise on any further action necessary to protect them.
5.2.7.3 Consideration and provision includes health and safety of the operation’s manpower active in mitigating efforts.

5.2.7.4 A different facet is public relations since national and international support is necessary for successful operation through cooperation. As a result information being communicated to the media should be scrutinized first by the Public Relations Officer.

5.2.7.5 If the extent of damage is such that the environment and ecosystem will be affected in long-term, restorative actions must be taken according to the challenges. Examples include replanting mangrove, marsh and sea grass, restocking aqua-cultural projects and so forth.

5.2.8 Records and accounting

5.2.8.1 To keep track of all financial and logistical details so that expenditures, claims, insurance and transactions are properly recorded, a standardized format has to be followed.

5.2.8.2 In the case of economic loss, documentation supporting the claims should demonstrate how the claim has been calculated. The following aspects are to be considered while assessing cost of an oil spill/chemical combating and operating, and preparation of transaction records:

1. Delineation of the area affected describing the extent of pollution and identifying areas most heavily contaminated. This may be best presented as a map or chart accompanied by photographs.

2. Summary of events including a description of the work carried out in different areas and of the working methods chosen in relation to the circumstantial evidence linking oil/chemical pollution with the ship involved in the incident (e.g. chemical analysis).

3. Labour costs (numbers and categories of labourers, rates of pay days, hours worked, total costs etc.).

4. Data on which work was carried out (weekly or daily costs).

5. Material costs (Consumable materials, utilized fuel, food, shelter facilities, etc.).

5.2.9 Compensation from offender

5.2.9.1 In case of national infringement, the Government of Bangladesh will take necessary action according to legislation if private owners of vessels of instruments of spillage are at fault and decide on justified fines, penalties and compensation.

5.2.9.2 In case of international infringement, the 1992 Protocol of the International Convention and Civil Liability for Oil Pollution Damage (the “CLC”) makes the owner of a ship carrying cargo of persistent oil in bulk strictly liable for any pollution damage in the area of
5.2.9.3 The liability extends to post-spillage prevention and cleanup costs. Bangladesh does not have to prove that the ship was in any way at fault in causing the pollution.

5.2.9.4 If the costs of cleanup exceed the limited liability of the owner of the ship, Bangladesh may make a claim to the International Oil Pollution Compensation Fund in accordance with the 1992 Protocol of the Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.

5.2.10 Prevention of incidents in long-term

5.2.10.1 After the closing of operations, a report must be created detailing the incident, what mitigation measures were taken, summary of damage and finances, to be sent to all stakeholders.

5.2.10.2 Based on the report, the contingency plan will be updated to add lessons realized during the incident that will prepare the nation to develop more for the next time.

5.2.11 International Cooperation

5.2.11.1 In a scenario where spillage situation is beyond mitigation capability of the nation, international assistance will be sought from the SAS regional countries or any supportive nation following instructions and information stated in the Regional Oil Spill Contingency Plan in south Asian Region developed by SACEP and International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) developed by IMO (Appendix G).

5.3 Updating Important Information

All information related to the national/regional/local contingency plan has to updated regularly and be readily accessible.

5.4 Language Ambiguity

If there is any confusion between the Bangla and the English version, the Bangla version will prevail.
APPENDIX A: Maritime Boundary of Bangladesh

Source: Ministry of Foreign Affairs, Government of the People’s Republic of Bangladesh
APPENDIX B: Implementing National and International Policies and Conventions, Protocol and Agreements

A. National Policy and Legislation

1. National Environment Policy, 2018
4. Environment Court Act 2010
5. Bangladesh Biodiversity Act 2017
10. National Biodiversity Strategy and Action Plan, 2016-2021, and
14. Water Rules
17. Coastal Zone Policy, 2005
18. Integrated Coastal Resources Database 2005
20. Coastal Zone Management: an Analysis of Different Policy Documents 2003
21. National Policy for Safe Water Supply and Sanitation
22. Disaster Management Act 2012
27. Dangerous Cargoes Act 1953: Act V 1953
29. Territorial Waters and Maritime Zones Rules 1977
30. The Inland Water Transport Authority Ordinance, 1958 (East Pakistan Ordinance)/Act no LXXV of 1958
31. Port related laws:
- Chittagong Port Authority ordinance 1976
- Mongla Port Authority Ordinance 1976
- Payra Port Authority Act 2013: Act 53 of 2013
32. Inland Shipping Ordinance 1976: Ordinance LXXII of 1976
34. Forest Policy 1994
35. Forest Act 1927
41. Pure food ordinance, 1959 (East Pakistan ordinance no. LXVIII of 1959)
42. The Drugs Act, 1940 (Act no. XXIII of 1940)
43. Railways Act 1890, Act IX 1890
45. Industrial Policy 1999
46. Coast Guard Act 2016
47. Chemical Weapon (Prohibition) Act 2006

B. **International Policy and Legislation**
   5. Convention on Civil Liability for Oil Pollution Damage (CLC Convention) 69 & CLC Protocol 76/92
   7. Intervention Convention 69 & Intervention Protocol 73
   10. Anti-Fouling Systems Convention 2001
   11. Safe and Environmentally Sound Recycling of Ships, Hong Kong Convention 2009
C. Multilateral Agreements

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<td></td>
<td>(London, 1990.)</td>
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<td>Convention on Wetlands of International Importance especially As Waterfowl Habitat</td>
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<td>(Ramsar, 1971) (&quot;Ramsar Convention&quot;).</td>
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<td>International Convention Relating to Intervention on the High Seas in Cases of Oil</td>
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<td>Pollution Casualties (Brussels, 1969.)</td>
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APPENDIX C: Terms of Reference of National Oil and Chemical Spill Control (NOCS) Committee

Purpose
The National Oil Spill Contingency Plan is the key action plan to prevent and mitigate oil and chemical spill crises in sea, at the coast and exclusive economically zones of Bangladesh. Directed under the patronage of the Government of Bangladesh, the plan sets the central organizational and methodical steps necessary to tackle spillage emergencies. As such, NOCS Committee represents the leader of the general team that is active at the strategic level of the crisis management plan.

Roles and responsibilities
1. NOCS Committee would lead all the relevant national organization under a single command structure or umbrella;
2. NOCS committee will comprise of competent representative from relevant national organizations;
3. NOCS Committee will take necessary steps for training, workshop, drill etc. to build up a competent response team;
4. The Chairperson of the NOCS Committee will assemble the committee and provide leadership for the NOSCOP to be effective at all times and applied to the full scope as laid out in the plan;
5. NOCS Committee will appoint On-Scene Commander (OSC) for tackling spillage emergencies and provide necessary assistance;
6. The National Oil and Chemical Spill Control (NOCS) Committee will coordinate with first-responders in the area and alert all related organizations necessary to procure resources and expertise depending on the situation;
7. Supervise preparation of the nation in terms of equipment, resources, finances, training, information repository by coordinating with relevant government and non-government agencies;
8. Preparation of the plan, monitoring and active participation of other relevant organizations will be ensured by the committee;
9. Coordinate with SACEP, Governments of SAS countries, MARPOL, IMO to synchronize national plan with the regional plan, analyze and adopt international methods in crisis management, communicate and procure assistance in case of emergencies;
10. The active participation of different organization like Bangladesh Navy, Bangladesh Coast Guard and other relevant organizations during emergency will be ensured by the committee;
11. In case of emergencies, act as key contact person at strategic level in terms of communication with Ministerial agencies and the media liaison cell;
12. Consult with advisory cell for specialized expertise, plan and bring to affect the best compact solution;
13. Coordinate for providing greater logistical support for the on-scene team and any other international team;

14. Committee may co-opt any person/organization as per necessity;

15. The NOCS Committee will ensure the successful implementation of NOSCOP.

This Terms of Reference is changeable.
APPENDIX D: Terms of Reference: On-Scene Commander (OSC)

**Purpose**

The National Oil and Chemical Spill Contingency Plan (NOSCOP) is the key action plan to prevent and mitigate oil and chemical spill crisis in sea, at the coast and exclusive economically zones of Bangladesh. Directed under the patronage of the Government of Bangladesh, the plan sets the central organizational and methodical steps necessary to tackle spillage emergencies. As such, the position of the On-Scene Commander (OSC) represents the leader of the on-site team that will be deployed and engaged in directly mitigating oil/chemical spillage emergencies.

In support, at the operational level, there will be an On-Scene Commander (OSC) deployed by the NOCS committee. In case of marine, coastal, inland waterways, railways, or other places, OSC would be deployed from Bangladesh Coast Guard, Bangladesh Navy, Border Guard Bangladesh, and other relevant government organizations as whereas oil and chemical spillage/pollution occurred.

**Term**

Immediately after receiving the information on spillage and directed by the NOCS committee the On-Scene Commander (OSC) will be activated and as well activate the on-site operational team. The OSC will serve as the leader for the engaged in mitigation efforts until the crisis is resolved.

**Reporting**

The OSC will Report directly to the NOCS committee, Bangladesh

**Roles and responsibilities**

Responsibilities for which the OSC is accountable are inclusive but not limited to as proposed below:

1. Provide leadership for the on-site team to be effective at all times and direct the team for effective action
2. Work with local and international experts to promptly prepare a plan for pollution containment
3. Work with local authority leaders to gather resources and information
4. Moderate information and communication with strategic leaders
5. Direct logistics team to procure equipment and apply resources
6. The NOCS committee can change the terms of reference for the OSC as and when necessary.
7. Coordinate with policing, fire-department and military organizations to facilitate fast response to the crisis
8. Coordinate with international on-site teams and facilitate their operations
9. Supervise and monitor detailed action of the on-site team members
10. Ensure Health and Safety measures for everyone concerned with the operations, assist medical teams to respond to the crisis

11. Ensure auxiliary facilities for the on-site team

12. Check and maintain all kinds of financial and transactional bookkeeping.
## APPENDIX E: Urgent International Contact

<table>
<thead>
<tr>
<th>SL</th>
<th>Organization</th>
<th>Address</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>South Asian Co-Operative Environment Programme (SACEP)</td>
<td>146/24A, Havelock Roak Colombo 05, Sri Lanka</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel: +94 11 2596443</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax: +94 11 2589369</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email: <a href="mailto:info@sacep.org">info@sacep.org</a> <a href="mailto:secretariat@sacep.org">secretariat@sacep.org</a></td>
</tr>
<tr>
<td>2</td>
<td>IMO, London, UK</td>
<td>4, Albert Embankment London, SE1 7SR United Kingdom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel +44 (0)20 7735 7611</td>
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<tr>
<td></td>
<td></td>
<td>Fax +44 (0)20 7587 3210</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email: <a href="mailto:info@imo.org">info@imo.org</a></td>
</tr>
<tr>
<td>3</td>
<td>UN Environment Regional Office for Asia and the Pacific</td>
<td>2nd Floor, Block A, UN Building, Rajdamnern Avenue Bangkok 10200</td>
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<tr>
<td></td>
<td></td>
<td>Tel:+662 288 2314</td>
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<tr>
<td></td>
<td></td>
<td>Fax:+66-2-2803829</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email: <a href="mailto:uneprroap@un.org">uneprroap@un.org</a></td>
</tr>
<tr>
<td>4</td>
<td>Oil Spill Response Limited (OSRL)</td>
<td>Loyang Offshore Supply Base 25C Loyang Crescent (Block 503 TOPS Avenue 3) Singapore 506818</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel:+65 6266 1566</td>
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<td>Fax:+65 6266 2312</td>
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<tr>
<td></td>
<td></td>
<td>Email: <a href="mailto:singapore@oilspillresponse.com">singapore@oilspillresponse.com</a></td>
</tr>
<tr>
<td>5</td>
<td>U.S. Coast Guard</td>
<td>Tel: 202-372-2100</td>
</tr>
<tr>
<td>6</td>
<td>Indian Coast Guard</td>
<td>Tel:+91-11-23382546</td>
</tr>
<tr>
<td>7</td>
<td>Marine Environment Protection Authority</td>
<td>No.177, Nawala Road, Narahenpita Colombo 05.</td>
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<tr>
<td></td>
<td></td>
<td>Tele: +94 11 2554006/2554373</td>
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<tr>
<td>8</td>
<td>Pakistan Maritime Security Agency (PMSA)</td>
<td>Plot No. 34-A Dockyard Road Karachi 74000 P.O.Box 13333</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel: +92-21 99214624 (24 hrs) or +92-21 99214964-7</td>
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<tr>
<td>9</td>
<td>Coast Guard (for oil &amp; HNS) Maldives National Defense Force</td>
<td>Coast Guard Building BoduthakuruuadauMaguMalé Tel +960 999 2198 or +960 339 5981 or +960 332 1526</td>
</tr>
<tr>
<td></td>
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APPENDIX F: Format for Initial Oil/Chemical Spill Notification Report

1. Classification of Report: doubtful, probable, confirmed

2. Date and time pollution observed/reported and by whom

3. Position and extent of pollution

4. Tide, wind speed and direction (hydrology, Metrology Dept., Port Authority

5. Weather conditions and sea state

6. Characteristics of pollution (e.g. type of oil, if known, or color)

7. Source and cause of pollution (if known, e.g. name of vessel, and whether deliberate or accidental)

8. Details of any vessel in the area (to be given if polluter cannot be identified)

9. Whether photographs or samples have been taken: forecast of likely effect of pollution (e.g. estimated time and extent of beaching):
   o Primary steps taken to minimize the pollution

10. Probable type and estimate of Assistance
APPENDIX G: International Notification Procedures (Including Regional Plan Format)

Dissemination of Information on Oil and Chemical Spill Incidents

A maritime country or territory first receiving a report of an oil or chemical spill incident (if large scale i.e. 2-3 tier level) should immediately inform neighboring country/Territories that the incident may affect their related interests, giving as much detail as possible about the incident. In the event that a spill has occurred, that information should include date, time, position, type and amount of oil spilled, the prevailing and forecast weather conditions, proposed actions and recommendations. As the situation develops, information to these spills in maritime boundary or Territories must be updated continuously, and a regular synopsis provided to keep them informed. The procedures for such reports and communications are described in this chapter of the Plan. Transmission of such reports should not be delayed if complete information is not immediately available.

Available meteorological and hydrographic data should be analyzed to give rough early predictions of general spill movement. More sophisticated spill movement prediction methods may be subsequently used. However, visual observation of any spill is essential and the responsible authority under the appropriate National Contingency Plan should use those resources already identified, such as charter, military or commercial aircraft for surveillance. It is essential that the results of such observation and prediction be transmitted to other coast area and Territories that may be affected by the spilled oil until it no longer threatens any Island States and Territories in the area covered by the Plan.

Participating States and Territories should make every effort to transmit information that may aid in establishing liability for pollution removal costs, damages, and related fines and penalties, to requesting national authorities from other participating Country/States and Territories that are, or may have been, affected by an oil spill incident.

The initial report of an oil/chemical spill to a NOCS committee may be received from a variety of sources and may require confirmation by the NOCS committee that receives the report. After confirmation, the NOCS committee will draft a POLREP message to all the Lead Agencies of the other SAS states or Territories of Plan Regional Organization (SACEP). If over flights or surface vessel observations determine that one or more member country or Territories could be affected by the movement of the oil and chemical on the surface of the water, then speed of drift and direction shall be calculated and reported along with all other pertinent information.

Message Routing Procedure (POLREP)

After receipt of the initial report of an oil spill incident the NOCS committee may require confirmation of the spill sighting. After the spill has been confirmed, the NOCS committee, utilizing the Regional Oil and Hazardous Material Spill Alerting Mechanism, will prepare a POLREP message to notify neighboring States/member states and territories that may be affected by the spill.

The POLREP message will be sent directly to neighboring member states/country or to the Regional Supreme Commander of Regional Contingency Plan requesting relay of the POLREP messages to member country/States or territory alerting them of the spill and the possibility that assistance may be needed as defined in the Regional (OPRC, 1990) Plan.

Once the initial POLREP message has been sent subsequent messages will be routed through the established routing network until the spill emergency has been concluded.
The following is a summarized list of the composition of the POLREP message.

1. Heading Remarks
   a. Date time group
   b. From
   c. To
   d. Subject

2. Situation
   a. Date and Time Position Incident Outflow
   b. Characteristics of Pollution Source and Cause of Pollution (Wind direction and speed of Current or Tide)
   c. Sea state and visibility
   d. Drift of pollution Forecast
   e. Identity of observer and ships on scene

3. Action Taken
   a. Implementation of National Contingency Plan Incident surveillance
   b. Photographs and samples
   c. Names of other regional states/country/SAS lead country on regional contingency plan be informed
   d. Future Plans
   e. Various types of information such as anticipated changes of command; reducing information exchange to encompass only relevant, affected parties, etc.
   f. Assistance Requested
   g. Source of assistance.
   h. Estimated cost.
   i. Pre-arrangement for delivery.
   j. Assistance to where and how.
   k. Other states/country requested.
   l. Names and passport numbers of persons.
   m. Description of equipment.
   n. ETA and arrival information
      i. Place of embarkation
      ii. Place of disembarkation

4. Spare
If the POLREP is used in exercises, the text is to be introduced with the word EXERCISE and finished with this word three times. Each of the subsequent reports, which deal with the exercise, must be introduced and finished with the word EXERCISE as well.

POLREP EXPLANATION

**HEADING REMARKS**

**Date Time Group:**
The day of the month as well as the time of day of the message

**From:**
Lead Agency of the Maritime Country or Territory that is initiating the message
To:
On-Scene Commander (OSC)/Lead designated Commander for Implementation of Nat, Oil & Chemical spillage Contingency plan, will pass the message to other SAS Country directly by HF/VHF/Radio/Fax/Mob. And through Lead Regional On-Scene Commander to all member country or neighboring country that may be affected by the Spill.

Subject:
BD POLREP, sequential number of the report and the name of the vessel involved in the spill incident

SITUATION
Date and Time:
Date and time of the incident

Position:
Position of vessel or vessels involved in the incident. If source of spill is unknown location by latitude and longitude in degrees and minutes and may, in addition, give the bearings of and the distance from a location known by the receiver.

Incident:
The nature of the incident should be stated here, such as BLOWOUT, TANKER GROUNDING, TANKER COLLISION, OIL SLICK, etc.

Outflow:
The nature of the pollution, such as CRUDE OIL, CHLORINE, DINITROL, PHENOL, etc., as well as the total quantity in tonnes of the outflow and/or the flow rate, as well as the risk of further outflow. If there is no pollution but a pollution threat, the words NOT YET followed by the substance, for example, NOT YET FUEL OIL, should be stated.

Characteristics of Pollution:
Gives type of pollution, e.g., type of oil with viscosity and pour point, packaged or bulk chemicals, give proper name or United Nations number, if known. For all, give also appearance, e.g. liquid, floating solid, liquid oil, semi-liquid sludge, tarry lumps, weathered oil, discoloration of sea, visible vapor. Any markings on drums, containers, etc., should be given.

Source and Cause of Pollution:
e.g., from vessel or other undertaking. If from vessel, say whether as a result of a deliberate discharge or casualty. If the latter, give brief description. Where possible, give name, type, size, call sign, nationality and port of registration of polluting vessel. If vessel is proceeding on its way, give course, speed and destination.

Wind Direction and Speed:
Indicates wind direction and speed in degrees and MPH. The direction always indicates from where the wind is blowing.

Current of Tide:
Indicates current direction and speed in degrees and knots and tenths of knots. The direction always indicates the direction in which the current is flowing.

Sea State and Visibility:
Sea state indicated as wave height in meters. Visibility is in nautical miles.
Drift of Pollution:
Indicates drift course and speed of pollution in degrees and knots and tenths of knots. In case of air pollution, (gas cloud), drift speed is indicated in m/s.

Forecast:
e.g., arrival on beach with estimated timing. Results of mathematical models or computer trajectory modeling.

Identity of Observer and Ship on Scene:
Indicates who has reported the incident. If a ship, name, home port, flag and call sign must be given. Ships on scene can also be indicated under this item by name, home port, flag and call sign, especially if the polluter cannot be identified and the spill is considered to be of recent origin.

ACTION TAKEN
Implementation of National Contingency Plan: Indicate if National Contingency Plan has been activated. If appropriate, give name of Response Agency and On-Scene Commander.

Incident Surveillance:
Indicate type of spill surveillance such as aerial or vessel. Number of over flights per day, etc.

Photographs or Samples:
Indicates if photographs or samples from the pollution have been taken. Fax or Telex number of the sampling authority should be given.

Names of Other States Informed:
Lead agency initiating message concerning the spill incident should name the other Island States that have been notified directly. This is important if the control of communications is being passed to the U.S. Coast Guard Commander, Greater Antilles.

Assistance to Where and How:
Information concerning the delivery of the assistance e.g., rendezvous at sea with information on frequencies to be used, call sign and name of on-scene commander of the requesting Island State or Territory or land-based authorities with telephone number, fax, or telex number and contact person.

Other States Requested:
Only used if not covered by the country, if further assistance is later needed by other Island States or Territories. Personnel Names, Passport

Nationality and Number:
Names of persons responding from an assisting Island State including their passport numbers. This information is necessary to facilitate rapid entry into the requesting Island State or Territory.

Description of Equipment:
A brief description of the equipment including serial and model numbers. Also included a list of any component parts that are being shipped with the equipment.
**ETA and Arrival Information:**
Time and place of arrival of equipment and of personnel should be given to accommodate clearance with customs and immigration officials in the requesting Island State or Territory.

**Place of Embarkation:**
The responding Island State should give the airport or seaport where responding personnel will be arriving at in the requesting country.

**Spare:**
Any relevant information pertaining to the spill should be included such as results of field inspections or surveys.
## Appendix H: Record of Amendments

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Amended by: [Include organization name, person and designation]</th>
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Annex F: Pictures of the visit of the RM Mission 2020
Final consultation of the RMM team with the senior officials the concern Ministries and Departments

Consultation of RMM team with the third party members at Bangladesh Forest Department office.

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Flow Observed at Hardings Bridge

Data source: Joint Rivers Commission, Bangladesh
The Sundarbans (Bangladesh) (N 798) Progress Report

on the decisions of 43COM.7B.3 of the World Heritage Committee on the Sundarbans World Heritage Sites

May 2021

Ministry of Environment, Forest and Climate Change
Government of the Peoples’ Republic of Bangladesh
The Sundarbans (Bangladesh) (N 798) Progress Report

on the decisions of 43COM.7B.3 of the World Heritage Committee
on the Sundarbans World Heritage Sites
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# Acronyms and Abbreviation

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>BFD</td>
<td>Bangladesh Forest Department</td>
</tr>
<tr>
<td>BTAP</td>
<td>Bangladesh Tiger Action Plan</td>
</tr>
<tr>
<td>BWDB</td>
<td>Bangladesh Water Development Board</td>
</tr>
<tr>
<td>CREL</td>
<td>Climate Resilient Environment and Livelihood</td>
</tr>
<tr>
<td>DCT</td>
<td>Dolphin Conservation Team</td>
</tr>
<tr>
<td>DoE</td>
<td>Department of Environment</td>
</tr>
<tr>
<td>ECR</td>
<td>Environment Conservation Rules</td>
</tr>
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<td>ECNEC</td>
<td>Executive Committee of the National Economic Council</td>
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<td>Environmental Impact Assessment</td>
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<td>Environmental Management Plan</td>
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<td>EPZ</td>
<td>Export Processing Zone</td>
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<td>GRRP</td>
<td>Gorai River Restoration Project</td>
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<td>LPG</td>
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<td>MoEFCC</td>
<td>Ministry of Environment, Forest and Climate Change</td>
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<td>MPA</td>
<td>Mongla Port Authority</td>
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<tr>
<td>MSTPP</td>
<td>Maitree Super Thermal Power Project</td>
</tr>
<tr>
<td>NOSCOP</td>
<td>National Oil and Chemical Spill Contingency Plan</td>
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<tr>
<td>NCSS</td>
<td>National Committee for Saving the Sundarbans</td>
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<tr>
<td>NTRP</td>
<td>National Tiger Recovery Programme</td>
</tr>
<tr>
<td>OUV</td>
<td>Outstanding Universal Value</td>
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<tr>
<td>PA</td>
<td>Protected Area</td>
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<tr>
<td>PPR</td>
<td>Public Procurement Rules</td>
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<td>Strategic Environmental Assessment</td>
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<td>SRF</td>
<td>Sundarbans Reserve Forest</td>
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<td>SMART</td>
<td>Spatial Monitoring and Reporting Tool</td>
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<td>SMP-I</td>
<td>Management of the Sundarbans Mangrove Forests for Biodiversity Conservation and Increased Adaptation to Climate Change</td>
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<td>SW</td>
<td>South-west Region</td>
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<td>Tiger Co-ordination Committee</td>
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<td>ZLD</td>
<td>Zero Liquid Discharge</td>
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Executive Summary

In response to the recommendations given in the Decisions of 41 COM 7B.25 and 43 COM 7B3 of the World Heritage Committee, the Government of Bangladesh is transmitting the progress report documenting the current and future conservation initiatives for management of the Sundarbans ecosystem, potential major restorations activities.

With a land mass of 147,570 sq. km. and population of approximately 163 million, Bangladesh is one of the most densely populated countries in the world. For example, the combined land mass of France, Spain and Italy is almost ten times that of Bangladesh whereas the population is approximately the same. Despite high population density and limited natural resources, Bangladesh is progressing forward with a steady annual economic growth of more than 7.9%, sustained improvement of human development indices; the per capita income has increased to 2227 USD in recent times.

Bangladesh has made rapid social and economic progress in recent decades. Recently Bangladesh has graduated from the LDC and the economic growth trajectory has retained its smooth momentum even amidst the prevailing Covid-19 global pandemic. This steady but sure momentum has slingshot the economic growth within the last few decades grossing a total GDP of 364 billion USD and has resulted in boosting the current foreign reserve of Bangladesh to 45 billion USD, and annual export to 37 billion USD. Some of the landmark successes that have been fueled by the economic growth includes Bangladesh being placed 4th in world in terms of fish production, 2nd in terms of jute production and garments export, and 4th in terms of rice output. Recent statistics of World Bank marks the increase of agriculture production in the country as the second highest in the world during the last 20 years. This has culminated in an overall development in human index with average life expectancy increasing to 73 years as well as increases in happiness index.

Bangladesh houses the Sundarbans with a total area of 6000 sq km, out of which, 1397 sq km has been marked as world heritage site in 1997 by UNESCO. The Sundarbans is a famous biodiversity hotspot, harboring 320 species of birds, 53 reptiles, 49 mammals, and 290 fish, as well as protecting threatened and endangered species like the estuarine crocodile, Indian python, and Bengal Tiger. Notably, it is the only area known to have tigers that are ecologically adapted to mangrove habitats. The total carbon sink capacity of the forest is 136 million tons which is equivalent 499 million ton CO₂.

The Sundarbans have undergone positive changes in the last decades with increase of the mangrove forest over the last four epochs (1976-2015) from 436,617 hectares in 1976 to 494,757 hectares in 2015. (Reference: Helena Borgqvist, M Islam & Lalit Kumar, 2018.). Moreover, the Sundarbans experienced almost no tree cover loss from 2001 to 2012. While pollution, overexploitation, aquaculture and agriculture all pose challenges to this ecosystem, conservation efforts have largely minimized forest loss in the 21st century. As a result, the Sundarbans have recently been declared as "pirate-free" by our Honorable Prime Minister.

At an exemplary level, Bangladesh is one of the few developing countries that initiated the Strategic Environmental Assessment (SEA) process to safeguard its environment. The Sundarbans, the world’s largest continuous mangrove forest, is a national asset and pride for Bangladesh and the SEA has targeted the wellbeing of this heritage. EIA approval has been made mandatory for projects around the Sunderbans with strict monitoring provisions for ensuring compliance to all mitigation measures suggested within the EIA report.

Current and future development plans until 2041 in the Southwest region of Bangladesh revolving around preservation and conservation of the valuable Sundarbans ecosystems include dredging of Gorai River to divert water to the Southwest region, mandatory environmental clearance for any large-scale industrial projects in line with SEA (once it is completed), integrated freshwater inflow management plan to maintain freshwater flow and improve water quality, future dredging of the Pashur river, India-
Bangladesh JWG on Conservation of the Sundarbans and SMART-based patrolling across the Sundarbans Reserve Forest (SRF).

The Mongla Port Authority has taken initiative to procure and implement Vessel Traffic Management Information System (VTMIS). Standard Operating Procedures (SOPs) has been placed for Disaster Management for the Port. In addition, additional projects will be taken up to dredge upstream waterways to bring fresh water flow to the Sundarbans.

In recent times, especially in the year 2020 and 2021, the state party has taken various measures for conservation of the natural ecosystem and Outstanding Universal Value (OUV) of the Sundarbans. Government has undertaken projects such as ‘Sundarbans Shurokkha (in English- ‘Sundarbans Conservation’) project’, ‘development and extension of eco-tourism in the Sundarbans’, ‘pond excavation and re-excavation for the supplying of fresh drinking water’. These measures will enhance the sustainability of forest management of the Sundarbans. Other projects include ‘re-establishment of telecom system in the Sundarbans’, ‘support to the management of the Sundarbans Reserved Forest (SMP II)’, ‘Mobile Apps based development and post-development support of Eco-tourism in the Sundarbans for Bangladesh Forest Department (BFD)’ etc.

The MoU between the Ministries of Environment, Forest and Climate Change of both Bangladesh and India signed in 2011 reinforced transboundary cooperation on the Sundarbans. The countries have agreed to conduct studies to develop indicators to measure health of the ecosystems of the Sundarbans and to identify impacts of climate change on its ecosystems.

The Bangladesh Delta Plan 2100 a 100-year strategic plan adopted by the Government of Bangladesh, seeks to balance ecosystem conservation and economic development – in line with the country’s goal to achieve the vision 2041 – with the longer-term challenge of managing water, ecology, the environment and land resources, and the risks from natural disasters and climate change. Recently, Government of Bangladesh has launched the Mujib Climate Prosperity Plan Decade 2030 with a vision to shift Bangladesh’s trajectory from vulnerability to resilience and prosperity. Both Plans emphasize the need to protect the Sundarbans and provide the basis for adopting effective strategies to manage this very important mangrove forest.
1. Introduction

The Sundarbans, the world’s largest continuous mangrove forest, is a national pride for Bangladesh. The Sundarbans Reserve Forests (SRF) has three wildlife sanctuaries that covers 1,39,700 ha which was declared as World Heritage Site in 1997. In June 2017, the State Party has extended the area of this 3 (three) Wildlife Sanctuaries to 3,17,950 ha from 1,39,700 ha to facilitate undisturbed breeding ground for the Royal Bengal Tiger and other wildlife in the Sundarbans and World Heritage Site (WHS). Three dolphin sanctuaries (Dhangmari, Chandpai and Dudhmighi) measuring an area of 1070 ha have been established in 2012 at eastern portion of the Sundarbans and another three dolphin sanctuaries in and around the Sundarbans (Shibsha, Bhodra and Pankhali) measuring an area of 3427 ha have been established in 2020 for conservation of Ganges river and Irrawaddy dolphins. Now, the total area of wildlife sanctuary covers about 53.59% area of the Sundarbans. According to the Wildlife (Conservation and Security) Act, 2012, there is no access to the sanctuary area for the resource collectors - living around the vicinity of the Sundarbans and any kind of economic activities are strictly prohibited within the wildlife sanctuaries. These efforts have been protecting the property from possible threats that may affect the Outstanding Universal Value (OUV) of the property.

Local communities adjacent to the Sundarbans area have been dependent on agro-based economic activities such as aquaculture and hatchery, paddy processing for rice production, betel-nut processing etc. Mongla Port was established in Southern part of Bangladesh in 1954. Various secondary and tertiary economic activities emerged in the region after establishment of the Port.

The Government of Bangladesh is committed to take all measures to protect and conserve the integrity of the Sundarbans as a whole. The decisions adopted during the 43COM 7.B 3 in Baku, Azerbaijan in 2019 and 41st session of the world Heritage committee in Krakow, Poland in 2017, are being complied by the Government of the People’s Republic of Bangladesh. The Government is also taking a number of additional measures to maintain and improve the existing diversity and richness of the ecosystem of the property as well as the entire Sundarbans area.
2. Response to the Decision of the World Heritage Committee

Government of Bangladesh has prepared a comprehensive response on the decisions of 43 COM 7.B.3 of the World Heritage Committee. The responses to each decision are as follows:

2.1 Decision no. 1-2

i) Having examined Document WHC/19/43.COM/7B.Add,


Response

A comprehensive response on the decisions of 41 COM 7.B.25 and 43rd COM 7.B.3 has already been sent to the WHC in December 2018 and January 2020.

2.2 Decision no. 3

Welcomes the formation of an India-Bangladesh Joint Working Group (JWG) of the Sundarbans and requests the State Party of Bangladesh to keep the World Heritage Centre informed of the concrete actions and outcomes that arise from the JWG and how these will strengthen the long-term protection of the property’s Outstanding Universal Value (OUV).

Response

To improve the trans-boundary cooperation between Bangladesh and India on conservation of the Sundarbans, the first meeting of India-Bangladesh Joint Working Group (JWG) was held in India on 21 July 2016 (discussion and agreed action points of the meeting is attached as Annex-1). Initiatives have already been taken by the Ministry of Environment, Forest and Climate Change (MoEFCC) on agreed action points of the aforesaid meeting. The MoEFCC has constituted a Working Group in Bangladesh side for working on the agreed action points and for arranging second bilateral meeting with India.

The Second meeting was supposed to be held in Bangladesh on 18th February 2020 and the host country (Bangladesh) sent a proposal to the Indian Government. However, the Indian Government requested to arrange the meeting later and asked for providing them enough time for preparation. In the meantime, the Government of Bangladesh, meeting with its own stakeholders, took some further steps following the decisions of the 1st JWG meeting. The achievements so far and progress on the initiatives of Bangladesh are as follows:

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| 01    | Sharing of knowledge of flora and fauna in both parts of Sundarbans through biodiversity mapping and evaluation study. | As per decision of meeting of the Bangladesh side 22 research proposals on fauna is under consideration for Formulating Common Approach on Biodiversity Mapping of the Sundarbans and these proposals would be discussed in the 2nd meeting of JWG. Besides, the following steps have been taken regarding the fauna and flora of the Sundarbans. **Fauna**

Some of the Research/Survey have already been conducted by Bangladesh Forest Department.

1) Under the “Bengal Tiger Conservation Activity Project” tiger census (2018-19) was conducted through...
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<td>‘capture camera trapping’ method and estimated 114 tiger population in Bangladesh part of the Sundarbans. 49 VTRTs (Village Tiger Response Team) and 40 Tiger Scouts are working in the field along with FD (Forest Department) staffs and WILDTEAM to aware local people for Tiger conservation and to rescue the stray tiger from villages to its natural habitat.</td>
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<td>2) Under “Vulture Conservation Initiative” Vulture survey conducted. The survey recorded 100 White-rumped Vulture in Bangladesh part of the Sundarbans.</td>
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<td>3) Under “Population Assessment of Crocodile in the Sundarban” project 140 Salt Water Crocodile recorded. In addition, 184 Salt-Water Crocodiles were reproduced in the Karamjol wildlife breeding centre to release in the nature (Sundarbans).</td>
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<td>4) Under the “Batagurbaska Conservation project”, Batagurbaska population has been increased to 359 in the Batagurbaska Breeding Centre of Karamjol, Sundarban through captive breeding program. Recently 63 Hatchlings were added in the Batagurbaska population.</td>
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<td>5) Under “Dolphin project”, some survey &amp; Research works have been conducted in the Sundarbans &amp; adjacent areas. It is to inform that 1070 hectares of Sundarbans (Dangmari, Chadpai and Dudhmukhi) was declared as Wildlife Sanctuary in 2012 for dolphin conservation. Recently, 03 new Dolphin Wildlife Sanctuaries (Pankhali, Shibsha and Vodhra) with an area of 3427.0 hectares have been declared by the Government and 7 DCTs (Dolphin Conservation Team) are working in the field along with FD (Forest Department) staffs and Co-Management Committees to aware local people for Dolphin conservation, rescue dolphins in danger, and monitor Dolphin Sanctuaries etc.</td>
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<td>6) Assessment of tiger carrying capacity in the Sundarbans has been conducted by Forest Department in 2019 and it was found that at present the Sundarbans can support 164 tigers on average with available food and habitat support of the sundarbans.</td>
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</table>

**Flora**

1. Research on “Floristic Survey conducted on Sundarbans Mangrove Forest of Bangladesh (2015)” identified that the Sundarbans (Bangladesh part) has 528 species of Vascular Plants, of which 345 species are herb, 89 species are shrubs and 94 species are trees. Prain (1903) first recorded 334 species of Vascular Plants in the entire Sundarbans (Bangladesh and India). Among them 203 species were herb, 81 species were
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<td>shrubs and 54 species were trees.</td>
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<td>2. Non-Vascular plants and recorded 30 species of macro algae; Basak et al. (2005) recorded 10 species of lichen; Das et al. (2016) recorded 32 species of macro fungi and Ahmed (2017) recorded 250 species of macro fungi.</td>
</tr>
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<td>3. Bangladesh Forest Research Institute conducted a “Regeneration Study on Sundarbans” in 2019 at 33 permanent sample plots (PSPs) and recorded 32444 seedlings/ Hectare which was 27414 seedlings/ Hectare in 2018.</td>
</tr>
<tr>
<td>04.</td>
<td>On Bi-annual meetings (could be held at field director level) On Monthly meetings (could take place at DFO level along with the meeting of security forces)</td>
<td>On Bangladesh side, officers have been nominated for the Joint Border Meeting.</td>
</tr>
<tr>
<td>05.</td>
<td>Reserving seats for personnel from Bangladesh in the nine months Diploma course in the wildlife Institute of India, Dehradun.</td>
<td>Collaborating with Wildlife Institute of India (WII) on capacity building and research, In 2019-2020 fiscal year, 06 forest officials attained 10 months diploma program (03 officers) and 03 months certificate course (03 officers). at the Wildlife Institute of India</td>
</tr>
<tr>
<td>06.</td>
<td>Illegal exploitation of marine biodiversity using harmful gears.</td>
<td>In 2014, ‘Swatch of No Ground’ of Bangladesh with an area of 173,000 hectares was declared as Marine Protected Area (MPA). A proposal on Biodiversity conservation of this MPA has been developed. The proposal would be discussed in the 2nd meeting of JWG for joint intervention.</td>
</tr>
<tr>
<td>07&amp;08</td>
<td>Measuring the scale of dependency of adjacent community on Sundarbans ecosystem and study of the Sundarbans dependent community and their alternative livelihood. Study of the indicators to measure health of the ecosystems of Sundarbans</td>
<td>Proposal on &quot;Modalities for study to measure health of the ecosystems of Sundarbans” and joint modalities proposal on “Study of the Sundarbans dependent community and their alternative livelihoods” have been developed for Bangladesh part. These would be discussed on the 2nd meeting of JWG for working decision. Under different projects of Forest Department like Sundarbans Environmental and Livelihood Security (SEALS) project, Climate Resilience Ecosystems and Livelihoods (CREL) project, SDBC project, Bengal Tiger Conservation Activity (BAGH) project, Sundarbans Management Project (SMP-I) project, Dolphin project, about 73840 individuals of Sundarbans dependent community received alternative income generation (AIG) support/ training.</td>
</tr>
<tr>
<td>09</td>
<td>Joint identification of research need, joint research and incorporation of research findings in the Sundarbans management practice for the whole Sundarbans ecosystem.</td>
<td>Some research proposals and modalities on “Impact of Climate Change on the Sundarbans ecosystem” have been developed. They will be discussed on the 2nd meeting of JWG for working decision.</td>
</tr>
<tr>
<td>Sl no</td>
<td>Agenda</td>
<td>Actions taken</td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>Protocol on Tiger Conservation</td>
<td>In compliance with the principal Goal of Protocol on Tiger conservation, the first meeting regarding Trans-Boundary Tiger Conservation was held in Kolkata, India on 20th December 2019. The Committee has decided to work together for conservation of Tigers of the Sundarbans.</td>
</tr>
</tbody>
</table>

### 2.3 Decision no. 4

*Appreciates the confirmation that any future dredging of the Pashur River will be subject to an Environmental Impact Assessment (EIA), reminds the State Party that EIAs should be conducted in line with the IUCN World Heritage Advice Note on Environmental Assessment and include a specific section on the potential impact of the project on the OUV of the property, and also requests the State Party to ensure that any dredging within the property is conducted in compliance with strict conditions that safeguard the property’s OUV and further requests the State Party to provide information on dredging activities.*

**Response**

Maintenance dredging is required to maintain the navigability of the Mongla Sea Port on the Pashur River. Since 1979 Mongla Port has been performing maintenance dredging to keep the port operational.

The government of Bangladesh has controlled environmental polluting activities in and around Sundarbans Reserve Forest which is accelerating the improvement of the ecological condition of the Sundarbans. For the future dredging activities at Pashur River, EIA approval is obligatory according to the Environment Conservation Act 1995 and Environment Conservation Rules 1997 of Bangladesh. The EIA study for the maintenance dredging at the Inner Bar of Mongla Port Channel (Pashur River) has been conducted in line with the IUCN World Heritage Advice Note where a specific section (Chapter-8) has been detailed out about the OUV of the property. Moreover, multtier environmental monitoring has been framed out for safeguarding the SRF during dredging time.

It is assumed that, by now, the maintenance dredging has been adopted by the river ecosystem and safeguarding the OUV of WHC. No dredging activities are being conducted during fish breeding seasons. Information on dredging activities in Pashur River is as follows:

#### 2.3.1 Information on Dredging Activities

**a. Ongoing Dredging Activities within the Sundarbans area and its periphery**

**a.1. Inner Bar Area**

Currently, as per the approved EIA for dredging of inner bar area dredging is being carried out at seven locations in the inner bar of Pashur river: a) Turning Ground: 0.12 Million sq.m., b) Jetty Front: 0.25 Million sq.m., c) Confluence Channel: 1.13 Million sq.m., d) Mooring Buoy: 1.0 Million sq.m., e) Base Creek: 1.88 Million sq.m., f) Anchorage: 1.6 Million sq.m. and g) Harbaria: 0.50 Million sq.m. The dredging locations and potential dredged materials’ disposal locations are presented in the Figure 1 and 2. Inner bar dredging is ongoing and expected to complete by June 2022. The EMP and monitoring activities are being followed during the execution of dredging.

Dredged materials will be disposed in designated location following environmental code of practices and EMP. Mongla Port Authority (MPA) shall abide by relevant environmental rules and regulations as stipulated in the EIA report for protection of aquatic fauna and flora.

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1. [http://mpa.portal.gov.bd/sites/default/files/files/mpa.portal.gov.bd/page/3f7a6366_8880_4a95_a007_cf4559a0988ff11/2020-08-18-10-19-7a599bc532d3c0432e0cfeae1f8ce80b.pdf](http://mpa.portal.gov.bd/sites/default/files/files/mpa.portal.gov.bd/page/3f7a6366_8880_4a95_a007_cf4559a0988ff11/2020-08-18-10-19-7a599bc532d3c0432e0cfeae1f8ce80b.pdf)
Figure 1: Inner bar (Joymonirgol) dredging area in the Pashur River
Figure 2: Inner Bar dredging and disposal area in the Pashur River
2.4 Decision no. 5

Welcomes the State Party’s actions, such as the implementation of the integrated freshwater inflow management plan, the implementation of Spatial Monitoring and Reporting Tool (SMART), the development of the Tiger Action Plan (2018-2027) and National Tiger Recovery Programme (NTRP), expansion of the wildlife sanctuaries and the adoption of Bangladesh Delta Plan 2100 to protect and expand the Sundarbans.

Response

An updated report on ecological monitoring of the property was given in the progress report of 41COM 7B.25 decisions in December 2018, to the RMM of 2019 as well as in the progress report of 43COM 7B.3 decisions. The updates on those programs are as follows:

2.4.1 Spatial Monitoring and Reporting Tool (SMART) Patrolling in the Sundarbans

SMART (Spatial Monitoring & Reporting Tool) based monitoring system is being implemented in the Sundarbans. This monitoring system will be very much helpful to monitor and protect the resources (floral, faunal and aquatic) for the Sundarbans especially in regards to protecting wildlife poaching, smuggling and illegal fishing. Due to SMART patrolling wildlife poaching, smuggling and illegal fishing have been reduced appreciably.

SMART patrolling in the Sundarbans West Forest Division started in June, 2015 for the first time in Bangladesh. During the years prior to the SMART implementation, the rate of offender arrest was about 1-2 arrest per month while the SMART patrol team’s arrest rate was more than 25 arrest per month preceding implementation of SMART patrolling.

To support the implementation of the SMART patrolling approach in the SRF, BFD and Wildlife Conservation Society (WCS) of Bangladesh have jointly developed, 1) a SMART Operating Procedures (SMART-OPs) for Law Enforcement and Wildlife Monitoring in the Sundarbans, and 2) a Handbook for SMART Patrols in the Sundarbans Reserved Forest. The WCS of Bangladesh has also helped BFD for developing a configurable data model for data collection via Cyber Tracker-equipped handheld devices.

During January, 2019 to April 2021, a total of 264 patrols were conducted along 167,329 km channels during 1411 days of patrol effort. During the patrolling, 35,192 sightings of 67 key wildlife species were recorded. In this time period total 910 offenders were arrested. During the patrolling total 537 boats or transports and 601 fishing and crab harvesting gears, 167 cutting tools, 9 poison fishing were seized.

Yearly reports of SMART patrolling show that the forest offences, specially wildlife related offences has decreased from 2019 to 2021.

2.4.2 Bangladesh Tiger Action Plan (2018-2027)

Second generation Tiger Action Plan (2018-27) has been approved by the MoEFCC. The Bangladesh Tiger Action Plan (BTAP) is a policy level document that offers a structured approach to achieve long-term conservation of tigers in Bangladesh. The first generation BTAP was for the period 2007-2017. It provides a vision, goals and objectives to guide an integrated and focused tiger conservation program.

- The vision is to ensure ‘protected tiger landscapes in Bangladesh, where wild tigers thrive at optimum carrying capacities so as to perform their ecological role, and which continue to provide essential ecological services to mankind’.
- The main goals to address threats are to increase the current tiger population, maintain sufficient prey and habitat, and to address challenges are to improve conservation capacity, improve law enforcement, build capacity and proper mechanism for awareness and education programs as well as community involvement, build capacity to conduct tiger conservation research and monitoring, and encourage collaboration.
- The implementation of this BTAP will ensure that the nation attempts to sustain the current tiger occupancy in over 6,017 sq. km. and increase the density in the Sundarbans from the current 2.17 to 4.50 tigers per 100 sq.km. within the next ten years. Systematic monitoring and evaluation of progress against the BTAP goals will be done to enable the adaptation of conservation activities. Bangladesh Forest Department, under the Ministry of
Environment and Forests, is the primary custodian of the forest and its wildlife, but the immense task of tiger conservation necessitates support and expertise outside the normal regime of forest management. Therefore, the establishment of a Bangladesh Forest Department-led platform that facilitates collaboration for the implementation of conservation activities will be fundamental to its success.

In compliance with the Tiger Action Plan (2018-2027) the proposal of “Tiger Conservation Project (TCP)” of the Sundarbans (Project period: July, 2020 to June, 2023) is on process of approval from the Government and is expected to commence very soon. The principle objectives of the project are: a) to survey of tiger population through camera trapping, b) survey of population of tiger prey animals, c) relocation of tigers to the areas of Sundarbans where tigers are not naturally found, d) installation of satellite collar in tigers to monitor the translocated tigers, e) to measure the relative density of tigers in the Sundarbans through Khal (Canal) survey and f) reduction of Human tiger conflict.

2.4.3 National Tiger Recovery Program (NTRP)

As a party to the Global Tiger Recovery Program (GTRP), Bangladesh had produced its first version of the National Tiger Recovery Program (NTRP) in 2010 and the revised version has been prepared for the period of July 2017 to June 2022.

- The NTRP presents additional effort that Bangladesh needs to make in order to accelerate the implementation of the Bangladesh Tiger Action Plan (BTAP) with a focus on priority actions.
- The goal of NTRP of Bangladesh is: ‘by 2022, a demographically stable tiger population, greater than the current tiger population, under the scientific management and conservation in the Sundarbans.
- The priority actions to achieve the goal include building institutional capacity, engaging local communities, protecting habitats, and trans-boundary collaboration.

In compliance with the NTRP the following steps are taken from Bangladesh Government

- With the joint collaboration of Forest Department, Police, Border Guard, Customs and Coast Guard a Wildlife Crime Control Unit (WCCU) has been established. It is playing a vital role in the protection and conservation of tiger and other wildlife.
- Tiger Co-ordination Committee (TCC) has been formed in national and regional level to control wildlife poaching and illegal trafficking and working effectively.
- To reduce the human-tiger conflict, 49 Village Tiger Response Team (VTRT) with 332 community people and a 3-member Forest Tiger Response Team (FTRT) has been formed and working at the Sundarbans Impact Zone (SIZ).
- Compensation Policy for wildlife victims, 2012 has been approved which is helping to reduce the human-tiger conflict in the Sundarbans Impact Zone.
- The GoB has become the member of CITES, GTI, GTF and SAWEN for the conservation of biodiversity of the country including the SRF.

2.4.4 Expansion of Wildlife Sanctuary

With the objective of conservation of flora and fauna of the Sundarbans and to maintain and undisturbed breeding ground for wildlife, three wildlife sanctuaries encompassing an area of about 1,39,700 hectares were declared as Sundarbans East Wildlife Sanctuary, Sundarbans West Wildlife Sanctuary and Sundarbans South Wildlife Sanctuary in 1996. This area of three Sanctuaries has been extended to 3,17,950 hectares in 2017. Three dolphin sanctuaries (Dhangmari, Chandpai and Dudhmkhi) measuring an area of 1070.0 hectares was established in 2012 at eastern portion of the Sundarbans. Recently, another three dolphin sanctuaries in and around the Sundarbans (Shibsha, Bhodra and Pankhali)
measuring an area of 3427 hectares is established (2020) for conservation of Ganges River dolphin and Irrawaddy dolphins. Now, the total area of wildlife sanctuary covers about 53.59% area of the Sundarbans. Collection/extraction or harvesting of all kind of resources is strictly prohibited inside these sanctuaries.

2.4.5 Initiatives for Dolphin Conservation (including protected area declaration)

Waterways of the Sundarbans mangrove forest support the Endangered Ganges River dolphin and Vulnerable Irrawaddy dolphin, the last two remaining species of freshwater dolphins in Asia. 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.

Considering the aforesaid context, Bangladesh Forest Department in partnership with the United Nations Development Program in Bangladesh (UNDP-Bangladesh) and with support from the Global Environment Facility (GEF), has implemented a project titled 'Expanding the Protected Areas System to Incorporate Important Aquatic Ecosystems (EPASIIAE)' in the Sundarbans.

Activities for Dolphin conservation

Various activities have been implemented for conservation of Dolphin in the Sundarbans. Some of the major activities are mentioned below-

Expansion of the coverage of dolphin PA in and around the Sundarbans

Three dolphin sanctuaries (Dhangmari, Chandpai and Dudhmkhi) measuring an area of 1070.0 hectares have been established in 2012 at eastern portion of the Sundarbans and another three dolphin sanctuaries in and around the Sundarbans (Shibsha, Bhodra and Pankhali) measuring an area of 3427.00 hectares have been established in 2020 for conservation of Ganges River Dolphin and Irrawaddy Dolphin.

Under the project the SRF and associated areas were surveyed to identify hotspots for dolphin. In the survey 6 (six) new hotspots and 4 (four) semi-hotspots are identified. Three new hotspots have been considered as to be declared as sanctuary for dolphin.
Figure 3: Existing Dolphin Wildlife Sanctuary in the Sundarbans


Introduction of an Effective Management System in the Existing PA Established for Dolphin Conservation in the Sundarbans

The Forest camp staffs were provided training on GPS based patrolling in the camp area. One hundred and ten staffs of 8 (eight) sanctuary associated forest camps were trained on dolphin biology and behavior to capacitate on dolphin conservation. They were strengthened with fuel and other logistic support such as patrol vest, rain coat, GPS, GPS Batteries, fuel container, hand mike, torchlight etc. These efforts have already proved to be effective in the management of the sanctuary and the management effectiveness score has been increased.

Enhancement of Alternative Livelihood Options for Local Fisher Folk to Reduce their Dependency on Aquatic Resources

To reduce the dependency of the community on the aquatic resources the project provided livelihood support (worth of BDT 40,000 for each) to 1,000 (one thousand) households and training based on their choice, experience and willingness. Most of the community now are engaged in crab farming, goat rearing, driving three-wheeler van, running small business and tea stall, selling garments, tailoring etc.

Formation of Dolphin Conservation Team (DCT) is one of the important achievements of the project. 7 DCTs with 70 community people have been formed to help forest department for dolphin conservation by providing information on illegal activity (if there is any) in the dolphin sanctuary. Each DCT has 10 (ten) volunteers who are local inhabitants residing beside the sanctuaries. Members of 7 DCTs (Dolphin Conservation Team) are working in the field along with FD (Forest Department) staffs and Co-management Committee to aware local people for Dolphin conservation, rescue the trapped dolphin and to monitor the Dolphin Sanctuaries etc. Each DCT have been provided with BDT 0.3 million and a total of BDT 2.1 million have been provided as SEED MONEY (Fixed Deposit) under the project ‘Expanding the Protected Areas System to Incorporate Important Aquatic Ecosystems (EPASIIAE)’ to continue their operations and conduct their meetings from the interests of that deposited money.

2.4.6 Involvement of Local Communities in Co-management of the Sundarbans Reserved Forests (SRF)

Co-management activities were initiated in the Sundarbans in 2009-10 to ensure equitable participation and distribution of rights and benefits received from the natural resources. For 3 (three) Protected Areas in the Sundarbans, (viz, Sundarbans East Wildlife Sanctuary, Sundarbans West Wildlife Sanctuary, Sundarbans South Wildlife Sanctuary), 4 (four) Co-Management General Committee (CMGC) as well as 4 (four) Co-Management Executive Committees (CMEC) were formed. Here 211 Village Conservation Forums (VCF) are working consisting of 32,774 community people (3140 in Sharonkhola range, 6140 in Chandpai range, 12094 in Khulna range and 11400 in Satkhira range), 4 (four) People’s Forums (PF), 22 Community Patrolling Groups (CPG), 49 Village Tiger Response Teams (VTTRT) and 7 Dolphin Conservation Team (DCT) are working. The Co-management activity is regulated by the Protected Area Co-management Rules, 2017.

Role of Co-management Bodies

The current Co-management bodies with representatives from the communities are more functional for conservation of the Outstanding Universal Value (OUV) and ecosystem of the Sundarbans than before. At present, the 4 CMGCs have a total financial resources of 5.039833 million BDT (2.858906 million BDT of CMGC and 2.180927 million BDT of DCT). Besides, the CMC members have been provided with short term loan of 2.807580 million BDT to purchase Water tanks, Gas stoves etc. for their better living and to promote alternative livelihoods like purchasing of Easy bikes, Auto Vans, honey cultivation, handicrafts etc. from the fund of CMCs.

Members of CPG, VCF, PF, VTTRT, DCT do the patrol work along the borderline of the Sundarbans with the Forest Departmental Staff. Besides, VTTRT and DCT members are dedicatedly working with Forest Departmental officials for Tiger and Dolphin conservation respectively. In addition to patrolling, the Co-management bodies give information regarding the forest offences to the concerned forest office and the SMART patrolling team. Since introducing the Co-management approach, the level of forest offences reduced significantly. The CMCTeams play a vital role during the rescue of wildlifes from the adjacent villages and releasing them in the nature. Thus, the Co-management approach playing very important role for the conservation of the Outstanding Universal Value of the Property.
Community Patrolling Group (CPG)

This group patrol along with forest department staffs and inform about any illegal forest offences and offenders. At present, 22 CPG groups (196 members) working on 4 ranges in the Sundarbans. So far, the CPGs covered about 4500 round of patrolling with forest departmental staffs and rescued more than 250 wildlives from adjacent locality to the Sundarbans and released them to the nature (Sundarbans Reserved Forest). A recently approved project (approved on 05/01/2021) titled “Sundarbans Surokkha (in English-‘conservation’) Project” aims to provide daily allowances to the VCF members for patrolling with Forest Departmental officials. The allowances will inspire the VCF members for a rigorous patrol to prevent forest offences and encourage them for the conservation of the OUV of the Property.

Village Conservation Forum (VCF)

The VCF members provide important messages regarding poaching and illegal forest offence such as poison fishing, hunting and any type of illegal entrance to the Sundarbans Reserved Forest. So far, they are aware about 7700 people for the conservation of the Sundarbans.

Dolphin Conservation Team (DCT)

DCT team works on awareness building for the conservation of Dolphins in the Sundarbans. They do patrol in the Dolphin sanctuary areas and aware the fishermen not to capture fish in the Dolphin sanctuary areas. Furthermore, they inspire the fishermen to engage in alternative livelihoods and release stuck/trapped Dolphins to its nature. DCT has an FDR (Fixed deposit) amounting BDT 2.2 million BDT. The interest coming from this amount is used for awareness programs for Dolphin conservation. Till date, they released 08 stuck/trapped Dolphins to the nature, conducted 54 community meetings and 32 short training programs and made aware of more than 2500 people for the conservation of Dolphins.

Village Tiger Response Team (VTRT)

This team rescue stray Tigers from the villages adjacent to the Sundarbans, rescue wild lives like python, wild boar, monkey, deer, crocodile, fishing cat etc. from the adjacent villages and release them to the nature (Sundarbans Reserved Forest). So far, they released 431 wildlives to the nature with the help of Forest Departmental officials.

Sundarbans Resource User Groups (SRUG)

Under the project, “Management of the Sundarbans Mangrove Forests for Bio-diversity Conservation and increased Adaptation to Climate Change (SMP)” Sundarbans Resource User Groups (SRUG) were formed. SMP identified natural resource dependent households in Chandpai Range with varied dependency on the Sundarbans resources for livelihoods. Households those have 50% or more yearly income sourced from the resource collection out of the Sundarbans were categorized as Sundarbans Resource User (SRU) and given choice to participate in lower co-management tier i.e., Village Conservation Forums (VCFs). A sub-group within VCF titled Resource Users Group (RUG) has been created with the participation of SRUs. Bi-monthly meeting for them has been privileged to discuss resource collection, conservation best practices, problems faced during resource collection and the solutions etc. The meeting decisions are communicated to upper tiers via VCF. A Good number of RUG members and leaderships also received training on ‘Natural Resource Management’ (focus on importance and ecosystem services of Sundarbans, resource collection best practices, associated rules and regulations, penalties associated to illegal harvesting etc.) and ‘Organizational and Leadership Development’. Executives of RUGs are regularly mentored. Effective participation of resource users in the VCFs increased by these initiatives, the membership gradually been chosen for VCF’s executive positions as well as representatives to the Peoples Forum (PF). Their prioritized issues are more discussed than before. To date, 39 RUGs are operating in Chandpai Range more than 2000 members, while replication of the same approach is in the process in Sarankhola Range. Most of the VCF leaders also received training on ‘Organizational and Leadership Development’, ‘Sundarbans and Gender Role in Conservation’, mentored regularly with qualified staffs, supported to organize their bi-monthly meetings, organize participatory elections once tenure of executives and PF representatives completed, enhancing communications within and beyond co-management tiers, building good rapport with external service providers to help accessing benefits and services by the members. VCFs are also learning from peer-to-peer earning visits organized among them and enhancing connectivity and solidarity as horizontal spheres. Till date, nearly 6200 members enrolled in 37 VCFs in Chandpai Range while similar approach to upscale in 20 VCFs of Sarankhola Range.
Provisions of Alternative Income Generation (AIG) opportunities of the forest dependent local community

As mentioned before resource users of the Sundarbans are identified and provided with alternative income generation (AIG) opportunities to reduce pressure on the Sundarbans. Different GO and NGOs had been involved in providing AIG supports through projects in the Sundarbans. Improved cooking stoves, solar system, pond sand filter, rain water harvesting units were set up in the periphery of SRF. Training on AIG activities, kinds and grants have also been provided to the forest dependent people to reduce the pressure on the resources of Sundarbans.

Alternative livelihood activities for Sundarbans dependent community under previously implemented projects of Forest Department are as follows:

<table>
<thead>
<tr>
<th>Project Name</th>
<th>AIG supports/ training recipient number</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEALS project</td>
<td>45000 persons (on Fish, duck and chicken rearing, handicraft and honey cultivation)</td>
<td>At present, most of the trained persons have shifted from resource harvesting from the Sundarbans to alternative livelihoods such as Fish, duck and chicken rearing, handicrafts production, honey cultivation/bee keeping, vegetable cultivation, grocery shop etc.</td>
</tr>
<tr>
<td>CREL project</td>
<td>25400 persons (23000 persons on fish, duck and chicken rearing &amp; vegetable cultivation, 1600 men for income increment program and 800 women for handicraft training)</td>
<td></td>
</tr>
<tr>
<td>SDBC project</td>
<td>1940 persons (on Honey cultivation, crabs &amp; shrimps processing, Golpata collection related training)</td>
<td></td>
</tr>
<tr>
<td>BAGH project</td>
<td>500 persons (on Handicraft and honey cultivation)</td>
<td></td>
</tr>
<tr>
<td>SMP project</td>
<td>2000 persons (on Sustainable resources use related training)</td>
<td></td>
</tr>
<tr>
<td>Expanding the Protected Area System to Incorporate Important Aquatic Ecosystems (EPASIIAE) project – project for dolphin conservation.</td>
<td>1000 persons trained for AIG program (based on their needs, efficiency and previous experiences e.g., crab farming, goat rearing, van, small business tea stall, cloth business, tailoring etc.) and also BDT 40,000/- was given to each trainee.</td>
<td></td>
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</tbody>
</table>

2.4.7 Current Conservation Measures

In 2020 and 2021, the state party has taken various measures for conservation of the natural ecosystem and Outstanding Universal Value (OUV) of the Sundarbans. Considering the breeding season of most of the wildlife species and to ensure an undisturbed breeding ground for the wildlife, recently, the Government prohibited the entrance of the tourists in the core zone (wildlife sanctuary) Sundarbans from June to August. Furthermore, the Government has taken a number of projects for the Conservation of the natural ecosystem and Outstanding Universal Value (OUV) of the Sundarbans as well as the Natural World Heritage Site. The conservation efforts under those different projects are stated below:

2.4.7.1. SundarbanShurokkha (in English- 'Sundarbans Conservation') Project
The project with estimated cost 1570.00 million BDT was approved by the Government on 05th January, 2021. This project aims to adopt modern scientific management for the conservation of the Sundarbans as well as to provide climate resilient working environment to the Forest Departmental officials (including logistic supports) for better monitoring and management. The project aims to establish a long-term ecological monitoring system for the Sundarbans. The project is being implemented with the following activities –

- Detailed survey of flora and fauna of the Sundarbans, study on population status of major wildlife species and characteristics of their habitat, study on salinity (of soil and water) and Ecological Monitoring.
- Through Ecological Monitoring, a complete data base and information system on parameters like soil, water, air, vegetation, animals etc. regarding the ecosystem and environment of the Sundarbans will be established which may provide accurate guidelines for present and future management to achieve the SDGs.
- Through training under this project, the capacity of Bangladesh Forest Department will be enhanced to continue the ecological monitoring activities by its own capacity after the end of the project.
- Research studies on forest bio-diversity, climate change, study on density and population of different types of wildlife, wildlife habitat, diseases of wildlife etc., study on population of six important aquatic species of the Sundarbans and the characteristics of their habitat, probable threats to the aquatic animals etc. will be conducted.
- Training to Forest Departmental officials on implementation of the Wildlife (conservation and security), Act, 2012 for controlling of wildlife related offences, for management of the Wildlife Sanctuary areas (as well as the World Heritage Sites), training on First Aid, SMART patrolling, Wildlife Habitat observation, Wildlife Sanctuary Management, Rescue of Wildlife, Using of GPS and Cyber Tracker for SMART patrolling, for computer data entry and networking will be conducted.
- The project will arrange round table Consultation Meetings with the community political leaders and other stakeholders for the Conservation of the OUV of the Sundarbans.
- In addition, there are provisions for training on Managing of Eco-tourism, Tour Guiding, Nature Interpretation etc. for the tour operators, tour guides, members of Co-management bodies which may play vital role for Alternative Livelihoods for the forest dependent resource user groups.
- Afforestation (homestead plantation, block plantation, assisted natural regeneration and enrichment plantation) in and around the surrounding areas of the Sundarbans to supply fuel wood for the local people.
- Establishment of GIS lab for GPS based tracking, Vegetation Mapping, Change detection analysis, Land use Mapping etc.
- Establishment of Mangrove Adaptation and Knowledge Centre (MAKC) and Establishment of Sundarbans Archaeological museum.
- Re-excavation of rivers and canals in periphery of north-eastern part to supply fresh water flow and to improve the navigability for fishers.
- Establishment of Desalinization plant and re-excavation of ponds to supply fresh drinking water for Forest Departmental officials and for wildlife.
- Updating of Integrated Resources Management Plan (IRMP)
- Permit system automation for the Resource Users and providing the resource users digital identification number
- Establishment of climate resilient field offices and Range offices
- Repairing works of offices, residential buildings, monitoring and inspection vessels, roads, gangway & pontoon for increase of management efficiency.
- Supplying of fiber body monitoring vessels, cyber trackers, GPS, computers etc.

"2.4.7.2. Development and extension of Eco-tourism in Sundarbans project"

The project with estimated cost 249.5 million BDT is being implemented with the objectives of improvement of Eco-tourism attractions in the Sundarbans (especially in the buffer zone areas), improvement of Eco-tourism facilities for the tourists, to decrease the dependency of the forest dependent people on the Sundarbans resources and improvement of their socio-economic conditions by engaging them in eco-tourism based alternative livelihoods and awareness raising of local people on environment friendly eco-tourism activities management.

The project is being implemented covering activities such as development of eco-tourism facilities in the existing eco-tourism spots, out of which, development of souvenir shops may provide Alternative livelihoods to the forest dependent resource user groups of the Village Community Forum (VCF). This project will also provide Alternative Income Generation Activities to the VCF members by facilitating boat cruising organized by the Co-management bodies. Interpretation and information Centre built under the project will be helpful for better scientific eco-tourism management since it helps the tourists to become enriched with information regarding the ecosystem, bio-diversity and OUV of the Sundarbans and the tourists become aware about what to do or not to do at different spots of the forest.

Introduction of the Automated Identification System (AIS)/ Vessel Monitoring System (VMS) under the project will make eco-tourism more secured to the tourists. It will also help to monitor the tourist vessels whether they are moving on the right track (approved routes) in the forest.

Four new eco-tourism spots in the buffer area of the Sundarbans is being developed so that the Eco-tourism activities may be gradually shifted from the core zone area to the buffer zone area.

The project is providing training to the Forest Departmental officials, tour operators, tour guides, members of the Village Conservation Forum, local village leaders, students of schools and colleges adjacent to the Sundarbans for awareness raising for the conservation of the Outstanding Universal Value (OUV) of the Sundarbans as well as the World Heritage Site.

2.4.7.3. Pond excavation and Re-excavation project for the supplying of fresh drinking water in order to sustainable Forest Management of the Sundarbans

The project is being implemented in the Sundarbans to supply fresh drinking water to the Forest Departmental officials and to the forest resource users as well as to the wildlife of the Sundarbans. The project aims to Excavate 4 new ponds and re-excavate 84 existing ponds in the Sundarbans. At present, pond excavation and re-excavation works are going on under the project.

2.4.7.4. Re-establishment of Telecom system in Sundarbans project

This project is being implemented in the Sundarbans to re-establish the telecom system in the Sundarbans to control the forest offences and wildlife related offences, for better monitoring, and vigilance over the Forest Departmental official engaged in monitoring and to modernize the telecommunication system for conservation of the natural forest. It will supply and establish the telecom system with sufficient numbers of VHF sets, repeater sets, required numbers of towers, walkie talkie handsets with solar power back up system for all telecom facilities.

2.4.7.5. Support to the Management of the Sundarbans Reserved Forest (SMP II) project

This project with an estimated cost of 648.8 million BDT is being implemented with the partnership of GIZ with the objectives of –

- continuation of SMART patrolling in the Sundarbans.
- to make the Co-management bodies more functional,
- Initiation of Ecological Monitoring and
- Updating of Integrated Resources Management Plan (IRMP).
Under this project, Drone supported monitoring system (for the purpose of SMART patrolling as well as Ecological Monitoring) will be started very soon. Currently, the Forest Departmental officials are getting training to operate drones. The training program has started on 19th March, 2021.

2.4.7.6. Mobile Apps based Development and post-development support of Eco-tourism in Sundarban for Bangladesh Forest Department (BFD)

This project aims to facilitate the eco-tourism activities in the Sundarbans by providing online support to the intended tourists, tour operators and Bangladesh Forest Department (BFD) through mobile apps. The mobile app will be very helpful for the intended tourists, tour operator's business and management functions as well as the monitoring and management functions of BFD. At present, the app development work is going on.

2.5 Decision no. 6

Notes with great concern the likely environmental impacts of large-scale industrial projects on the property's OUV, and urges the State Party to take all necessary mitigation measures to address the concerns previously expressed by the Committee and the 2016 joint World Heritage Centre/IUCN Reactive Monitoring mission.

Response

The Government of Bangladesh is committed to protect the Sundarbans for its national and international importance. The Department of Environment, Bangladesh has not given environmental clearance or permission to the Orion power plant and Phase II of the Rampal power plant as well as to any large-scale industry adjacent to the Sundarbans World Heritage property since the decision of 41COM 7B.25 (2017). DOE is moving cautiously before considering and approving any large-scale industry near the Sundarbans. The Maitree STPP Project in Rampal has been taken up after obtaining all requisite/statutory clearances such as Environmental Impact Assessment (EIA) and Environmental Management Plans (EMPs) as per the Bangladesh Environment Conservation Act 1995 and Environment Conservation Rules 1997 (amended in 2010) in 2013.

Before submission of EIA report of Maitree STPP Project, an Initial Environmental Examination (IEE) report was prepared from July-September 2010 and submitted to DoE. Based on the IEE report, approval of Location Clearance by DoE was given in May 2011. Before approval of EIA study for Maitree STPP of Rampal various comments, questions were raised by DoE, individuals, societies, researchers, journalists, Members of National Committee for Saving the Sundarbans (NCSS) etc. and all were addressed in the final approved EIA report. Public hearing/disclosure on EIA Report was also done in April'2013. The EIA report was approved on 05.08.2013 by DoE. The study was carried out following the Environmental Impact Assessment Guideline of DoE and the World Bank guidelines including multidisciplinary tools and techniques of physical environment, water resources, agriculture, land and soil, fisheries, ecology and socio-economic surveys and investigation. Participation of local people was ensured through RRA, FGD and stakeholder consultation process. The Environment Management Plan as per EIA was prepared and being implemented since 2013 after the DOE approval of EIA. Further, a separate EIA study for Coal Transportation was approved in Jan 2018 after due diligence in line with the rules and regulations of Bangladesh and World Bank Guideline.
Figure 4: Location and Distance of Maitree STPP of Rampal from the Property
2.5.1 Current status of construction of the Maitree STPP, Rampal

Maitree STPP is being developed with all measures to safeguard the Sundarbans from potential hazards as recommended in EIA and RMM report in 2016. The work of project hampered due to COVID-19 outbreak. The Project is in 49th month of its execution plan and achieved 66% physical progress. All the mitigation measures as recommended in EIA have been adopted to control the pollution while implementing this power plant project.

A. Air Pollution Control

- **Modern & Efficient Technology**: High steam temperature and pressure to increase plant efficiency, less quantity of coal burning per unit of electricity output which results in lesser fuel consumption and less GHG emission.

- **Imported coal of High Calorific value** (around 6000Kcal/Kg), Low Sulphur and Low Ash content will be used.

- **Highly efficient wet limestone based Flue Gas De-sulphurisation System (FGD)**: Highly efficient Wet limestone based FGD System shall be used to capture SO2 to control the emission of SO2 within the limit of 200 mg/Nm³ as per WB/IFC guidelines. Further, high quality coal with low Sulphur content will be used for fuel. The average content of Sulphur in the coal will be around 0.6%. FGD System for SOx reduction includes -
  - Wet Limestone, Forced Oxidation type FGD system shall be used to remove SOx from flue gas.
  - Modern Japanese Technology based Double Flow Contact Scrubber type FGD of high efficiency shall be used.
  - To augment the cleaning of flue gas, very high purity limestone shall be used.

- **Electrostatic Precipitator (ESP)** of efficiency above 99% shall be used to collect the fly ash and to control emission of Particulate Matter (PM) within the limit of 50 mg/Nm³ as per WB/IFC guidelines. It is pertinent to mention, some of the dust particles are also being captured in the FGD during scrubbing process, before the flue gas is exited from the chimney.

- **Advanced Low NOx Burner**: An effective and proven Low NOx burner technology is being used to control emission of NOx within the limit of 510 mg/Nm³ as per WB/IFC guidelines.
  - Formation of NOx in combustion is related to source of N2 from combustion air and organic Fuel. Combustion at near Stoichiometric air fuel ratio and at low temperature will result in less NOx generation.
  - Low NOx Tangential Firing system equipped with Closed Coupled Over Fire Air (CCOFA) and separate Over Fire Air (OFA), being used by BHEL (EPC contractor) that has been developed by world pioneer in Steam Generator Technology, Alstom Power Inc. Alstom has a technology transfer with BHEL and Alstom is a qualified steam generator manufacturer (QSGM).
  - With this above technology of Low NOx firing system and low NOx burner, the emission of NOx will be maintained within the norms of international standards.

- **Chimney**: 275 m tall Chimney for wider dispersion of particulates leading to reduced ground level concentration.

- **Covered coal storage & enclosed coal conveyors** to eliminate of fugitive coal dust.

- **Dust extraction & suppression system** in Coal Handling Plant.

- **Large scale afforestation** in and around the project which will improve overall environment/ambience and also act as a carbon sink. Maitree Super Thermal Power Project, Rampal has an agreement to plant two hundred thousand saplings of different species. Till date around 116,000 saplings have been planted. These saplings consist of Mangrove species, Golpata, Fruit/ Medicinal Trees, and Coconut trees etc. BHFPCCL is not only planting but also taking enough management care to ensure their growth.
B. Water Pollution Control

- **Modern Induced Dart Cooling Tower (IDCT):** Provision of IDCT for Closed Circuit Cooling Water System to reduce the overall water requirement.

- **Make-up water requirement is only 0.05% of lean flow period in the lean season, through Pashur River; discharge will be about half of this make up water. However, the entire water system has been designed for efficient water use where a series of water re-use provision has been kept. The treated water will be tried to reuse or recycle as much as possible.**

- **No Thermal pollution of River water.** As per design, the Temperature of discharge water shall never be more than two degree centigrade (2°C) above river water temperature at the edge of mixing zone which is as per stringent IFC norms.

- **Dry bottom ash system** to reduce intake water requirement instead of conventional wet bottom ash system and facilitate utilization of dry bottom ash.

- **Effluent Treatment Plant** are provided so that no effluents from the plant are discharged to the river without treatment.

- **Sewage Treatment Plants** are used to treat the domestic waste from the residential buildings, offices and other places

- For Hg present in coal, the amount of Hg will be only in traces, a large part of which will be collected in the dry form in the dry ash handling system and significant part of the remnant shall be captured in the downstream FGD equipment.

C. Ground Pollution Control

- **100% ash utilization for** this project is envisaged and accordingly required system for ash handling including Dry bottom ash instead of conventional wet bottom ash system is envisaged & under implementation. Ash management including design requirement of ash collection, transportation and loading to closed barge/ closed tanker for further utilization by ash utility is under implementation.

- Expression of Interest to buy dry ash from the plant has been received from Cement industries. It is found that demand of dry ash from the plant is 4-5 times more than 100% output.

- **High Concentration Slurry Disposal System (HCSD):** In addition, in the unlikely event of ash not being dispensed for a limited period, measures have been taken to collect and store the ash (during such period) through an advance technology i.e. HCSD to an ash pond of 25 acres to mitigate any contingency.

- Feature of HCSD system is that after mineral transformation of settled dense ash slurry, ash stone is developed whose main features are:
  - No water leakage to surface and ground water systems
  - No dissolution of ash components.
  - Hazardous components remain embedded
  - No dyke breeching, leaching and contamination
  - No dusting and ash/water runoff.

- High Concentration Slurry Disposal (HCSD) system is supposed to have no excess water. However, a recirculation system is envisaged for pumping any excess decanted water from the Dyke. Decanted water from ash pond of HCSD pond will be led to the plant area by using high capacity pumps and the same will be conveyed from ash dyke to plant area. This water will be further used in the project area.
Suitable protection from back water of the river all around the ash dyke has been envisaged. On downstream (D/S) slope of the dyke embankment, stone pitching with inverted filter arrangement shall be provided from G.L. to HFL plus 1.0 m height of dyke embankment. Provision shall also be made to protect the upstream slope of embankment. Rock-toe with toe drain shall also be provided at the toe of the embankment all around the ash dyke. In addition to that, ash pond with impermeable liner in compliance with statutory guidelines is envisaged to further ensure no leaching of water to sub soil/ground water contamination.

2.5.2 Fuel Transportation

As per the condition stipulated in the EIA study approval letter of DoE (August, 2013) for the proposed 2X660 MW Maitree STPP, BIFPCL has conducted Environmental Impact Assessment (EIA) study for Coal Transportation for Maitree STPP through third party and approved by DoE in January 2018. For coal transportation to the Rampal Project site, daily 1-2 lighterage vessels will be operated in the Pashur river which is insignificant with respect to existing number of vessels plying through established maritime route of Mongla Port.

Coal for Rampal Project will be transported using Purpose-built modern sea worthy vessel, tailor made as per IMO classifying norms covered vessels and environment friendly with very low effluent discharge, low SOx emission, low noise engine, GPS facility etc. Coal transshipment/transfer will be done utilizing modern environment friendly technology and best utility practices to ensure clean coal handling. Low noise vessels/ships will be used for coal carrying so that the aquatic lives of the river are not disturbed due to noise.

While carrying out the EIA study for Coal Transportation through the Pussur River, a sophisticated model (CALPUFF) has been used to determine the level of pollution at the World Heritage Site (Property). The result shows that the incremental level of pollutants (like SOx, NOx, PM10, PM2.5) at the Property is negligibly small and the cumulative level of these pollutants, considering the current base level and future additional pollution load from power plant, will remain very much within the limits (Table 1) specified by World Bank standards.

Table 1: A Comparative Scenario of Ground Level Concentration of Pollutant Ingredients before and after the Project Implementation at the Tip of Sundarbans (Annual average)

<table>
<thead>
<tr>
<th>Polluting Ingredients</th>
<th>Present Status (µg/Nm3)</th>
<th>Status after Project Implementation (µg/Nm3)</th>
<th>Bangladesh Standard(µg/Nm3)</th>
<th>World Bank/IFC Standard(µg/Nm3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx (Annual Avg.)</td>
<td>2.2</td>
<td>2.3</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>SOx (Annual Avg.)</td>
<td>2.1</td>
<td>2.2</td>
<td>80</td>
<td>Not available</td>
</tr>
<tr>
<td>PM2.5 (Annual Avg.)</td>
<td>3.1</td>
<td>3.3</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>PM10 (Annual Avg.)</td>
<td>6.5</td>
<td>6.8</td>
<td>50</td>
<td>20</td>
</tr>
</tbody>
</table>

2.5.3 Measures taken During Pre-Construction and Construction Period

Environmental Management plan (EMP) is a part of approved EIA study. The main objective of the EMP is to guide the implementing agency to achieve sustainability of the project ensuring environmental conservation as per national and international standard.

The EMP includes mitigation, enhancement, compensation and contingency measures for each of the three phases of the project –

i. pre-construction,

ii. construction and

iii. Post construction/operation

The construction works of Maitree Super Thermal Power Project (MSTPP) is progressing well with preeminent prioritizing environmental and safety issues. A comprehensive checklist after due diligence, has been developed to monitor the environmental compliance of different components e.g.,
Environmental and Social Management System and Action Plan; Labor and Working Condition; Community Health, Safety and Security; Biodiversity and Sustainable Management of Living Natural Resources. Further, special thrust has been given to following areas while implementing the EMP measures:

- Noise management plan
- Air Quality management plan
- Water Quality management plan
- Waste management plan
- Safety at site
- Occupational Health and Safety procedure
- Construction site management plan
- Community Development Activities

Project Implementing authority has appointed third party monitoring agency for regular monitoring of environmental parameters in and around the power plant project area and also from Khulna to the Sundarbans. The scope of Third party monitoring agency is as follows:

- Monitoring the compliance of DoE guideline and giving their observations.
- Specific monitoring parameters are being measured at locations in and around the project area and along the Pashur River up to Hiron point of the Sundarbans Reserve Forest.
- The reports are being shared with concerned Ministries and local Authorities. Till date 26 quarterly reports have already been submitted.
- Environmental parameters e.g. 24 hours air quality particulate matter) monitoring at three locations inside the BIFPCL project area, discharge water quality and noise level are being monitored within the project area on monthly basis since April’2018
- The Monthly and Quarterly Reports are being uploaded on www.bifpcl.com, the official website of BIFPCL, accessible to public.

As evident from above, Maitree Super Thermal Power Project, Rampal is being implemented with modern state of the Art Technology to meet most stringent standards of DoE, Bangladesh and World Bank/ IFC (Table 2).

Table 2: Standards of Environmental Conservation Rules 1997, World Bank/IFC and Maitree Super Thermal Power Project

<table>
<thead>
<tr>
<th>Environmental Parameter</th>
<th>Bangladesh Standard</th>
<th>WB/ International Finance Corporation requirement</th>
<th>Maitree STPP parameters</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO₂</td>
<td>–</td>
<td>EHSG - TPP 200 to 850 mg/Nm³</td>
<td>200 mg/Nm³</td>
<td>For Maitree project, the parameters are kept much lower than permissible limit of World standards.</td>
</tr>
<tr>
<td>NOₓ</td>
<td>&gt;No Standard Exists for coal Power Plant. &gt;Boiler of Industrial Unit (600 mg/Nm³)</td>
<td>EHSG - TPP 510 mg/Nm³</td>
<td>510 mg/Nm³</td>
<td>For Maitree, project, parameters are kept within permissible limit of World standards.</td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>150 mg/Nm³</td>
<td>EHSG - TPP</td>
<td>50 mg/Nm³</td>
<td>For Maitree, project, parameters are kept within</td>
</tr>
</tbody>
</table>
### Environmental Parameter

<table>
<thead>
<tr>
<th>Environmental Parameter</th>
<th>Bangladesh Standard</th>
<th>WB/ International Finance Corporation requirement</th>
<th>Maitree STPP parameters</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase of ambient River Water temperature at the edge of mixing zone</td>
<td>--</td>
<td>Not more than 3 Deg. Celsius</td>
<td>Not more than 2 Deg. Celsius of the discharge point</td>
<td>For Maitree project, norms are kept lower than permissible limit of World standards.</td>
</tr>
<tr>
<td>Noise Pollution</td>
<td>Day time noise: 50db(A) Night time noise: 40db(A)</td>
<td>G-EHSG - Residential areas Daytime:55db(A) Nighttime:45db(A)</td>
<td>Daytime: 50 dB(A) Nighttime: 40 dB(A) (Measured along the site boundary of the plant)</td>
<td>For Maitree project, the parameters are kept lower than permissible limit of World standards and within Bangladesh Standard.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50 mg/Nm³</td>
</tr>
</tbody>
</table>

### 2.6 Decision no. 7

Expresses concern that 154 industrial projects upstream of the property are currently active, and reiterates the Committee’s request in paragraph 4 of decision 41 COM 7B.25 and welcomes the commitment of the State Party to continue the Strategic Environmental Assessment (SEA) requested by the same decision.

**Response**

The State party would like to reaffirm that there are only 20 (out of 24) red category industries operational around the Sundarbans. All existing 154 factories/farms/facilities operations were established before 2016, mostly in the 1990’s and 2000’s. A total of 130 factories, mills, cottage industries, agro-based livelihood activities under the Orange Category as well as 24 industrial facilities under the Red Category are situated around the Sundarbans. Other than the Red Category industrial facilities all other facilities/operations are mostly small scale enterprises based on agrarian livelihood.

Prominent among the 130 Orange Category Industries are 54 rice processing facilities, 14 fish farms/ponds, 8 ice factories and 8 welding workshops with the rest including grading mills, various small agrarian enterprises, small restaurants and other facilities etc. Most of them do not emit or discharge any air/water pollutants to the surrounding environment. **Detailed and in-depth reporting on the 154 industries have previously been provided in the progress report submitted in January, 2020 (refer to previous progress report 2020).** In addition, these facilities especially the red category factories are situated around 45 km to 70 km away from the property in Bagerhat District (Figure 5).

Government of Bangladesh has not issued environmental clearance to any large-scale industrial/infrastructural development adjacent to the Sundarbans World Heritage property since the decision of 41COM 7B.25 (2017). Upon decision from the WHC, a project to conduct Strategic Environmental Assessment (SEA) of South West region of Bangladesh including the Sundarbans is under implementation by Bangladesh Forest Department (BFD).
Figure 5: Location and Distance of the Facilities/Factories from the Property
2.7 Decision no. 8

Requests that the State Party implement the relevant recommendations of the SEA to all current and future projects and recalls the obligation of the State Party to submit to the World Heritage Centre, for review by the Advisory Bodies, detailed information including Environmental Impact Assessments for development projects, which have the potential to influence the OUV of the property before they commence in accordance with Paragraph 172 of the Operational Guidelines before work commences or any irretrievable decision is made.

Response

The Government of Bangladesh has not given any environmental clearance or permission to any large-scale industry adjacent to the Sundarbans World Heritage property since the decision of 41COM (2017). Terms of Reference of conducting SEA has already been shared with WHC.

In accordance with the ToR the joint ventured firm CEGIS & Integra Consulting of Czech Republic is conducting the SEA in compliance with OECD guidelines and operational guidelines of WHC. The Inception report, Prospectus and Screening and Scoping report covering a total 89 Policies, Plans and Programs (PPP) of 28 sectors relevant to South West region has already been prepared. From the baseline information of the SW region the key Environmental and Socio-Economic issues are considered for the SEA study. All the reports are available in the dedicated website: [www.seasw-sundarbansbd.org](http://www.seasw-sundarbansbd.org).

2.8 Decision no. 9

Regrets that the National Oil Spill and Chemical Contingency Plan has still not been finalized, and also reiterates its requests that the State Party ensure adequate provision of funding and human resources for the implementation of the plan once it is adopted, and provide further information and data on the monitoring of long-term impacts from recent shipping incidents involving spills of hazardous materials in proximity to the property.

Response

Final version (both English and Bangla) of the “National Oil and Chemical Spill Contingency Plan (NOSCOP)” has already been approved by the Cabinet Division of the Government on 3rd February 2020 and published by the Ministry of Environment, Forests and Climate Change in both Bangla and English version in February 2020. A rigorous consultation has been done during development of the plan. The final version of the NOSCOP is attached herewith as AppendixA.

The following clause in the NOSCOP provides provision of funding and human resources for the implementation of the plan,

Finance Division of the Ministry of Finance will provide authorization for expenditure and funds for initial response and ensure adequate financial records are maintained.”

2.9 Decision no. 10

Requests that the State Party invites a joint World Heritage Centre/IUCN Reactive Monitoring mission to the property to assess the state of conservation, in particular the level of threats to the hydrological and ecological dynamics which underpin the OUV of the property and recommends that this mission takes place by the end of 2019.

Response

Upon the request of WHC the State Party invited the World Heritage Centre/ IUCN Reactive Monitoring Mission to visit the World Heritage Site in the Sundarbans. Accordingly the four members’ mission visited the property and the Rampal Power Plant and consulted with different stakeholders from December 10 to December 15 2019. The mission inspected all areas according to their Terms of References. During the Sundarbans visit the Mission was briefed on updated management practices being implemented by the Forest Department such as Integrated Resource management Plans for the Sundarbans (IRMP) for 2010-20, Sundarban West Wildlife Sanctuary Management Plan (2015-2025), Community-based Resources Management Plan of the Wildlife Sanctuaries for Dolphins in Bangladesh Sundarbans (2019-2028), Fish Conservation/Management, Involvement of local community for conservation and monitoring, Alternative livelihood activities for Sundarbans dependent community under previously implemented projects of Forest Department and Forest inventory in the Sundarbans. The Mission also attended a consultation
meeting with local community, local public representatives and local administrative authority. The Mission also met with the Third party in the last day of their visit (Appendix B).

2.10 Decision no. 11

Finally requests the State Party to submit to the World Heritage Centre, by 1 February 2020, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 44th session in 2020 so that the Committee can decide on whether or not to inscribe the property on the List of World Heritage in Danger.

Response

This report along with all implementation updates is submitted as per decision number 11 of 43 COM 7.B 3. The state party also requests to consider the additional information of the progress report of January 2020.
3. Public access to the state of conservation report

The state party requests that the full report should be uploaded for public access.

Signed/- 25/05/2021

Secretary

Ministry of Environment, Forest and Climate Change

Government of the Peoples’ Republic of Bangladesh
Annex-1: First meeting of India-Bangladesh Joint Working Group (JWG) held in India on 21 July 2016 (reference to decision no. 3)

The JWG discussed on-

- Sharing of knowledge on flora and fauna in both parts of the Sundarbans through a biodiversity mapping and study.
- Water quality monitoring of important rivers terminating in the Sundarbans region and ultimately to the Bay of Bengal for both the countries through a standard methodology and standard parameters solely for the management of the Sundarbans ecosystems.
- Siltation trend analysis of rivers terminating in the Sundarbans region of both the countries and generation of time-line data for future studies and assessments solely for the management of the Sundarbans ecosystem.
- Sharing of intelligence information on smuggling of animals and wildlife products; inviting forest officials to regularly attend meetings on security issues held by forces; officials of India and Bangladesh holding periodic meetings on either side of the Sundarbans alternately- to share management strategies and create common approaches as envisaged in the MoUs.
- Illegal exploitation of marine biodiversity using harmful gears.
- Measuring the scale of dependency of adjacent community of the Sundarbans ecosystem.
- Study on the Sundarbans dependent community and their alternative livelihoods.
- Joint identification of research need, joint research and incorporation of research findings in the Sundarbans management practices for the whole Sundarbans ecosystem.

The JWG has agreed-

- To conduct a joint study to arrive at a set of indicators in order to measure health of the ecosystems of Sundarbans.
- Undertake a joint study on impact of climate change on the ecosystems of Sundarbans.
National Oil and Chemical Spill Contingency Plan (NOSCOP)

Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh

February 2020
National Oil and Chemical Spill Contingency Plan (NOSCOP)

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FORWORD

Oil and chemical spillage is critically detrimental to the environment and difficult-to-control. Consequently, pollution-causing from oil spillage is one of the gravest concerns throughout the coastal and seas region around the globe. This is especially true for Bangladesh due to its strategic location in the Bay-of-Bengal as important shipping routes for sizable master vessels and tankers carrying goods and oils from different locations around the Globe. This is also important since Bay-of-Bengal abounds in rich marine biodiversity including fish and aquatic other lives which are very sensitive to adverse effects of pollution. Not only delta is the source of life to ecologically essential and unique species, but also human livelihood dependent on the area and the location of the world's largest mangrove forest – the Sundarban, home to rare flora and fauna, makes the area extremely important requiring protection from pollution. Given the nation's current state of economic growth, industrial activities have increased that have access to the waters, trade has increased with growing numbers of shipping routes being used rigorously both nationally and internationally, and ports have become busier. Amongst all the processes, risks of spillage of hazardous materials in transportation or storage have increased over the years. Recent observation of spillage incidents has necessitated an imperative to reinforce pollution reduction actions. Hence the National Oil and Chemical Spill Contingency Plan (NOSCOP) has been prepared as part of national and regional effort which formulates an instructional, guiding and informative procedure to tackle oil and chemical spillage emergencies for Bangladesh.

The National Oil and Chemical Spill Contingency Plan (NOSCOP) outline allocation of functional responsibilities to the various Ministries and Departments of the Government of Bangladesh for oil and chemical spill response.

This National Oil and Chemical Spill Contingency Plan (NOSCOP) and other guidelines referenced during the development of this template include those produced by South Asian Cooperative Environmental Program (SACEP), the Regional Oil and Chemical Pollution Contingency Plan for the SAS (South Asian Seas) member countries and some national plans by SAS countries.

The intention of the preparation of this document of national plan is to place an open access to all relevant government organizations (ministries/departments), industries (private and public), entrepreneurs, including civil society to develop a comprehensive, practical national Plan, that allows the implementation of response measures while maximizing environmental protection. To achieve this objective, emphasis has been given to the followings to country-specific:

a. resources at risk (sensitive area, ecologically critical area, PA area, fishing ground of Bay of Bengal, Coastal resources sea beaches, mangrove forests, its resources and biodiversity, including tigers, turtle, dolphins etc.);

b. sources and causes of spills;

c. ambient conditions (local conditions include current velocity, tide and other meteorological factors);
d. legal framework and other relevant factors, like routes, ways of shipments, loading and unloading, safety precautions, rules & regulations of Bangladesh Coast Guard, Chittagong Port Authority, Mongla Port Authority, Payra Port Authority, Bangladesh Shipping Corporation, Bangladesh Inland Water Transport Authority, Department of Environment, Forest Department, Department of Fisheries, Bangladesh Navy, Bangladesh Fire Service And Civil Defense, Oil Companies, Bangladesh Petroleum Corporation and other relevant organizations and may be others of oil tankers movement of regional, national, port authority concerned, river and coastal authority, shipment of oil for different purposes; and

e. International agreement (SACEP, MARPOL, UNCLOS, CLC-1990 etc.) by the Bangladesh Government being considered when developing this National Plan.

The plan approaches crisis management in two levels of application. It sets forth a comprehensive risk management framework, and clearly defines roles and responsibilities for the sector-specific agencies. The legal framework under which, the Government of Bangladesh is vested with the responsibility of the plan, and all policy action specifics are laid out in this plan as well.

Successful implementation of this plan is critical to the continued cooperation and collaboration between and among the partners. I ask for continued commitment and cooperation from all stakeholders as we move forward to developing and implementing NOSCOP.

Ziaul Hasan ndc
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<th>Description</th>
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<tbody>
<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>BCG</td>
<td>Bangladesh Coast Guard</td>
</tr>
<tr>
<td>BFRI</td>
<td>Bangladesh Fishery Research Institute</td>
</tr>
<tr>
<td>BIWTA</td>
<td>Bangladesh Inland Water Transport Authority</td>
</tr>
<tr>
<td>BIWTC</td>
<td>Bangladesh Inland Water Transport Cooperation</td>
</tr>
<tr>
<td>BN</td>
<td>Bangladesh Navy</td>
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<tr>
<td>BSC</td>
<td>Bangladesh Shipping Corporation</td>
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<tr>
<td>CLC</td>
<td>Convention on Civil Liability for Oil Pollution Damage (CLC Convention) 1969 &amp; its Protocol 1992</td>
</tr>
<tr>
<td>CMP</td>
<td>Crisis Management Plan</td>
</tr>
<tr>
<td>CMS</td>
<td>Crisis Management System</td>
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<tr>
<td>CMS</td>
<td>Convention on Migratory Species</td>
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<tr>
<td>CPA</td>
<td>Chittagong Port Authority</td>
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<tr>
<td>DoE</td>
<td>Department of Environment</td>
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<tr>
<td>DoF</td>
<td>Department of Fisheries</td>
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<tr>
<td>DoS</td>
<td>Department of Shipping</td>
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<tr>
<td>ECA</td>
<td>Ecologically Critical Area</td>
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<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>EI</td>
<td>Environmental Impact</td>
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<tr>
<td>EOC</td>
<td>Emergency Operations Centre</td>
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<tr>
<td>ETA</td>
<td>Estimated Time of Arrival</td>
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<tr>
<td>Flash Point</td>
<td>The lowest temperature at which the vapors above a volatile liquid form a combustible mixture with air.</td>
</tr>
<tr>
<td>FS</td>
<td>Forest Specialist</td>
</tr>
<tr>
<td>GoB</td>
<td>Government of the People's Republic of Bangladesh</td>
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</tbody>
</table>
IAP  Incident Action Plan
IMDGcode  International Maritime Dangerous Goods code
IMO  International Maritime Organization
IMSF, CU  Institute of Marine Science & Fisheries, Chittagong University
In-Situ Burning  A controlled ignition of oil, other hydrocarbon products, and oil spill debris at the site of the spill. For offshore spills the burning of the floating oil may occur with or without fire-resistant booms.
MARPOL  International Convention for Prevention of Maritime Pollution from Ships
MFAG  Medical First aid guide
MSDS  Materials Safety Data Sheet
MSRC  Marine Spill Response Corporation
MoEFCC  Ministry of Environment, Forest and Climate Change, Government of Bangladesh
MPA  Mongla Port Authority
MPA  Marine Protected Area
NAADC  North American Aerospace Defense Command
NDRCC  National Disaster Response Coordination Centre
NEBA  Net Environmental Benefit Analysis
NOCS Committee  National Oil and Chemical Spill Control Committee
NORAD  Norwegian Agency for Development Cooperation
ODA  Overseas Development Assistance
OPRC  Oil Pollution Preparedness, Response and Cooperation
OSC  On-Scene Commander
OSSC  Oil Spill Service Centre
PA  Protected Area
PAH  Polynuclear Aromatic Hydrocarbon
POLREP  Pollution Report
PVC      Polyvinyl Chloride
RP       Responsible Party: The RP of an incident is the person, business, or entity that has been identified as owning the vessel or facility that caused the spill. The term does not imply criminal negligence
SAS      South Asian Seas
SACEP    South Asia Cooperative Environment Programme
SCUBA    Self-Contained Underwater Breathing Apparatus
SITREPS  Situation Reports
SOP      Standard Operating Procedure
UNEP     United Nations Environment Programme (currently UN Environment)
VHF      Very High Frequency
Viscosity A measure of the resistance to flow that a liquid offers when it is subjected to shear stress. Higher values indicate thicker, slower-moving materials. For example, gasoline has a lower viscosity than diesel
VOC      Volatile Organic Compound
National Oil and Chemical Spill Contingency Plan (NOSCOP)

Goal

This document is the official contingency plan that must be followed according to protocol and hierarchy for immediate response in cases of oil and chemical spill emergencies. This document also serves as a guide for long-term planning and preventive mechanisms that all stakeholders may refer to.

Custodian

The Ministry of Environment, Forest and Climate Change of Bangladesh Government is the custodian of this plan.

Amendment

Consulting with all stakeholders, amendment or all revisions will be made by the custodian of this plan—the Ministry of Environment, Forests and Climate Change, Bangladesh. This plan will be updated every five years or it could be amended as and when necessary. Once updated, details must be distributed among all stakeholders as early as possible. Changes in the plan may include but not limited to:

- Policy update
- Technology update
- Manpower and resource update
- Regional opportunities and/or limitations update
- Hierarchy update
- Others

Distribution

After every amendment and update, the plan must be distributed to the following institutions. This list itself is subject to change according to change in organization of the mitigation efforts.

<table>
<thead>
<tr>
<th>Type</th>
<th>Organization</th>
</tr>
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<tbody>
<tr>
<td>Government and Non-government organizations</td>
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</tr>
<tr>
<td>1.</td>
<td>Cabinet Division</td>
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<td>2.</td>
<td>Ministry of Environment, Forests and Climate Change (MoEFCC)</td>
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<tr>
<td>3.</td>
<td>Public Security Division, Ministry of Home Affairs</td>
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<tr>
<td>4.</td>
<td>Security Service Division, Ministry of Home Affairs</td>
</tr>
<tr>
<td>5.</td>
<td>Department of Environment (DoE)</td>
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<td>6.</td>
<td>Department of Fisheries (DoF)</td>
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<td>7.</td>
<td>Forest Department (FD)</td>
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<td>8.</td>
<td>Chittagong Port Authority (CPA)</td>
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<td>9.</td>
<td>Mongla Port Authority (MPA)</td>
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<td>10.</td>
<td>Payra Port Authority (PPA)</td>
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<td>11.</td>
<td>Bangladesh Navy (BN)</td>
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<td>12.</td>
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<td>16.</td>
<td>Department of Shipping (DoS)</td>
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<td>Bangladesh Petroleum Corporation (BPC)</td>
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<td>19.</td>
<td>BAPEX</td>
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<td>20.</td>
<td>Eastern Refinery Ltd. (ERL)</td>
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<td>21.</td>
<td>Deputy Commissioners/Upazilla Nirbahi Officers</td>
</tr>
<tr>
<td>22.</td>
<td>Bangladesh Police</td>
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<tr>
<td>23.</td>
<td>Bangladesh Ansar and VDP</td>
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<td>24.</td>
<td>Local Government Institutions</td>
</tr>
<tr>
<td>25.</td>
<td>National Disaster Response Coordination Center (NDRRC)</td>
</tr>
<tr>
<td>26.</td>
<td>IMSF, CU and NGO dealing with waste and related environmental issues</td>
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<tr>
<td>27.</td>
<td>Bangladesh Fire Service and Civil Defense</td>
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<tr>
<td>28.</td>
<td>Road Transport and Highways Division</td>
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<td>29.</td>
<td>Bridges Division</td>
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<tr>
<td>30.</td>
<td>Relevant Stakeholders</td>
</tr>
</tbody>
</table>

| International | SACEP, SAS Governments |
| Relevant Contacts | Private national and international petroleum and chemical companies using Bangladeshi waters |

**Sponsors**

The document is prepared with support, direction and funding of the following patron agencies:

- Ministry of Environment, Forests and Climate Change (MoEFCC)
- Department of Environment (DoE)
- Bangladesh Coast Guard
- Bangladesh Navy
- South Asian Cooperative Environmental Program (SACEP) for South Asian Seas (SAS) countries (Bangladesh, India, Maldives, Pakistan and Sri Lanka)
- Norwegian International Development Agency (NORAD)
- International Maritime Organization (IMO)

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- South Asian Cooperative Environmental Program (SACEP)
  - For non-commercial educational distributions
EXECUTIVE SUMMARY

The specific objectives of the National Oil and Chemical Spill Contingency Plan of Bangladesh are:

i. To provide a complete set of instructions that must be followed by all participating agencies in order to prevent, control and manage oil and chemical spillage emergencies in a coordinated way.

ii. To list all the tools, materials and resources held by relevant agencies, and to record all the important contact addresses for communication during contingency mitigation efforts.

The plan comes as a developmental progress of the efforts of the Government of Bangladesh to minimize/reduce and control oil and chemical spill incidents, avoid pollution and risks, and also a result of the joint effort of South Asian Seas (SAS) regional contingency plan overseen by SACEP.

The plan is sponsored by International Maritime Organization (IMO) and SACEP and prepared by the Ministry of Environment, Forests and Climate Change (MoEFCC) supported by Bangladesh Coast Guard, Bangladesh Navy, Port Authorities, South Asian Cooperative Environmental Program (SACEP), and government of SAS countries (Bangladesh, India, Maldives, Pakistan and Sri Lanka).

The plan sets out by defining all its objectives and spelling out all the authorities those will act together. The custodian of the plan is the Ministry of Environment, Forest and Climate Change (MoEFCC), Bangladesh. Hence, MoEFCC is the central agency that will act as command and communication center issuing instructions and requests in case of emergencies. Any change to the plan must be approved by MoEFCC, and distributed every time to relevant stakeholders for the concurrence. Besides, it has to be uploaded in the websites of MoEFCC, DoE and relevant other ministries/departments/organizations.

The necessity of the plan is illustrated in the introduction with a scientific and historical background. Since oil and chemical spillage poses high risk to the environment, terrestrial and aquatic animals, the ecosystem, human health, flora and fauna of Bangladesh. The industries along our coastlines and river bank are very active with expansions of shipping routes in the waterways connecting Bay of Bengal and the ports. A lot of boats and ships play through it without taking adequate safety measures to prevent spillage and puts the entire location at risk. Therefore, a comprehensive contingency plan is required to put effective mitigation systems in action in long and short-terms in case of any contingency.

In the scope, the plan mentions the geography of the coastal region, sea divisions in the Bay of Bengal where all economically and environmentally important zones are laid out with topography. The legal framework under which the Government of Bangladesh will act in national and international perspective is detailed in this section as well.
Organization with clearly spelled out roles is of vital importance for swift and precise action. As a result, there is a need for a hierarchy and chain of command which the agencies can rely on for effective action. In the distribution of authority section, the instrumental agencies which can provide full support and resources in a contingency situation are mentioned. This includes all the policing and defense organizations, government and non-government agencies critical during and post operations, which also include mitigation processes.

The plan approaches the crisis management plan in two levels of application:

1. Policy and Strategic Level
2. Operational Level

In **policy and strategic level**, the plan defines a hierarchy which brings all facilitator agencies together who would provide equipment, resources, expertise, manpower and communication. This further includes how the nation will prepare before hand through resource management, training, risk identification, monitoring and policy application.

In the **operational level**, the plan lays out formation of an on-site team which would directly engage pollution mitigation. This includes in situ roles and responsibilities according to need of time and on hand expertise. The team has to be deployed in moments depending on location. This part also includes DoE, MARPOL and SACEP notification and international alert systems.

A **NEBA** (net environmental benefits analysis) will be carried out to evaluate the spillage. Specific instructions on how to carry out NEBA have been provided with requirement of resources. Depending on the size, nature and location of the spillage, the **tier-identification matrix** will be used to decide on actions, such as methods of containment, dispersants, etc. Details on where to procure equipment has been provided. As for logistics, the plan mentions how resources are to be made available physically with transportation, customs and facilities for the team on-site. To manage the **after-effects**, coastline protection and monitoring activities have to be put in place as detailed in the plan.

The plan continues into the transactional details that have to be maintained throughout the entire process and how to do it with record keeping, **accounting**, legal claims and insurance procedures.

Finally, the plan ends its description by referring to a series of **appendices**. This is a very important part of the plan. It contains Maritime Boundary of Bangladesh, National and International Policies-Rules-Regulations-Agreement, Terms of References of NOCS Committee and On-Scene Commander, Urgent International Contacts, Reporting Format and Record of Amendments. This part is always evolving and needs to be updated as more resources are made available for the contingency.
1. **PART 1: INTRODUCTION**

Oil and chemical spills are one of the gravest detrimental incidents that can occur to the environment. They are long-lasting disasters that can affect large areas of land, coast and sea and underlying terrestrial and aquatic ecosystems. Spills can have several different effects. Initially it smothers organisms physically, particularly due to heavy oil and chemicals. Smothering may restrict an organism’s respiration, feeding and thermal regulation. Oil and chemicals may be absorbed into the organism’s organs, tissues and cells which can put the organism’s life at risk. In case of large spills, significant change can be observed in the ecosystem. There may be loss of important organisms which bind the ecosystem together by its individually specialized functions. This can have disastrous effects on dependent organisms and the food chain. Spilt oil and chemicals may also cause loss of habitat for organisms. The aggregate cost of an oil and chemical spill, both monetary and environmental, is enormous to any country since the effects are very long-lasting. This is even truer for a country like Bangladesh where rare and diverse habitats and ecosystems exist.

Spills also present perilous risk to the human health through direct and indirect exposure. In direct exposure, a variety of health effects may develop when the oil and chemical spill occurs close to where people live or work, and may come in contact with humans through breathing gaseous oil and chemical compounds and/or oil and chemical compounds adsorbed on particulate matter (dispersed through air). Another exposure pathway may relate to activities in contaminated ground (e.g., soil and water) or through skin absorption when touching spilled material. Indirect exposure may occur through consumption of contaminated food or water—especially relevant in the case of consumption of fish that have been in contact or in an oil spill polluted environment. This is because some oil components have ability to “bio-accumulate” in living organisms. This means that if a fish lives in a polluted environment, it will keep absorbing in its body some oil components (without excretion) which may reach concentrations several orders of magnitude higher than those of the surrounding waters. Through consumption of such polluted fish meat, humans may become seriously exposed to higher concentrations of oil components than in the surrounding environment or as compared to ingestion of the polluted water or bathing in the polluted water.

Exposure has direct effects on human health. Previous studies show consistent evidence of acute toxic effects, mainly neurological, ocular (eye), and respiratory, of those living in exposed communities and among clean-up workers. In case of particular chemicals associated with crude oil and chemical transport in the Bangladeshi coastal region, at high doses some chemical components cause respiratory, hepatic (liver), renal (urinary system), endocrine (hormonal system), neurologic, hematologic (vascular system), and other systemic effects, while even very low doses can cause mutagenic effects, with cancer of particular concern. In cases where a spill has been managed by dispersants, the dispersants themselves pose threat to human health; highly toxic chemical ingredients such as benzene and polycyclic aromatic hydrocarbons (PAHs) can damage systems in the body, including DNA damage and mutations.
Bangladesh, specifically, is at high risk of damage in instances of oil and chemical spills. The country’s delta has sensitive and precious ecosystem at the mangrove forest and coasts. Being a river-floodplain-proficic country, there is high traffic movement in the waterways, both inland and deep sea. The pollution from blow-out, collision, stranding, and other marine accidents can threaten marine life in the inter-tidal zones, fisheries in the inter-tidal zones and floodplains, sea birds; recreational beaches and tourism with subsequent loss of revenue. The coastal belt of Bangladesh is one of the most economically important areas of the nation. The world-famous mangrove forest (the Sundarban) and three seaports—Chittagong, Mongla and Payra lie in the region. Besides this, shrimp culture and fisheries are important activities in the region, and noticeably influences foreign currency earning. Furthermore, the Bangladeshi coast, its EEZ in the Bay of Bengal, area of the High Sea within national maritime border is close to multiple international shipping routes that expose the country to possible spillage incidents. Considering the additional ship-breaking activities and proximity of oil, petroleum and chemical processing industries on the coastal belt present substantial commercial activity and hazards that may cause spillage.

The country has seen multiple cases of spillage situation (Appendix F) which prompts the country and the region to set up a detailed framework and guidelines for all agencies, organization and stakeholders concerned that must be active in responding to spillage events, leading in remedial action and prevention in the long-term.

The preparation of a National Oil and Chemical Spill Contingency Plan is, therefore, necessary to identify the national capabilities and resources in order to establish an organizational structure to combat marine pollution so that focal points and lead agencies are identified and guided effectively.

2. PART 2: SCOPE

2.1 Functional aspects of contingency plan

2.1.1 The contingency plan is action-oriented, covering aspects such as reporting, communication, alerting, assessment, operations, administration, finances, public relations and arrangements.

2.1.2 The plan assigns the responsibility for various tasks to be undertaken by the relevant government departments and agencies, identifies trained personnel, equipment, and resources, and means of accessing them. Physical resources may be specialized multi-purpose pollution combating equipment such as vessels, aircraft and communication systems.

2.1.3 This plan intends to delineate functions of various departments and agencies concerned for the operational responsibility to marine and coastal incidents which could result due to spillage of oil and chemical into water.
2.1.4 The plan also provides the framework of co-ordination of integrated response by various government departments and agencies to protect the environment from the deleterious effects of pollution by oil and chemicals. It derives from the regional contingency plan developed by SACPE in SAS region and specifies response plans in the context of Bangladesh. In an effort to direct all stakeholders properly respond to spillage situations the plan suggests ways to increase capability and effectiveness of the response through coordinated resource utilization and capacity improvement measures, both material and human. In case where support from neighboring countries and regional cooperation is required, this plan specifies appropriate communication systems.

2.2 Materials, substance and chemicals covered under scope

2.2.1 It is important to note that the NOSCP addresses emission and/or spillage the following substances: all kinds of oil including but not limited to crude oil and its derivatives, petrol, diesel, coal and its industrial derivatives, all forms of chemicals including but not limited to industrial chemical compounds, acids, fertilizers, etc.

2.2.2 In this plan, ‘oil and chemical’ refers to all of the aforementioned hazardous substances and the plan must be implemented in crises pertinent to these substances.

2.2.3 In case of ambiguity about a substance not listed above but may be considered hazardous to human, animal and agricultural health and the ecosystem, the plan should be employed upon discretion of NOSCP participating agencies since the same principles underlying the guidelines will be applicable to any spillage crises in general.

2.3 Geographic and topological scope of the plan

2.3.1 Geographically, the plan is applicable to all areas within the national boundaries under jurisdiction of the Government of Bangladesh.

2.3.2 The plan will be put on effect in any area where oil and chemical spillage occurs and surrounding area where spillage may spread. This includes, but not limited to: coastal areas adjacent to the Bay of Bengal, the delta, all rivers and floodplains and waterways of the country, the Sundarban, all physical establishments that are responsible or affected by spillage, the exclusive economic zones (EEZ), territorial sea, high seas, beaches and estuaries.

2.4 National and international policy implemented by the plan

2.4.1 The legal framework under which, Bangladesh Government and International Authorities operate are detailed in Appendix B.
3. **PART 3: OBJECTIVES**

3.1 General objectives of the plan

The objectives of the plan are to:

3.1.1 Develop appropriate and effective systems for the detection and reporting of spillage of oil and chemicals;

3.1.2 Specify an operational chain of command that would ensure prompt response.

3.1.3 Specify appropriate response techniques are employed to:

3.1.3.1 Prevent, control, and combat oil and chemical spillage and pollution, and

3.1.3.2 Dispose recovered material in an environmentally accepted manner.

3.1.4 Identify key resources and specify logistics procedures.

3.1.5 Ensure adequate protection is provided to the public health and welfare, and the marine and aquatic environment, both on a short and long-term basis.

3.1.6 Ensure that complete and accurate records are maintained of all expenditure to facilitate cost of recovery.

3.1.7 Serve as a standard reference of information for crisis management.

3.1.8 To list all the tools, materials and resources held by different agencies, and to record all the important contact addresses that will help during contingency mitigation efforts.

4. **PART 4: DISTRIBUTION OF AUTHORITY**

4.1 Central Agency

4.1.1 Ministerial Level: The Ministry of Environment, Forests and Climate Change (MoEFCC) will be the nodal ministry for coordinating the emergency response in case of an oil or chemical spill disaster.

4.1.2 Executive Level: Department of Environment (DoE) will provide necessary executive, technical and secretarial support to MoEFCC for an effective coordination in case of the incidence of the emergency.

4.2 Central Contact Personnel

4.2.1 The Secretary, MoEFCC will be the central leader for the initiative.

4.3 Participating and responsible stakeholders of the plan

4.3.1 The government departments and agencies who will act as resource agencies as required to provide all-out support to the actions of the coordinating authority are as follows:
<table>
<thead>
<tr>
<th>No.</th>
<th>Organization</th>
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<tbody>
<tr>
<td>1.</td>
<td>Cabinet Division</td>
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<td>2.</td>
<td>Public Security Division, Ministry of Home Affairs</td>
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<td>3.</td>
<td>Security Services Division, Ministry of Home Affairs</td>
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<td>4.</td>
<td>Ministry of Local Government Division</td>
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<td>5.</td>
<td>Ministry of Defense</td>
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<td>6.</td>
<td>Ministry of Shipping</td>
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<td>7.</td>
<td>Ministry of Foreign Affairs</td>
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<td>8.</td>
<td>Ministry of Finance</td>
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<td>9.</td>
<td>Health Services Division, Ministry of Health and Family Welfare</td>
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<td>10.</td>
<td>Power Division</td>
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<td>12.</td>
<td>Ministry of Disasters Management and Relief</td>
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<td>13.</td>
<td>Ministry of Water Resources</td>
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<td>14.</td>
<td>Ministry of Railway</td>
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<td>15.</td>
<td>Ministry of Fisheries and Livestock</td>
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<td>16.</td>
<td>Ministry of Industries</td>
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<td>17.</td>
<td>Armed Forces Division</td>
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<td>18.</td>
<td>Department of Agricultural Extension</td>
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<td>Bangladesh Police</td>
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<td>Bangladesh Fire Service and Civil Defense</td>
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<td>21.</td>
<td>District Administration</td>
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<td>Local Government Institutions</td>
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<td>Bangladesh Ansar and VDP</td>
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<td>Riverine Police</td>
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<td>25.</td>
<td>Bangladesh Navy</td>
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<td>26.</td>
<td>Chittagong Port Authority</td>
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<td>Mongla Port Authority</td>
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<td>Payra Port Authority</td>
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<td>Bangladesh Coast Guard</td>
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<td>Border Guard Bangladesh</td>
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<td>Bangladesh Petroleum Corporation (BPC)</td>
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<td>34.</td>
<td>Eastern Refinery Limited</td>
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<td>Forest Department</td>
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<td>Bangladesh Forest Research Institute</td>
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<td>37.</td>
<td>Department of Fisheries</td>
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<td>Bangladesh Fisheries Research Institute</td>
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<td>Department of Shipping</td>
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<td>Department of Environment</td>
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<td>Bangladesh Shipping Corporation</td>
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<td>42.</td>
<td>Bangladesh Inland Water Transport Authority (BIWTA)</td>
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<td>43.</td>
<td>Bangladesh Meteorological Department</td>
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<td>44.</td>
<td>Bangladesh National Authority for Chemical Weapons Convention (BNACWC)</td>
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<tr>
<td>45.</td>
<td>University of Dhaka (Department of Zoology, Oceanography and other relevant departments)</td>
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<td>46.</td>
<td>University of Rajshahi (Department of Zoology and other relevant departments)</td>
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<td>Bangladesh Agricultural University, Mymensingh (Relevant departments)</td>
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<td>Bangladesh Oceanic Research Institute (BORI)</td>
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<td>50.</td>
<td>University of Chittagong (Institute of Marine and Fisheries Science-IMFS)</td>
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<tr>
<td>51.</td>
<td>University of Khulna (Department of Environment)</td>
</tr>
<tr>
<td>52.</td>
<td>Bangabandhu Sheikh Mujibur Rahman Maritime University (BSMRMU)</td>
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<tr>
<td>53.</td>
<td>Bangladesh Institute of Maritime Research and Development (BIMRAD)</td>
</tr>
<tr>
<td>54.</td>
<td>Any other agency concerned</td>
</tr>
</tbody>
</table>
4.3.2 During an emergency or crisis all the agencies will extend co-operation by providing resources and expertise.

4.3.3 They will be coordinated by requests of a central committee named National Oil and Chemical Spill Control (NOCS) Committee to be formed and headed by the Secretary MoEFCC and Director General of the Department of Environment as member secretary. The other members of the committee are as follows:

1. Chairman, National River Protection Commission
2. Chairman, Chittagong Port authority
3. Chairman, Mongla Port authority
4. Chairman, Payra Port authority
5. Chairman, Bangladesh Inland Water Transport Authority (BIWTA)
6. Director General, Bangladesh Coast Guard
7. Director General, Border Guard Bangladesh
8. Director General, Bangladesh Water Development Board
9. Chief Conservator of Forest, Bangladesh Forest Department
10. Representative of Secretary, Cabinet division (Not below the rank of Joint Secretary)
11. Representative of Ministry of Disasters Management and Relief (Not below the rank of Joint Secretary)
12. Representative of Public Security division, Ministry of Home affairs (Not below the rank of Joint Secretary)
13. Representative of Security Services division, Ministry of Home affairs (Not below the rank of Joint Secretary)
14. Representative of Ministry of Fisheries and Livestock (Not below the rank of Joint Secretary)
15. Representative of Ministry of water resources (Not below the rank of Joint Secretary)
16. Representative of Health Services Division, Ministry of Health and Family Welfare (Not below the rank of Joint Secretary)
17. Representative of Energy and Mineral Resources Division (Not below the rank of Joint Secretary)
18. Representative of Ministry of Industry (Not below the rank of Joint Secretary)
(19) Representative of Ministry of Shipping (Not below the rank of Joint Secretary)

(20) Representative of Power Division (Not below the rank of Joint Secretary)

(21) Representative of Ministry of Railway (Not below the rank of Joint Secretary)

(22) Representative of Road Transport and Highways Division (Not below the rank of Joint Secretary)

(23) Representative of Bridges Division (Not below the rank of Joint Secretary)

(24) Director (Naval Operation), Bangladesh Navy

4.3.4 The terms of reference for National Oil and Chemical Spill Control (NOCS) committee are included in Appendix C.

4.3.5 Responsibility of individual agencies will be defined in a more elaborate Incident Action Plan (IAP) according to specialization of those agencies.
5. PART 5: CRISIS MANAGEMENT PROCEDURE

5.1 POLICY AND STRATEGIC LEVEL

5.1.1 Organization

5.1.1.1 In case of any emergency or issues related to oil and chemical spill, the Secretary of Ministry of Environment, Forests and Climate Change as the Chairperson of the NOCS committee must be contacted first.

5.1.1.2 The Chairperson will assemble the National Oil and Chemical Spill Control (NOCS) Committee and Committee will coordinate with first responders in the area and alert all related organizations necessary to prepare resources and expertise depending on the situation.

5.1.1.3 NOCS Committee would lead all the relevant national organizations under a single command structure or umbrella and would comprise competent representatives from relevant national organizations (Figure: 1).

![Policy and Strategic Level Diagram]

![Operation Level Diagram]

Figure 1: Organization of response management
5.1.1.4 Other persons and organizations may be co-opted as appropriate and as desired by the NOCS committee. Its role is primarily to direct the response, but also includes planning, preparedness, monitoring, response operations and ensuring that other agencies, such as BCG, BN will play an appropriate part in support of action.

5.1.1.5 The chairperson of the NOCS committee will organize the experts from different organizations of environmental pollution and its impacts on ecosystems. The experts will advise the NOCS committee to mitigate the pollution.

5.1.1.6 In support, at the operational level, there will be an On-Scene Commander (OSC) deployed by the NOCS committee. In case of marine, coastal, inland waterways, railways, or other places, OSC would be deployed from Bangladesh Coast Guard, Bangladesh Navy, Border Guard Bangladesh, and other relevant government organizations as whereas oil and chemical spillage/pollution occurred. The terms of reference for the OSC are included in Appendix D. The NOCS committee can change the terms of reference for the OSC as and when necessary.

5.1.1.7 Resources will be co-opted as necessary and the beach-cleaning task will involve resources from e.g., Public Works Department, Civil Contractors or others specified in case of national emergency.

5.1.1.8 Roles and responsibilities of each ministry or agency will be pre- pointed during the meeting of the NOCS Committee. For example:

5.1.1.8.1 The port authorities will be responsible for the response of accidents within port limits.

5.1.1.8.2 Oil and petroleum exploration and production corporations will be responsible for instituting preventive, precautionary, and other measures for monitoring, controlling and combating an oil/chemical spill contingency in their area of operations.

5.1.1.8.3 The Bangladesh Navy and Bangladesh Coast Guard will make their facilities and resources available to address the situation, such as– aircrafts, ships, logistics support, and manpower.

5.1.1.8.4 The Ministry of Shipping will provide waterways resources necessary, such as tug boats or assessment boats, and the Energy and Mineral Resources Division will arrange tank barges and store recovered oil. Director General, Department of Shipping, Ministry of Shipping, will be responsible for all negotiations with the vessel, cargo owners, and insurers and will also conduct all negotiations regarding compensations and indemnification.
5.1.1.8.5 The Ministry of Environment, Forests and Climate Change will provide scientific advice regarding species at risk, ecosystem sensitivity, restriction of fishing activities, use of dispersant chemicals, beach cleaning methods, etc.

5.1.1.8.6 The Finance Division of the Ministry of Finance will provide authorization for expenditure and funds for initial response and ensure adequate financial records are maintained.

5.1.2 Preparation

For the nation to be prepared to provide adequate response in case of spillage incidents and preventively control future spillage, following issues are necessary to address:

5.1.2.1 Resources of the country and nature of spill

5.1.2.1.1 With the current resources that Bangladesh has, the nation is unable to manage large-scale spillage at the sea and the coastal belt. Regional cooperation is required and if such an incident occurs, assistance must be sought immediately from SAS countries, SACEP and IMO to arrest spillage at the shortest possible time and manner, because the spillage may adversely affect other countries as well. Remedial efforts must be international, utilizing all available resources regardless of national boundaries and policy limitations.

5.1.2.1.2 The regional contingency plan must be maintained simultaneously with the national plan to ensure maximum effectiveness. Both plans must be updated regularly according to new additions of resources, manpower, expertise and technology.

5.1.2.1.3 The key point is collaboration when it comes to national action, recognizing that the damage that needs to be controlled requires full strength of the region and prompt communication and action.

5.1.2.2 Identification and monitoring of risk sources

5.1.2.2.1 Since the Bay of Bengal, its coast and the national waterways are transport routes for important commercial activities and also different chemically risky industries are situated close to the shoreline and waterways, it is necessary to monitor and regulate activities regularly in these regions.
5.1.2.2.2 As much as the Government is responsible in handling spillage crises, the owner of the source of spillage is more responsible to prevent and control spillage. At the end of the day the owner of the source, whether public or private, is absolutely responsible for the damage caused in all areas of the physical, environmental, health and financial.

5.1.2.2.3 Owners of all water vessels, exploration operations, ports, harbor facilities, terminals and pipelines that transport or handle hydrocarbons or other potentially hazardous substances must submit an emergency response plan to DoE.

5.1.2.2.4 The local plan should be consistent with and be coordinated with the central national and regional plans. Meetings of the NOCS committee will be required to review local plan requirements with agencies that oversee contingency planning. These agencies will ensure that a plan is compliant.

5.1.2.2.5 For obtaining clearance of activity, local plans must include an adequate system of personnel and equipment to handle spillage according to scale of their operation, describe how the crisis management system would work without flaw and provide a declaration or copies of insurance certificates.

5.1.2.2.6 In case of shipping, all vessels must carry Standard Operating Procedures (SOP) to manage spillage. It must be in accordance with guidelines developed by MARPOL 73/78 and IMO and should include a reporting procedure, list of authorities to be contacted, detailed description of the action to be taken immediately by persons onboard to reduce discharge of oil and chemicals, procedures and point of contact on the ship for coordinating onboard activities with national and local authorities in combating the pollution.

5.1.2.2.7 Marine traffic including oil tankers, cruise liners, cargo vessels, small and medium sized boats using ecologically important waterways are one of the risk factors and industries including oil processing, ship-breaking and chemical manufacturing being the other, it is necessary to maintain a dynamically updating map, list and database to identify and monitor major risk concerns periodically to check conformity with health and safety standards.
5.1.2.2.8 The database would contain important contact information that would be useful in expediting the communication and action process during crises. The map/database must also include lists of critical ecological concerns such as administrators at the Sundarban, fisheries owners and fishing communities living along the coast who must be alerted immediately to take necessary action to protect human health and overall environment in case of spillage emergencies.

5.1.2.2.9 This process should also take in consideration international shipping routes that connect Bangladesh directly and indirectly and the frequency of usage of this route by vessels transporting risky materials.

5.1.2.3 Capacity development

In addition to having a contingency plan, the capacity to respond to emergencies effectively over time must be increased.

5.1.2.3.1 Capacity must be increased in areas of expertise on knowledge and technology, apparatus and machinery available.

5.1.2.3.2 While resources from the Bangladesh Navy, Bangladesh Coast Guard and Port Authorities such as aircrafts, ships and tugboats will be availed extensively during emergency response management, increasing the number and capacity of these vehicles, oil/chemical mitigating equipment should be of concern in national budget and resource allocation planning.

5.1.2.3.3 Training of the people who would participate in crisis mitigation efforts is necessary so that they are aware of up-to-date on knowledge and technology that is available for proper and efficient oil and chemical control.

5.1.2.3.4 Training must be at national, regional and international level with necessary mock runs to keep the skills learnt updated. Large scale exercises must be carried out between regional countries to enhance coordination between the participating international teams. Meetings for coordination may be held annually.

5.1.3 Jurisdiction and legal proceedings

5.1.3.1 If an illegal discharge takes place within a port area of Bangladesh/Out of Port area or any other territorial water body of Bangladesh, the port authority and DoE will consider whether prosecution action is appropriate under the International Convention for Prevention of Pollution from Ships, MARPOL 73/78, and/or under national laws and regulations or application of both at a time.
5.1.3.2 If foreign ship discharges oil while passing through the territorial waters of Bangladesh, the port authority/BN/BCG who will report the incident to the Flag State of the vessel concerned along with any photographs or evidence and request that the matter be investigated further.

5.1.3.3 Port Authority will analyze all actions by a damaged vessel, will carefully assess any salvage agreement between the master of the Vessel and any Salvage Company, and will be prepared at all times to intervene under the Merchant Shipping Act or Supreme authority according to regulations.

5.1.3.4 As such the NOCS Committee can use this power to give final authoritative direction when an accident has occurred to the ship/facility that presents significant danger to the environment and requires urgent response directions in this respect should preferably be in writing and the commands executed through the OSC on-site.

5.1.3.5 The Port Authority will inform the incident of spill or damage immediately to the NOCS Committee and the Port Authority will seek the cooperation from Bangladesh Navy, Bangladesh Coast Guard or another agency to contain the pollution and damage to the environment.

5.2 Operational Level

5.2.1 Assembling On-site Response Team

5.2.1.1 Once crisis management efforts are activated, the NOCS committee will assign roles from internal and external organization to form the team below with stated responsibilities:

(1) On-scene commander (OSC): Key personnel driving the remedial effort in the field. To be assigned depending on scenario/jurisdiction by the National Oil and Chemical Spill (NOCS) Committee. For coastal region it may be the Coast Guard Commander; for high seas it may be the Navy Commander; for a port it may be the Harbor Master of Port, for inland waterways competent personnel from relevant organizations and so on.

(2) Deputy on-scene commander (DOSC): A personnel either chosen by the NOCS committee or OSC to aid the OSC in management efforts. Must be competent and at authoritative ranking.

(3) Information Officer (IO): Collects and disseminates information. Provides data relating to the incident to as much detail as possible. Works as a focal point of communication between strategic and on-field command.
(4) Health and Safety Officer (HSO): A safety specialist designated to ensure that the spill location and initial containment site are safe for workers. This Officer also advises the On-Scene Commander of any special safety requirements and ensures that all work is conducted in a safe manner and that all accidents are properly documented.

(5) Liaison Officer: Coordinates and summons help from support agencies and facilitates and expedites international assistance. Liaises with all relevant stakeholders, quick response in case of emergency and in need of regional/international support technical assistance.

(6) Operations Officer (OpO): Oversees the administration of Transportation, Storage, Procurement and Finance, and Technical Services (Engineering & Communications), maintaining regular contact with the OSC.

(7) Cleanup Supervisor (CS): Coordinates the spill response activities of a large spill including managing the Response Team. For marine spills, a Marine Cleanup Supervisor and a Shoreline Cleanup Supervisor might be needed. Ensures sufficient personnel and equipment are assigned to land or water-based recovery locations and oversees access, site preparation and disposal. Must be a technical expert in sound procedural choice for the environment.

(8) Environment Officer (EO): Administers environmental affairs, including confirming mandatory regulatory agency's conditions/directions and ensuring technical environmental expertise as required. Monitoring of the effectiveness of the spill response.

(9) Security Officer (SO): Maintains site security. Assists with evacuation and routing of logistics and transportation.

(10) Public Affairs Coordinator (PAC): If a spill is large, a Public Affairs Coordinator may be required to serve as the on-site contact for arranging tours and information gathering and dissemination for agencies, the public, and the media.

(11) Logistics Officer (LO): Coordinates communications and equipment, personnel and supply movements in a large spill. Activates a mobile command centre and ensures that its operational needs are met. Duties also include spill access, equipment expediting, accommodation, catering, evacuation, and arranging for technical and repair services.
(12) Environmental Advisor—Coastal & Marine (EA): Providing suggestions and recommendations to the NOCS Committee on the ecological impacts of the spilled oil/chemical pollution and possible adverse impacts in coastal and marine waters as well as on environmental regulations. Must be an expert with a strong background/degree on coastal/marine pollution, eco-toxicology to guide the monitoring team to assess the impacts of oil/chemical pollution on marine water bodies, aquatic biota, and human health and will advise the authority for possible mitigation and clean-up operations.

(13) Meteorology Officer: Advises on water movement and effect of weather and climate

(14) Legal Officer (Legal): Advises on insurance and liability concerns. Ensures that adequate analytical sampling is performed, as necessary, and that photographic, video, and written documentation of all spill response activities are conducted.

(15) Finance Officer (FO): Facilitates financial and other resources, arranges payments and controls invoicing. Ensures on-site cost and recovery accounting and a chronological record keeping of spill control events.

(16) Planning Officer (PO): Coordinates status reports on environmental monitoring and risk management, public security, communications and training

(17) Forest Specialist (FS): Activated when spillage occurs in Sundarban and/or protected forest area only. The specialist must have ample particular knowledge of the flora and fauna and able to provide information on specific impacts to the ecosystem of the forest and advise to the team.

5.2.2 Alert and notification system

5.2.2.1 As soon as a spillage incident occurs, the owner, captain or any person in charge of the marine means of transportation, the persons responsible for the transportation of oil and chemical located within seaports or the marine environment of Bangladesh and the officials of parties involved in oil and chemical transportation extraction are required to report immediately any oil/chemical spillage incident to the national and/or monitoring authorities.

5.2.2.2 Owners also include shoreline or coastal belt industries that release oil or chemicals into the waterways.
5.2.2.3 Vessel and ship masters and owners, given that either their vessel is causing spillage or have observed other vessel spilling while passing by, are obliged by Article 4, Oil Pollution Reporting Procedures, Section (10) (a) of the International Convention on Oil Pollution Preparedness Response and Co-operation, 1990 (OPRC) and Protocol I of MARPOL 73/78 to notify the nearest coast or territorial authority of a marine pollution emergency that has arisen.

5.2.2.4 While the NOCS committee stands as the key coordinator, to centralize the appropriate communication system that can address urgency of the situation, 24/7 Response Command Centers may be developed in major port authority, Coast Guard and Navy locations to maintain continuous watch and easy accessibility. The centers will be manned by employees of associated local organizations.

5.2.2.5 Although identifying private and government vessels are not connected by Cell phone or Satellite phone coverage in remote waters, all carry VHF radios. A dedicated channel may be set up for all vessels to report incidents to the 24/7 command centers.

5.2.2.6 The reporting forms provided in Appendix F and G will be used as required.

5.2.2.7 Any incident observed must be immediately reported to the NOCS committee or nearby command centers simultaneously, or any nearby port authority, Bangladesh Navy, Bangladesh Coast Guard, Border Guard Bangladesh, Bangladesh Police or any other nearby government office.

5.2.2.8 Each agency under the contingency Plan should have focal points with Email address and hotline to report the incident instantly.

5.2.2.9 In case the form is not available, the alert should include, at the minimum, the following details:

(1) Location of the spill (by latitude and longitude if possible)
(2) Nature of the spill (oil or chemical type)
(3) Approximate quantity of pollutant
(4) Source of the spill
(5) Weather-sea state, and tidal conditions in the area
(6) Initial actions taken; and
(7) Identification of the reporter (name, contact number).
(8) Nature of assistance required
(9) Possible threat of damage
5.2.2.10 As soon as the alert is sent out the on-site team will be activated by
direction of the NOCS committee and OSC and the team will mobilize
to respond to the situation. On-Scene Commander will monitor this
and inform this.

5.2.2.11 By the time the on-site team is deployed the organizations concerned
must be alerted to engage them in their due responsibilities.

5.2.3 Evaluation of the crisis

5.2.3.1 The aim of oil and chemical spill response are both to minimize the
immediate damage to environmental and socio-economic resources
and to reduce the time for recovery of affected resources. These can
be best achieved by basing all oil spill responses on the process called
Net Environmental Benefit Analysis (NEBA), meaning the measures
undertaken should be those that will result in the greatest reduction
of environmental damage for the available means and resources.

5.2.3.2 First responders and the response team on-site, apart from
participating in urgent leakage prevention, should follow the NEBA
procedure below to evaluate the spillage situation so that decisions
can be taken on damage control quickly using the information
collected.

(1) Collect details on type, quantity, size and spreading area of the spill

(2) Collect information about physical characteristics, ecosystem,
human use of the environment, and other resources of interest
in the area

(3) Review previous spill experiences and experimental results
which are relevant in the area and the response methods that were considered

(4) In the bases of the aforementioned, predict the likely
environmental outcomes of using the suggested response
method

(5) Predict similarly the likely environmental outcomes if the area
is left for a natural clean up

(6) Compare the advantages and disadvantages of the response
option with those of a natural clean up

(7) Oil and chemical should be contained and recovered
mechanically if possible

(8) Oil and chemical should generally be collected as close to the
source as possible
(9) Focus should be on preventing oil or chemical from reaching the shoreline.

(10) If mechanical recovery is not effective or possible, chemical dispersants should be considered based on a NEBA.

(11) Upon protecting shoreline resources, the level of priority should be based on its environmental sensitivity.

(12) All oil and chemical spill response efforts should be based on a NEBA.

(13) The natural breakdown processes should be utilized to the greatest extent possible, and

(14) Consider the "No response" option in conducting a NEBA, if applicable.

(15) Collect MSDS (Materials Safety Data Sheet) for oil or Chemical to know the specification of Oil/Chemical and consult with IMDG (International Maritime Dangerous Goods code) and action for MFAG (Medical First aid guide) for the person on scene collecting Spilled Oil/Chemical in case of contact his skin/eyes etc.

5.2.3.3 Initial confirmation will be made by the local administration/authority, then Bangladesh Coast Guard or Bangladesh Navy using information gained by observation by the aircraft and surface vessel and an assessment as to the threat to the country's water body will be made by the OSC, who will report directly to the NOCS committee.

5.2.3.4 The NOCS committee will arrange for surveillance of the oil slick and, by use of meteorological and hydrographic data, predict its probable movement (Hydrological Circle of BWDB and Bangladesh Meteorological Department should be involved) in the planning process.

5.2.3.5 If the assessment shows that another state/country is likely to be threatened, the NOCS committee will inform that country/state and regional body (LOSC) in SACEP immediately.

5.2.3.6 For routine surveillance all pilots of aircraft and masters of ships and vessels should be instructed by the Civil Aviation, Seaport Authorities and other relevant authorities to report any sightings of oil in the sea or inland waterways for immediate onward transmission to the authorities. Instruction on surveillance is part of the NOSCOP as well as the Regional Contingency Plan.
5.2.4 Categorization of spillage and corresponding response

After evaluation, the spillage will be classified to decide appropriate response according to the criteria below.

5.2.4.1 A tier system is introduced to make definite judgment calls depending on size, location, vicinity and extent of spread of the spill.

5.2.4.1.1 Tier 1 – Small local spills

Small controllable spills that can be fully dealt with local contingency plan (developed in accordance with the national plan).

This covers privately owned operations and spills resulting from minor activities such as transfer and bunkering at jetties or piers. Assuming spillage is successfully mitigated using the organization’s own personnel and resources; there is no need to involve other parties apart from reporting and legal affairs.

As many as non-specialized vessels (in context of oil/chemical-spillage) protecting national waters must be equipped with appropriate tools to respond to at least Tier 1 incidents to maximize range and flexibility.

5.2.4.1.2 Tier 2 – Medium spills

This tier concerns spills that may be local or at some distance from the organization concerned. Generally, this is applicable to cases where the local organization or authority can only partially control spillage effects. External resources are required for mitigation, which can be adequately dealt with by a national response.

5.2.4.1.3 Tier 3 – Large spills

This is a large spill which requires full resources of the nation where the volume of oil/chemical will possibly spread to a large area crossing international borders or foreign shores.
5.2.4.1.4 The matrix below specifies how the Tiers are categorized:

![Matrix of Spill Tiers](image)

Figure 2 Proximity to contingency response organizer

5.2.5 Spillage response and strategy

5.2.5.1 Once NEBA has been established to unilaterally understand the nature and extent of spillage, the following methods may be employed to control effects of the spillage. Whatever course of action is chosen, it must be with approval from the NOCS Committee.

5.2.5.2 Since instantaneous effective action is necessary, it is important that all possible contingency-responding vessels are fitted with equipment appropriate for applying methods below—both for immediate response and post-incidents actions—as soon as possible and upgraded with time. This must be achieved through cooperation of relevant ministries and national and international agencies.

5.2.5.2.1 Mechanical Recovery at water body: Mechanical recovery constitutes the most common approach for combat of marine oil/chemical spills (assuming the chemical does not mix well with water). The mechanical recovery operation will typically involve the following components:
(1) Booms for containment of oil/chemical
(2) Skimmers for recovery of oil/chemical
(3) Pumps
(4) Oil/water/chemical separators
(5) Temporary storage
(6) Vessel for towing of booms and operation of recovery units

(7) The operation may involve three or two vessels, depending on how the boom is deployed. The purpose of the boom is to concentrate and contain to avoid spreading the oil/chemical to a thick enough layer for effective recovery to take place. The effectiveness of booms to accumulate the oil is highly dependent on wave conditions, tow speed, boom configuration and oil properties.

5.2.5.2.2 Mechanical removal at shore: Shoreline cleanup by mechanical removal involves a wide range of different tools and techniques, reflecting the highly variable conditions that a shoreline area can represent. Techniques may be ranging from manually removal of oil/chemical using simple tools to the use of more advance beach cleaning machinery. Provided below is a non-exhaustive list of techniques/tools commonly applied to remove oil/chemical at a shoreline:

(1) Manual sorbent application
(2) Manual removal of oiled/chemical entangled materials (hand, shovel, rakes, etc.)
(3) Manual cutting of vegetation
(4) Low pressure flushing at ambient temperature
(5) Vacuum trucks
(6) Warm water /low pressure washing
(7) High pressure flushing
(8) Manual scraping
(9) Beach cleaners
5.2.5.2.3 Leave alone, but monitor: Sometimes the best course of action is a decision not to clean up the spilled oil/chemical. If the oil/chemical is at sea, and not threatening shore or sensitive areas, it may be sufficient to monitor the spill while allowing the natural process of dispersion and biodegradation to take course. This decision, of course, has to be taken after careful consideration of all the other alternatives.

5.2.5.2.4 Bioremediation: Bioremediation is the application of nutrients (fertilizers containing nitrogen and phosphorous) to the shoreline to accelerate the natural biodegradation of the oil. Oil/chemical biodegradation is the natural process by which microorganism oxidizes hydrocarbons, ultimately converting them to carbon dioxide and water. The process is limited by the availability of oxygen, moisture and nutrients needed by microbes. The use of non-native bacteria is not recommended as most areas have indigenous bacteria that are capable of degrading oil. Bioremediation is typically used as a final treatment step after completing conventional shoreline treatment or in areas where other methods are not possible or recommended.

5.2.5.2.5 In-situ burning: In case of flammable spillage, in-situ burning is carried out at shorelines by igniting the upwind end of the spread area and allowing the oil/chemical to burn downwind. The method is typically used on substrate or vegetation where sufficient oil/chemical has been collected to sustain ignition. If oil/chemical of a type that will sustain burning and local air pollution regulations allow, The method will kill surface organisms in the burn area and residue may be somewhat toxic. The method will also cause local and time limited air pollution.

5.2.5.2.6 Dispersant: The use of dispersants will break up the oil film physically, thus reducing the smothering effect of a slick in plants and animals and they will also accelerate the oil biodegradation process. The use of dispersant is not recommended where physical recovery of oil is feasible. The choice of dispersant must be approved in writing by DoE, EO, EA, FS and OSC in accordance with the national contingency plan as well as regional plan. The Air Force and all agencies with required aircraft must help in the efforts.

5.2.5.3 For these methods to be chosen and applied, the plan recommends dedicated oil and chemical contingency response vessels are stationed at Chittagong, Mongla and Payra Ports locations. Further vessels may be procured in time to serve other major locations.

5.2.5.4 These vessels must be fitted with state-of-the-art oil and chemical response equipment as required to apply methods aforementioned.
5.2.6 Resource Management and Logistics

5.2.6.1 Complexity of spillage mitigation efforts depend on the scale of the incident. In order to execute a successful operation, following resources are required at minimum and must be made available during action:

1. Primary oil/chemical spill equipment: booms, skimmers, spray equipment, dispersant, absorbents, oil storage, radio communications
2. Auxiliary equipment: tugs and work boats, aircraft, vacuum trucks, tanks and barges, loaders and graders, plastic bags, tools, protective clothing, communications equipment
3. Support equipment: aircraft, communications, catering, housing, transport, field sanitation and shelter
4. Sources of manpower: contractors, local authorities, caterers, security firms, volunteers
5. Experts and advisors: environment, forest and wildlife, safety, auditing
6. Aircraft usage of airports (National/regional/coastal) will be required for landing and unloading of certain aircraft and, for fueling by all aircraft
7. Availability and deployment of marine crafts
8. Seaport docking and cargo handling facilities and, where necessary, water transport
9. Immigration, Health and Customs arrangements
10. Food, accommodation, medical and public health services

5.2.6.2 While the list above mentioned basic requirement, international collaboration and assistance through provision of resources and technical expertise as stated in the regional contingency plan is necessary and in that context resources from neighboring countries should be availed to the greatest possible extent to allow effective action.

5.2.7 Spillage after-effects and damage mitigation

While efforts are made to control and collect oil/chemical at the waterways and shoreline, the state of public health, flora, fauna and the ecosystem in the area require special attention.
5.2.7.1 Resources should be made ready by local health administration to assess oil/chemical exposure effects, possible contamination and diseases and whether specialized medical aid is necessary.

5.2.7.2 Local administrators of the Department of Forest should assess the extent to which the organisms in the area is affected, report in and advise on any further action necessary to protect them.

5.2.7.3 Consideration and provision includes health and safety of the operation’s manpower active in mitigating efforts.

5.2.7.4 A different facet is public relations since national and international support is necessary for successful operation through cooperation. As a result, information being communicated to the media should be scrutinized first by the Public Relations Officer.

5.2.7.5 If the extent of damage is such that the environment and ecosystem will be affected in long-term, restorative actions must be taken according to the challenges. Examples include replanting mangrove, marsh and sea grass, restocking aqua-cultural projects and so forth.

5.2.8 Records and accounting

5.2.8.1 To keep track of all financial and logistical details so that expenditures, claims, insurance and transactions are properly recorded, a standardized format has to be followed.

5.2.8.2 In the case of economic loss, documentation supporting the claims should demonstrate how the claim has been calculated. The following aspects are to be considered while assessing cost of an oil spill/chemical combating and operating, and preparation of transaction records:

1. Delineation of the area affected describing the extent of pollution and identifying areas most heavily contaminated. This may be best presented as a map or chart accompanied by photographs.

2. Summary of events including a description of the work carried out in different areas and of the working methods chosen in relation to the circumstantial evidence linking oil/chemical pollution with the ship involved in the incident (e.g. chemical analysis).

3. Labour costs (numbers and categories of labourers, rates of pay days, hours worked, total costs etc.).

4. Data on which work was carried out (weekly or daily costs).

5. Material costs (Consumable materials, utilized fuel, food, shelter facilities, etc.).
5.2.9 Compensation from offender

5.2.9.1 In case of national infringement, the Government of Bangladesh will take necessary action according to legislation if private owners of vessels of instruments of spillage are at fault and decide on justified fines, penalties and compensation.

5.2.9.2 In case of international infringement, the 1992 Protocol of the International Convention and Civil Liability for Oil Pollution Damage (the "CLC") makes the owner of a ship carrying cargo of persistent oil in bulk strictly liable for any pollution damage in the area of Bangladesh including the territorial waters, seabed, shores, beaches and the ecosystem thereof.

5.2.9.3 The liability extends to post-spillage prevention and cleanup costs. Bangladesh does not have to prove that the ship was in any way at fault in causing the pollution.

5.2.9.4 If the costs of cleanup exceed the limited liability of the owner of the ship, Bangladesh may make a claim to the International Oil Pollution Compensation Fund in accordance with the 1992 Protocol of the Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.

5.2.10 Prevention of incidents in long-term

5.2.10.1 After the closing of operations, a report must be created detailing the incident, what mitigation measures were taken, summary of damage and finances, to be sent to all stakeholders.

5.2.10.2 Based on the report, the contingency plan will be updated to add lessons realized during the incident that will prepare the nation to develop more for the next time.

5.2.11 International Cooperation

5.2.11.1 In a scenario where spillage situation is beyond mitigation capability of the nation, international assistance will be sought from the SAS regional countries or any supportive nation following instructions and information stated in the Regional Oil Spill Contingency Plan in south Asian Region developed by SACEP and International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) developed by IMO (Appendix G).

5.3 Updating Important Information

All information related to the national/regional/local contingency plan has to be updated regularly and be readily accessible.

5.4 Language Ambiguity

If there is any confusion between the Bangla and the English version, the Bangla version will prevail.
APPENDIX A: Maritime Boundary of Bangladesh

Source: Ministry of Foreign Affairs, Government of the People's Republic of Bangladesh
APPENDIX B: Implementing National and International Policies and Conventions, Protocol and Agreements

A. National Policy and Legislation

1. National Environment Policy, 2018
4. Environment Court Act 2010
5. Bangladesh Biological Diversity Act 2017
14. Water Rules, 2018
16. Coastal Zone Policy, 2005
17. Integrated Coastal Resources Database 2005
19. Coastal Zone Management: An Analysis of Different Policy Documents 2003
20. National Policy for Safe Water Supply and Sanitation
21. Disaster Management Act 2012
25. Dangerous Cargoes Act 1953: Act V 1953
27. Territorial Waters and Maritime Zones Rules 1977
28. The Leland wets transport Authority Ordinance, 1958 (East Pakistan Ordinance) (Act no LXXV of 1958)
29. Port related laws:
   - Chittagong Port Authority Ordinance 1976
   - Mongla Port Authority Ordinance 1976
   - Payra Port Authority Act 2013: Act 53 of 2013
30. Inland Shipping Ordinance 1976: Ordinance LXXII of 1976
32. Forest Policy 1994
33. Forest Act 1927
35. The Protection and Conservation of Fish Act, 1950 (East Bengal Act no. XVIII of 1950)
37. Petroleum Act 2016
39. Pure Food Ordinance, 1959 (East Pakistan ordinance no. LXVIII of 1959)
40. The Drugs Act, 1940 (Act no. XXIII of 1940)
41. Railways Act 1890, Act IX of 1890
42. Arbitration Act 2001: Act I of 2001
43. Industrial Policy 1999
44. Coast Guard Act 2016
45. Chemical Weapon (Prohibition) Act 2006

B. International Policy and Legislation

8. Ballast Water Management and Control Convention, 2004
10. Safe and Environmentally Sound Recycling of Ships, Hong Kong Convention 2009

C. Multilateral Agreements

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<thead>
<tr>
<th>Date of Adoption</th>
<th>Title of the Treaty</th>
<th>Signed Date</th>
<th>Date of Entry into force</th>
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<tbody>
<tr>
<td></td>
<td>International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (Brussels, 1969.)</td>
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APPENDIX C: Terms of Reference of National Oil and Chemical Spill Control (NOCS) Committee

Purpose
The National Oil Spill Contingency Plan is the key action plan to prevent and mitigate oil and chemical spill crises in sea, at the coast and exclusive economically zones of Bangladesh. Directed under the patronage of the Government of Bangladesh, the plan sets the central organizational and methodical steps necessary to tackle spillage emergencies. As such, NOCS Committee represents the leader of the general team that is active at the strategic level of the crisis management plan.

Roles and responsibilities
1. NOCS Committee would lead all the relevant national organization under a single command structure or umbrella;
2. NOCS Committee will comprise of competent representative from relevant national organizations;
3. NOCS Committee will take necessary steps for training, workshop, drill etc. to build up a competent response team;
4. The Chairperson of the NOCS Committee will assemble the committee and provide leadership for the NOSCOP to be effective at all times and applied to the full scope as laid out in the plan;
5. NOCS Committee will appoint On-Scene Commander (OSC) for tackling spillage emergencies and provide necessary assistance;
6. The National Oil and Chemical Spill Control (NOCS) Committee will coordinate with first-responders in the area and alert all related organizations necessary to procure resources and expertise depending on the situation;
7. Supervise preparation of the nation in terms of equipment, resources, finances, training, information repository by coordinating with relevant government and non-government agencies;
8. Preparation of the plan, monitoring and active participation of other relevant organizations will be ensured by the committee;
9. Coordinate with SACEP, Governments of SAS countries, MARPOL, IMO to synchronize national plan with the regional plan, analyze and adopt international methods in crisis management, communicate and procure assistance in case of emergencies;
10. The active participation of different organization like Bangladesh Navy, Bangladesh Coast Guard and other relevant organizations during emergency will be ensured by the committee;
11. In case of emergencies, act as key contact person at strategic level in terms of communication with Ministerial agencies and the media liaison cell;

12. Consult with advisory cell for specialized expertise, plan and bring to affect the best compact solution;

13. Coordinate for providing greater logistical support for the on-scene team and any other international team;

14. Committee may co-opt any person/organization as per necessity;

15. The NOCS Committee will ensure the successful implementation of NOSCP.

This Terms of Reference is changeable.
APPENDIX D: Terms of Reference: On-Scene Commander (OSC)

Purpose
The National Oil and Chemical Spill Contingency Plan (NOSCOP) is the key action plan to prevent and mitigate oil and chemical spill crisis in sea, at the coast and exclusive economically zones of Bangladesh. Directed under the patronage of the Government of Bangladesh, the plan sets the central organizational and methodical steps necessary to tackle spillage emergencies. As such, the position of the On-Scene Commander (OSC) represents the leader of the on-site team that will be deployed and engaged in directly mitigating oil/chemical spillage emergencies.

In support, at the operational level, there will be an On-Scene Commander (OSC) deployed by the NOCS committee. In case of marine, coastal, inland waterways, railways, or other places, OSC would be deployed from Bangladesh Coast Guard, Bangladesh Navy, Border Guard Bangladesh, and other relevant government organizations as whereas oil and chemical spillage/pollution occurred.

Term
Immediately after receiving the information on spillage and directed by the NOCS committee the On-Scene Commander (OSC) will be activated and as well activate the on-site operational team. The OSC will serve as the leader for the engaged in mitigation efforts until the crisis is resolved.

Reporting
The OSC will Report directly to the NOCS committee, Bangladesh

Roles and responsibilities
Responsibilities for which the OSC is accountable are inclusive but not limited to as proposed below:

1. Provide leadership for the on-site team to be effective at all times and direct the team for effective action;

2. Work with local and international experts to promptly prepare a plan for pollution containment;

3. Work with local authority leaders to gather resources and information;

4. Moderate information and communication with strategic leaders;

5. Direct logistics team to procure equipment and apply resources;

6. The NOCS committee can change the terms of reference for the OSC as and when necessary;

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7. Coordinate with policing, fire-department and military organizations to facilitate fast response to the crisis.

8. Coordinate with international on-site teams and facilitate their operations;

9. Supervise and monitor detailed action of the on-site team members;

10. Ensure Health and Safety measures for everyone concerned with the operations, assist medical teams to respond to the crisis;

11. Ensure auxiliary facilities for the on-site team;

12. Check and maintain all kinds of financial and transactional book keeping.
## APPENDIX E: Urgent International Contact

<table>
<thead>
<tr>
<th>SL</th>
<th>Organization</th>
<th>Address</th>
</tr>
</thead>
</table>
| 1. | South Asian Co- Operative Environment Programme (SACEP)                      | 146/24A, Havelock Road  
Colombo 05, Sri Lanka |
|    |                                                                             | Tel:+94 11 2596443  
Fax: +94 11 2589369  
Email:info@sacep.org  
secretariat@sacep.org                      |
| 2. | IMO, London, UK                                                              | 4, Albert Embankment  
London, SE1 7SR  
United Kingdom |
|    |                                                                             | Tel +44 (0)20 7735 7611  
Fax +44 (0)20 7587 3210  
Email: info@imo.org                      |
| 3. | UN Environment Regional Office for Asia and the Pacific                     | 2nd Floor, Block A, UN Building  
Rajdamnern Avenue  
Bangkok 10200 |
|    |                                                                             | Tel:+662 288 2314  
Fax: +66-2-2803829  
Email: uneproap@un.org                      |
| 4. | Oil Spill Response Limited (OSRL)                                           | Loyang Offshore Supply Base  
25C Loyang Crescent  
(Block 503 TOPS Avenue 3)  
Singapore 506818 |
|    |                                                                             | Tel: +65 6266 1566  
Fax: +65 6266 2312  
Email: singapore@oilspillresponse.com                      |
| 5. | U.S. Coast Guard                                                            | Tel: 202-372-2100                                                   |
| 6. | Indian Coast Guard                                                           | Tel: +91-11-23382546                                             |
| 7. | Marine Environment Protection Authority                                     | No.177, Nawala Road,  
Narahenpita  
Colombo 05. |
|    |                                                                             | Tele: +94 11 2554006/ 2554373  
Fax: +94 11 2556505  
Email: info@mepa.gov.lk                      |
<table>
<thead>
<tr>
<th>SL</th>
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<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Pakistan Maritime Security Agency (PMSA)</td>
<td>Plot No. 34-A Dockyard Road Karachi 74000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P.O.Box 13333</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel: +92-21 99214624 (24 hrs) or +92-21 99214964-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax: +92-21 99214625</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email: <a href="mailto:mrccpmsa@cyber.net.pk">mrccpmsa@cyber.net.pk</a></td>
</tr>
<tr>
<td>9.</td>
<td>Coast Guard (for oil &amp; HNS) Maldives National Defense Force</td>
<td>Coast Guard Building</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boduthakurufaanu Magu Malé</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel +960 999 2198</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td>or +960 332 1526</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax: +960 331 0054</td>
</tr>
</tbody>
</table>
APPENDIX F: Format for Initial Oil/Chemical Spill Notification Report

1. Classification of Report: doubtful, probable, confirmed

2. Date and time pollution observed/reported and by whom

3. Position and extent of pollution

4. Tide, wind speed and direction (hydrology, Metrology Dept., Port Authority

5. Weather conditions and sea state

6. Characteristics of pollution (e.g. type of oil, if known, or color)

7. Source and cause of pollution (if known, e.g. name of vessel, and whether deliberate or accidental)

8. Details of any vessel in the area (to be given if polluter cannot be identified)

9. Whether photographs or samples have been taken: forecast of likely effect of pollution (e.g. estimated time and extent of beaching):
   o Primary steps taken to minimize the pollution

10. Probable type and estimate of Assistance
APPENDIX G: International Notification Procedures (Including Regional Plan Format)
Dissemination of Information on Oil and Chemical Spill Incidents

A maritime country or territory first receiving a report of an oil/chemical spill incident (if large scale i.e. 2-3 tier level) should immediately inform neighboring country/Territories that the incident may affect their related interests, giving as much detail as possible about the incident. In the event that a spill has occurred, that information should include date, time, position, type and amount of oil spilled the prevailing and forecast weather conditions, proposed actions and recommendations. As the situation develops, information to these spills in maritime boundary or territories must be updated continuously, and a regular synopsis provided to keep them informed. The procedures for such reports and communications are described in this chapter of the Plan. Transmission of such reports should not be delayed if complete information is not immediately available.

Available meteorological and hydrographic data should be analyzed to give rough early predictions of general spill movement. More sophisticated spill movement prediction methods may be subsequently used. However, visual observation of any spill is essential and the responsible authority under the appropriate National Contingency Plan should use those resources already identified, such as charter, military or commercial aircraft for surveillance. It is essential that the results of such observation and prediction be transmitted to other coast area and Territories that may be affected by the spilled oil until it no longer threatens any Island States and Territories in the area covered by the Plan.

Participating States and Territories should make every effort to transmit information that may aid in establishing liability for pollution removal costs, damages, and related fines and penalties, to requesting national authorities from other participating Country/States and Territories that are, or may have been, affected by an oil spill incident.

The initial report of an oil/chemical spill to a NOCS committee may be received from a variety of sources and may require confirmation by the NOCS committee that receives the report. After confirmation, the NOCS committee will draft a POLREP, message to all the Lead Agencies of the other SAS states or Territories of Plan Regional Organization (SACEP). If over flights or surface vessel observations determine that one or more-member country or Territories could be affected by the movement of the oil and chemical on the surface of the water, then speed of drift and direction shall be calculated and reported along with all other pertinent information.

Message Routing Procedure (POLREP)

After receipt of the initial report of an oil spill incident the NOCS committee may require confirmation of the spill sighting. After the spill has been confirmed, the NOCS committee, utilizing the Regional Oil and Hazardous Material Spill Alerting Mechanism, will prepare a POLREP message to notify neighboring States/member states and territories that may be affected by the spill.

The POLREP message will be sent directly to neighboring member states/country or to the Regional Supreme Commander of Regional Contingency Plan requesting relay of the POLREP messages to member country/States or territory alerting them of the spill and the possibility that assistance may be needed as defined in the Regional (OPRC,1990) Plan.

Once the initial POLREP message has been sent subsequent messages will be routed through the established routing network until the spill emergency has been concluded.
POLREP FORMAT

The following is a summarized list of the composition of the POLREP message.

1. Heading Remarks
   a. Date time group
   b. From
   c. To
   d. Subject

2. Situation
   a. Date and Time Position Incident Outflow
   b. Characteristics of Pollution Source and Cause of Pollution (Wind direction and speed of Current or Tide)
   c. Sea state and visibility
   d. Drift of pollution Forecast
   e. Identity of observer and ships on scene

3. Action Taken
   a. Implementation of National Contingency Plan Incident surveillance
   b. Photographs and samples
   c. Names of other regional states/country/SAS lead country on regional contingency plan be informed
   d. Future Plans
   e. Various types of information such as anticipated changes of command; reducing information exchange to encompass only relevant affected parties, etc.
   f. Assistance Requested
   g. Source of assistance.
   h. Estimated cost.
   i. Pre-arrangement for delivery.
   j. Assistance to where and how.
   k. Other states/country requested.
   l. Names and passport numbers of persons.
   m. Description of equipment.
   n. ETA and arrival information
      i. Place of embarkation
      ii. Place of disembarkation

4. Spare

If the POLREP is used in exercises, the text is to be introduced with the word EXERCISE and finished with this word three times. Each of the subsequent reports, which deal with the exercise, must be introduced and finished with the word EXERCISE as well.
POLREP EXPLANATION

HEADING REMARKS

Date Time Group:
The day of the month as well as the time of day of the message

From:
Lead Agency of the Maritime Country or Territory that is initiating the message

To:
On-Scene Commander (OSC)/Lead designated Commander for Implementation of Nat, Oil & Chemical spillage Contingency plan, will pass the message to other SAS Country directly by HF/VHF/Radio/Fax/Mob. And through Lead Regional On-Scene Commander to all member country or neighboring country that may be affected by the Spill.

Subject:
BD. POLREP, sequential number of the report and the name of the vessel involved in the spill incident

SITUATION

Date and Time:
Date and time of the incident

Position:
Position of vessel or vessels involved in the incident. If source of spill is unknown location by latitude and longitude in degrees and minutes and may, in addition, give the bearings of and the distance from a location known by the receiver.

Incident:
The nature of the incident should be stated here, such as BLOWOUT, TANKER GROUNDING, TANKER COLLISION, OIL SLICK, etc.

Outflow:
The nature of the pollution, such as CRUDE OIL, CHLORINE, DINITROL, PHENOL, etc., as well as the total quantity in tonnes of the outflow and/or the flow rate, as well as the risk of further outflow. If there is no pollution but a pollution threat, the words NOT YET followed by the substance, for example, NOT YET FUEL OIL, should be stated.

Characteristics of Pollution:
Gives type of pollution, e.g., type of oil with viscosity and pour point, packaged or bulk chemicals, give proper name or United Nations number, if known. For all, give also appearance, e.g. liquid, floating solid, liquid oil, semi-liquid sludge, tarry lumps, weathered oil, discoloration of sea, visible vapor. Any markings on drums, containers, etc., should be given.
Source and Cause of Pollution:

e.g., from vessel or other undertaking. If from vessel, say whether as a result of a deliberate discharge or casualty. If the latter, give brief description. Where possible, give name, type, size, call sign, nationality and port of registration of polluting vessel. If vessel is proceeding on its way, give course, speed and destination.

Wind Direction and Speed:
Indicates wind direction and speed in degrees and MPH. The direction always indicates from where the wind is blowing.

Current of Tide:
Indicates current direction and speed in degrees and knots and tenths of knots. The direction always indicates the direction in which the current is flowing.

Sea State and Visibility:
Sea state indicated as wave height in meters. Visibility is in nautical miles.

Drift of Pollution:
Indicates drift course and speed of pollution in degrees and knots and tenths of knots. In case of air pollution, (gas cloud), drift speed is indicated in m/s.

Forecast:
e.g., arrival on beach with estimated timing. Results of mathematical models, or computer trajectory modeling.

Identity of Observer and Ship on Scene:
Indicates who has reported the incident. If a ship, name, home port, flag and call sign must be given. Ships on scene can also be indicated under this item by name, home port, flag and call sign, especially if the polluter cannot be identified and the spill is considered to be of recent origin.

ACTION TAKEN
Implementation of National Contingency Plan: Indicate if National Contingency Plan has been activated. If appropriate, give name of Response Agency and On-Scene Commander.

Incident Surveillance:
Indicate type of spill surveillance such as aerial or vessel. Number of over flights per day, etc.

Photographs or Samples:
Indicates if photographs or samples from the pollution have been taken. Fax or Telex number of the sampling authority should be given.
Names of Other States Informed:
Lead agency initiating message concerning the spill incident should name the other Island States that have been notified directly. This is important if the control of communications is being passed to the U.S. Coast Guard Commander, Greater Antilles.

Assistance to Where and How:
Information concerning the delivery of the assistance e.g., rendezvous at sea with information on frequencies to be used, call sign and name of on-scene commander of the requesting Island State or Territory or land-based authorities with telephone number, fax, or telex number and contact person.

Other States Requested:
Only used if not covered by the country, if further assistance is later needed by other Island States or Territories. Personnel Names, Passport

Nationality and Number:
Names of persons responding from an assisting Island State including their passport numbers. This information is necessary to facilitate rapid entry into the requesting Island State or Territory.

Description of Equipment:
A brief description of the equipment including serial and model numbers. Also included a list of any component parts that are being shipped with the equipment.

ETA and Arrival Information:
Time and place of arrival of equipment and of personnel should be given to accommodate clearance with customs and immigration officials in the requesting Island State or Territory.

Place of Embarkation:
The responding Island State should give the airport or seaport where responding personnel will be arriving at in the requesting country.

Spare:
Any relevant information pertaining to the spill should be included such as results of field inspections or surveys.
## Appendix H: Record of Amendments

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<tr>
<th>No.</th>
<th>Date</th>
<th>Amended by: [Include organization, name, person and designation]</th>
<th>Details of amendment</th>
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