



Department of Fisheries
Ministry of Fisheries and Livestock

Environmental and Social Management Plan

for Government Shrimp Estate Chakaria, Cox's Bazar;
BFDC; BMC and Canals

Annex A



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C₃GIS

Center for Environmental and
Geographic Information Services

**Environmental and Social Management Plan
for Government Shrimp Estate Chakaria, Cox's Bazar;
BFDC; BMC and Canals**

Annex A

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Abbreviations and Acronyms

ARIPA	Acquisition and Requisition of Immovable Property Act
BAP	Biodiversity Action Plan
BFDC	Bangladesh Fisheries Development Corporation
BFRI	Bangladesh Fisheries Research Institute
BMC	Brood Management Center
BMEP	Biodiversity Monitoring and Evaluation Plan
BMP	Biodiversity Management Plan
BNBC	Bangladesh National Building Code
BOD	Biochemical Oxygen Demand
BoQ	Bill of Quantities
BP	Bank Procedure
BSGSM	Bangladesh Standards and Guidelines for Sludge Management
BTS	Black Tiger Shrimp
BWDB	Bangladesh Water Development Board
CBA	Collective Bargaining Agent
CEGIS	Center for Environmental and Geographic Information Services
CESAP	Construction Environmental and Social Action Plan
CoC	Code of Conduct
COD	Chemical Oxygen Demand
CSC	Construction Supervision Consultant
DA	Designated Account
DAE	Department of Agriculture Extension
DDM	Department of Disaster Management
DFO	District Fisheries Officer
DFTC	Demonstration Farm and Training Center
DG	Director General
DO	Dissolve Oxygen
DoE	Department of Environment
DoF	Department of Fisheries
DPD	Deputy Project Director
DPHE	Department of Public Health Engineering
DPP	Development Project Proforma
DTW	Deep Tube wells
EAA	Ecologically Appropriate Area
EAAA	Ecologically Appropriate Area of Analysis

EBRD	European Bank for Reconstruction and Development
EC	Electrical Conductivity
ECAs	Ecologically Critical Areas
ECC	Environmental Clearance Certificates
ECR	Environmental Conservation Rule
EHS	Environment, Health, and Safety
EMMoP	Environmental Management and Monitoring Plan
EPC	Engineering, Procurement, and Construction
ESCOPs	Environmental and Social Code of Practices
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMoP	Environmental and Social Monitoring Plan
ESS	Environmental and Social Standards
ESU	Environment and Social Unit
ETP	Effluent Treatment Plant
FAO	Food and Agriculture Organization
FD	Forest Department
FGDs	Focused Group Discussions
FLID	Fisheries and Livestock Information Department
FMP	Fisheries Management Plan
FRSS	Fisheries Resources Survey System
GBV	Gender Based Violence
GIIP	Good International Industry Practices
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HBB	Herring-Bone-Bond
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HYV	High Yielding Variety
IA	Implementing Agency
IFC	International Finance Corporation
ILO	International Labour Organization
IMA	Independent Monitoring Agency
IMO	International Maritime Organization
INGOs	Implementing Non-Government Organizations
IPC	Instruction of Payment Certificate
IUCN	International Union for Conservation of Nature
IUFR	Interim Unaudited Financial Reports

KIIs	Key Informant Interviews
LCS	Labor Contracting Society
LGRC	Local level Grievance Redress Committee
LGRD	Local Government and Rural Development
LMP	Labor Management Plan
MARPOL	Marine Pollution
MD	Managing Director
MoA	Ministry of Agriculture
MoEF	Ministry of Environment and Forest
MoFL	Ministry of Fisheries and Livestock
MoL	Ministry of Land
NBSAP	National Biodiversity Action Plan
NCR	Non-compliance Report
NEQS	National Environmental Quality Standards
NG	Net Gain
NGOs	Non-Government Organizations
NID	National Identification Card
NNL	No Net Loss
NTCB	National Technical Committee on Biodiversity
OHS	Occupational Health and Safety
OP	Operation Policy
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PAPs	Project Affected Persons
PD	Project Director
PGRC	Project Grievance Redress Committee
PM	Particulate Matter
PMC	Project Management Consultants
PME	Powered Mechanical Equipment
PMU	Project Management Unit
PPE	Personal Protection Equipment
PS	Performance Standard
RCC	Reinforced Cement Concrete
RPF	Resettlement Policy Framework
RRA	Rapid Rural Appraisal
SC	Supervision Consultant
SCMFP	Sustainable Coastal and Marine Fisheries Project
SDF	Social Development Foundation

SE	Supervision Engineer
SEA/SH	Sexual Exploitation and Abuse/Sexual Harassment
SEP	Stakeholder Engagement Plan
SOE	Statement of Expenditure
SOP	Standard Operating Procedures
SPF	Specific Pathogen-Free
SPME	Specified Powered Mechanical Equipment
SPMU	Sub-Project Management Unit
SUFO	Senior Upazila Fisheries Officer
TAN	Total Ammonia Nitrogen
TDS	Total Dissolve Solid
TSS	Total Suspended Solid
UFO	Upazila Fisheries Officer
UP	Union Parishad
VESCs	Valued Environmental and Social Components
WBG	World Bank Group
WCS	Wildlife Conservation Society
WTP	Water Treatment Plant
XEN	Executive Engineer

Executive Summary

The ESMP has been prepared to mitigate the project's environmental and social risks and impacts that includes mitigation measures, capacity building, responsibilities and reporting system, management and monitoring plan with detailed budget. The ESMP would be managed through a number of tasks and activities. ESMP will record the procedure and methodology for managing the mitigation and enhancement measures of the identified each negative/adverse impacts of the Project. The management will clearly delineate the responsibility of various participants and stakeholders involved in planning, implementation, and operation of the Project.

The ESMP includes different types of mitigation and control measures and management plans for addressing and managing significant impacts and risks, including: (i) general and non-site-specific measures in the form of ESCOPs to address general construction and operation matters identified as medium and minor/low significance prior to mitigation and prevention; (ii) project specific and, to the extent possible, site-specific mitigation measures; (iii) CESAP with site-specific and contract-specific management plans to be prepared by the Contractors that will be submitted within 90-days of a contractor's mobilization and be approved by the Engineer; (iv) OHS Management System Processes and SOPs to be prepared by the Contractors; and (v) proposed ESMP sub-plans to address direct and indirect impacts on biodiversity, environment project workers and community. The ESMPs have been suggested in various stages of the sub-Project implementation and are given in brief below:

Demolition plan has been suggested for demolition activities to be conducted during construction period at 48-acres of Shrimp Demonstration Area at CSE; BFDC Harbor; and BMC Area at DFTC, Teknaf. A concrete demolition plan has been described in Section 2.1 in Chapter 2 of this Report which covers detailed procedures of demolition including precautionary measures during this tenure, demolition waste management plan and environmental precautions.

After demolition activities land development and site preparation would be done. Tree would be fallen and clearance of bushes would be conducted. In addition, labor camp would be established and septic tank would be implemented temporarily. Hence, site preparation would be conducted through maintaining ESCOP 1, 7, 8, 9, 10, 16, and 22 which are explained in the Annex 34 of the Volume II: Annexures of Main Report.

As per the number of manpower loading during various stages of sub-Project implementation, (Ref. to Section 3.16 under Chapter 3 of the Volume I: Main Report-ESIA Report), the EPC Contractor shall prepare a construction camp management plan considering applicable national requirements, Bangladesh labor law, International Finance Corporation (IFC) & European Bank for Reconstruction and Development (EBRD) guidelines, and World Bank Guideline and following ESCOP 1, ESCOP 9, ESCOP 10, ESCOP 14, ESCOP 16, and ESCOP 18 as mentioned in Annex 34 of the (Volume II: Annexures of Main Report) and submit the plan to the supervision consultant or Owner Engineer of the proponent for approval. This management plan also details out the facilities at workers camps, sanitation facilities, and drinking water supply system.

To handle the generated debris from the construction sites, a concrete waste management plan is required to mitigate the potential impacts. The waste management plan explains about the debris handling (demolition of abandoned civil structures), construction waste management, waste disposal and effluent management, sewage management, solid waste management, and sludge management including the options.

Drainage management plan is necessary to manage rainfall runoff in the construction site. This plan is required to prepare by each contractor on the basis of ESCOP 4 and ESCOP 6 mentioned in Annex 34 of the Volume II: Annexures of Main Report).

Bangladesh is a natural hazard prone country for its deltaic location. As all the sub-Project are located within the coastal region of the country, hence, the Project is very much susceptible for cyclone with storm surge, flood, salinity intrusion hazard. In this regard, various hazard protection plans have been provided in this Report. Among them, in flood protection plan, analyzing 50-years return period of flood, it has been suggested that for any establishment the safest height should be considered at least 1m above the highest return period of water level.

During Construction stage, both road and riverine traffic would be increased due to transporting generated debris from the demolishing civil structures, sluice gates, wooden debris, excavated soils, construction materials, chemicals and other materials and equipment as required from the sub-Project sites to the designated locations and vice versa. A detailed site-specific traffic plan for transportation of materials during construction period including loading and unloading procedure will be prepared by the Contractor on the basis of ESCOP 14, and ESCOP 15 as mentioned in the Annex 35 of the (Volume II: Annexures of Main Report), consulting with the PMU and authorities responsible for roads and traffic. In devising the plan, the Contractor should consider the sensitive receiver points and road conditions including road bents, zebra crossing, speed breaker, road crossing, River Bridge etc.

Occupational Health and Safety (OHS) Plan: Contractors will prepare an OHS Plan based on the framework proposed in this ESIA, which include Contractors' high-level policy, processes and standard operating procedures for high-risk activities to safeguard works and community health and safety.

Contractors will also prepare an occupational health and safety plan for devising the general guidelines for the identified hazards and control measures along with the OHS Management Processes and Standard Operating Procedures (SOPs) stated in OHS framework; World Bank Groups IFC's General Environmental Health and Safety Guidelines: Occupational Health and Safety, 2007; Bangladesh Labour Act 2006 (amended in 2013); and International Labour Organization (ILO) Code of Practices 1992, Safety and Health in Construction Industry; and Safety and Health in Building and Civil Engineering Works. If the guidelines stated before cannot address a specific OHS management in the project, GIIP will be applied. The OHS Plan should contain general guidance for all identified hazards under each intervention for both offshore and onshore parts. It also contains management system processes (PRO) and SOPs. Processes and SOPs should be presented in three discrete headings, (a) Contractor's Standards on the identified hazard management, (b) Expected Site specific OHS hazards and risks during construction, and (c) Control Measures proposed by the Contractor.

In addition, the Contractors will prepare a CHS Plan to addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable.

To maintain the environmental quality within the standard limit, the Environmental quality monitoring plan mainly address to the impacts on ambient environment during construction stage. DoF should monitor through third party consultant or by PMU as per the guidelines, mentioned in the ESIA Report for all the sub-Projects. They may take policy level initiatives to control emissions from nearby sources. Furthermore, mitigation measures prescribed in the report must be adopted to minimize the additional environmental (air, water and noise) pollution in and around the sub-project sites. ESCOP 10 for the management of Air Quality, ESCOP 11 for the management of acoustic environment and ESCOP 1, ESCOP 3, and ESCOP 24 for the management of water quality as mentioned in the Annex 35 under the (Volume II: Annexures of Main Report) can be followed. In addition, considering the climatic effect of El Niño and La Niña, considerable water quality should be maintained in the shrimp farming ponds in the CSE and the cluster farming ghers in the coastal three Districts

connected with the cluster farming canals which has been detailed out in Section 2.10 of Chapter 2 under this Report.

Similarly, Re-excavated soil management plan, Maintenance of RCC Infrastructures at CSE etc. have been also mentioned in this ESMP.

Biodiversity Management Plan: The ESMP proposes to conduct an encounter, abundance and habitat Survey in the Project Area for species triggering Critical Habitat criteria of ESS6 to confirm that mitigation is adequate to address expected limited and temporary impacts. We already addressed in the baseline section the species that have significance for conservation. The fishing cat (*Prionailurus viverrinus*) is a charismatic and endangered species, inhabiting the wetlands and mangrove ecosystems of Chakaria Mini Sundarbans, located in CSE. In addition, the brown-winged kingfisher (*Pelargopsis amauroptera*) is another vulnerable species of kingfisher to the Chakaria mangrove forests, which are rarely visited, as per local people. In addition, Biodiversity Action Plan has been explained in the following Section 2.14.

Fisheries Management Plan: The Fisheries Management Plan (FMP) will govern the fisheries of the Chakaria Shrimp Estate and shrimp cluster canal fisheries. The critical habitat assessment indicates two fish species Chandani Ilish, Kukurjiv and Shaplapata triggering Critical Habitat criteria of OP/BP4.04. A fisheries management plan is proposed with the aim of achieving “no net loss” of fisheries habitat and “net gain” of Chandani Ilish, Kukurjiv and Shaplapata. The following are proposed in the Fisheries Management plan: (i) Managing the impacts (Ref. to Chapter 9 of the Volume I: Main Report) of interventions on fisheries; and (ii) Managing environment and diseases of shrimp aquaculture

The Plan covers the critical habitat area of various fish species including shrimp, species conservation significance mentioning the potential critical habitat and the triggered species, Ecologically Appropriate Area of Analysis, Ecological Sensitivities Associated within the EAA, critical habitat assessment, evaluation of impacts on species and associated habitat, fisheries management and monitoring plan considering national and international legislatives with applicability, biodiversity actions, monitoring and evaluation, roles and responsibilities etc.

Management plan to control snails in shrimp farming areas has been provided in this ESMP also which includes the common species of snails, its biology, adverse impacts of snails in the shrimp farming areas, beneficial impacts of snails in shrimp gher/ pond, and management plan to control it.

Labor Management Procedure (LMP): The LMP sets out the approaches and measures to meet and mitigate the national requirements as well as the objectives of the WB’s ESF specific objectives of ESS 2 and ESS4. The LMP will focus on the potential labor risks and suggested measures to prevent, mitigate and overcome these risks. Following to these procedures, contractors will be required to prepare and implement its own Labor Management Plan for larger works. For smaller contracts, the Project Implementation Unit (PIU) may prepare specific procedures to be inserted in the contract as part of contractors’ legal obligations.

Stakeholder Engagement Plan (SEP): The SEP should be prepared in accordance with the national and international guidelines and the common social policy and corporate principles of the sponsors of the Project. The SEP complies with WB’s OP 4.04/ESS 10 as well as GOB rules. The SEP describes how the project will involve all parties involved, including national and regional stakeholders, PAPs, vulnerable communities, various interested parties, local community members, members of various occupational groups, women’s groups, labors, and contractors.

Sexual Exploitation and Abuse and Sexual Harassment Risk Mitigation Action Plan: Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) Prevention and Response Action Plan outlines

how the project will put in place the necessary protocols and mechanisms to address SEA/SH risks; and how to address any SEA/SH allegations that may arise.

Social management Plan: Land acquisition will be required for Project interventions. All PAPs, thus, will receive: (i) compensation (as required, to match replacement value); and/or (ii) replacement land, structures, seedlings, other resettlement assistance such as shifting allowance, assistance with rebuilding structures, and/or compensation for loss of workdays/income. The ESMP proposes to compensate the people: (i) who have formal legal rights to land or assets; (ii) who do not have formal legal rights to land or assets, but have a claim to land or assets that is recognized or recognizable under national law; or (iii) who have no recognizable legal right or claim to the land or assets they occupy or use.

The ESMP also includes a Livelihood Restoration Plan, Agricultural plan, some others to address the possible impacts and its mitigation measures. In addition, Mitigation Plan has been provided for all the sub-Projects separately in Chapter 5. Furthermore, Environmental and Social Monitoring Plan with budget for construction and post-construction stages have been given in Chapter 6.

Institutional Arrangements and Capacity Building

The key institution, DoF has create a Project Management Unit (PMU) for SCMFP operation and BFDC may create a Sub-project Management Unit (SPMU) in addition to the DoF PMU. The PMU consists of one Project Director (PD), three Deputy Project Director (DPD), Project Management Consultants (PMC), one National Consultant (Environment), one Executive Engineer (Structure), and an Assistant Director-cum- Accountant. PMU will recruit a Supervision Engineer under whom a EHS unit consist of an environmental, health and safety (EHS) unit with five (05) environmental experts and surveyor will be developed. Moreover, independent monitors will be retained by DoF to carry out monitoring implementation of the different components and submit an independent monitoring and appraisal report to the PMU, DoF and to the World Bank. Finally, each contractor will be recommended to have one Environmental Specialist and one Occupational, Health and Safety Specialist, who will be working in close coordination with the environmental staff of Supervision Engineer and PMU.

As per the DoF organogram, there is no dedicated EHS, so proposal has been made to create one headed by a Deputy Manager and two Assistant Managers, one for environment and one for health and safety. One Communication Specialist is also proposed under the Project Director to maintain regular communication with the concerned local people and address the grievance (if any) on spot or delegate the message to the upper tier (Project Director). USD 0.24 has been estimated for strengthening the EHS Unit.

The environmental and social trainings will help to ensure the ESMP implementation. Capacity building will be aimed at strengthening the PMU and EHS Unit of PMU staff in the field of environmental management and occupational health and safety. The contractor will also be required to provide environmental and health and safety trainings to its staff, to ensure effective implementation of the ESMP. A budget of USD 0.10 million has been earmarked for capacity building of PMU and EHS Unit staff. Furthermore, two grievance redress committees (GRCs) will be formed: local grievance redress committee (LGRC); and project grievance redress committee (PGRC) to address compliant within seven days.

Various Environmental and Social Management Plan including budget has been prepared and mentioned in the Chapter 6. In total the budget including Environmental and Social Management Plan (ESMP), Environmental and Social Monitoring Plan (ESMoP), Institutional arrangement, Indirect project benefits, and Department of Environment (DoE) approval cost for the four sub-projects has been estimated as around BDT 186 million.

1. Environmental and Social Management Plan

1.1 Introduction

This report describes and highlights the Environmental Management Plan (EMP) including Social Management Plan (ESMP) of the Project following the guidance of Schedule 11 of Environment Conservation Rules (ECR) 2023. The ESMP is an integral part of the project planning and execution. The overarching objective of ESMP in sustainable development is to systematically address and mitigate the environmental and social impacts of development projects. This planning framework integrates environmental considerations into project management, ensuring compliance with regulations while promoting sustainable practices. The framework will address any unexpected or unforeseen environmental impacts that may arise during construction and operational phases of the project. Preparation of this report follows ESMP implementation practices in other similar World Bank funded projects in the region as well as Good International Industry Practices (GIIP). The ESMP will be updated when the detailed design of the proposed project and other associated sub-components are completed and finalized.

ESMP includes several plans for implementing mitigation and enhancement measures, emergency response, occupational health and safety, and Environmental Code of Practices. Generally, the impacts, which are minor or moderate, are to be mitigated by adopting Environmental and Social Code of Practices (ESCOPs: as detailed out in the **Annex 35** of the **Volume II: Annexures of Main Report**) and EPC contractor's good practices during project implementation. On the other hand, impacts and risks which are critical or major would be mitigated or prevented by adopting mitigation measures discussed in **Chapter 9** and **Chapter 10** of the (**Volume I: Main Report-ESIA Report**) and specific plans discussed in this Chapter.

1.2 Project Description

The 'Sustainable Coastal and Marine Fisheries Project (SCMFP)' is an umbrella Project of Department of Fisheries (DoF) aims to increase the contribution of coastal and marine fisheries and aquaculture sustainably to the national economy, and access of the fishing communities to alternative livelihood activities in an environment-friendly manner. In line with this, DoF has taken an initiative for the development and rehabilitation of infrastructures under four (04) sub-projects: (i) Rehabilitation of 10-, and 11-acre Shrimp Estate and 48-acre Shrimp Demonstration Farm at Chakaria, Cox's Bazar, (ii) Development Works for Sustainable Management of BFDC Harbor at Chattogram, (iii) Establishment of SPF-Black Tiger Shrimp (BTS) Brood Management Center (BMC) at DFTC, Teknaf, and (iv) Desilting and re-habilitation of existing canals under Khulna, Bagerhat and Satkhira Districts with the concept of implementing the cluster shrimp farming.

The overarching objective of the SCMFP is to explore greater opportunity from the coastal and marine fisheries resources, along with promoting sustainable management of fisheries stock and environment to reduce poverty and improve livelihood of the coastal community.

1.3 Project activities

The Sub-Project activities have been divided into three (03) separate stages considering the potential impacts which would be identified. The activities might be changed depending on the sub-projects and implementation strategies of the Project. The three stages are named as: Pre-construction, Construction and Operation stages. Stage-wise activities of each component are given below:

1.3.1 Pre-Construction Stage

- Review of relevant literatures and project documents (i.e., feasibility study and other relevant technical documents);
- Desk based secondary data collection and analysis;
- Review and finalize the design and drawings of the structures (from Feasibility Study);
- Examining of the documents regarding land acquisition/requisition/purchase;
- Review and study all relevant and applicable national and international laws, regulations, rules, policies, framework etc.;
- Procuring of the raw materials and associated items to the construction site; and
- Contractor(s) engagement and man power loading.

1.3.2 Construction Stage

Sub- Project 1A: Rehabilitation of 10, and 11-acre shrimp estate including associated canals Chakaria, Cox's Bazar

- Construction of temporary labor shed and sanitation facilities;
- Reconstruction of Embankment/ Peripheral Dyke;
- Rehabilitation of water supply and drainage canals;
- Repair & renovation of existing sluice gate;
- Construction of Guard Shed with sanitary and electrical facilities;
- Installation of on grid solar panels on embankment (peripheral dyke);
- Renovation of Fish Landing Center;
- Construction of herring bone road on embankment;
- Barbed wire fencing with Reinforced Cement Concrete (RCC) pillars

Sub- Project 1B: Rehabilitation of 48-acre Shrimp Demonstration Area, Rampur, Chakaria, Cox's Bazar

- Land development, levelling and land preparation;
- Construction of temporary labor shed and sanitation facilities;
- Repair and renovation or reconstruction of peripheral dyke with mechanical compaction and turfing;
- Rehabilitation of water supply canals, and re-excavation of drainage canal;
- Repair and renovation or reconstruction of existing sluice gate;
- Construction of 2 storied (with free ground floor) office building, guard shed cum store house including associated facilities;
- Construction of Police Fari;
- Construction of deep tube well and watch tower;
- Re-excavation of 4 nursery and 13 grow out ponds, pond inlet- outlet system aerator;
- Construction of herring bone road including soling, end-edging, road alignment from Rampur Bazar Chakaria;
- Barbed wire fencing with RCC pillars.

Sub- Project 2: Establishment of SPF-Black Tiger Shrimp (BTS) Brood Management Center (BMC) at DFTC, Teknaf

- Establishment of shrimp hatchery.

Sub- Project 3: Development works for sustainable management of BFDC harbour at Chattogram

- Electrical Sub-station with distribution line & accessories (2 MW/ 1600 KVA) including alternative back up supply Generator;
- Installation of deep tube well (2 nos.);
- Renovation of auction center cum training center;
- Construction of pre-processing zone with ICE Plant and chilled storage facilities
- Construction of modern processing factory 500 MT capacity with 4-6 chambers including storage and associate other facilities;
- Installation of complete Fire Fighting System of Fish Harbor;
- Construction of ETP; and
- Construction of Water Treatment Plant (WTP).

Sub- Project 4: Other Activities

- Desilting and rehabilitation of existing canals of cluster shrimp farms at different locations of Khulna, Bagerhat, and Satkhira; and
- Repairing and construction (as per suggestion of the Feasibility and ESIA Team) of hydraulic structures on the selected Canals.

Considering the above-mentioned objective, various development works would be undertaken under the four sub-projects. extracting natural resources like fish along with other edible and non-edible products from and discharge of liquid and solid wastes to the coastal and marine sources cause the coastal and marine ecosystem fragile. Infrastructural development under this project may degrade further the concerned ecosystem and environment, and thus impede the dependent livelihood. Henceforth, the ESIA studies would be conducted for the interventions for assessing the environmental and socio-ecological impacts and prescribe corresponding mitigation measures for integrating the fragile ecosystem.

Under each sub-project, based on the baseline information as generated through primary and secondary information, field information, data analysis etc.; Important/Valued Environmental and Social Components (I/VESCs) have been identified for physical environment, biological environment, and socio-economic environment. Afterwards, both adverse and beneficial impacts have been assessed and corresponding mitigation and enhancement measures have been prescribed. The detailed information of Impacts and Mitigation Measures are mentioned in the **Chapter 9** under the **(Volume I: Main Report-ESIA Report)**. This Report systematically explains the Environmental and Social Management including Mitigation and Monitoring Plans based on the I/VESCs with corresponding budgets.

1.4 Environmental Policy

This ESMP has been prepared in accordance with the guidelines stated in ECR 2023 and World Bank adopted Environmental and Social Framework (ESF) where ESS-1 has clearly depicted the requirement of ESMP.

The most relevant pieces of legislations include (but not limited to): Environment Conservation Act (ECA) 1995 (with amendments); Environment Conservation Rules (ECR) 2023; Protection and

Conservation of Fish Rules 1985; Water Act 2013; Bangladesh Water Rules 2018, Acquisition and Requisition of Immovable Property Act (ARIPA) 2017 (the key piece of legislation for land acquisition and requisition in Bangladesh); Wildlife (Conservation and Security) Act 2012; and the Bangladesh Biodiversity Act 2017. These as well as all occupational Health and Safety (OHS) related laws are critically examined and set for compliance to protect the environmental and social aspects, including terrestrial and aquatic ecology, fisheries, and to maintain air and water quality during the construction and operation stages of the proposed project.

Based on a review of the WB's OP/BP that include- OP/BP 4.01: Environmental Assessment; OP/BP 4.04: Natural Habitats; OP/BP 4.36: Forests; OP/BP/GP 7.50: Projects in International Waterways; WB Policy 2010: The World Bank Policy on Access to Information; and Performance Standard (PS) - 4: Community Health, Safety, and Security are relevant to the Project. The review included a gap analysis between OP/BP requirements and national legislation. Where gaps were identified, the Project will adopt the most stringent standards.

Chapter-1 of this Report has described the detail national and international law, policy and regulatory frameworks that are relevant and applicable to this proposed project.

1.5 Environmental Compliance Requirements

An Environmental and Social Monitoring Plan is suggested to monitor the impact and compliance issues in respect of environmental and social measures and standards along with the conditions imposed by Department of Environment (DoE) in order to comply with the environmental regulations and abide by the environmental standards (**Table 1.1 1.2 1.3**). Additionally, following detailed management plans and other best practices and guidance notes will be followed accordingly:

- Biodiversity Management Plan
- Fisheries Management Plan
- Labor Management Procedure (LMP)
- Stakeholder Engagement Plan (SEP)
- Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) Risk Mitigation Action Plan
- Environmental and Social Code of Practices (ESCOPs) that has been described in the Annex 35 of the Volume II: Annexures of Main Report
- Good International Industry Practices (GIIP)
- World Bank adopted Guidance note for the project implementation and management.

Table 1.1: Standard Range of Air Quality Parameters

Air Quality Standards

Sl. No.	Parameters	Avg. Duration	Air Pollution (Control) Rules 2022	IFC 2007 (Environmental, Health, and Safety General Guidelines)/ WHO 2005
1.	PM _{2.5} (µg/m ³)	1 year	35	35 (IT-1) 25 (IT-2) 15 (IT-3) 10 (G)
		24 hr	65	75 (IT-1) 50 (IT-2) 37.5 (IT-3)

Sl. No.	Parameters	Avg. Duration	Air Pollution (Control) Rules 2022	IFC 2007 (Environmental, Health, and Safety General Guidelines)/ WHO 2005
				25 (G)
2.	PM ₁₀ (µg/m ³)	1 year	50	70 (IT-1) 50 (IT-2) 30 (IT-3) 20 (G)
		24 hr	150	150 (IT-1) 100 (IT-2) 75 (IT-3) 50 (G)
3.	SO ₂ (µg/m ³)	24 hr	80	125 (IT-1) 50 (IT-2) 20 (G)
		1 hr	250	-
		10 minutes	-	500 (G)
4.	NO ₂ (µg/m ³)	1 year	40	40 (G)
		24 hr	80	-
		1 hour	-	200 (G)
5.	O ₃ (µg/m ³)	8 hr daily maximum	100	160 (IT-1) 100 (G)
		Peak Season*	-	-
		1 hr	180	
6.	CO (mg/m ³)	24 hr	-	-
		8 hr	05	-
		1 hr	20	-
		24 hr	400	-

Note: IFC-International Finance Corporation; WHO-World Health Organization; ADB-Asian Development Bank; AIIB-Asian Infrastructure Investment Bank; IT - Interim Target; G - Guideline *Peak Season-Average of daily maximum 8-hour mean O₃ concentration in the six consecutive months with the highest six-month running-average O₃ concentration.

Table 1.2: Standard Range of Noise level Parameters

Noise Level Standards

Location Type	Unit	Noise Pollution (Control) Rules 2006		IFC 2007/ WHO 1999/ WB	
		Day (06:00-21:00)	Night (21:00-06:00)	Day (07:00- 22:00)	Night (22:00-07:00)
Silent	dB (A)	50	40	55	45
Residential	dB	55	45	55	45
Mixed	dB	60	50	-	-
Commercial	dB	70	60	70	70
Industrial	dB	75	70	70	70

Note: WB-World Bank; IFC-International Finance Corporation; WHO-World Health Organization; dB- decibel

Table 1.3: Standard Range of ground water Parameters**Ground Water Quality Standards**

Sl. No.	Parameters	Unit	ECR 2023 (Schedule-2, Kha)	WHO Guidelines		IFC 2007
				2024	2022	
4.	Nitrate (NO ₃ ⁻)	mg/L	45	50	50	-
5.	Arsenic (As)	mg/L	0.05	0.01	-	-
6.	Turbidity	NTU	5	≤1	-	50
7.	Aluminum (Al)	mg/L	0.20	-	-	-
8.	Ammonia (NH ₃)	mg/L	1.50	-	-	-
14.	Chloride	mg/L	250	-	250	-
27.	Fluoride	mg/L	1.0	1.5	1.5	-
28.	Hardness as CaCO ₃)	mg/L	500	-	-	-
29.	Iron (Fe)	mg/L	0.3-1.0	-	-	-
34.	Mercury (Hg)	mg/L	0.001	-	0.006	-
36.	Nitrite (NO ₂ ⁻)	mg/L	1.0	-	3.0	-
39.	pH	mg/L	6.5-8.5	6.5-8.5	-	6.5-8.5
45.	Suspended Solid (SS)	mg/L	10	-	-	-
47.	Sulfate (SO ₄ ⁻²)	mg/L	250	-	-	-
48.	Total Dissolved Solid (TDS)	mg/L	1000	-	-	-
49.	Temperature	°C	20-30	-	-	-

1.6 Objective

The basic objective of the ESMP is to manage adverse impacts of proposed project interventions in a way that minimizes the adverse impact on the environment and people in the project area. The specific objectives of the ESMP are to:

- Facilitate the implementation of the mitigation measures identified during the present Environmental and Social Impact Assessment (ESIA) to comply with regulatory requirements that discussed earlier in the document;
- Maximize potential project benefits and control adverse impacts;
- Draw responsibilities for Project Proponent (in this case, PMU of the DoF), contractors, consultants, and other stakeholders of the project team for the environmental and social management of the Project;
- Maintain essential ecological process, preserving biodiversity, and where possible restoring degraded natural resources;
- Make stakeholders aware about implications of the project activities, satiate their concerns and roles and responsibilities of respective quarters; and
- Foster and facilitate informed decision-making process and ensure sustainable development.

The ESMP would be implemented through a number of tasks and activities. One purpose of the ESMP is to record the procedure and methodology for management of mitigation and enhancement measures identified for each negative/adverse impacts of the Project. The management will clearly delineate the responsibility of various participants and stakeholders involved in planning, implementation, and operation of the Project.

1.7 Inclusion of Relevant Components of ESMP in Contract Documents

The relevant components/measures in the ESMP of the Project along with the ESCOPs (as mention in the **Annex 34** of the **Volume II: Annexures of Main Report**) and occupational hazards and risks are to be included in the contractors' bid documents. The technical specifications of the bid documents will clearly state that the contractor will need to comply with the mitigation and control measures provided in the ESMP, ESCOPs, OHS Plan, World Bank Group Environment, Health, and Safety (EHS) General Guidelines and National Environmental Quality Standards (NEQS).

1.7.1 BOQs in Bidding Documents

The following items will be included in the Bills of Quantities (BOQs) of bidding documents

- After the award of the contract and before mobilization, the EPC Contractor will prepare and submit two separate plans, Contractor Environmental and Social Action Plan (CESAP) and OHS Plan in compliance with ESMP, WBG EHS Guidelines, IFC performance standards, NEQS and following international best practice. The preparation and their revisions and updates will also be quantified and presented as line items in the Contract.
- Quantities of personal protective equipment (PPE), first-aid boxes, ambulance, and health care facility with Bangladesh Medical Association licensed doctors and nurses.
- Provision of Environmental and OHS Staff for the entire construction period.
- Providing and maintenance of Dust Measurement Meters for spot measurements (08 nos.).
- Quarterly applicable time slots/24-hour Air Quality Monitoring PM₁₀, PM_{2.5}, NO₂, SO_x, CO₂, CO.
- One hour of continuous noise monitoring at project sites in close proximity of sensitive receptors, settlement areas and nearby biodiversity sensitive area (i.e., mangrove forest patch, critical habitat, migratory birds' habitat) during the construction work.

1.7.2 Payment Milestones

Payments to contractors will be linked to environmental, health and safety performance, measured by completion of the prescribed environmental and social mitigation measures in the CESAP and control measures described in the OHS plan. In addition, for any non-compliance causing damages or material harm to the natural environment, workers, public or private property or resources, the contractor will be required to either remediate/rectify any such damages in a timeframe specified by and agreed with the Construction Supervision Consultant (CSC), or pay Implementing Agency (IAs) for the cost (as assessed by IAs) of contracting a third party to carry out the remediation work. For repeated non-compliance the Contractor will be penalized. The penalty of non-compliance of the requirements of the CESAP and OHS Plan will be 3% (It may be changed) of the total Civil Works in the Instruction of Payment Certificate (IPC). The penalty will be imposed after all contractual instruments are applied and a Non-compliance Report (NCR) is issued by the Engineer.

2. Environmental Management Plan during Construction and Operation Stages

During construction stage, Project site preparation including vegetation clearing, land filling and levelling etc.; and civil construction and erection activities would be conducted (Ref. to **Section 3.12**). Potential impacts have been identified and mentioned in **Chapter 9** of the (**Volume I: Main Report-ESIA Report**) and **Annex F: Occupational Health & Safety** with detailed information such as magnitude of impacts, sensitivity and the significance of those identified impacts. Accordingly, corresponding mitigation measures of the major impacts have been suggested in the above-mentioned chapter. The Environmental and Social Management Plans (ESMPs) with necessary ESCOPs (as mentioned in the **Annex 34** of the **Volume II: Annexures of Main Report**) for this stage are given as follows:

2.1 Demolition Plan

Demolition activities would be conducted at 48-acres of Shrimp Demonstration Area at Chakaria Shrimp Estate; BFDC Harbor; and BMC Area at DFTC, Teknaf. A concrete demolition plan is given as follows:

Demolition Procedures

- Demolition will be carried out by hand operated pneumatic jack hammer. Oxy-acetylene torch may be used to cut the reinforcement. Mobile air compressor will be placed on the ground floor.
- Demolition should be started on the roof and proceed down floor by floor to the ground floor. The concrete of each structural element should be broken down gradually. The reinforcement should be left in place until the concrete is broken away and when its support is no longer needed.
- The demolition of other structural element under the building should be executed according to the following:
 - i. Cantilevered slabs will be demolished by hand held jack or pneumatic hammer; prior to such demolition, the cantilevered slab should be supported and the area underneath it be protected according to the precautionary measures.
 - ii. The cantilevered beams will be demolished by hand held jack or pneumatic hammer; the cantilevered beam will not be demolished prior to demolition of slabs and walls which are supported by the cantilevered beams.
 - iii. Demolition of other slabs should be done sequentially and then interior beams and columns would be demolished.

Precautionary Measures during Demolition

- There should be a provision of covered walk way along the entire length of each property boundary.
- The catch platform on top of the covered walkway should be placed underneath the balconies to support the cantilevered structures. Steel propping should be installed on all

floors underneath the cantilevered slabs and beams. Steel propping will have a bearing capacity of 25kN¹, spaced at 1.2 m on center.

- Double row scaffold with nets and tarpaulin will be installed and will cover the external face of the building.
- Bamboo catch fans will be provided at vertical intervals of no more than 10 m.
- All existing utilities should be terminated. Sewer services and drainage connections will be disconnected and sealed off at the last manhole.
- Field Safety Gears for Personal Safety of the labors should be in place.
- Appropriate cloths (long pants, high visibility jacket), footwear, and gloves should be in place and used as required:
 - i. Eye and ear protection;
 - ii. Hardhat;
 - iii. Respiratory protection;
 - iv. Personal meds & Rx drugs;
 - v. Bottled water;
 - vi. Maps/ GPS device;
 - vii. Cell Phone;
 - viii. Sunscreen, insect repellent; and
 - ix. First aid kit

Demolition Waste Management Plan

Debris handling

According to the **Section 3.18.1: Non-Hazardous Wastes: Other Solid Waste** of the (**Volume I: Main Report-ESIA Report**), a large volume of concrete debris would be generated from the structure demolition at the three (03) sub-project sites. Therefore, following procedures should be followed for debris handling:

- Existing furniture, door frames, windows, piping and other building services will be removed before demolition. Any salvageable material will be sorted and removed separately.
- Building debris will be conveyed through a 800 mm x 800 mm opening on the floor slabs. Openings shall not cut through structural support elements. Plastic chute will be initiated through the openings to convey the debris to the ground floor.
- Demolition debris should be picked up on ground floor with bulldozer and carried away by dump trucks. Debris clearing and transportation should be scheduled to maintain the following conditions:
 - i. Debris accumulation on the first floor or above will not be higher than 100mm.
 - ii. Debris accumulation on the ground floor will not exceed 1m.
 - iii. No debris will be allowed to accumulate on the cantilevered structures.
- Debris waste and other materials should not be thrown, tipped or shot down from a height where these are liable to cause injury to any person.

¹ kN stands for Prop Load

According to the Special site safety

- The existing staircase will be used as emergency route. The emergency route will be maintained throughout the demolition process. The route will be clear of obstruction at all time. Signs or markings will be installed to clearly identify the route.
- Fire extinguisher or firefighting equipment will be placed in a visible location, adjacent to the staircase, on each floor.
- All flammable materials will be stored in a safe location.

Dust and Noise

- Water spraying will be applied to suppress the dust generated during the demolition operation and debris hauling.
- Super silenced type air compressor will be used during demolition. Demolition works will not be performed within the restricted hours and day.

Training

- All site personnel will go through a training program to understand the project and site safety requirements. The training program will be conducted by a competent trainer. The training program will include the following:
- An induction course at the beginning of the job to circulate information on the proposed method and required safety measures to perform the work,
- Daily safety meetings to maintain and reinforce the safety concept.

Typhoon (Emergency Bell)

- In the case when Typhoon signal is hoisted, the contractor will inspect all scaffolding, protective screen, and externally exposed temporary work and strengthen any loose connections. After the typhoon, all scaffoldings, protective screens and externally exposed temporary works will be inspected and confirmed to be safe by the competent and experienced person.

Maintenance and inspection

- All the precautionary measures, covered walkway, catch platforms, catch fans and temporary supports will be checked by the representatives from the PMU under the Project Director (PD) of the Project, DoF on a weekly basis and the contractor on a daily basis any accumulation of building debris on the catch fans and catch platforms should be removed. Any deficiency will be repaired when found necessary. The inspection and repair report records will be provided to the PD of the Project.
- The contractor will identify and rectify any unsafe conditions such as partially demolished structural elements and damaged temporary supports before leaving the job site each day.

Emergency Plan

- Emergency telephone numbers will be clearly displayed in a selected location. In the event of any emergency or accident, the contractor will notify the Police and Fire services Department for assistance. The Contractor will also notify the DoF.
- At the initial warning of the typhoon or a major storm event, the following will be performed.

- Contractor will secure all scaffold, screen, temporary supports and loose elements on site. The scaffold will be taken down to the prevailing top level of the building.
- All flammable materials will be removed or secured in a safe location.
- No unstable and/or partially demolished structural elements will be left on site. If this is unavoidable, the unstable structure will be braced and secured.

Environmental Precautions

The general requirements to minimize environmental impacts from construction sites should also be applied to demolition processes. The following sections contain some of the measures to be adopted.

Air Pollution

Concrete breaking, handling of debris and hauling process are main sources of dust from building demolition. Dust mitigation measures complying with the air pollution control regulations should be adopted to minimize dust emissions. Burning of waste shall not be allowed. Diesel fumes generated by equipment during demolition works should be subject to the control of the Air Pollution Regulations.

Noise

Noise pollution arising from the demolition works including, but not limited to, the use of specified powered mechanical equipment (SPME), powered mechanical/rotatory equipment (PME), such as pneumatic breakers, excavators and generators, etc. scaffolding, erection of temporary works, loading and transportation of debris, etc. affects the site. Silent type PME should be used to reduce noise impact as much as practicable. Demolition activity should not be performed within the restricted hours as established by EPC Contractor and approved by PD, DoF.

Water

The discharge of wastewater from demolition should be treated to the standards as stipulated in ECR 2023 before discharging to the open environment. EPC contractor should maintain proper control of temporary water supply and an effective temporary drainage system.

Hazardous Materials

Toxic and corrosive chemicals and any other hazardous materials have to be identified and properly handled and removed prior to the commencement of the demolition of the buildings. The DoE local or headquarters should be consulted if in case of doubt about the waste classification.

Post Demolition

The site should be re-established to eliminate any potential hazard to the public. The following measures should be considered:

- The site will be levelled and cleared of debris (Ref. to **Section 1.7.4**) of the (**Volume I: Main Report-ESIA Report**) after completion of the demolition activities. Adequate drainage (temporary) should be provided before implementation of construction works.
- In the case of no immediate redevelopment, the site boundary will be completely enclosed to prevent public access.
- For storing the dismantled infrastructure components, spacious scrap site will be required of temporarily stack or sold out to the relevant vendors.

Damage to pavement, footpath and other elements within the right of way will be repaired to its original condition prior to the completion of the demolition activities.

2.2 Land Development and Site Preparation Plan

The land development and site preparation would be required for sub-projects: 48-acres of Shrimp Demonstration Area under “Chakaria Shrimp Estate”; Water Treatment Plant (WTP), Effluent Treatment Plant (ETP), Deep Tube wells (DTW), and Fish Processing Plant areas under “BFDC Harbor at Chattogram”; and “Brood Management Center” area at DFTC, Teknaf. In this regard, base stripping, felling of trees and clearance of some bushes, abandoned civil structure demolition, (Ref. to **Section 3.18.1**) of the (**Volume I: Main Report-ESIA Report**) labor camp establishment, and septic tank implementation would be conducted first. The EPC contractor will prepare a land development and site preparation plan on the basis of **ESCOP 1, ESCOP 7, ESCOP 8, ESCOP 9, ESCOP 10, ESCOP 16, and ESCOP 22** [**Annex 35** of the **Volume II: Annexures of Main Report**]) to ensure safeguarding of environment. This plan must be submitted to Supervision Engineer (SE) for review and approval.

2.3 Construction Camp Management

According to the **Section 3.16** under **Chapter 3** of the (**Volume I: Main Report-ESIA Report**), a tentative manpower has been calculated for each sub-Project. Therefore, the EPC Contractor shall prepare a construction camp management plan considering applicable national requirements, Bangladesh labor law, International Finance Corporation (IFC) and World Bank Guideline and submit the plan to the supervision consultant or Owner Engineer of the proponent for approval.

However, the construction camps for labor accommodation, offices and construction plant sites shall be identified within the designated sites or at acceptable areas from the environmental, cultural, and social point of view and approved by the supervision consultant/SE or the Client. It may be suggested to consider labor camps location about 500m away from any surface water source/drainage area and 500m from any local settlement. EPC contractor should follow **ESCOP 1, ESCOP 9, ESCOP 10, ESCOP 14, ESCOP 16, and ESCOP 18** as mentioned in **Annex 34** of the (**Volume II: Annexures of Main Report**).

Facilities at Workers Camps

During the construction stage of the project, the EPC Contractor should construct and maintain necessary (temporary) living accommodation and ancillary facilities for labor. It should be ensured that the accommodation facility for the laborers should be provided with safe water for drinking, cooking, and washing. Adequate washing and bathing places shall also be provided and kept in clean and properly drained condition. Construction camps should be sited away from the sensitive social component, and adequate health care should be provided for the labor.

Sanitation Facilities

Construction camps should be provided with required sanitary latrines and urinals. According to the local conditions, closed drainage systems and the proper treatment systems should be constructed for the appropriate flow and effective treatment. The sewage system built for the labor camp should be maintained and operated properly to avoid health hazards, groundwater, and soil contamination. Compost pits may be constructed to dispose of the garbage and other biodegradable wastes generated from the camps. Proper collection, transportation, and disposal of the wastes should be ensured. The sanitation facilities might be implemented considering the volume of sewage waste to be generated from the labor camp (Ref. to **Section 3.18.1: Non-Hazardous wastes: iv. Organic Solid Waste/ Sewage Waste**) under the (**Volume I: Main Report-ESIA Report**).

Drinking Water Supply

During construction stage, a separate water supply and sanitation provisions might be needed for the temporary facilities, labor camp and workshops, in order not to cause shortages and/or contamination of water. A Plan will be prepared by the Contractor on basis of **ESCOP 18** as mentioned in the **Annex 35** of the **Volume II: Annexures of Main Report**). The Plan will be submitted to the SE for review and approval before contractor mobilization.

2.4 Waste Management Plan

EPC contractor shall guarantee that all wastes pertaining to the project are appropriately managed in compliance with all relevant international standards, business policies, and laws and regulations that are applicable for the proposed project interventions. A Waste Management Plan (WMP), which outlines safe handling, storage and disposal procedures for each waste created during Project activities, will be in place to assist with the prevention of unintentional release of wastes.

Debris handling (Demolition of the abandoned civil structures)

According to the **Section 3.18.1: Non-Hazardous Wastes: iii. Other Solid Waste** under the (**Volume I: Main Report**), a large volume of concrete debris would be generated from the structure demolition at the three (03) sub-project sites. Therefore, following procedures should be followed for debris handling:

Firstly, the generated debris should be stored in a designated place. Based on the calculated debris might be generated from the demolished structures (about 225 m³ or 338 ton or 3,06,628 kg of concrete from 48- acres of shrimp demonstration area under Cchakaria Shrimp Estate (CSE); around 300 kg iron from 224 CI sheets, and around 224 m³ or 336 ton or 3,04,814 kg of concrete materials from BFDC Harbor at Chattogram; and around 704 m³ or 1056 ton or 9,57,987 kg concrete materials would be generated from the BMC area at DFTC, Teknaf). Hence, at least around 0.005 acres (0.5 decimal) for CSE, around 0.01 acres (1 decimal) for BFDC Harbor including 192 numbers for tree felling and vegetation clearing, and around 0.016 acres (1.16 decimal) for BMC area at DFTC, Teknaf would be required for the storage of these debris.

Assessment Methodology: The fugitive dust emissions at demolition sites are associated with land clearing, ground excavation, vehicle movement, cutting and filling operations. These sources involve earth-moving activities and general disturbance of ground. A significant portion of the dust associated with the demolition are falling walls.

Major dust generating activities associated with the demolition works are:

- mechanical demolition of building structures;
- debris storage; and
- material transferal on to dump trucks

Demolition works and truck movements are the two major dust generation activities for the demolition. The demolition comprises land clearance, excavation, vehicle movement and cutting and filling which are assumed to be occurring simultaneously.

The demolition works will be carried out at different elevations and, therefore, the height of emissions for the dusty activities will be varied. The emission height of the dust sources is considered 1 m for demolition and 0.5 m for concrete road [Compilation of Air Pollutant Emission Factors, 5th Edition, USEPA (AP-42)]. Dust generating activities of demolition works will be carried out during normal working hours.

The debris storage will be temporarily and waste materials would be taken offsite as soon as possible. The mechanical demolition will be carried out at the beginning of the demolition period, while filling of puddles and pools would be undertaken at a later stage. These two activities will not, therefore, be carried out concurrently.

The means of transport and the number of dump trucks required for removal of materials from the site depend on the choice of the demolition contractor and the quantity of materials arising from the demolition works. It is expected that there would be eight (08) dump trucks movements per day and the existing road would be used for transporting the waste materials from the BFDC Harbor and BMC sub-project sites. If the capacity of the truck is 5 ton and 10-ton size (considering the road width) for BMC and BFDC respectively. Hence, around 6 days would be required for transporting the debris (both wooden, CI sheet and concrete) from the BFDC Harbor. From BMC area, removal of the total generated debris may require about 27 days. However, from CSE the debris may be removed using trawlers to the boat ghat and from the ghat it may take around 6- 7 days using dump trucks having capacity of 10 ton (considering debris carrying time by trawlers).

Mitigation Measures: As presented above, the demolition works are likely to cause high dust impacts at some ASRs. The following dust control measures should be implemented and incorporated in the Contract Specification to minimize dust nuisance to within acceptable levels arising from the works:

- the heights from which excavated materials are dropped should be controlled to a practical height to minimize the fugitive dust arising from unloading;
- dusty materials should not be loaded to a level higher than the side and tail boards, and should be covered before transport;
- effective water sprays should be used on the site at potential dust emission sources such as active demolition areas; and
- wheel washing facilities should be provided at the exit of the site.

Construction Waste

The waste to be generated from construction work should be managed properly. The rate of waste generation should be minimized through prior take up efficient technique and limiting waste generating activities. The essential possible measures for controlling construction waste may include limiting site clearance activities, planned stocking and gathering of construction materials and equipment with covering, fencing around the construction yard, maintaining existing right of way to carry construction materials, adopting proper sanitation system for employees, banning of waste burning and quality housekeeping. A waste dumping place should be pre allocated and provided with efficient waste collection and disposal techniques. No waste should be dumped to the nearby rivers or canals (the Bura Matamuhuri River and internal canals at Chakaria Shrimp Estate; the Karnaphuli River at BFDC Harbor; and Naf River, Kaikhali khal and Hachkar Khal at near BMC area at DFTC, Teknaf). Appropriate measures provided with run-on and run-off system might be constructed from controlling run off from construction yard and liquid waste. Initiatives must be taken to reuse and recycle of waste materials and they should not be dumped anywhere of the plant site. Hazardous material from construction site including fuel and other combustible materials shall have to be stored with highest care and caution. Spillage, accidental release must be controlled adopting hazardous material handling guideline. Liquid waste management is again an important issue. No liquid waste during the construction activities should be discharged or released straight to the open environment or internal drainage system. There must remain separate and isolated drainage system guided to the sump and with due primary treatment procedure release and manage the liquid waste outside the

project premise. **ESCOPE 1** can be followed for the management of construction waste as mentioned in the **Annex 35** of the **Volume II: Annexures of Main Report**).

Waste Disposal and Effluent Management

During Construction stage, it is mandatory to have a waste disposal plan to manage the construction waste from the labor sheds. Possible wastes from the labor sheds are mainly perishable kitchen wastes; unperishable solid wastes like plastic, paper, water bottle, empty packets of food etc. and municipal solid waste or sewage waste. A detail plan will be prepared and implemented by the Contractor on the basis of **ESCOPE 1** as mentioned in the **Annex 35** of the **Volume II: Annexures of Main Report**).

During Operation stage, effluents coming from different components of the Fish Processing Plant would be guided to the Effluent Treatment Plant (ETP) and the treated water may be reused (as per National 3R Strategy for Waste Management, 2015) for different purposes like watering plants, dust suppression activities and the residual part may be released to the drainage channel which can be used for irrigation purpose.

A detail plan will be prepared and implemented by the Contractor on the basis of **ESCOPE 1**, **ESCOPE 23** as mentioned in the **Annex 35** of the **Volume II: Annexures of Main Report**) and Financer's EHS Guidelines. The Plan will be submitted to the SE for review and approval before contractor mobilization.

Sewage

The EPC contractor should develop a detail management plan for sewage management during construction stage. A septic tank with soak well would be constructed for managing this waste at the sub-project sites in which laborers would stay in the labor camp, and supervisors, and engineers would stay for the daytime (8 hrs) only for monitoring purposes. The septic tank should be designed in a way that would satisfy the effluent standard of ECR 1997 and IFC. The size of the septic tank would be built considering the volume of the sanitary waste to be generated from the labor camp at the sub-project sites as mentioned in the **Section 3.18.1: Non-Hazardous wastes: iv. Organic Solid Waste/ Sewage Waste** under **Chapter 3** of the (**Volume I: Main Report-ESIA Report**).

Solid Waste Management

The Project authority shall develop a waste prevention strategy, which will significantly reduce the total amount of waste. The strategy will focus on recycling and the facility wise implementation of recycling plans, considering the following items (as per Financer/IFC Guidelines):

- Evaluation of waste production processes and identification of potentially recyclable materials;
- Identification and recycling of products that can be reintroduced into the operation of the plant;
- Establishing recycling objectives and formal tracking of waste generation and recycling rates;
- Providing training and incentives to employees in order to meet these objectives.

Sludge Management

Referring to the **Section 3.12: Sub-Project Activities- BFDC Harbor at Chattogram**, in **Volume I: Main Report- ESIA Report**, a WTP and an ETP would be constructed in the sub-project site. The WTP would be used for purifying the ground water for commercial purposes (after proper packaging).

Generated waste water from fish processing plant, chiller and other sources would be collected in ETP sump and would be released to the nearby surface water source after treatment in the ETP.

Sludge is a hazardous and complex material having heterogeneous toxic substances which may be generated from W/ETP and Municipal wastes. These may have impacts on human health, air, water, soil and aquatic systems. Appropriate treatments/disposal routes need to be ascertained.

The Bangladesh Standards and Guidelines for Sludge Management (BSGSM), 2015 provides extensive information on all aspects of sludge management. It is addressed to anyone operating water or wastewater treatment plants or effluent treatment plants producing sludge, regardless of the origin of the wastewater involved in the classification, management and use or disposal of sludge. The guidelines describe various methods of sludge treatment and disposal, which are: (i) General requirements for classification and management, (ii) Classification of sludge, and (iii) Sludge management options.

According to the “National 3R Strategy for Waste Management 2010”, the waste management hierarchy to be followed are reduce, reuse and recycle (3R strategy) followed by disposal. The general requirements of sludge management are:

- The sludge producer (W/ETP at BFDC Harbor at Chattgoram) should take the responsibility for sludge management by complying with the requirements of BSGSM.
- The sludge producer is required to submit a sludge management plan to DoE as a part of the environmental clearance information required for W/ETP.
- Depending on the category of the sludge (Category B) specific sludge management options in compliance with the requirements given in this document may be chosen. These include anaerobic digestion, land application, thermal incineration, controlled landfill and recycling in making construction materials.
- The sludge management plan submitted to DoE must include:
 - i. Company and address of the producer, if the wastewater originates in industry, company and address of the industry.
 - ii. The amount of sludge that is to be expected per year in tons dry matter (t DM/yr).
 - iii. The amount of sludge produced in the previous year in tons in dry matter (t DM/yr).
 - iv. The origin of the wastewater is classified as in Annex 2B of BSGSM.
 - v. The class of sludge as described in Chapter 2 of BSGSM,
 - vi. Planned option for safe disposal or use as described in Chapter 3 of BSGSM,
 - vii. Documentation on fulfillment of requirements as described in Chapter 3 of BSGSM.
 - viii. Company and address of further parties involved in sludge management including collection, transport, recovery and disposal of sludge, including the supervision of such operations and after-care of disposal sites.
 - ix. Documentation on suitability of recovery or disposal plant or site,
 - x. Company and address of the laboratory accredited by the appropriate authority.
 - xi. Commissioned to conduct any analysis, if applicable.

Sludge Management Options

Pre-Treatments: For ensuring “3R-principle” (reduce, reuse and recycle) of the proposed project, the sludge passes through pre-treatment. The main goal of pre-treatment is to minimize the volume and the organic matter of the sludge to reduce waste volume that must be disposed of, to enable safer disposal.

Possible treatment types for industrial wastewater and sludge from industrial wastewater are the following:

- Mechanical treatment: e.g., sedimentation, thickening.
- Physico/Chemical treatment: e.g., use of ferrous sulphate, lime and polyelectrolyte in coagulation, flocculation,
- Ozonation, chemical oxidation (wet oxidation or wet peroxidation),
- Adsorption of non- biodegradables on activated carbon.
- Biological treatment: e.g., (aerobic) activated sludge treatment, anaerobic digestion.
- Further sludge treatment: e.g., dewatering and drying by use of several aggregates (filter presses and centrifuges).
- The generated sludge should be kept in a designated place and managed properly as per the BSGSM.

2.5 Drainage Management Plan

The Drainage Management Plan is necessary to manage rainfall run off in the construction site. This plan is required to prepare by each contractor on the basis of **ES COP 4** and **ES COP 6** mentioned in **Annex 34** of the **Volume II: Annexures of Main Report**). The Plan will be submitted to the SE for review and approval before contractor mobilization. Storm water may include any surface runoff and flows resulting from precipitation, drainage or other sources. Typically, storm water runoff contains suspended sediments, metals, petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons (PAHs), coliform, etc. Rapid runoff, even of uncontaminated storm water, also degrades the quality of the receiving water by eroding stream beds and banks. The Contractor should follow the measures below to reduce the need for storm water treatment and its proper management:

- The dimension of the drainage system should be fixed based on the area of the catchment and maximum precipitation;
- The drainage should be built as RCC to have proper stability and strength;
- The drainage should be covered with concrete slab to avoid the droppings of solid waste;
- Storm water should be separated from process and sanitary wastewater streams in order to reduce the volume of wastewater to be treated prior to discharge;
- Surface runoff from process areas or potential sources of contamination should be prevented;
- Where storm water treatment is deemed necessary to protect the quality of receiving water bodies, priority should be given to managing and treating the first flush of storm water runoff where the majority of potential contaminants tend to be present;
- When water quality criteria allow, storm water should be managed as a resource, either for groundwater recharge or for meeting water needs at the facility.

2.6 Flood Protection Plan

Referring to **Section 4.5.1: Natural Hazards- b) Flooding** under the (**Volume I: Main Report-ESIA Report**), considering 50-year return period for flood in Log Normal method, it is revealed that the maximum water level is 4.82 mPWD for Saflapur region on the Maheshkhali Channel, and 9.23 mPWD for Chiringa Station on Matamuhuri River as considered for Chakaria Shrimp Estate. Similarly, for BFDC Harbor the highest flood level has been recorded as 4.98 mPWD; for BMC, it is 3.28 mPWD. To protect the sub-project sites and its surroundings from the flood event the designs of embankment or peripheral dyke of the Chakaria Shrimp Estate should be at least 6m above the present water datum

(Ref. to **Section 4.5.1: Natural Hazards- b) Flooding: Storm Surge Risk Assessment**) under the (**Volume I: Main Report-ESIA Report**); BFDC Harbor, and BMC establishment at least 1m above the highest return period of water level. This Management Plan is relevant for all the stages of implementing all the sub-projects

2.7 Earthquake Preparedness

The proposed Chakaria Shrimp Estate, BFDC Harbor, BMC area fall under Indo-Burman Range; and selected canals under three coastal Districts fall under Faridpur Trough. The Indo-Burman Range fault might be considered a potential source of future earthquakes. Exact timing, magnitude and intensity of earthquakes are difficult to predict. However, possible impacts may include explosion and fire related hazards at Substation, underground distribution lines, fish processing Plant etc. under BFDC Harbor area at Chattogram. For this reason, earthquake preparedness is very much important during the Operation Stage of the project.

The following strategies should be followed during operation phase:

- Keep continuous record of seismicity in and adjacent areas (ref. to the **Section 4.2.3**) under the (**Volume I: Main Report-ESIA Report**). Extra precaution should be posted after any noticeable fore shock(s) in nearby locations.
- Rapid emergency response team (Ref. to the ERP in the **Annex B**) should be prepared to reduce earthquake damages (e.g. check for leaks in distribution lines, transformer and generator areas, fire hydrants to stop fire, stop people moving near damaged areas etc.)
- Awareness should be built up about emergency preparedness among the Fish Processing Plant including other facilities' operation staff and local communities following the Bangladesh National Building Code (BNBC) 2020 and available relevant guidelines.

2.8 Traffic Management Plan

During Construction stage, both road and riverine traffic will be used for transporting construction materials from the load ports/material selling points at BFDC Harbor at Chattogram; and Chakaria Shrimp Estate. As Chakaria Shrimp Estate is a remote place, to visit to the Estate is very difficult through roadway only. Hence, trawler/speed boat as waterway transport would be used for carrying construction material to the sub-project site. In case of other sub-project sites, a number of road vehicles will be running from/to the construction site. Increased traffic may affect the movement of normal road traffics and increase additional threat to the road-users including the pedestrians. A detailed site-specific traffic plan for transportation of materials during construction period including loading and unloading procedure will be prepared by the Contractor on the basis of **ESCOP 14**, and **ESCOP 15** as mentioned in the **Annex 35** of the (**Volume II: Annexures of Main Report**), consulting with the PMU and authorities responsible for roads and traffic. If possible, operate vehicles, in the off-peak hours to minimize the traffic disruptions. Enforce on-site speed limit, especially close to the sensitive receptors, such as schools, religious places, health care centers, etc. To avoid the impacts of this additional traffic there must be a management plan for traffic operation. A Detailed Plan prepared by the Contractor will be submitted to the Supervision Engineer (SE) for their review and approval before their mobilization. In devising the plan, the Contractor should consider the sensitive receiver points and road conditions including road bents, zebra crossing, speed breaker, road crossing, River Bridge etc.

2.9 Occupational Health and Safety Plan

Contractors will also prepare an occupational health and safety plan to fulfil the requirements of IFC's PS2 (Labor and Working Conditions) devising the general guidelines for the identified hazards and

control measures along with the OHS Management Processes and Standard Operating Procedures (SOPs) stated in OHS framework; World Bank Groups IFC's General Environmental Health and Safety Guidelines: Occupational Health and Safety, 2007; Bangladesh Labour Act 2006 (amended in 2013); and International Labour Organization (ILO) Code of Practices 1992, Safety and Health in Construction Industry; and Safety and Health in Building and Civil Engineering Works. If the guidelines stated before cannot address a specific OHS management in the project, GIIP will be applied, as for example, Occupational Safety and Health Administration (OSHA), etc. Review and update of the OHS plan will be done (a) when there is a change in the scope and/or design of the project, (b) there is a change in construction methodology/technique based on site condition, (c) following significant OHS hazard or a major accident, and (d) at the end of the Project (to allow for improvements in subsequent projects).

The OHS Plan should contain general guidance for all identified hazards under each intervention. It also contains management system processes (PRO) and SOPs. Processes and SOPs should be presented in three discrete headings, (a) Contractor's Standards on the identified hazard management, (b) Expected Site specific OHS hazards and risks during construction, and (c) Control Measures proposed by the Contractor. Details OHS is given in **Annex F**.

2.10 Environmental Quality Monitoring

Air Quality Management

These ESMPs mainly address to the impacts on ambient environment during construction stage. Especially the dust particles may be generated due to transporting generated wastes from the sub-project sites, and carrying construction materials to the sub-project sites. These may increase dust particles in the ambient air. In addition, increasing number of industrial activities and vehicular movement would increase the ground level concentration of the criteria pollutants. However, this would be limited to construction period only. The concentration of Particulate Matter (PM) is already higher due to lots of existing sources in the air shed. Re-excavation of canals, soil handling, unpaved roads, vehicular movements, emission from nearby urban areas are the major sources of PM. However, DoF should monitor the air quality as described in the monitoring plan during construction and operation of the sub-projects. They may take policy level initiatives to control emissions from nearby sources. Furthermore, mitigation measures prescribed in the report must be adopted to minimize the additional air pollution of the project air shed. **ESCAP 10** as mentioned in the **Annex 35** under the (**Volume II: Annexures of Main Report**) can be followed for the management of Air Quality.

Noise Management

A comprehensive plan for noise reduction and attenuation is required to control ambient noise limit within the permissible level. Therefore, the contractor should develop an integrated plan on the basis of **ESCAP 11** as mentioned in the **Annex 35** under (**Volume II: Annexures of Main Report**) during construction stage.

During operation stage, development of a Greenbelt as per **Annex 37** of the **Volume II: Annexures of Main Report**) at the peripheral dyke that will separate the sub-project area from the surrounding other land use areas where human activities are present. An embankment would be built on the peripheral dyke through which shrimp and other fisheries would be transported from the Chakaria Shrimp Estate to the landing center by roadway. Increasing noise due to vehicular movement might be kept within the limit through afforestation.

Water Quality Management

Chakaria Shrimp Estate, BMC, and Cluster Farming Areas: A successful and sustainable shrimp farming depends on the quality of feeding for the PLs and on the quality of the water and its management. Shrimp is one of the most sensitive aquatic species to water quality (Ref. to **Section 4.5.1: Natural Hazards: c) El Niño and La Niña Effects**) under the (**Volume I: Main Report-ESIA Report**). If any of the parameters of the water quality changes, it effects on the immunity of the shrimp. Therefore, success or failure of the shrimp farming may depend on the quality of water quality. The research on “Water Quality Management in Shrimp Aquaculture” by Dr. D. Srinivas, Dept. of Fisheries, GoAP; and Dr, Ch. Venkatrayulu, Dept. of Marine Biology, V.S. University, Nellore explained through a presentation as published in the research gate website² that to manage the water of the ponds and its quality, “following initiatives may be undertaken:

- After harvest of a crop, the deposits of organic debris in the pond bottom should be removed, or treated, ploughed, tilled and levelled;
- All parts of ponds should be thoroughly sun dried for at least three weeks for microbial;
- Decomposition of soil organic matter and mineralization of organic nutrients;
- Three Stage water filtration with different mesh size shall be done before stocking it into reservoir pond.
- Chlorinate water in the reservoir with sufficient chlorine (10 ppm) to kill any potential vectors or carriers in the source water;
- It is recommended that the area of a reservoir within a farm should be about 30% to 33% of the total farm area in order to hold a sufficient volume of the water supply;
- The reservoir must have an outlet that can allow total drainage;
- The pH should be in optimum level of 7.5 to 8.5 and should not vary more than 0.5 in a day;
- Variations in salinity not exceeding 5 ppt in a day will help in reducing stress on the shrimp;
- The optimum range of transparency measured using secchi-disc is 25-35 cm;
- Total Ammonia Nitrogen (TAN) and nitrite N concentration should not be more than 1 and 0.5 ppm, respectively;
- Any detectable concentration of hydrogen sulphide is considered undesirable;
- Periodical exchange of chlorine treated water from reservoir as and when required will help in maintaining the water quality in optimal range;
- The use of aerators results in mixing of water at surface and bottom and breakdowns the DO and thermal stratification;
- Use of inputs without proven efficiency should be strictly avoided;
- The discharge water from the shrimp ponds has to be allowed into a treatment system pond before letting it into the environment so that the suspended solids may settle at the bottom.”

The Water Quality parameters should be checked regularly and should be within the following range (**Table 2.1**):

² Water Quality Management in Shrimp Aquaculture; <https://www.researchgate.net/publication/368535509>

Table 2.1: Standard Range of Water Quality Parameter for Shrimp Farming

SL. No.	Water Quality Parameters	Range
1	Temperature	28-32°C
2	Dissolve Oxygen (DO)	> 4mg/L
3	Salinity	10-25ppt
4	pH	7.5 to 8.5
5	Alkalinity	> 50mg/L (100-120mg/L)
6	TAN	<1ppm (NH ₃ <0.1)
7	H ₂ S	<0.02mg/L
8	Turbidity	30-40cm
9	Nitrite N	<0.1 ppm

Note: The above are indicative and shall vary as per exact nature of culture

Water Quality Maintenance

To maintain the water quality, water depth should be maintained properly as deeper water might provide a stable environment for shrimps. According to Dan. D. *et al.* (2002), water depth should not be less than 1m, whereas the ideal is 1.5 m for the shrimp farming pond. As per the same manual, bluish green to dark green colour of water of such pond should be cleaned, rather, brownish green, golden brown or light green colour of water in the pond indicates good plankton profile. A good plankton bloom shades the water column, prevents the growth of benthic algae, and stabilizes water temperature. However, if excessive phytoplankton blooms occur, 20-30% of the water should be changed. Paddle wheel aerators may be used if DO falls below 4ppm, otherwise, shrimp might be suffered from metabolism, health or survival issues [Ref. to **Section 4.5.1(c)**] under the (**Volume I: Main Report-ESIA Report**).

In order to minimize the surface water contamination due to fuel discharge from the vessels, unauthorized disposal of wastes to be generated from the laborer shed and debris due to demolition and rehabilitation of hydraulic structures and existing abandon buildings. Project authorities through laborer must follow the best practices and good housekeeping during construction period. Moreover, the workers must be trained or made aware of their duties during abnormal or emergency situation like oil spill, chemical spill, etc. In addition, direct disposal of liquid waste from the construction activities to the surface water should be prohibited.

In addition, Probiotics for bioaugmentation may be applied in both grow-out and reservoir ponds to reduce toxic gases in the sediment and water and enhance the growth of beneficial bacteria. Bacterial count should be monitored at least twice a week.

BFDC Harbor at Chattogram: There is a provision for implementing a WTP and an ETP to purify the effluent release from the Fish Processing Plant in this sub-project site. Waste water from the equipment and other sources such as fish cleaning, water from chiller etc. will be collected at the ETP sump and discharge it to the ETP which include clarifier, physical treatment, chemical treatment, biological treatment. After proper treatment, the water would be discharged to the Karnaphuli River. **ESCOP 1, ESCOP 3, and ESCOP 24** as mentioned in the **Annex 35** of the (**Volume II: Annexures of Main Report**) can be followed for the management of water quality.

Encounter, Abundance and Habitat Survey

It is proposed to conduct an encounter, abundance and habitat survey for species triggering CH criteria according to the OP/BP 4.04 (Fishing Cat- *Prionailurus viverrinus*, Chital- *Notopterus chitala*) to confirm the effectiveness of mitigation to address impacts to these species. Such survey should include identification of current threats, habitat suitability and, possible conservation measures.

Wildlife and Biodiversity Survey

Wildlife survey in the program influence area is proposed to be done to monitor the changes in their status, composition, distribution and diversity. Especially, survey for sensitive species (e.g., fishing cat) and groups (herpetofauna) is recommended to know the changes or alteration in their ecology and behaviour. The survey can be done in the project area through employing a set of methods such as- transect line, plot count, point count, focal animal sampling, setting camera traps etc. and include consultation. The appropriate survey method should be selected by the specialist to be appointed by the PMU.

2.14 Biodiversity Action Plan

The Biodiversity Action Plans (BAP) is a systematic approach to manage biodiversity that can help the implementation project to maintain biodiversity and contribute to the nature positively. In this context, it has been addressed in the baseline (ref. to **Section 5.1.2**) of the (**Volume I: Main Report-ESIA Report**), the species that have significance for conservation. As per IUCN Red List 2015, the fishing cat (*Prionailurus viverrinus*) is an endangered species, inhabiting the wetlands and mangrove ecosystems of Chakaria Sundarbans, located in Chakaria Shrimp Estate. In addition, the brown-winged kingfisher (*Pelargopsis amauroptera*) is another vulnerable species of kingfisher to the Chakaria mangrove forests, which are rarely visited, as per local people. This biodiverse region not only shelters the endangered species but also supports a plethora of other flora and fauna. Recognizing the importance of conserving this unique ecosystem, this report outlines a comprehensive Biodiversity Action Plan (BAP) for the conservation of the fishing cat and its habitat in the Chakaria Sundarbans. In line with Operation Policy (OP)/ Bank Procedure (BP) 4.04 World Bank (ESS6), this report presents a Biodiversity Action Plan (BAP) aimed at conserving the brown-winged kingfisher and fishing cat and their habitats in the Chakaria Sundarbans. Near BMC, Teknaf sites have a mangrove patch along Hotchkar Canal, and local people reported that Asian clawed otter (endangered) observed in the past but not seen in the last 3-4 years. No other species are present in all project sites has significance of conservation.

The primary objective of this BAP is to ensure the long-term survival of the fishing cat and browned winged kingfisher population in Chakaria Sundarbans by conserving and effectively managing its habitat. Process of BAP is given below in **Figure 2.2**:

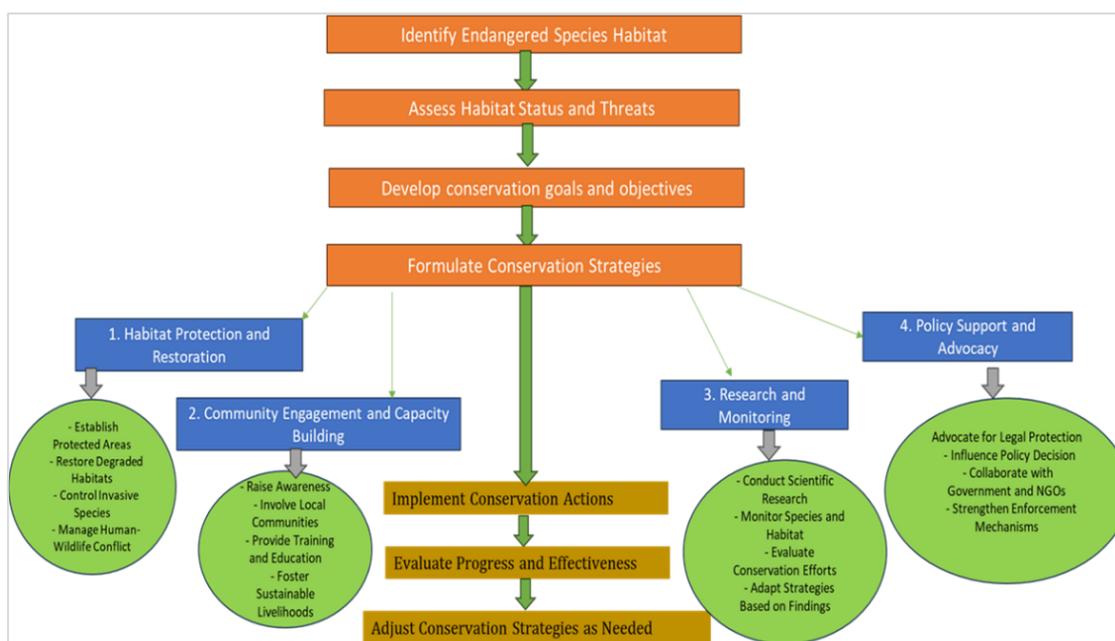


Figure 2.2: Process of Biodiversity Action Plan

This flowchart provides a sequential overview of the steps involved in developing and implementing a Biodiversity Action Plan for conserving the habitat of an endangered species. Each step leads to the next, guiding the process from initial assessment to ongoing evaluation and adaptation of conservation efforts.

In baseline section addresses result of ecological survey and their habitat as well as their International Union for Conservation of Nature (IUCN) red list status (Ref. to **Section 5.1.2**) of the (**Volume I: Main Report-ESIA Report**). A set of strategies is recommended to combat threats and mitigate impacts due to the implementation of the project. The strategies are:

Key Strategies and Actions

Habitat Mapping and Assessment

- Conduct comprehensive habitat mapping to identify fishing cat habitats within the Chakaria Mini Sundarbans at Choarfari union (Figure 2.3). However, Brown winged kingfisher and fishing cat both species have another habitat near Tinmokha at Saflapur Union.
- Assess the vegetation cover, and human disturbances and avoid any kind activity near the area.

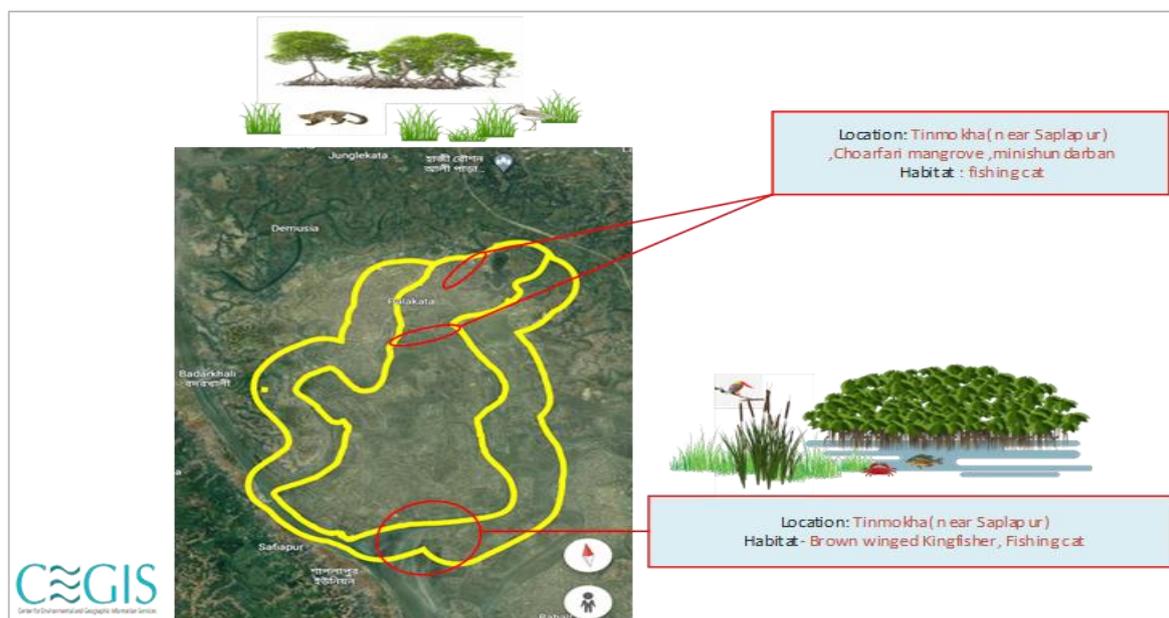


Figure 2.3: Habitat of Fishing Cat and Brown Winged Kingfisher at Chakaria Shrimp Estate

Habitat Restoration and Enhancement

- Implement habitat restoration initiatives to rehabilitate degraded areas within the species' range.
- Enhance habitat quality by planting native vegetation in excavate earth properly smashing like a road, restoring natural water flow patterns by repair-controlled structure, and controlling invasive species.
- Follow the mitigation measure from management plan during construction activities.

Community Engagement and Participation

- Work closely with local communities residing in and around Chakaria Sundarbans to raise awareness about the importance of fishing cat conservation.
- Increase awareness local people about brown winged kingfisher and their breeding or roaming area.
- Avoid activities during winter season and avoid existing mangrove vegetation area for any kind of activities.

Monitoring

- Conduct regular monitoring of the two important species populations and their habitats using scientific methodologies such as camera trapping, GPS tracking, and ecological surveys.
- Invest in research initiatives to better understand the ecology, behavior, and conservation needs in Chakaria Mini Sundarbans.

Support and Advocacy

- Collaborate BFDC with government agencies, Non-Government Organizations (NGOs), and other stakeholders to strengthen legal protection for fishing cats, brown winged kingfisher and their habitats.

Implementation Plan

- Monitoring habitat condition once during construction period and second after six months of post construction period
- Establish a multi-stakeholder task force include local shrimp owners, fisherman, BFDC official and local chairman to oversee the implementation process of conservation and ensure coordination among various stakeholders.
- Regularly review and update the BAP based on emerging threats, research findings, and feedback from stakeholders.

2.15 Agricultural Land Management

This Plan is applicable for the sub-project, “Canal Rehabilitation for Cluster Farming under Khulna, Satkhira, and Bagerhat Districts” only if any re-excavated soil falls on the nearby agricultural land during conducting re-excavation work and dumping the soil on the dykes along the canal. Following measures might be undertaken:

- The farmers should be informed well ahead (before the start of cropping season) about the dumping activities, so that they would not take any initiative for the cultivation of any crops in the dumping area.
- The contractor should avoid cultivable fields during construction.
- The contractor should ensure that no vehicular movements take place through cultivation fields.
- The contractor should ensure that no material is dumped inside cultivation fields.
- Dredged materials of the channel should not be dumped on the agricultural lands.
- The contractor should maintain liaison with the communities.
- Contactor would prepare site-specific dredged material management and disposal plans for each site to be followed upon approval by the Monitoring and Implementation Consultant through PMU of DoF.

In addition, farmers or land owners of the agricultural lands (under aquaculture areas) might be compensated for any crop damage considering the current price of the crop and having consultation with the local Department of Agriculture Extension (DAE).

2.16 Fisheries Management Plan

The Fisheries Management Plan (FMP) prepared under this study will govern the fisheries of the Chakaria Shrimp Estate and shrimp cluster canal fisheries. It will cover both shrimp and fin fish of the intervened areas. The major interventions proposed are re-excavation of canals, deepening shrimp ghers, and installation of water control structures. Implementation of these interventions would exert beneficial and adverse impacts on the fisheries resources of the area despite the interventions are proposed for improving and expanding the study area fisheries. The major target of this FMP is protecting both fisheries and shrimp aquaculture from the adverse impact may be evolved from the implementation of the interventions in temporary and prolonged scales.

The FMP is prepared in two contexts:

- Managing the impacts (discussed in **Chapter 8** of the **Volume I: Main Report**) of interventions on fisheries; and
- Managing environment and diseases of shrimp aquaculture

In both cases, applicability of following policy, act, rules and guidelines (national and international) has been reviewed.

2.16.1 Critical Habitat Area

In the assessment of critical habitat area (CHA), the nationally protected areas, which are closed the site are considered.

Nationally Protected Area

Among the identified nationally protected areas, Sonadia Island, an Ecologically Critical Area (ECA) located within 11 km aerial distance from the boundary of the Chakaria Site. Similarly, the Cox's Bazar-Teknaf Peninsula, and ECA is located within 17 km aerial distance from the BMC boundary.

2.16.2 Species of Conservation Significance

An initial screening of species likely to occur in the study area is presented in **Table 2.2**.

Table 2.2: Critical Habitat Screening for Potential Critical Habitat Trigger Species

SI. No.	Local name	Common Name	Scientific Name	IUCN Status in Bangladesh	Global Conservation Status	Qualitative assessment of the species
1.	Chandani Ilish	Toli shad	<i>Tenualosa toli</i>	LC	IUCN: Vulnerable (VU) Date assessed: 06 March 2018	Inhabits fast-flowing, turbid estuaries and adjacent coastal waters (Ref. 26929). Schooling in coastal waters, euryhaline and perhaps anadromous, ascending rivers to breed (but in some areas fishery workers claim that it does not). A protandrous hermaphrodite (Ref. 55367). Presumably its biology is similar to that of <i>T. ilisha</i> , but the fewer gill rakers suggest that it takes larger food organisms. Reported to feed on zooplankton (Ref. 58784). More data needed especially since it is not always distinguished from <i>T. ilisha</i> , especially at juvenile stages. Marketed fresh or dried-salted. It is very important species hence; this species has been screened. <i>Source: Fish Base</i>
2.	Kukurjiv	Sole	<i>Cynoglossus macrostomus</i>	LC	IUCN: Vulnerable (VU) Date assessed: 16 August 2019	Inhabits shallow muddy and sandy bottoms of the continental shelf, down to 25 m. Also found in midwaters in certain seasons of the year. Enters estuaries (Ref. 4833). Feeds mainly on benthic invertebrates, especially worms. <i>Source: Fish Base</i>
3.	Shaplapata	Pale-edged Stingray/sharp-nose stingray	<i>Dasyatis zugei</i>	-	IUCN: Vulnerable (VU) Date assessed: 28 August 2019	Feed on bottom-dwelling organisms (Ref.50449); primarily small crustaceans, but also small fishes (Ref.58048). Ovoviviparous (Ref. 50449). <i>Source: Fish Base</i>

2.16.3 Ecologically Appropriate Area of Analysis (EAAA)

An Ecologically Appropriate Area of Analysis (EAAA) is an area that delineates the extent to which a proposed action or project directly impacts the surrounding biodiversity. The presence of conservation significant species (e.g. Vulnerable species) influences the size and location of an EAAA.

The Ecologically Appropriate Area of Analysis (EAAA) was defined based on the existing Project Area condition, surrounding environment condition, surrounding land uses, likely presence of species of conservation significance such as Toli shad (*Tenuulosa toli*) [Vulnerable], Sole (*Cynoglossus macrostomus*) [Vulnerable] and Shaplapata (*Dasyatis zugei*). The Project is located in coastal waters and mangrove dominated island. Considering all factors and high influence of estuarine intertidal nature of the landscape, entire Cox's Bazar-Teknaf Peninsula Ecologically Critical Area (ECA), including fish species in the study area.

Land Class Assessment of and Natural Habitat and Modified Habitat Assessment

Satellite imagery and field investigations were used to identify and delineate land class boundaries within the Project Area and EAA. International Finance Corporation (IFC) Performance Standard 6 (Performance Standard- PS6) requires the delineation of natural habitat and modified habitat in order to identify risks and mitigation measures for biodiversity values during the impact assessment phase of an action or development. Habitats have been classified based on the understanding of land cover classification. Details presented in **Table 2.3**.

Table 2.3: Land Class Habitat Assessment

Land Class	Description	IFC PS Habitat Classification
Mudflats	Mudflats are extremely dynamic, and relatively new in terms of formation time, they are highly influenced by tide and gets submerged during high tide. During high tide Mudflats of the study area are important grazing ground for fish species.	Natural
Mangroves	The mangrove area is supporting associate flora as well as diversity of fauna like large variety of fish, crab, shrimp, and mollusc species. The mangroves also serve as nurseries for many fish species.	Natural
Salt pan & Aquaculture Pond	Historically mangrove has been replaced by Aquaculture ponds, which are used for prawn culture during and post monsoon and for salt harvesting during dry season. In addition to mudflats these salt pans and aquaculture ponds is very important area for fisheries resources.	Modified

2.16.4 Ecological Sensitivities Associated within the EAA

During the course of the desk-based survey, on site primary survey and consultation with stakeholders, it was identified ecological sensitivities associated with the Ecologically Appropriate Area (EAA). These are provided in the following sections.

Fish Species

Field survey provided evidence of globally vulnerable fish species (Kukurjiv and Chandani Ilish) were found in these waters. List of fishes recorded from the study area is provided in **Table 2.4**.

Table 2.4: Fish Species Recorded from the Study Area

S.N.	Local name	Common Name	Scientific Name	Global IUCN Status	IUCN Status in Bangladesh
1.	Chandani Ilish	Toli shad	<i>Tenuulosa toli</i>	IUCN: Vulnerable (VU) Date assessed: 06 March 2018	IUCN: LC Date assessed: 19 December, 2014
2.	Kukurjiv	Sole	<i>Cynoglossus macrostomus</i>	IUCN: Vulnerable (VU) Date assessed: 16 August 2019	IUCN: LC Date assessed: 25 June, 2014
3.	Shaplapata	Pale-edged Stingray /sharp-nose stingray	<i>Dasyatis zugei</i>	IUCN: Vulnerable (VU) Date assessed: 28 August 2019	-

Endangered, EN = Endangered, LC = Least Concern, NE= Not Evaluated, Critically Endangered = CR

Consultation with local fishers of Chuarfari and Rampura revealed that they occasionally catch Chandani Ilish and Kukurjiv from the canals inside mangroves.

Mr. Mohammad Ashraful Haque (Senior Scientific Officer at Bangladesh Fisheries Research Institute, Cox's Bazar) added that dynamic depth range of EAA, provides wide range of habitat and estuaries in the EAA with nutrient rich productive water for fish.

2.16.5 Critical Habitat Assessment

This study revealed that there is no endangered and critically endangered fish species in the study area, hence, the critical habitat assessment is not needed as per IFC PS-6.

2.16.6 Evaluation of Impacts on Species and Associated Habitat

The analysis of Project related activity, described in the EIA report and detailed impacts is discussed in **Chapter 8 in Volume I: Main Report-ESIA Report**.

Summary of Cumulative Impact

Overall, cumulative impacts on fish could occur as a result of habitat disturbance and loss aquatic biodiversity. It is anticipated that, implementation of Fisheries Management Plan will ensure restoration of temporarily impacted fish habitat and minimize impacts, therefore it is determined that the Project would not contribute significantly to cumulative impacts on fish, including protected species, relative to the other past, present, or foreseeable projects in the area.

2.16.7 Fisheries Management Plan and Fisheries Monitoring and Evaluation Plan

Applicability: This Fisheries Management Plan (FMP) applies to activities during both construction and operation of the project. The impacts are discussed in **Chapter 8 of Volume I: Main Report-ESIA Report**.

2.16.8 Roles and Responsibilities

A list of responsible persons is provided in **Chapter 6** of this Report in **Table 6.1 to Table 6.4**.

2.16.9 Plan Review and Update

The Fisheries Management Plan (FMP) is to be reviewed and updated on an annual basis with consideration of changes to project operations or areas where refinement is required. Annual changes

to the FMP must be approved by the Board of Members prior to implementation. Organogram for the Implementation of FMP is attached in **Chapter 4** of this Report.

2.16.10 Additional Conservation Actions

Proposed Conservation Actions

The Conservation Actions will focus on the Ecologically Appropriate Area, delineated during the Critical Habitat Assessment. Conservation Action will be executed primarily through “Community Engagement”.

Conservation Objectives

The following objectives apply for community engagement to reduce impact on fish biodiversity values of the study area:

- Raising awareness of the conservation value of habitats and species in the study area.
- Encourage local people not to conduct illegal activities and discuss alternatives through proactive community engagement.
- Raising awareness to avoid destructive fishing gears.
- Fishermen involved in nearshore fishing activity must be targeted to generate awareness to avoid fishing activity near foraging grounds of fish.
- Training fishermen about the use of “Turtle excluder device” in shrimp/ fish trawling nets and encourage them to release trapped turtle by generation of awareness.
- People involved in fish drying activity and shrimp/salt farming in the study area, should be made aware of the negative effect.
- Implement an education and training program for fishermen to generate awareness regarding conservation importance of fish and reduce the by-catch of these species.

Operational Control

Community Survey and Stakeholder Engagement Activities

The following activities are to occur on an annual basis with the local community.

- **Local Community Engagement:** A detailed socio-economic survey (Focus Groups and Key Stakeholder Interviews) of primary community stakeholders is to be undertaken within the first year of Conservation Action implementation. This assessment is designed to understand who the local community are composed of in terms of income; education; health; natural resource use; access patterns; dependencies; demographics; and socio-cultural makeup. This will enable the extent of engagements with the local community engagement for implementation of BAP.
- **Oyster Consultation:** Engagement with outsiders e.g law enforcement officers; forestry officials; fish landing station and other service providers is to occur to understand the motivations that drive hunting, illegal logging and other illegal activities in the area.
- **Market Survey:** Visit the local markets, fish landing stations, dry fish markets where fish and fish products are traded to understand the fishing value chain in addition to report the landing of the CR and EN species at the landing point.
- **Identifying Champions:** Identify people from community to become “paid volunteers” i.e., people who genuinely want to protect wildlife and protected areas, who will get paid a reasonable stipend by to act as sanctuary patrols for a number of years. Also

identify/assign ambassadors in each community, who will organize events in local language to educate community members and their children about the need to protect biodiversity values of the study area. Use localized communication methods such as community theatre etc. to make it fun and accessible.

2.16.11 Conservation Action Administration

Administration and management of the Additional Conservation Action will require the establishment of an administrative framework with the key objectives of:

- Implementing conservation actions;
- Providing funding;
- Monitoring and evaluation;
- Ensuring that outcomes are assessed and success/failure reported upon; and
- Resolving disputes between stakeholders.

It is intended that the project “Additional Conservation Action” is overseen by a management committee to attend to these objectives.

An outline of the administrative arrangements proposed are below.

Additional Conservation Action Management Committee

To facilitate the creation of a management committee consisting of:

- DoF Staff (Chair)
- Forest Department Representative
- Community Representative
- External conservation expert and/ or NGO, for Example:
 - Bangladesh Spoon-billed Conservation Project (mostly involved in monitoring and conserving fish in study area landscape.
 - Wildlife Conservation Society (WCS) Bangladesh (International NGO working on monitoring, conservation and awareness generation marine fauna in Bangladesh)

The role of the management committee is to oversee the implementation of management actions in this Plan. The committee is to:

- Provide strategic advice on the conservation management actions contained in this Plan;
- Provide recommendations on the monitoring and evaluation framework;
- Review reports on progress in implementing this Plan;
- Recommend and approve changes in management actions and expenditure;
- Prepare the 5 yearly reviews of the Plan; and
- Resolve any disputes with the community and other concerned parties.

Tenure of Members

The tenure of members of the management committee is to be reviewed at years 2.5 and 5 yearly thereafter to enable sufficient time for the committee to oversee implementation of one 5 yearly review. The review process can occur during the mid-point of two reviews, enabling efficient use of the committee’s time and to manage workload during the member’s tenure.

Meeting frequency

It is recommended that meetings be initially held on a bi-monthly basis for the first 8 months, followed by 6 monthly meetings thereafter. More frequent meetings may be employed during review and/or tendering processes. Meeting frequencies may vary over the 20-year implementation timeframe.

Cost of Management Plan/Additional Conservation Measures

The proposed cost for implementation of Management Plan/Additional Conservation Measures which are discussed above are presented in the **Table 2.5**.

Table 2.5: Cost of Implementation of the Management Plan/Additional Conservation Measures

SI. No.	Activities Recommended	Cost in Lakh BDT for 5 Years
1	Community Engagement and Education Strategy	20
1a	Raising awareness of the conservation value of habitats and species in study area landscape	10
1b	Fishers Training	10
2	Community Survey and Stakeholder Engagement Activities	30
2a	Community engagement and Consultation	10
2b	Market Survey	10
2c	Logistics for Management Committee	10
Total		50

Fund Administration

The following rules will apply to the management of funds associated with this Conservation Action:

- Funds to implement this plan will be controlled by DoF;
- All funds will be expended to the Management Committee;
- Funds expended will be subject to successful implementation of management actions;
- DoF may retain funds if it is determined that unsatisfactory implementation activities have occurred;
- Any additional funds sought by the management committee will be at the discretion of DoF;
- All funding arrangements will be subject to standard accounting and auditing practices; and
- All funding arrangements will be subject to legal contracts between relevant parties and DoF.

Report Requirements

- An Annual Report is to be prepared by DoF on performance against the objectives and actions;
- A Five Yearly Review Report on the fifth anniversary of this plan (in place of the Annual Plan) is to be prepared by DoF for the previous 5 years on the success/failure on the implementation of offset management activities. This report is to be based on performance against the objectives and actions contained within the Plan for the previous 5 years;

Five Yearly Review

After the initial five (5) year implementation, a review is to be conducted of the plan. This review is to determine successes and weaknesses of plan implementation; determine future implementation arrangements (including ongoing tendering arrangements for the Contracted Conservation NGO/company). The review is to be undertaken by the Management Committee. The review is to be commence 6 months prior to the 5 yearly anniversaries and provide any recommendations prior to the 5-year anniversary.

Summarizing biodiversity actions aimed at achieving No Net Loss (NNL) and Net Gain (NG) for fisheries resources, focusing on activities such as canal re-excavation, sluice gate repair & renovation, and embankment reconstruction. The summary of biodiversity actions resulting no net loss and net gain is presented in **Table 2.6**.

Table 2.6: Summary of Biodiversity Actions Resulting in No Net Loss and Net Gain

Action Category	Project induced impacts	Suggested Additional Conservation Actions	Justification to achieve No net loss and net gain
Avoidance	Negative impacts on fish habitats during construction period due to activities.	Planning construction activities outside breeding seasons.	Preserved fish habitats and reduced disruption.
Minimization	Impact of infrastructure activities on fish habitats and populations.	Using silt curtains to prevent sediment from spreading during canal re-excavation.	Minimized habitat degradation and sedimentation.
Rehabilitation	Fish habitats that may be degraded due to infrastructure.	Rehabilitating areas with native aquatic vegetation after sluice gate repair.	Improved habitat conditions and fish populations.
Restoration	Degraded aquatic habitats to their original state after construction activities.	Restoring natural flow regimes after embankment reconstruction.	Enhanced habitat quality and increased fish stocks.
Enhancement	Biodiversity and productivity of fish habitats that affected by infrastructure of the projects.	Adding fish passage congenial structures to sluice gates to allow fish passage.	Net Gain in fish populations and habitat connectivity.
Conservation	-	Active management and protection of aquatic habitats during and after infrastructure activities. Establishing protected areas around critical habitats affected by construction.	Stabilized or increased fish populations.
Sustainable Practices	-	Adopting sustainable construction practices to minimize long-term impacts on fish habitats. Using eco-friendly materials and techniques in embankment reconstruction.	Reduced long-term impact on fish habitats.

Action Category	Project induced impacts	Suggested Additional Conservation Actions	Justification to achieve No net loss and net gain
Education and Awareness	-	Raising awareness among stakeholders about the importance of protecting fish habitats during infrastructure projects. Conducting community workshops on sustainable construction practices.	Increased community engagement and support.
Policy and Legislation	-	Implementing and enforcing policies and regulations to protect fish habitats during infrastructure projects. Enforcing environmental regulations for construction projects affecting water bodies.	Legal framework supporting NNL and NG for fisheries.
Monitoring and Research	-	Continuous monitoring and research to understand the impact of infrastructure projects on fish populations. Conducting pre- and post-construction fish population assessments.	Informed decision-making for effective management.

Explanation of Key Concepts

No Net Loss (NNL): Ensuring that any losses in fish populations or habitats due to infrastructure activities (e.g., canal re-excavation, sluice gate repair, embankment reconstruction) are balanced by equivalent gains elsewhere.

- **Implementation:** Strategies include avoiding critical periods for fish, minimizing habitat disruption, rehabilitating affected areas, and compensating for residual impacts through habitat creation or restoration.
- **Net Gain (NG):** Achieving a net positive impact on fish populations and habitats by going beyond NNL, actively enhancing fish biodiversity and habitat quality.
- **Implementation:** Involves all NNL actions plus additional proactive measures such as creating new fish habitats, enhancing existing ones, and implementing features that support fish populations and biodiversity.

Detailed table for monitoring a Biodiversity Action Plan to assess No Net Loss (NNL) and Net Gains (NG) specifically for fisheries resources, focusing on activities such as canal re-excavation, sluice gate repair, and embankment reconstruction:

Table 2.7: Monitoring of Biodiversity Action Plan to Assess No Net Loss and Net Gains

Activity	Suggested Additional Conservation Actions	Monitoring Plan	Responsibility	Means of Verification That Commitment Has Been Met
Canal Re-excavation	Establish fish refuge areas.	Pre- and post-excavation fish population surveys.	DoF, IMA	Survey reports showing stable or increased fish populations.
	Install sediment control measures (e.g., silt curtains).	Monitor water quality parameters (e.g., Turbidity, DO,	DoF, IMA	Water quality monitoring records

Activity	Suggested Additional Conservation Actions	Monitoring Plan	Responsibility	Means of Verification That Commitment Has Been Met
		pH, EC, TDS) before, during, and after excavation.		indicating compliance with standards.
	Schedule work to avoid fish spawning seasons.	Regular site inspections to ensure adherence to conservation measures.	DoF, IMA	Inspection reports confirming no work during critical periods.
Sluice Gate Repair	Construct fish passages or ladders to allow migration.	Monitoring fish passage effectiveness.	DoF, IMA	Data showing successful fish movement through passages.
	Implement temporary fish relocation if necessary.	Pre- and post-repair assessments of fish habitat quality and population dynamics.	DoF, IMA	Reports showing minimal disruption and successful relocation (if applicable).
	Use eco-friendly materials to minimize chemical runoff.	Regular water quality tests for contaminants during and after repair.	DoF, IMA	Water quality test results meeting safety standards.
Embankment Reconstruction	Restore and enhance riparian vegetation along reconstructed embankments.	Vegetation surveys before, during, and after reconstruction.	DoF, IMA	Survey results showing improved riparian vegetation coverage and quality.
	Create buffer zones to protect sensitive habitats from construction impacts.	Continuous monitoring of buffer zone integrity and effectiveness.	DoF, IMA	Inspection reports showing maintained and effective buffer zones.
	Design embankments to support aquatic species habitats.	Post-construction habitat assessments to evaluate suitability for target species.	DoF, IMA	Habitat assessment reports indicating enhanced or restored habitats.
General Measures	Conduct stakeholder engagement and education programs about the importance of biodiversity.	Surveys and feedback collection from local communities and stakeholders.	DoF, IMA	Records of engagement activities and positive feedback from stakeholders.
	Develop and implement an adaptive management plan based on monitoring results.	Annual review meetings to assess monitoring data and adjust conservation actions as needed.	DoF, IMA	Meeting minutes and updated management plans reflecting adaptive strategies.
	Ensure legal compliance with environmental regulations and policies.	Regular audits and compliance checks by independent bodies.	DoF, IMA	Audit reports confirming adherence to regulations and standards.

*IMA- Independent Monitoring Agency

2.17 Management Plan to Control Snails in Shrimp Farming Areas

2.17.1 Introduction

The snails found in the coastal regions of Bangladesh, primarily from the *Gastropoda* class, have adapted to the dynamic and often harsh coastal ecosystems, which include mangroves, mudflats, estuaries, and sandy beaches. These snails play a significant role in maintaining the ecological balance of the coastal zones.

2.17.2 Common Species of Snails

Some common snail species found in the study area include *Cerithidea cingulata* (mangrove mud snail), *Littoraria scabra* (mangrove periwinkle), *Idiopoma dissimilis* (Guli shamuk), *Pila globosa* (Bara shamuk), *Pirenella alata* (Jhumjhumi shamuk) and various species of *Nassariidae* (mud snails), which are commonly found in canals and mudflats. These species are well-adapted to fluctuating salinity levels and are essential to the canal and mudflat ecosystems.



Figure 2.4: Snails Attached in the Concrete Structure

2.17.3 Biology of Snail

Snails in the study area are commonly found in the canals and mudflat area. These areas provide an ideal environment for snail species. The mudflats and mangrove roots offer shelter and food sources for these snails. They are mostly herbivorous or detritivorous. They feed on algae, decomposing organic matter, and plant detritus found on the muddy and sandy shores. Some species graze on the biofilm of microorganisms growing on mangrove roots or submerged surfaces. Snails are generally oviparous, laying eggs in secure, moist environments. In the intertidal zones, snails often lay eggs in crevices or within the mud, protecting them from predators.

The life cycle of snails found in the coastal regions of Bangladesh, like most gastropods, involves several stages: egg, juvenile (larval stage in some species), and adult. These snails typically have adapted life cycles to survive the changing environmental conditions of coastal ecosystems, including tidal fluctuations and varying salinity levels.

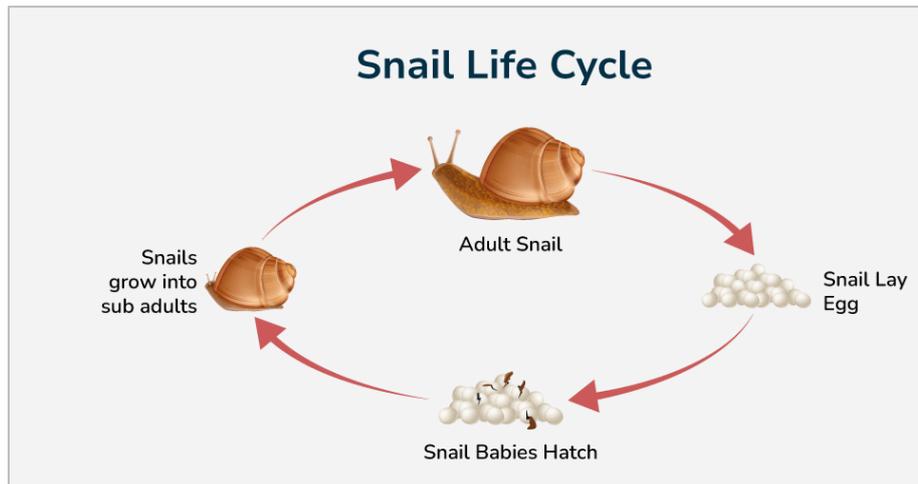


Figure 2.5: Life Cycle of Snail

2.17.4 Adverse Impacts of Snails in Shrimp Farming

The impacts of snails in shrimp farming areas are multifaceted, influencing both ecological dynamics and aquaculture practices. Snails can serve as biocontrol agents, but their introduction may lead to unintended consequences for native species and ecosystems as well.

Impacts on inlet-outlet Structure

Snails need calcium to strengthen their shells, so they often seek out sources like limestone. Calcium absorption may occur when snails are attached in the inlet-outlet structures of shrimp farms, where limestone is used. This action can destroy structures and may cause difficulties in the operation of the inlet structures and hinder the removal of waste products. Additionally, higher maintenance cost is needed as farmers need to clean or rehabilitate the inlet structures.

Impacts on Environment

- **Nutrient Loading:** Shrimp farming contributes to hypernutrification, which can alter the habitat for snails and other organisms, potentially leading to shifts in community structure (Hopkins *et al.*, 1995). This alteration may cause the habitat favorable for snails and for their propagation.
- **Food competition:** Snails may affect the food web and reducing the efficiency of energy transfer within the ecosystem (Leloup *et al.*, 2008). Snails and shrimp can experience food competition when they share the same habitat, especially in environments where food resources are limited. Both species are omnivores and scavengers, with their diets overlapping in several areas. Algae, a key food source for both snails and shrimp, often becomes a point of competition if it is scarce. Similarly, both species feed on detritus decaying organic matter found on the substrate which can lead to competition when the supply is low. They also consume plant matter, such as decaying leaves (litter) and soft plants, creating further competition if the food availability decreases. Biofilms, consisting of bacteria and organic material, can be another contested resource when space is limited, as both snails and shrimp feed on these surface growths. Even in controlled environments like aquariums, snails and shrimp might compete for supplemental foods like sinking pellets or vegetables.

2.17.5 Beneficial Impacts of Snails in Shrimp Gher/Pond

Snails are molluscs that play important ecological roles in aquatic and terrestrial ecosystems, providing food for other organisms and improving water quality (Srivastava, 2020). In the study area, snails serve important roles in the shrimp gher/pond ecosystem, offering multifaceted benefits to the aquaculture ecosystem. They help in natural pest control by preying on harmful parasites and algae that can afflict shrimp populations, thus bolstering the overall health of the aquatic environment. Additionally, snails contribute to nutrient recycling, efficiently converting organic matter into valuable nutrients that promote the growth of essential microorganisms and plankton, forming the foundation of the food web. By grazing on algae and organic debris, they help maintain optimal water quality, crucial for supporting thriving shrimp populations. Furthermore, their bioturbation activities oxygenate the sediment, mitigating the risk of toxic gas buildup and creating a healthier habitat for shrimp and other aquatic organisms. Embracing the role of snails in shrimp ghers not only fosters sustainable aquaculture practices but also underscores the intricate balance of nature within these aquatic systems, ultimately benefiting both farmers and the environment.

2.17.6 Management Plan to Control Snails in Shrimp Farming Areas

Developing a management plan for controlling snails in the Chakaria Shrimp Estate and cluster farming ponds in the Satkhira, Khulna, and Bagerhat Districts is a dire need. In this backdrop, the following key strategies with references to best practices can be considered:

- **Water Management:** Install fine mesh screens or physical barriers at the inlet and outlet structures to prevent snails from attaching to these areas. The screens to be used should be easy to clean and maintain. In addition to this, regulate water exchange and quality by screening water inlets and outlets to prevent snail introduction.
- **Use of Snail-Deterrent Coatings:** Apply anti-fouling or snail-deterrent coatings by epoxy paint to the surfaces of inlet-outlet structures. These coatings can prevent the attachment of snails, reducing calcium accumulation and damage.
- **Regular Pond Preparation:** Drain and dry the pond bed during the off-season to eliminate snails at regular intervals. Apply lime (CaCO_3) to increase soil pH, which can create unfavorable conditions for snails.
- **Mechanical Removal:** Collect snails manually from the pond banks and bottom during pond preparation and farming seasons.
- **Chemical Control:** Apply approved molluscicides like copper sulfate (CuSO_4) at recommended doses. This should be carefully managed to avoid harming shrimp.

3. Social Management Plan

3.1 Compensation and Resettlement/Relocation Plan

The Acquisition and Requisition of Immovable Property Act 2017 is used for the legal and policy framework for land acquisition and requisition (temporary purpose). The Act 2017 is not useful for the proposed Project, as the Project will not acquire land. The legal and policy framework of the Project, therefore, will be based on: (i) the Project policies and (ii) The Operation Policy (OP) 4.12 of the World Bank Group (WBG), which is applied to all World Bank's financed and/or administered projects initiated before October 1, 2018, regardless of the country of where the project is located or the financing modality (i.e., loan, a grant, or other means), as the proposed Project has been initiated before October 1, 2018.

- The resettlement action plan includes measures to ensure that the displaced persons are
 - i. informed about their options and rights pertaining to resettlement;
 - ii. consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives; and
 - iii. provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project.
- If the impacts include physical relocation, the resettlement action plan or resettlement policy framework includes measures to ensure that the displaced persons are
 - i. provided assistance (such as moving allowances) during relocation; and
 - ii. provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, convenient relocation sites, and other factors is at least equivalent to the advantages of the old site.
- Where necessary to achieve the objectives of the policy, the resettlement action plan also includes measures to ensure that displaced persons are
 - i. offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; and
 - ii. provided with development assistance in addition to compensation measures such as land preparation, credit facilities, training, or job opportunities

The compensation strategies are considered based on the Project policies and the WB OP 4.12

Where impacts are found unavoidable, DoF will plan to mitigate them in accordance with the following principles:

- Compensation and other benefits for the affected trees will be assessed at current market price and paid directly by DoF with assistance from RAP Implementing Agency.
- The absence of legal titles in cases of public land users will not be considered a bar to resettlement and rehabilitation assistance, especially for the socio-economically vulnerable groups.
- Vulnerability, in terms of socio-economic characteristics of the APs/ households, will be identified and mitigated according to the provisions in the RPF.
- Tree owners will be allowed to fell and take away the trees free of cost.

Eligibility for Compensation and Assistance

Regardless of their title and tenure status to the lands to be used for the Project implementation, the APs/households will be eligible for compensation and assistance. DoF will mitigate impacts on the following:

- **Owners of Structures:** DoF will pay compensation at replacement cost and along with transfer and reconstruction grants.
- **Owners of Trees:** Compensation for trees to be affected will be paid at current market price to be assessed by Property Valuation Advisory Committee (PVAC). Tree owners will be allowed to fell and take away the trees free of cost. Compensation for fruits will also be paid @ 30% of timber value of fruit bearing trees.
- **Women headed and other Vulnerable households:** Women heading the households and the households having income level up to BDT 171,201 and 186,741³ year³, elderly members, and similar others will be eligible for a special assistance of one-time cash grants.

3.2 Sexual Exploitation and Abuse and Sexual Harassment Risk Mitigation Action Plan

The focus group discussion particularly with the women group (**Ref. Section 7.5.9**) revealed that a low level of risk from SEA/SH is prevalent, which becomes a deterrent factor for involving women themselves in the outside work. It is apparent from the above statement that the SEA/SH is ratified as low, so the prevention plan is emphasized in the SEA/SH Risk Mitigation Action Plan. Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) Prevention and Response Action Plan outlines how the project will put in place the necessary protocols and mechanisms to address SEA/SH risks; and how to address any SEA/SH and incidents that may arise during implementation of the project.

The identification of the SEA/SH risk mitigation measure is guided by the WBG Good Practice Note on Addressing Sexual Exploitation and Abuse in Investment Projects Financing involving major civil works and the World Bank most recent ESF Directive. Mitigation measures will include the following: (i) contractors' workforce on all sites will be trained and well supervised minimizing the SEA/SH risks for the project; (ii) all supervision consultants and contractor's workers will include full time social and gender experts and community liaison officers; (iii) all workers will sign a code of conduct; (iii) SEA/SH training for staff, supervision consultants staff and the contractor's workers will continue throughout project implementation; (iv) SEA/SH mitigation measures will be incorporated into the Environmental and Social Management Plans (ESMPs); (v) stakeholders' consultations will properly inform communities and stakeholders of the project on SEA/SH risks; (vi) the project grievance redress mechanism will provide multiple channels to initiate complaints, including specific procedures for SEA/SH related complaints including confidential reporting with safe and ethical documentation of SEA/SH and (vii) the project will maintain SEA/SH staff for PMU, Supervision Consultants and Contractors.

³According to Household Income and Expenditure Survey 2022 (HIES 2022) of Bangladesh Bureau of Statistics (published on 14 December 2023) the household (HH) size at national level is 4.26 and accordingly the poor income per HH per month are BDT 14,267.00 and 15,562.00 in Chattogram and Khulna Divisions, respectively. Therefore, HHs with average income up to BDT 14,267.00 and 15,562.00 per month or BDT 171,201 and 186,741 per year is considered to be living under the poverty line in Chattogram and Khulna Divisions, respectively.

Table 3.1: SEA/SH Prevention and Response Action Plan Matrix

S.L	Activities to be taken to Address SEA/SH Risk	Steps to be taken	Responsible	Monitoring (Who will Monitor)
a)	<p>Training on SEA/SH to include:</p> <ul style="list-style-type: none"> Accountability and response framework. Grievance mechanism and referral pathways. Confidentiality and whistle blower protection clauses. 	<p>Develop SEA/SH training materials including PPT, briefing notes for project officials, supervising engineers, contractors, project workers and the grievance committees.</p> <p>Schedule separate training sessions for various project officials and workers.</p> <p>Training of project consultants and contractors.</p>	<p>Social Specialist under PMU</p> <p>PIU and Upazila Women and Children affairs officer.</p>	Project coordinator
b)	Continuous learning through annual refresher training.	<p>Adapt existing training material to facilitate refresher training.</p> <p>Organize and conduct annual refresher training for all project workers to enhance capacity for continuing SEA/SH mitigation, prevention, and response.</p>	Gender Specialist under PMU	Project coordinator
c)	Conduct an SEA and SH risk assessment on sub-projects and activities to inform risk mitigation strategies	Request all contractors and supervising contractors to include SEA/SH screening in the E&S risk screening for projects	<p>Contractors' sociologist</p> <p>Supervising consultant's sociologist</p>	<p>Regional Gender officer</p> <p>PMU Coordinator</p>
d)	Provide a list of Gender Based Violence (GBV) service providers in the project area able to provide care and support Sexual Exploitation and Abuse/Sexual Harassment (SEA and SH) survivors.	<p>Implementing agencies to adopt the WBG GBV service providers mapping checklist and share with safeguard focal person.</p> <p>Prepare mapping report and link quality service providers to the project grievance mechanism.</p>	<p>GBV focal point</p> <p>Contractors' sociologist</p> <p>Supervising consultant's sociologist</p>	<p>Regional Gender officer</p> <p>PMU Coordinator</p>
e)	<p>Monitoring of the implementation of the SEA/SH Action Plan</p> <p>Monitoring is aimed at developing a set of key quantitative and qualitative indicators to manage measure and</p>	<p>Implementing agencies will monitor implementation of the SEA/SH prevention and response plan.</p> <p>Develop instruments meant to measure the magnitude of reported cases of SEAH categorized in their various</p>	<p>GBV focal point.</p> <p>World Bank Mission</p>	PMU Coordinator

S.L	Activities to be taken to Address SEA/SH Risk	Steps to be taken	Responsible	Monitoring (Who will Monitor)
	<p>monitor the progress and effectiveness of the integrated effort to deal with SEAH.</p> <p>It measures how well the policies are being adhered to, any issues that might emerge in regard to SEAH and recommendation to improve any situation that may arise.</p>	<p>forms, such as child sexual abuse</p> <p>Mechanism to measure effectiveness of the various support systems to respond</p> <p>Conduct at least three-time survey to assess: project workers attitudes towards the acceptability of SEAH by gender.</p> <p>Develop mechanisms to measure the impact of Public Education, Awareness Creation and Campaigns conducted by the SEAH teams.</p> <p>World Bank mission follow up on implementation of the SEA/SH prevention and response plan.</p>		
f)	<p>The purpose for GM is to safe channels for reporting any cases of sexual harassment or sexual exploitation and abuse.</p> <p>The focus is confidentiality to protect the privacy and choices of the victim, and urgency to preserve evidence and access assistance and care for the victim</p>	<p>Review and amend the existing GM to ensure it meets the SEAH needs that currently exist. This should include evaluating the existing entry points (are they safe and reliable, accessible), and establishing protocols for safe and confidential data sharing, collection, and storage.</p> <p>Guide the community and employees on the channels of reporting cases of SEAH and what constitutes sexual harassment as per the guidelines.</p> <p>Outline for the employees the penalties and disciplinary actions that will be taken against anyone that breaches the code of conduct.</p>	GBV Consultants and GM focal points	PMU coordinator, PMU and regional

3.3 Stakeholder Engagement Plan (SEP)

Stakeholder Engagement Plan (SEP) has been prepared for the Client considering the ESIA process for various sub-Projects. The SEP has been prepared in accordance with the national and international guidelines and the common social policy and corporate principles of the sponsors of the Project. The SEP complies with WB's OP 4.04 as well as GoB rules. The SEP describes how the project will involve all parties involved, including national and regional stakeholders, Project Affected Persons (PAPs), vulnerable communities, various interested parties, local community members, members of various occupational groups, women's groups, laborers, and contractors. It also gives them a way to voice concerns, offer feedback, or express both positive and negative opinions about the benefits and impacts of the project. In accordance with international good practice, the purpose of the SEP is to:

- ensure a technically and culturally appropriate approach to engagement with all key stakeholders;
- ensure the adequate and timely sharing of information with affected stakeholders and other interested parties;
- provide sufficient opportunity for stakeholders to express their opinions and concerns; and
- ensure that these concerns are incorporated into project decision-making processes during all stages of the project lifecycle.

This SEP includes:

- the identification of stakeholders for the Project;
- analysis of relationships of the stakeholders with the Project;
- details of consultation methodologies;
- activities carried out to-date and those planned for the future stages of the Project;
- details of the process for managing stakeholders' concerns and grievances; and
- explains how the stakeholder engagement process will be recorded, monitored, evaluated and reported.

A detailed SEP has been prepared for this Project mentioning stakeholder's actions, defined responsibilities and established timeline which have been shown in following **Table 3.2**.

Table 3.2: Stakeholder Engagement Plan for SCMFP

Project phase	Target stakeholders	Topic of engagement	Method of engagement	Location & Frequency	Responsibilities
Stage 1: Pre construction Stage (Project design, Scoping etc.)	Project Affected People: <ul style="list-style-type: none"> • People residing within project area • Petty businessmen around the Approach Road • Local administration and local leadership • Beneficiary Groups • Workers engaged in the project work • Suppliers and service providers • Contractors, sub-contractors • Transport owners & workers 	<ul style="list-style-type: none"> • Project scope and rationale • ESIA, RPF, SEP, SEA/SH Action Plan disclosures • E&S Risks • Project E&S principles 	<ul style="list-style-type: none"> • Public meetings, • Face-to-face meetings • Mass/social media communication (as needed) • Disclosure of written information: brochures, posters, flyers, website • Local newspaper 	<ul style="list-style-type: none"> • In respective unions and upazilas • Continuous communication through mass/social media and routine interactions 	<ul style="list-style-type: none"> • Department of Fisheries (DoF) • Safeguard consultants
	Disadvantaged and Vulnerable Groups <ul style="list-style-type: none"> • Disabled Individuals • Elderly people, especially if they are living alone; • Persons with physical and mental disabilities and their caregivers; • Low-income families' dependent on Social Safety Net Program (SSNP) allowance; • Women-headed households or single mothers with underage children, adolescent girls; • Children and adolescent girls • Unemployed persons (men and women); 	<ul style="list-style-type: none"> • Project scope and rationale • ESIA/ESMP, RPF, SEP, SEA/SH Action Plan disclosures • E&S Risks • GRM 	<ul style="list-style-type: none"> • Separate, targeted consultations • Engagement with local organizations representing the interests of persons with disabilities • Face-to-face meetings • Disclosure of written information in local language • Information boards or desks • GRM • Honorarium for the participant and the care giver (if any) • Ensure their voice during meeting 	<ul style="list-style-type: none"> • In respective Upazila for disclosure of Drafts ESMF, ESIA, SEP • Continuous communication through mobile/letter and routine interactions 	<ul style="list-style-type: none"> • Department of Fisheries (DoF) • Safeguard consultants

Project phase	Target stakeholders	Topic of engagement	Method of engagement	Location & Frequency	Responsibilities
	Other Interested Parties (External: Mainly LGI Groups) <ul style="list-style-type: none"> Respective unions and Upazila Parishads Representatives in villages 	<ul style="list-style-type: none"> Project scope, rationale and E&S principles ESIA/ESMP, RPF, SEP livelihood restoration options (if needed) GRM process 	<ul style="list-style-type: none"> Local newspaper Face-to-face meetings Joint public/community meetings with PAPs Public Disclosure 	<ul style="list-style-type: none"> Throughout SEP preparation and implementation as needed Project launch meetings in respected Upazilas Quarterly meetings in affected villages and or as when demanded by the affected community Disclosure meetings in nearby area 	<ul style="list-style-type: none"> E&S Team & management DoF
	Other Interested Parties (External: NOGs, Press and Media people, Local elites etc.) <ul style="list-style-type: none"> Press and media NGOs Businesses and business organizations Workers' organizations Women's NGO's and organizations Academic institutions National Government Ministries Respective Upazila Government Departments General public, tourists, jobseekers 	<ul style="list-style-type: none"> ESIA/ESMP, RPF, SEP, SEA/SH Action Plan disclosures Project scope, rationale and E&S principles GRM process 	<ul style="list-style-type: none"> Public meetings, trainings/workshops (separate meetings specifically for women and vulnerable as needed) Mass/social media communication Disclosure of written information: Brochures, posters, flyers, website Information boards or desks in respective local project office Notice board for employment recruitment 	<ul style="list-style-type: none"> Project launch meetings by DoF Quarterly meetings in affected villages and affected communities Disclosure meetings in local and national level Communication through mass/social media (as needed) Information desks with brochures/posters in 	<ul style="list-style-type: none"> E&S Team & management DoF

Project phase	Target stakeholders	Topic of engagement	Method of engagement	Location & Frequency	Responsibilities
				affected villages (continuous)	
	<p>Other Interested Parties (External: Government Bodies):</p> <ul style="list-style-type: none"> • Other Government Departments including DoE from which permissions/clearances are required; • Other project developers, donors 	<ul style="list-style-type: none"> • Legal compliance issues • Project information scope and rationale and E&S principles • Coordination activities • ESMP/RPF/SEP disclosures 	<ul style="list-style-type: none"> • Face-to-face meetings • Invitations to public/community meetings • Submission of required reports 	<ul style="list-style-type: none"> • Disclosure meeting as required 	<ul style="list-style-type: none"> • E&S Team & management, DoF
STAGE 2: Construction Stage	<p>Project Affected People:</p> <ul style="list-style-type: none"> • People residing in project area • Benefited Group • Local laborer's to be engaged in the project work • Suppliers and service providers • Contractors, sub-contractors • Transport owners & workers 	<ul style="list-style-type: none"> • SEA/SH Risks • E&S Risks • Health and safety impacts (community H&S) • Employment opportunities Project status 	<ul style="list-style-type: none"> • Public meetings, open houses, trainings/workshops; • Disclosure of written information: brochures, posters, flyers, website • Grievance mechanism GRM and as guided with ESMP and RPF documents. 	<ul style="list-style-type: none"> • Quarterly meetings during construction seasons • Communication through mass/social media as needed • Notice boards updated weekly • Routine interactions • Brochures in local offices 	<ul style="list-style-type: none"> • E&S Team & management DoF
	<p>Disadvantaged and Vulnerable Groups</p> <ul style="list-style-type: none"> • Elderly people, especially if they are living alone; • Persons with physical and mental disabilities and their care givers; • Women-headed households or single mothers with underage children, adolescent girls; 	<ul style="list-style-type: none"> • Project scope and rationale • RPF, SEP, SEA/SH Action Plan disclosures • GRM process • SEA/SH Risks 	<ul style="list-style-type: none"> • Separate, targeted consultations for persons with disabilities. • Engagement with local organizations representing the interests of persons with disabilities • Face-to-face meetings 	<ul style="list-style-type: none"> • In respective Unions or Upazila for disclosure of Drafts ESIA, SEP • Continuous communication through mobile/letter and routine interactions 	<ul style="list-style-type: none"> • DoF • Safeguard consultants

Project phase	Target stakeholders	Topic of engagement	Method of engagement	Location & Frequency	Responsibilities
			<ul style="list-style-type: none"> Resources allocation towards local administration representatives Provision of transportation or transportation cost GRM Local newspaper 		
	<p>Other Interested Parties (External: NOGs, Press and Media people, Local elites etc.):</p> <ul style="list-style-type: none"> Press and media NGOs Businesses and business organizations Workers' organizations Women, NGO's and organizations Academic institutions Respective Upazila Government Departments General public, tourists 	<ul style="list-style-type: none"> Project information - scope and rationale and E&S principles Project status Health and safety impacts Employment opportunities Environmental concerns GRM process 	<ul style="list-style-type: none"> Public meetings, open houses, trainings/workshops Disclosure of written information: brochures, posters, flyers, website, Information boards, notice board(s) at construction sites GRM 	<ul style="list-style-type: none"> Same as for PAPs 	<ul style="list-style-type: none"> E&S Team & management of DoF
STAGE 3: Operation and Maintenance Stage	<p>Project Affected People:</p> <ul style="list-style-type: none"> People residing in project area 	<ul style="list-style-type: none"> Satisfaction with engagement activities and GRM process Damage claim process 	<ul style="list-style-type: none"> Outreach to individual PAPs DoF websites 	<ul style="list-style-type: none"> Outreach as needed Meetings in affected people and villages (as needed/requested) Monthly (newsletter) 	<ul style="list-style-type: none"> E&S Team & management of DoF
	<p>Disadvantaged and Vulnerable Groups</p> <ul style="list-style-type: none"> Elderly people, especially if they are living alone; Persons with physical and mental disabilities and their care givers; Women-headed households, adolescent girls; 	<ul style="list-style-type: none"> Satisfaction with engagement activities E&S Risks GRM process and Damage claim process 	<ul style="list-style-type: none"> Outreach to individual PAPs Separate, targeted consultations Face-to-face meetings GRM 	<ul style="list-style-type: none"> Outreach as needed Meetings in affected villages (as needed/requested) Monthly (newsletter) 	<ul style="list-style-type: none"> E&S Team & management, DoF

Project phase	Target stakeholders	Topic of engagement	Method of engagement	Location & Frequency	Responsibilities
	Other Interested Parties (External: NOGs, Press and Media people, Local elites etc.): <ul style="list-style-type: none"> • Press and media • NGOs • Businesses and business organizations • Workers' organizations • Academic institutions • Respective from Upazila Government Departments • General public, tourists 	<ul style="list-style-type: none"> • GRM process • Issues of concern • Status and compliance reports 	<ul style="list-style-type: none"> • GRM • DoF website • Face-to-face meetings • Submission of reports as required 	<ul style="list-style-type: none"> • As, when and where required 	<ul style="list-style-type: none"> • IAs/PMOs

3.3.1 Project Stakeholders

Any person, entity, or group that may be impacted by the project or that is interested in the project and its effects is considered a stakeholder for the purposes of this SEP. The goal of stakeholder identification is to determine whether stakeholders have an interest in the project (referred to as "other interested parties") or may be directly or indirectly impacted, either positively or adversely.

Special attention be paid to identifying any marginalized and vulnerable groups who might be impacted by the project in a different or disproportionate way, or who would find it challenging to engage in the development and engagement processes. Stakeholder identification is a continuous process that needs to be reviewed and updated on a regular basis.

3.3.2 Stakeholder Engagement Tools

A variety of tools were and will be used for the project's stakeholder involvement. Key Informant Interviews (KIIs), Rapid Rural Appraisal (RRAs), checklists at the community level, and Focus Group Discussions (FGDs) are a few examples. As needed, stakeholder involvement will continue utilizing the systems already in place, guaranteeing efficient and successful participation all the way through the project.

Project officials will be present at significant community engagement and information sharing events. Whenever feasible, images and maps will be used to convey information in a way that is both easy to grasp and appropriate for the target culture.

Project has and will continue to use the following methods for engaging with stakeholders:

- Project brochures and updates – initially utilized as part of the public consultation process, the project brochure is likely to be the main source of ongoing consultation during the construction and operation stage.
- This will be used as an ongoing communication tool and updated to provide current information on construction progress.
- The website of the project proponent, which is open to the public and contains announcements, documents, reports, etc.
- A grievance procedure that is specifically targeted at those that are directly impacted. The impacted public has been and will continue to be extensively informed about the mechanism.
- Media ads: requests for attendance at events, revelation of information, etc.

3.4 Grievance Redress Mechanism (GRM)

The Implementing Agency (IA) will create Grievance Redress Mechanism (GRM) in accordance with OP 4.12 to handle grievances and complaints from stakeholders, including resettlement related to the Project.

Concerns, grievances, and complaints from impacted parties shall be received, assessed, and resolved with the help of field level and project level GRM. The goal of the GRM is to offer a transparent, time-bound process for addressing social and environmental issues related to the project.

The project authorities should collaborate with the local community to create a grievance redress process. Any issues that arise throughout the operation period will be directed to the grievance redress cell. As a result, the authority will move quickly to address the issues as needed.

The implementation and monitoring of ESMP shall have to be ensured. Therefore, a team of Environmental Specialist and Social Specialist has to be engaged with responsibility of strong

monitoring during implementation of EMP and their environmental and social consequences. DoF official will must be engaged in the Grievance Redress Mechanism.

3.4.1 Composition of Grievance Redress Committee (GRC)

The purpose of the Grievance Redress Committee (GRC) is to accept and resolve issues from impacted parties and other local stakeholders. It should be established both locally at project sites and centrally at the project level. The first tier of the two-tier GRM will consist of local GRCs at the union/municipal level (LGRC), and the second layer will be Project GRC at the central level (PGRC). The majority of issues will be handled by the local GRC; however, cases that are not settled there will be sent to the PGRC. The local UP Chairman and other impacted parties will be represented in the local level GRC, with a focus on guaranteeing the representation of women. An Implementing NGO (INGO), the Project Management Unit (PMU), and other representatives from the implementing agency.

Local Level GRC (LGRC)

The following GRC composition is proposed for the local level GRC (LGRC) with representations from Project Proponent, INGO, local elected officials, representatives of affected people including women in the Project area to ensure a participatory process and to allow voices of the affected communities in the grievance procedures.

Concerned officials/members	Position
Senior Upazila Fisheries Officer (SUFO), Concerned Upazila	Convener
Representative of INGO/IA	Member-Secretary
Chairman of Union Parishad (UP) concerned	Member
Female member of ward of the UP concerned	Member
Retired teacher from the union concerned	Member
Representative of PAPs	Member

One (1) representative of PAPs (based on the recommendation of INGO and approved by the Convener) will be a member of the LGRC. The Member-Secretary of LGRC will be available and accessible to APs to address concerns and grievances. Unresolved cases will be forwarded to the Project-level GRC (PGRC). The LGRC is empowered to take a decision, which is bound upon the Project Proponent. But it requires the approval of the Project Director for implementation of the decisions.

Project-Level GRC (PGRC)

The Project-level GRC will review all unresolved cases involving social and environmental issues. The Project Director heads the Project-level GRC. The composition of the PGRC will be as follows:

Concerned officials/members	Position
Project Director, PMIU, DoF	Convener
Team Leader of INGO/IA/Senior Social Safeguard Specialist	Member Secretary
Representative of local MP	Member
Gender Specialist	Member
Representative of Civil Society	Member

The Member-Secretary in the PGRC will provide necessary knowledge and information regarding relevant standard policies and international protocols. He/she will also set examples of resolving such grievances from other development projects in Bangladesh. The PGRC should establish fairness and

transparency in the resolution of grievances by project-affected persons. In case of technical or environmental issues as well as any legal matters, the Team Leader of the INGO/IA will advise the PGRC. In specific cases, environmental and social development specialists of Environment and Social Unit (ESU) or external legal advisors may be consulted, if required.

3.4.2 Six steps of GRM process:

- Uptake (3 days)
- Sorting and processing (within 7 days of complaint submission)
- Acknowledgement and follow-up (within 10 days of complaint submission). Within three (3)
- Verification, investigation and action (within 20 days of complaint submission)
- Monitoring and evaluation (within 25 days of complaint submission)
- Providing Feedback (within 30 days of complaint submission)

3.4.3 Institutional arrangement

Formation and Responsibility of PIU

The PIU will also be responsible for:

- Synchronization of resettlement activities with the Project construction schedule;
- Ensure that all eligible affected persons are identified, provided with their respective entitlements according to the resettlement policy and are relocated / compensated as per the implementation schedule;
- Supervising and reviewing preparation, implementation and providing necessary advice for timely delivery;
- Monitoring implementation progress and suggesting necessary course corrections;
- Resolving issues and conflicts that may emerge during implementation; and
- Keeping the PSC apprised on overall performance and key issues relating to the project.

Roles and responsibility of INGO/consulting firm

Some of the key roles and responsibilities of the INGO/consulting firm will comprise of the following:

- Closely work with affected community and disseminate information to ensure correct and complete information is available to APs;
- Assist the Assistant Safeguard Manager (Resettlement) in disbursement of compensation (making of ID cards, etc.);
- Take lead responsibility in planning and implementing the resettlement activities following the entitlement package; and
- Ensure safeguard interest of the APs.

3.5 Labor Management Plan

3.5.1 Introduction

The potential labor risks identified by the project include working conditions, community, health and safety (CHS), child labor and forced labor, Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH) etc. The LMP will focus on the potential labor risks and suggested measures to prevent, mitigate and overcome these risks. The focus of the LMP is on workers engaged by the project.

Following to these procedures, contractors will be required to prepare and implement its own Labor Management Plan for larger works. For smaller contracts, the Project Management Unit (PMU) may prepare specific procedures to be inserted in the contract as part of contractors' legal obligations.

The approach will be assessed as a part of the initial screening of environmental and social risk and impact carried out by the Project Management Unit (PMU).

This LMP has been developed to achieve the following specific objectives:

- To ensure workplace safety and health.
- To provide sufficient treatment, non-discrimination, and equal opportunity for project workers irrespective of sex, race, or ethnic identity.
- To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, per National law and the ESS2 of the World Bank ESF) and, contracted workers and primary supply workers, as applicable.
- To prevent the use of all forms of forced labor and child labor.
- To provide project workers with accessible means to raise workplace grievances.
- To mitigate the risks of Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) in the workplace

3.5.2 Overview of Labor Use in the Project

The LMP applies into all Project workers and labors whether full-time, part-time, temporary, seasonal or migrant workers. The LMP is applicable, in the following manner:

- People employed or engaged directly by the SCMFP-PMU at DoF, including government officials/officers, deputed to work specifically in relation to the project (e.g., director workers).
- People employed or engaged by contractors and sub-contractors to perform work related to the core function of the project, regardless of location (Contracted workers);
- People employed or engaged by the primary suppliers to the project (primary supply workers).
- People employed or engaged in providing community Labor (community workers).

3.5.3 Labor Requirements

Direct Workers⁴: Direct workers will be divided into the following categories: firstly, the PMU consultants and other project-based staff, and permanent staff (deputed/seconded from the Government) to the project. The PMU will employ consultants and support staff who are working on contractual basis. and, the terms and conditions of these consultants are to be guided by the national labor laws, e.g., the Bangladesh Labor Act, 2006 and Bangladesh Labor Rules, 2015 in line with the World Bank guidelines.

The Labor Act and Labor Rules stipulated provisions covering a wide range of areas, including the condition of employment and service, procedures for cessation of employment, working hours and payment of wages, prohibition of child labor, occupational health and safety, non-discrimination and

⁴ A "direct worker" is a worker with whom the project has a directly contracted employment relationship and specific control over the work, working conditions, and treatment of the project worker. Where government employees (civil/public servants) are working in connection with the project, whether full-time or part-time, they will remain subject to the terms and conditions of their existing public sector employment agreement or arrangement, unless there has been an expressed effective in terms of legal transfer of their employment or engagement to the project.

equal opportunities at the workplace, freedom of association and collective bargaining, prevention of sexual harassment etc.

3.5.4 Timing of Labor Requirements

Direct workers are eligible to work for a fixed contract period of not more than 1 year. Contracts will be renewed for another/ next year based on satisfactory services. Consultants will be engaged under a short-term period of not more than six months and the Labor requirement including the time schedule and deliverables are stipulated in their respective contracts.

Contracted Workers⁵: Based on the requirement of the project the PMU will employ contractors who will hire contracted workers in consideration of the project needs and required level of skills. If agreed with the PMU, the sub-contracts of the works could be given. Sub-contractors recruited may supply laborers as per the agreed terms and conditions. The sub-component regarding the provision of jobs through labor intensive civil work to be implemented by DoF will include immediate provision of labor-intensive small works contracts that will provide just-in-time livelihood support to poor people in rural areas and stimulus to the local economy.

Community Workers: Community workers might be brought in engagements for routine civil works. The Labor Contracting Society (LCS) model of the government will be followed in this case. The workers engaged by the contractors shall be guided by respective national law, e.g., the Bangladesh Labor Act, 2006 and the Bangladesh Labor Rules, 2015; those laborers shall be considered as the laborers of respective contractors. The contractor(s) shall be responsible for proper management and enforcement of the contracts of the workers employed by the sub-contractors.

3.5.5 Assessment of Key Potential Labor Risks

The main labor risks associated with the projects are assessed to be related to the potentially hazardous work environment, the associated risk of accidents and labor influx. Based on current conditions in the sector it is assessed that the risk of a child or forced labor is negligible, and already addresses through national legislation.

Child and Forced Labor: No children under the age of 18 will be hired under the project. The risk of child labor will be mitigated through the certification of laborers' age. This will be done by using the legally recognized documents such as the National Identification Card (NID), and Birth Registration Certificate. Furthermore, awareness raising sessions will be conducted regularly to the communities to sensitize on prohibition and negative impacts of child and forced labor.

3.5.6 Labor Influx

The IA (DoF) who are responsible for these components have existing operational procedure, which is to mandate and localize the economic benefits and only allow for outside workers, including expatriate labor, where there is a requirement for specialized skills. External workers, which will be limited in numbers, will If it is necessary, there will be dedicated camps established for workers' accommodation in the project. Specific requirements to manage risks associated with labor influx, related to the interaction between project workers and local communities, such as communicable diseases and SEA-SH, are to be managed through contractual requirements, code of conduct and training set out in this document.

⁵ A "contracted labor" is a worker employed or engaged by a third party to perform designated works or provide services related to the core functions of the project, where the third-party exercises and maintains the control over the work, working conditions, and treatment of the project worker.

Sexual Exploitation and Abuse, Sexual Harassment (SEA/SH): The construction workers are predominantly younger males, and some females as well. Those who are away from home on the construction job are typically separated from their family and act outside their normal sphere of social control. This can lead to inappropriate and criminal behavior, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community. The influx of male labor may also lead to an increase in exploitative sexual relationships and physical assault whereby women and girls are forced into sex work.

Respective contractors will make sure that all the workers are provided with the necessary orientation and training on issues related to SEA/SH and related Code of Conduct (CoC) are presented and signed by all workers before commencement of any work. At the same time adequate measures and procedures including a SEA/SH compliant GRM will be in place to prevent related risks and mitigate any incident reported thereof in regard to SEA/SH.

3.5.7 Brief Overview of Labor Legislation: Terms and Conditions

The standards for the labor and working conditions are defined in the national legal framework, i.e., the Bangladesh Labor Act, 2006, Bangladesh Labor Rules, 2015 and Occupational Health and Safety Policy, 2013. The Labor Act is a comprehensive legislation. The Act addresses three areas, among others, e.g.: (i) Conditions of service and employment including working hours, wages and payment, establishment of the Minimum Wages Boards, employment of young people, maternity benefits and leave; (ii) Health, safety, hygiene, and welfare, and compensation for injury; and, (iii) Trade unions and industrial relations.

3.5.8 Responsible Staff

The overview of responsible staff and oversight mechanisms will be described in further detail in the ESMP and ESMF; the responsible staff would be the Project Director and/or designated official at the DoF. However, the LMP remains as the main reference to labor management that identifies the key responsible persons and will be executed during the implementation stage and referred to during the project cycle.

Project Implementation Unit inter alia the Project Director (PD) will have the overall responsibility to oversee all aspects of the implementation of the LMP, in particular to ensure contractor compliance. DoF will address all LMP aspects as part of procurement for works as well as during contractor induction. The contractor is subsequently responsible for management in accordance with contract specific provisions, implementation of which will be supervised by PMU monthly or at shorter intervals as defined by specific plans.

Occupational Health and Safety: Contractors will engage a minimum of one safety representative. Smaller contracts may permit for the safety representative to carry out other assignments as well. The safety representative ensures the day-to-day compliance with specified safety measures and records of any incidents. Minor incidents are to be reported to the DoF a monthly basis, serious incidents are to be reported immediately. Minor incidents are to be reflected in the quarterly reports to the WB; and, major issues are to be flagged to the WB immediately, e.g., within three working days from the date of occurrence.

Contractors will Develop a detailed OHS Management Plan for each site which shall include, but not be limited to, Task-specific risks assessments; Standard Operating Procedures (SOPs) associated with each task which will include capacity/skill requirements as well as required Personal Protection Equipment associated with the task. Daily 10-minute safety talks to every working crew for awareness and refreshing of the OHS risks associated with the tasks to be performed as well as procedures/chain of command in case of incidents or accidents. Periodic Safety Audit / Inspections would be conducted.

In addition to these necessary safety items would be provided such as appropriate PPE for workers, safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Also, will provide health care facilities with first aid.

The Contractor would periodically document and report occupational accidents, diseases, and incidents and actions are taken. They would identify potential hazards to workers, particularly those that may be life-threatening and provide awareness to the construction drivers to strictly follow the driving rules. Adequate lighting in the construction area and along the roads in the construction site will be ensured by the Contractor.

The PMU will ensure that the Environmental and Health Safety Guidelines (EHSG) and the ILO Convention 167: Safety and Health in Construction Convention, 1988, which is adopted specific proposals regarding safety and health in construction, are adopted and followed. Contractors must engage a minimum of one safety representative/officer and prepare and enforce Life and Fire Safety Protocols.

Labor and Working Conditions: Contractors will keep records in accordance with specifications set out in this LMP. The DoF at any time require records to ensure that labor conditions are met. The PMU will review records against actuals at a minimum on a monthly basis and can require immediate remedial actions if warranted. A summary of issues and remedial actions will be included in quarterly reports to the WB.

Workers' Grievances: Contractors will be required to present a workers' grievance redressal mechanism which responds to the requirements in this LMP. The PMU's designated Officer will review records on a monthly basis. Where worker concerns are not resolved, the national system will be used as set out in the section, but the PMU will keep abreast of resolutions and reflect in quarterly reports to the WB.

Labor Camps and Camp Management: Onsite labor camps may generate solid and liquid waste, which may cause community health risks along with SEA/SH risks. Labor camps should be constructed at a distance from the water bodies and avoid productive land and away from the settlement during the selection of land for the setup of the labor camp. Contractors will oversee this process from close and report if otherwise. No solid and liquid waste should be discharged into the water bodies, and contractors will instruct workers to maintain a clean environment in the camps. There will be a Code of Conduct for all workers that will be enforced, and contractors will work on raising awareness among the communities on STDs, SEA/SH, and the project GRM. The PMU will review records against actuals at a minimum monthly basis and can require immediate remedial actions if warranted.

Waste Management and Communicable Diseases: Contractors will be fully responsible for ensuring that their workers know and are trained on the national laws, safe disposal of waste (i.e., used PPE, etc.), and reporting of communicable diseases, if they contract any. Continuous motivation, monitoring and reporting on the same is the Contractors' responsibility. The PMU will have a monitoring team to ensure the same.

Additional Training: Contractors are required to, at all times, have a qualified designated officer on board. If training is required, this will be the contractor's responsibility. The safety officer will provide instructions to contractor staff. The DoF will procure for training to address risks associated with labor influx and will provide a schedule for trainings required. The contractor will be obligated to make staff available for this training, as well as any additional mandatory trainings required by the project, as specified by the contract.

Raising awareness: The project will take initiative to organize sessions on raising awareness of the communities on issues relevant to the project's compliance and standards (e.g., labor standards,

gender-based violence etc.). This, in addition to project's Communication Strategy, will ensure effective and efficient participation of different stakeholders of the project.

3.5.9 Policies and Procedures

Decisions relating to the employment or treatment of the employees and workers for the project will not be made on the basis of personal characteristics unrelated to inherent job requirements. The employment of project workers will be based on the principle of equal opportunity and fair treatment, and there will be no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, or disciplinary practices

Occupational, Health and Safety: The project is committed to:

- Comply with legislation and other applicable requirements which are related to the occupational health and safety.
- Enabling active participation in the risk elimination regarding OSH through promotion of appropriate skills, knowledge and attitudes towards hazards.
- Continuously improve the OHS management system and performance.
- Communicate the LMP's policy statement to all persons working under the control of DoF with emphasis on individual OHS responsibilities.
- Made available this LMP to all interested parties at all related DoF facilities and sites.

The PMU will have a designated Safety, Health and Environmental Representative for the workplace or a section of the workplace for an agreed period. At a minimum, the Representative must:

- Identify potential hazards;
- In collaboration with the employer, investigate the cause of accidents at the workplace;
- Inspect the workplace including plant, machinery, and substance, with a view to ascertaining the safety and health of employees provided that the employer is informed about the purpose of the inspection;
- Accompany an inspector whilst that inspector is carrying out the inspector's duties in the workplace;
- Attend meetings of the safety and health committee to which that safety and health representative is a member;
- Subject to (g), make recommendations to the employer in respect of safety and health matters affecting employees, through a safety and health committee; and
- Where there is no safety and health committee, the safety and health representatives shall make recommendations directly to the employer in respect of any safety and health matters affecting the employees.

Furthermore, to avoid work related accidents and injuries, the contractor will:

- Provide occupational health and safety training to all employees involved in works.
- Provide protective masks, helmet, overall and safety shoes, and safety goggles, as appropriate.
- Provide workers in high noise areas with earplugs or earmuffs.
- Ensure availability of first aid box.
- Provide employees with access to toilets and potable drinking water.

- Provide safety and occupational safety measures to workers with Personal Protection Equipment (PPE) when installing pumps to prevent accidents during replacement and installation and follow safety measures in installing submersible pump and cleaning the raiser pipes.
- Properly dispose of solid waste at designated permitted sites landfill allocated by the local authorities and cleaning funds; and attach the receipt of waste from the relevant landfill authority.
- Carry out all procedures to prevent leakage of generator oil into the site.

Further to enforcing the compliance of environmental management, contractors will be responsible and liable for safety of the site equipment, labors and daily workers attending to the construction site and safety of citizens for each subproject site, as mandatory measures.

3.5.10 Age of Employment

No child under the age of 18 years be recruited or allowed to work in any factory or establishment. All forms of child labor are prohibited as per the 2018-amendment of Labor Act.

Respective verification is to be carried out in reference to the birth certificate issued by the local government to the labor in reference, e.g., Municipality and/or City Corporation. In case of any dispute in terms of the age of a labor, the same shall be determined by a registered physician.

3.5.11 Terms and Conditions

The terms and conditions of employment of the workers and employees engaged are to be governed by provisions of the Labor Act. The Act had made it mandatory for employers to issue to its employees a copy of the written appointment letter indicating requisite particulars of employment, to signed by both parties. The contractors will be required to provide all its workers and employees with written appointment letter/contract of employment in terms of particular of employment. In case of recruitment of unskilled workers through the contractors, the respective contractor is obligated to issue said individual appointment letter to respective worker depending on the nature of employment, e.g., daily-wager, casual, temporary etc. The contractors will also be required to comply with all current regulation in terms of the wages which is issued by the Government. The order specifies the minimum wages, hours of work, overtime pay, leave entitlements, travelling and subsistence allowances and the issue of protective clothing.

3.5.12 Grievance Redressal Mechanism

In implementation of an effective dispute management system consideration will must be given to the disputes resulting from the following:

- Disciplinary action;
- Individual grievances;
- Collective grievances and negotiation of collective grievances;
- GBV, SEA/SH and workplace sexual harassment;

The Labor Act 2006 Section 33 provides the formal grievance procedure if a laid-off worker retires, is discharged, dismissed, removed, or otherwise terminated from employment. Section 202 (Subsection 24) describes the responsibilities of a Collective Bargaining Agent (CBA), especially bargaining with the employer in matters of the workers' conditions of work or environment and conducting cases on behalf of any individual worker or a group of workers under this Act. Workers' grievance redress

mechanisms (GRM) under the project will support all project workers, direct contracted and, if applicable primary supply workers.

The Workers GRM will include:

- A channel to receive grievances such as comment/complaint form, suggestion boxes, email, a telephone hotline that might also be anonymous;
- Stipulated timeframes to respond to grievances;
- A register to record and track the timely resolution of grievances;
- A responsible section/wing/committee to receive, record, and track the resolution of grievances.

The Workers GRM will be described in workers induction training, which will be provided to all project workers. The mechanism will be based on the following principles:

- The process will be transparent and allow all project workers to express their concerns and file grievances.
- There will be no discrimination against those who express grievances, and any grievances will be treated confidentially.
- Anonymous grievances will be treated equally as other grievances, whose origin is known.
- Management will treat grievances seriously and take timely and appropriate action in response. Information about the existence of the grievance mechanism will be readily available to all project workers through notice boards, the presence of "suggestion/complaint boxes," and other means as needed.
- The Project workers' grievance mechanism will not prevent workers from using the conciliation procedure provided in the BLA 2006 or recourse to legal means.

The PMU will monitor the Contractors' recording and resolution of grievances and report these in their monthly progress reports to share with the PMU. The process will be monitored and the report on workers GRM will be disseminated to the workers regularly and shared with the World Bank periodically.

Disciplinary Procedure: These workplace rules must be as follows:

- Valid or reasonable;
- Clear and unambiguous;
- The employee is aware, or could reasonably be aware of the rule or standard; and
- The procedure to be applied in the event the employee contravenes any of these rules

The PMU will establish a fair and effective disciplinary procedure in the workplace, which should be fair. The procedure is as follows:

- Conduct an investigation to determine whether there are grounds for a hearing to be held;
- In case of a hearing is to be held, the employer is to notify the employee of the allegations using a form and language that the employee can understand (indicating at least seven days' time to reply);
- Employee is to be given reasonable time to prepare for the hearing and to be represented by a fellow employee or a union representative;
- Employee must be given an opportunity to respond to the allegations, question the witnesses of the employer and to lead witnesses;

- If an employee fails to attend the hearing the employer may proceed with the hearing in the absence of the employee;
- Hearing must be held and concluded within a reasonable time and is to be chaired by an impartial representative.

If an employee is dismissed, it must be given the reasons for dismissal and the right to refer the dispute concerning the fairness of the dismissal (e.g., appeal). Therefore, it is obligatory upon the contractors to ensure that they have a disciplinary procedure and code and standards which the workers and employees are aware of. Each contractor will be required to produce this procedure to ensure that employees are not treated unfairly.

Individual Grievance Procedure: Every employer, including contractors, to have a Formal Grievance Procedure which should be known and explained to the employee.

The LMP recommends that such procedure should at least:

- Specify to whom the employee should lodge the grievance;
- Refer to time frames in the LMP to allow the grievance to be dealt with expeditiously;
- Allow the person to refer the grievance to a more senior level within the organization, if it is not resolved at the lowest level;
- If a grievance is not resolved the employee has the right to lodge a dispute with the DoF.

All the contractors who will be engaged for the project will be required to produce their grievance procedure as a requirement for tender which at a minimum comply with these requirements. In addition, good international practices recommend that the procedures be transparent, is confidential, adheres to non-retribution practices and includes right to representation. After they are engaged, they will be required to produce proof that each employee has been inducted and signed that they have been inducted on the procedure.

Management of Gender and SEA/SH Related Complaints: The DoF, with support from the consultants, will identify institutions and services providers who are actively engaged in prevention of GBV, SEA/SH and workplace-related sexual harassment in order to establish a manual for referencing any potential survivor. The DoF and the contractor are not equipped to handle complaints or provide relevant services to survivors, but will reference any person to relevant service providers, including health facilities, law enforcement agency or others, as relevant using the information on available services. Grievances related to GBV/SEA/SH be reported through the project/contractor, the nature of the complaint will be recorded along with the age of the complainant and relation to the project will be recorded but the issue will be referenced to relevant institutions.

Reference to World Bank Good Practice Note on Addressing SEA/SH in IPF will be made to prepare a guidance note to be incorporated by the IA for governing the conduct of all workers to ensure acceptable behavioral requirements with other workers (including training and signing Code of Conduct by all workers) and in relation to nearby communities. This will specify a set of measures to prevent SEA/SH in the project.

The PMU will keep records of all resolved and unresolved complaints and grievances (one file for each case record) and make them available for review as and when asked for by Bank. The PMUs will also prepare periodic reports on the grievance resolution process and publish these on their respective official websites.

3.5.13 Contractor Management

The project requires that contractors monitor, keep records and report on terms and conditions related to labor management. The contractor will provide workers with evidence of all payments made, including social security benefits, pension contributions or other entitlements regardless of the worker being engaged on a fixed term contract, full-time, part-time, or temporarily. The application of this requirement will be proportionate to the activities and to the size of the contract, in a manner acceptable to the DoF and WB:

- **Labor Conditions:** records of workers engaged under the project, including contracts, registry of induction of workers including working hours, wages and remuneration and deductions (including overtime), and collective bargaining agreements;
- **Safety:** recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
- **Workers:** number of workers, indication of origin (expatriate, local, non-local nationals), gender, age with evidence that no child labor is involved, and skill level (unskilled, skilled, supervisory, professional, management).
- **Training/ Induction:** dates, number of trainees, and topics.
- **Details of any Security Risks:** details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.

Worker grievances: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.

3.5.14 Community Workers

The community workers will be engaged under the Labor Contracting Society model. And such workers shall be treated as the contract workers and such workers will have no direct contract from the DoF. In engaging community workers, it will be ensured that there is no child labor and forced labor.

In engaging the community workers, the same shall be on the basis of voluntariness of the individual workers. And, in that effect an agreement has to be reached with the community concerned. And said voluntariness and any vulnerability and exploitation will be monitored regularly by the PMU.

3.6 Security Management Plan for Chakaria Shrimp Estate

Assessment of Security Risks

- **Site Evaluation:** Conduct a thorough assessment of the estate, identifying potential vulnerabilities (e.g., entry points, storage areas, processing facilities).
- **Threat Analysis:** Identify potential threats (theft, ransom, environmental risks, local wildlife, etc.).
- **Stakeholder Consultation:** Engage with local authorities, community leaders, and employees to understand perceived threats.

Security Objectives

- Protect assets (equipment, shrimp stock, and property).
- Ensure the safety of personnel.
- Maintain compliance with local laws and regulations.
- Foster a secure and productive working environment.

Security Policies and Procedures

- **Access Control:** Implement measures such as ID badges for employees, visitor logs, and restricted areas.
- **Surveillance:** Install CCTV cameras at key points, ensuring coverage of entry/exit points and sensitive areas.
- **Patrols:** Schedule regular security patrols of the estate, especially during off-hours.
- **Emergency Response Plan:** Establish protocols for various emergency situations (theft, fire, natural disasters).

Personnel Security

- **Training Programs:** Conduct regular security awareness training for employees, covering emergency procedures and reporting suspicious activities.
- **Background Checks:** Implement background checks for all new hires to mitigate insider threats.

Physical Security Measures

- **Fencing:** Install robust fencing around the estate to prohibit unauthorized access.
- **Lighting:** Ensure adequate lighting in and around the estate, particularly at entry points and pathways.
- **Secure Storage:** Use secure locks for storage areas containing valuable equipment and products.

Technology and Communication

- **Alarm Systems:** Install alarm systems that can alert security personnel and local authorities in case of breaches.
- **Communication Protocols:** Establish clear lines of communication among staff, including a reporting system for security concerns.

Collaboration with Local Authorities

- **Partnerships:** Build relationships with local law enforcement and emergency services.
- **Regular Meetings:** Schedule periodic meetings to discuss security updates and concerns.

Monitoring and Review

- **Regular Audits:** Conduct security audits to evaluate the effectiveness of existing measures and identify areas for improvement.
- **Incident Reporting:** Develop a system for reporting and documenting security incidents for future analysis.

- **Continuous Improvement:** Use findings from audits and incident reports to refine security policies and procedures.

Community Engagement

- **Awareness Campaigns:** Educate the local community about the importance of security and encourage cooperation.
- **Feedback Mechanism:** Create channels for local stakeholders to provide input on security issues.

3.7 Gender Action Plan

The project is about rehabilitation of shrimp estate, canal rehabilitation, fish processing and others. The core objective of the Gender Action Plan (GAP) is to address the gender gap, to reduce gender disparity, ensure gender inclusion and empowerment. Inclusion in the project-driven benefits, and ensuring safety security in the workplace, as well as creating equitable environment for vulnerable group (i.e., women) is the crucial goal of this GAP.

In light of the abovementioned objectives, below a list of gender action plan is suggested:

a. Providing Vocational Training

In the study area, women's employment rate is 4.8%, which is far lower than men's 29.3% (Section 7.10 in Chapter 7 of Volume 1: Main Report Final ESIA). This creates male and female inequality in employment sector which eventually affects in all aspects. By preparing them for diverse income-generating activities (IGAs) through various vocational trainings, women could participate in variety of activities so that they might be benefitted in the long run. Local women are willing to participate in different IGA's. In light of this following initiatives might be undertaken by the Proponent:

- The project can adopt vocational training programs for women in sustainable resource management, shrimp farming techniques, aquaculture practices, and quality control;
- Encourage women entrepreneurship by developing skill in fish and fish products-based ventures;
- Introducing climate-resilient farming practices and technologies, focusing on training women in their use can be included.

b. Access to Financial Resources

Due to their limited access to financial resources, women mostly rely on microfinance, which is insufficient for business entrepreneurs (Section 7.10 in Chapter 7 of Volume 1: Main Report Final ESIA). Men use the majority of credit facilities. As a result, women mostly stay and work at home. They usually involve in rearing of livestock, child care, household chores activities, fish net woven etc. The project can facilitate access to credit and financial resources for women, helping them invest in small-scale businesses or adopt sustainable fishing practices. This could involve partnering with microfinance institutions to create larger credit facilities tailored to women entrepreneurs in the fisheries sector.

c. Providing Scholarships or Stipends

According to the information stated in Section 7.10 in Chapter 7 of ESIA Report, male and female enrollment in schools is almost equal between the ages of three & five and six & ten. Between the ages of 15 & 19, the percentage of people not attending school is higher (4.1%). It is due to the family's

financial hardship and especially for girl's the percentage drops due to early marriage. During this age, girls start to assist in various household activities with their parents and other family members.

In the CSE area, most of the lease holders are outsiders. They could provide scholarships or stipends for the meritorious female students under the Corporate Social Responsibility (CSR) activities adjacent to the project area or the people those are engaged in the project activities. Technical and vocational training could be provided to them as well. It would create job opportunities which would bring economic solvency, which is expected to play important role in alleviating crimes at and around the project area.

d. Access to Healthcare Facility

According to UNDP 2016⁶, in coastal areas, the mortality rate from natural disasters is 14 times higher for women than men. Pregnant women are mostly vulnerable due to limited access of healthcare facilities. This poses a significant risk for pregnant women, especially in emergencies and with poor sanitation and water quality issues (Section 7.10 in Chapter 7 of Volume 1: Main Report Final ESIA).

During various stages of Sub-Project implementation, women might face health-related issues (occupational health hazards) while working at sub-Project sites. Considering the working women, the project should have a management plan as:

- Arrange partnering with local healthcare providers to improve access to basic healthcare services, particularly for pregnant women and young mothers.
- The project might facilitate communication facilities including roads and bridges and also the vehicle services so that local people particularly the women are supported during the emergencies. The project should also prioritize constructing gender-sensitive sanitation facilities, especially in public areas like markets and processing plants.
- The project through the leaseholders may take initiatives in building awareness among the women about healthcare education and using hygienic latrine.
 - The project should also prioritize constructing gender-sensitive sanitation facilities, especially in public areas like markets and processing plants.

e. Community-based Resource Management

In cluster farms where women play a significant role in pond preparation, stocking shrimp post-larvae, feeding, and harvesting. The fisheries sector in Bangladesh employs around 1.4 million people, with about 10% being women, although this likely underestimates their involvement due to informal and unrecognized work. Ensuring women's active engagement in community-based resource management and decision-making processes is important for formalizing their contribution and empowering them to lead the initiatives (Section 7.10 in Chapter 7 of Volume 1: Main Report Final ESIA). Establish gender-sensitive governance structures within fisheries management bodies. They can participate in monitoring natural resources, conflict resolution among stakeholders, women can lead community mobilization efforts, organizing groups to advocate for sustainable practices, environmental protection, and equitable resource distribution and women can build networks with other women's groups.

f. Alternative Income Generating Activity

Women in the fisheries sector typically earn 20-30% less than that of men, primarily due to their concentration in lower-paying roles, such as fish processing and marketing. Engaging the women in

⁶ <https://www.undp.org/sites/g/files/zskgke326/files/publications/PB3-AP-Gender-and-disaster-risk-reduction.pdf>

different income generating activities may help them to develop their leadership, access to different citizen facilities, prioritize in decision making (Section 7.10 in Chapter 7 of Volume 1: Main Report Final ESIA). Economic activities not only help generate income but also empower women and strengthen community resilience. The project can support livelihood diversification programs that offer women alternative income-generating activities, such as small-scale aquaculture, fish processing businesses, or handicrafts related to the fisheries sector. In the CSE area women can be engaged in small-scale fish farming, seafood processing, can create crafts using local materials, such as woven baskets or nets, or produce jewelry, which can be sold at local markets or online, eco-tourism (by offering guided tours, boat rides, cultural experiences related to fishing traditions can attract visitors). It would improve the financial condition of the family and in turn would facilitate in reducing the crime of this area. In the BFDC, women can be involved in fish processing activities. Training would be needed for women to perform technical activities. In the canal rehabilitation project, women can be engaged in earthwork, textile production,

g. Raise Awareness about GBV

More than 50% of women and girls in Cox's Bazar have experienced some form of GBV, including domestic violence, sexual assault, and early marriage. Furthermore, 60% of GBV survivors in Cox's Bazar do not have access to adequate support services, including legal aid, psychosocial support, and healthcare (Section 7.10 in Chapter 7 of Volume 1: Main Report Final ESIA). In the project, it is necessary to integrate GBV prevention and response measures specific to the fisheries and shrimp sector, including establishing safe spaces for women working in these industries, improving access to support services (legal, medical, and psychosocial) at processing plants, and conducting training programs to raise awareness about GBV in local fishing communities.

4. Contingency Planning

A complete contingency plan is required for addressing emergencies that may jeopardize the safety of the entire project, humans, and infrastructure. This document provides protocols for reducing risks, responding effectively, and ensuring recovery from potential disasters such as natural disasters, pandemic, and fires outbreaks. Along with that, the contingency plan will be lucid to GBV risks screening and putting in the corresponding measures to prevent and mitigate the SEA/SH risks as the local community women might be engaged in the project work. The contingency budget should be included in the project cost for any possible referral services available in the beneficiary areas.

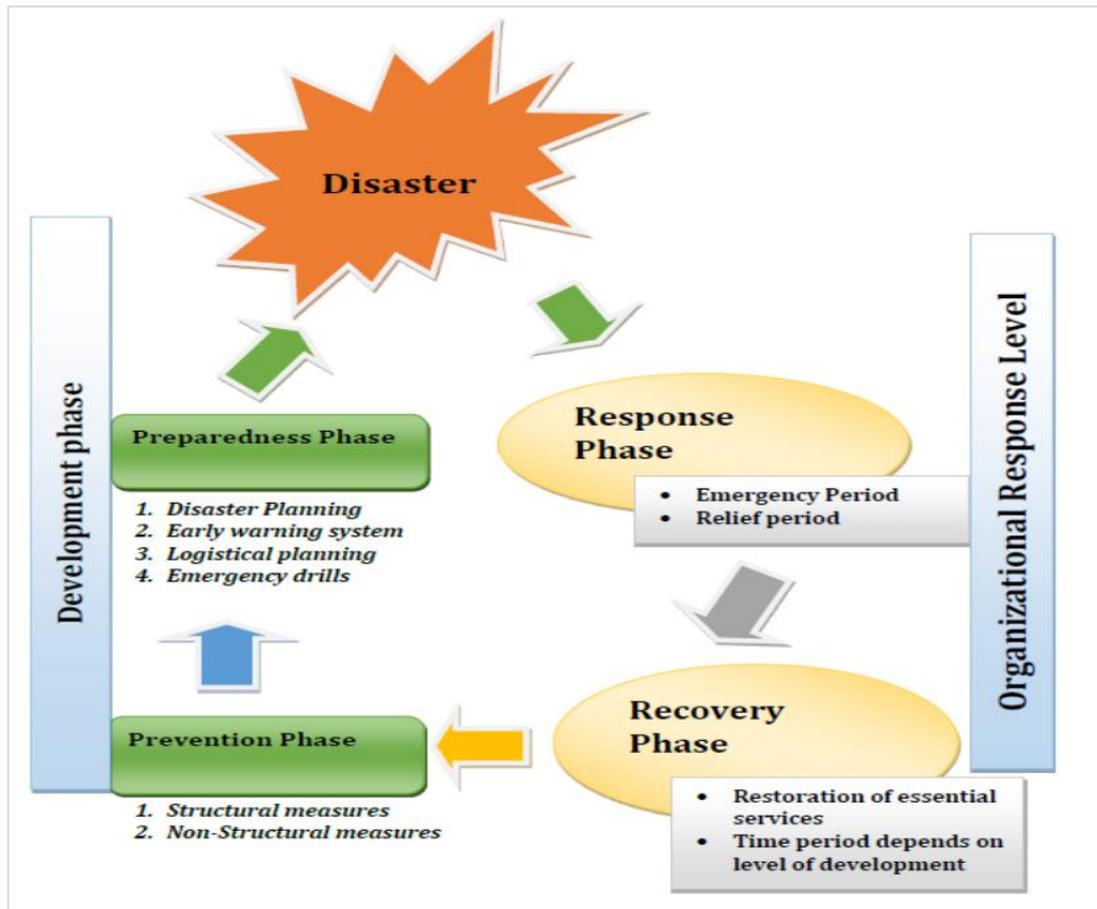


Figure 4.1: Framework of a Contingency Plan for emergencies

The above contingency plan is a standard live document that can be updated and streamlined with the client's (DoF) requirement based on the real needs of any emergencies at the project site. The resources in the Emergency Response Team (ERT) team of client should be sufficient and capable so that they can manage the emergencies with the existing equipment and contemporary manner. An institutional audit should be conducted to know the existing resource availability at each sub-project area and accordingly may enrich the Emergency team and its capability.

This contingency plan would include, but not limited to the following action plans:

- Implementation plan based on personnel and project safety while implement the proposed interventions of each sub-project.
- Identify the possible risk and evaluate their potential significance to set the appropriate mitigation measures based on the severity.
- Evacuation plan, first aider and Incident Response Team (IRT) should get ready for instant external facilities if required if there is any flash flood, cyclone, fire hazard, earthquake etc.
- Notification plan, employees alarm method and list of emergency contacts should be available at each project site for any kind of hazard
- Response plan defining the matrix utilize to arrive at the appropriate response level
- Documentation plan identifying forms and information about hazardous material in the facility
- Emergency Response Team (ERT) plan, which would consist of personnel within the facility, complete with their respective roles and responsibilities in case of an emergency
- Adequate training and mock drill must be conducted at a regular interval to reduce or eliminate the significance of the hazard.
- Mobilization plans, which would include equipment, material, and services required for the implementation of response to an emergency event.
- Schedule regular monitoring and reviews of the contingency plan to ensure its relevance.

5. Institutional Arrangement

5.1 Department of Fisheries

The Department of Fisheries (DoF) is the key organisation responsible for fisheries development and management both in the inland and marine waters of Bangladesh. The Fisheries Directorate was established in 1908 and upgraded to a department in 1983. The Department of Fisheries is presently functioning under the Ministry of Fisheries and Livestock (MoFL). The mission of the Department is “to support sustainable growth in fish and shrimp production with other aquatic resources as well, for domestic consumption and exports, and management of open water fisheries resources through community participation leading to equitable distribution of the benefits generated, for optimal economic and social growth in Bangladesh”.

The DoF renders its services to the nation through following wings:

- Inland fisheries;
- Marine fisheries;
- Fisheries Resources Survey System (FRSS);
- Fish Inspection and Quality Control; and
- Personnel and Human Resources Development.

There are three other fisheries related organisations that work under the administrative umbrella of the MoFL. These are (i) the Bangladesh Fisheries Research Institute (BFRI); (ii) the Bangladesh Fisheries Development Corporation (BFDC) and (iii) the Fisheries and Livestock Information Department (FLID).

In addition, several other government agencies and bodies like the Ministry of Local Government and Rural Development (LGRD), the Ministry of Land (MoL), the Ministry of Agriculture (MoA), Administration & Police, and Water Development & Flood Control with the help of their affiliated institutions are actively involved in fisheries administration, management and development.

The mandates of DoF broadly are:

- Fisheries Extension Services
- Conservation of Fisheries Resources
- Quality Control of Fish and Fisheries Products
- Policy Framework
- Health and Socio-economic Development
- Human Resource Development

In all these efforts, public investments and State ownership have been the case and the fisheries sector remained under government control. The project level organogram of DoF is presented in **Figure 5.1**.

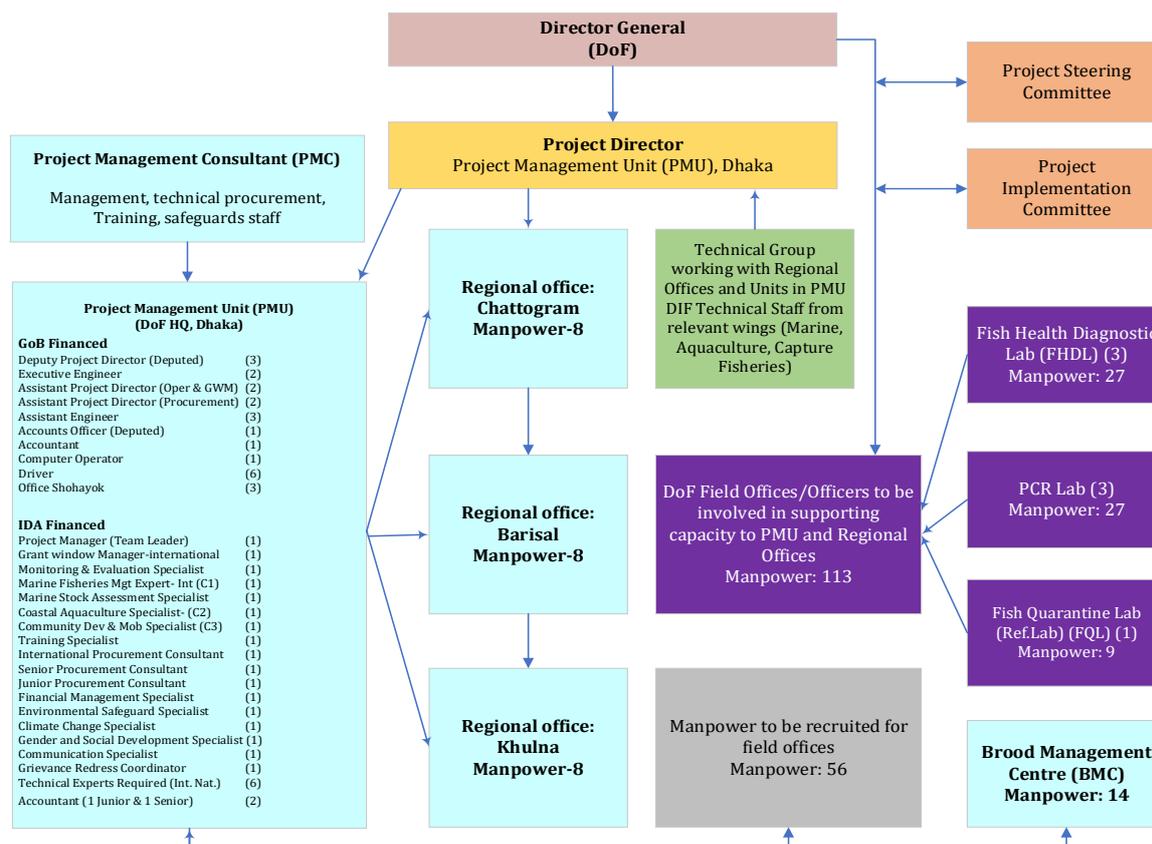


Figure 5.1: Organogram of SCMFP, DoF

5.2 Bangladesh Fisheries Development Corporation

The Bangladesh Fisheries Development Corporation (BFDC) was established in 1964 and has been operating as a corporation by the Bangladesh Fisheries Development Corporation Act 1973 (Act No. 22). It is a service oriented and non-financial government organization. From its inception it has been giving its utmost effort in development of fish related industries, modernization of deep-sea fishing vessels, hygienic fish landing, preservation, processing and marketing of harvested fish, and cooperating the fish and fish products exporters. A total of 20 units of BFDC has been working in the country and discovered four commercial fishing grounds in the Bay with the help of Food and Agriculture Organization (FAO) in 1966-72. The grounds are South Patches, South of South Patches, Middle Ground, and Swatch of No Ground.

The mandates of BFDC broadly are:

- Taking measures for the development of fisheries and fishing industry;
- Establishing fishing industries;
- Establishing units for preservation, processing, distribution and marketing of fish and fishery products;
- Establishing fish catching unit to build up organized body for exploitation of fisheries;
- Forming fisheries industry and fishermen co-operative committee;
- Encouraging fishermen co-operative society and fair price marketing of fish;
- Taking measures and establish training and research institute for fisheries resources exploitation, processing, transportation, storing and distribution; and
- Establishing organization for export of fish and fisheries products.

The partial skeletal organogram of BFDC is showing major components of BFDC, Chattogram in **Figure 5.2**.

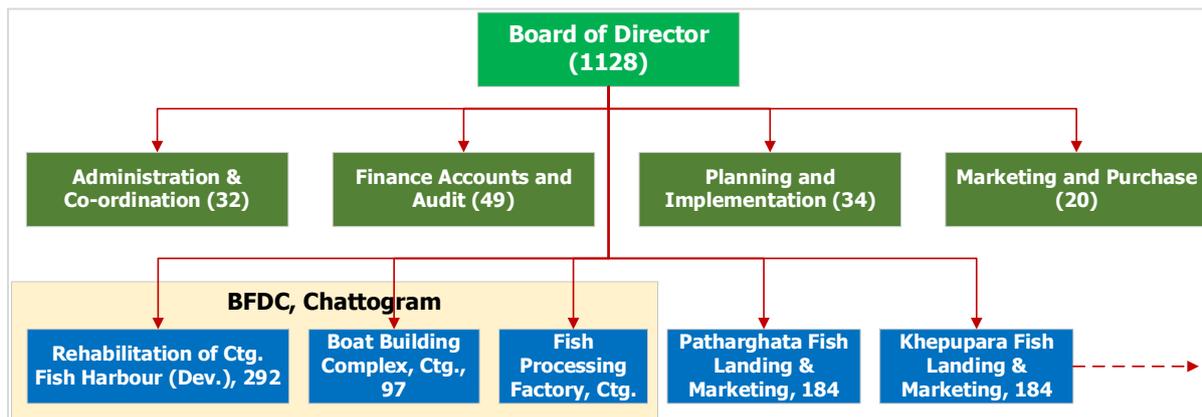


Figure 5.2: Organogram of Chattogram BFDC

5.3 Project Implementation Unit

For the operation of SCMFP, the DoF has created a Project Management Unit (PMU), under the office of the Director General, Department of Fisheries (DoF). The PMU consists of one Project Director (PD), three Deputy Project Director (DPD), Project Management Consultants (PMC), one National Consultant (Environment), one Executive Engineer (Structure), and an Assistant Director-cum-Accountant.

To strengthen the PMU additional resources are needed. A Development Project Proforma (DPP) with a provision of manpower loading of six diverse disciplines has been considered including an Assistant Director (accounts) has been submitted to the Government for approval. This DPP has been prepared and submitted to implement the project within the approved time and budget. A detailed qualification with the required number of people in each post and responsibility of each position is depicted in **Table 5.1**. Chattogram BFDC might form a Sub-Project Management Unit (SPMU) in addition to the PMU of DoF for the implementation of components allocated for Chattogram BFDC. The Project Management Unit as per revised DPP is shown in **Figure 5.3**.

Table 5.1: Qualification and Responsibilities of the PMU Staff

Sl. No.	Name of the Post	Quantity	Qualification	Responsibility
1	Project Director (Director)	1	M.Sc. in Fisheries or as per DoF's Service Rule	Responsible to implement the project on time and furnishing both financial and physical progress report of the project for informing the progress of the project in the monthly Pre-steering and Steering meetings.
2	Deputy Project Director (Deputy Director/DFO/SUFO/UFO)	3	B.Sc. in Fisheries or as per DoF's Service Rule	Assisting the Project Director in all respects. In the absence of the PD, DPD will be responsible for implementing the project.
3	Executive Engineer (XEN)	1	B.Sc. Engineering or as per DoF's Service Rule	Supervision of contractor's work during implementation of the proposed interventions as per the design and scope of works outlined in the contract document.

Sl. No.	Name of the Post	Quantity	Qualification	Responsibility
				Report on work progress from time to time to the PD/DPD. Monitor all issues related to the environment, health, and safety (EHS).
4	Deputy Manager (EHS)	1	B.Sc. Environmental Engineering/ Science or as per DoF's Service Rule	To provide all supports to the XEN in the execution of the contractor's works engaged for the implementation of the proposed interventions.
5	Assistant Director (Accounts)	1	Masters/Graduate	Maintaining general ledger book, processing of contractor's bill for payment, preparation of monthly accounts statement for the project related financial transaction. Also responsible for all personnel and administrative matters as per delegation of authority.

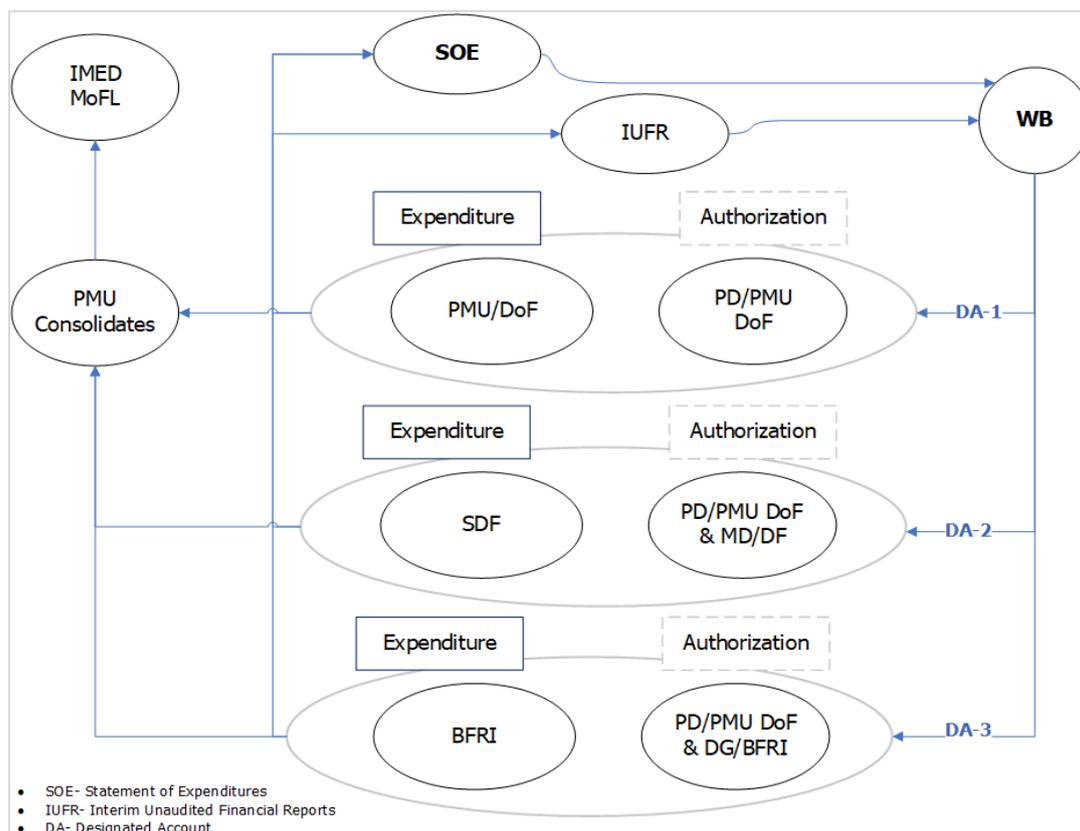


Figure 5.3: Organogram of PMU as per RDPP

5.4 Other Relevant Organizations

Other relevant organizations involved in the implementation of EMP are: (a) Department of Environment (DoE) oversee implementation of all development projects in the country verifying that the environmental requirements are fulfilled, government guidelines and procedures followed and environmental quality standards are maintained properly. DoE will be consulted in case of complicated issues and if it requires any further Environmental Clearance Certificates (ECC), (b) Bangladesh Water Development Board (BWDB) is responsible for O&M of the peripheral dyke and

ensuring flow inside canal of the CSE and cluster shrimp farms on the southwest region, (c) Forest Department (FD) is responsible for the management of green belt on the peripheral dyke, (d) Bangladesh Fisheries Research Institute (BFRI) is responsible for producing high yielding variety (HYV) of shrimp and other fishes and extension of their inventions, (e) Department of Disaster Management (DDM) is responsible for assessing the post event damage of the infrastructure and arranging the repairing works, (f) Department of Public Health Engineering (DPHE) is responsible for maintaining the quality of drinking water and addressing sanitation issues, and (d) District administration, Upazila administration, municipality and union are responsible for traffic management, law and order and resolving the social disputes that may arise during construction activities.

5.5 Supervision Engineer

PMU will recruit a Supervision Engineer (SE) for the supervision of implementation of canal rehabilitation, sluice gate construction, peripheral dyke rehabilitation, guard shed construction, demolition of abandoned civil structures, etc., contractor(s) involving in civil works, including supervision and implementation of ESMP. The SE will consist of an environmental, health and safety (EHS) unit with five (05) environmental experts and surveyor. The proposed positions and man-month requirements of national experts and surveyor of the Supervision Engineer are given in **Table 5.2**. Environmental specialists of SE, in coordination with PMU staff, will ensure the implementation of environmental management practices at each stage of the project activities. The Supervision Engineer will also be responsible for updating ESMP, if required.

Table 5.2: Proposed EHS Unit Consultant of Supervision Engineer

Sl. No.	Expertise	Input (PM)
1	Deputy Manager (Environmental Specialist)	24
2	Asst. Manager (Environment)	24
3	Asst. Manager (Occupational, Health, and Safety)	24
4	Communication Specialist	24
5	Field Surveyor (Diploma Engineer)	24
Total		120

5.6 Independent Monitor

Besides internal monitoring and evaluation by the PMU/DoF for environmental management and monitoring, independent/external monitors will be retained by DoF, to undertake monitoring of all compliance and effects monitoring components. These external monitors will carry out monitoring implementation of the different components and submit an independent monitoring and appraisal report to the PMU, DoF and to the World Bank. DoF will submit this report to DoE as a part of their compliance.

5.7 Contractors

Each Contractor procured under this Project (especially sluice gate and canal re-excavation Contractors for CSE and southwest shrimp cluster canals; installation of electric sub-station, deep tube wells, ETP, WTP, modern fish processing plant, etc. for BFDC, Chattogram, demolition of abandoned civil structures and installation of facilities for BFDC and BMC will be recommended to be a compliant of ISO 14001 Environmental Management System (EMS) certification. Further conditions of compliancy for OSHA 18000 (2007) related Occupational Health and Safety (OHS) and SA 8000 (Social Accountability) could also be imposed on the Contractors. Each contractor will be

recommended to have one Environmental Specialist and one Occupational, Health and Safety Specialist, who will be working in close coordination with the environmental staff of Supervision Engineer and PMU.

5.8 Need for Institutional Strengthening

Despite DoF is the main custodian of the SCMFP Project, WB has financed some of its fund directly to other two co-implementing agencies, such as SDF and BFRI. The co-signatories of the Designated Account (DA) are both the PD/PMU DoF and the MD/SDF for financial reporting and WB funds disbursement to facilitate a more integrated co-implementation process. The major wings of the PMU are: Director (PD), Director General (DG) from DoF; Managing Director (MD) from SDF; and Director General (DG) from BFRI, **Figure 5.5**.

However, currently there is no dedicated Environment, Health, and Safety (EHS) Unit to address environmental management and occupational health and safety issues. A proposal has been made to create an EHS Unit headed by a Deputy Manager and two Assistant Managers, one for environment and one for health and safety. One Communication Specialist is also proposed under the Project Director to maintain regular communication with the concerned local people and address the grievance (if any) on spot or delegate the message to the upper tier (Project Director). Currently, DoF has no staff with previous experience in implementing environmental management and monitoring plan along with grievance redressal.

Generally, DoF/PMU outsource key services to consulting firm or relevant academic institutions well-suited to the environmental, socio-political and socio-economic conditions in Bangladesh. The SCMFP has appointed a National Consultant as an Environmental Management Consultant to look after the studies. The same kind of consultant should be engaged during implementation and operation stages.

In order to implement the environmental and social management plan (ESMP) as proposed in this ESIA, an effective PMU with dedicated staff will be of crucial significance. Without qualified full-time staff, it would be nearly impossible to minimize and/or eliminate the effects of environmental hazards and risks and ensuring a safe working environment for the workers, staff, and staff family members (if any), who are residing in the project compound.

5.9 Proposed Institutional Strengthening of Sub-Project Management Units

5.9.1 PMU Dedicated EHS Staff Requirements

Under the revised DPP there is a request for an additional 54 staff to strengthen the PMU. However, in the DPP no provisions have been made for dedicated staff to ensure compliance to EHS issues. For effective and meaningful implementation of the ESMP, it is recommended that one Executive Engineer, with requisite training and practical experiences in implementing and/or monitoring environmental, health and safety issues pertaining to hydraulic structures are recruited. To look after the EHS issues, one Deputy Manager (EHS), and two Assistant Manager (one experienced in environmental management, and other in Occupational Health and Safety) has been suggested. A Diploma Engineer is recommended to support the Executive Engineer (Structure). **Table 5.4** presents some of the key required qualifications of these staff.

5.9.2 Strengthening of the Proposed Environmental, Health and Safety Unit

In order to comply with the ESMP requirements that have been proposed in this ESIA, an effective EHS Unit with experienced and dedicated staff are essential. After a careful review of the proposed organogram of PMU, the Consultant made a proposal to strengthen the proposed organization

structure, which is presented in **Figure 5.4**. The key highlights of the strengthening are presented below:

- One deputy manager for environment and health and safety.
- Two Asst. Engineers with one in Environment and one in Occupational Health and Safety background under deputy manager EHS.
- One Diploma Engineer (Field Surveyor) must have qualifications in their relevant areas of expertise under the Executive Engineer/Deputy Manager (EHS).
- Since, it will be difficult to get staff within DoF who has experience in environmental, health and safety background, it is recommended to outsource the mentioned positions for facilitating the project implementation.

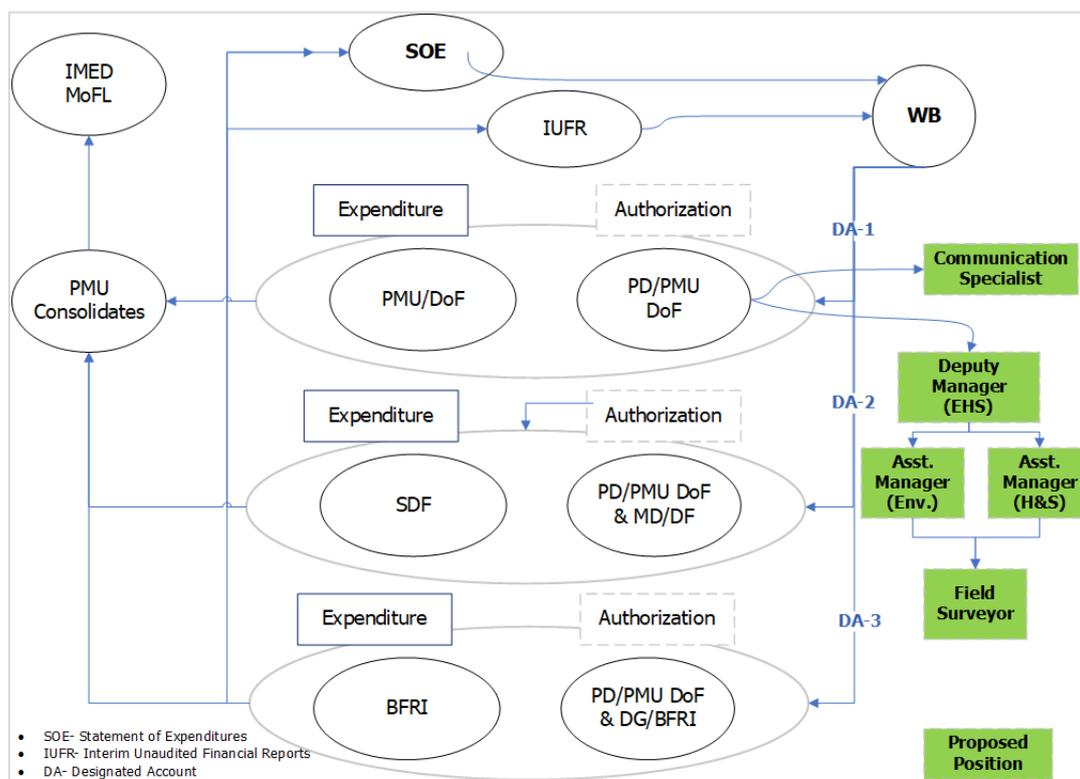


Figure 5.4: Organogram of SCMFPMU Proposed by the Consultant

The budget of the EHS staff and required logistics during one and a half years of construction and half a year of operation is presented in **Table 5.3**. The job descriptions of the key EHS staff with preferred responsibilities and qualifications are presented in **Table 5.4**.

Table 5.3: Budget for EHS Staff

Sl. No.	Items	Amount (USD)
1	Staff Budget (5 staff x 2 years)	208,696
2	Library	6,000
2	Furniture, Computers, Printer	10,000
3	Filming/Media/Publicity of Project Activities	7,000
4	Surveys, Analysis and Reports	10,000
Total		241,696

Table 5.4: Job Descriptions and Responsibility with Qualifications of Key EHS Staff

Sl. No.	Name of the Post	Quantity	Qualification	Responsibility
1	Project Director (Director)	1	M.Sc. in Fisheries or as per DoF's Service Rule	Responsible to implement the project on time and furnishing both financial and physical progress report of the project for informing the progress of the project in the monthly Pre-steering and Steering meetings.
2	Deputy Project Director (Deputy Director/DFO/SUFO/UFO)	3	B.Sc. in Fisheries or as per DoF's Service Rule	Assisting the Project Director in all respects. In the absence of the PD, DPD will be responsible for implementing the project.
3	Executive Engineer (XEN)	1	B.Sc. Engineering or as per DoF's Service Rule	Supervision of contractor's work during implementation of the proposed interventions as per the design and scope of works outlined in the contract document. Report on work progress from time to time to the PD/DPD. Monitor all issues related to the structures.
4	Deputy Manager (EHS)	1	B.Sc. Environmental Engineering/ Science or as per DoF's Service Rule	To provide all supports to the PD or to XEN (if empowered by PD) in the execution of the contractor's works engaged for the implementation of the proposed interventions.
5	Asst. Manager (Environment)	1	B.Sc. Environmental Engineering/ Science or as per DoF's Service Rule	To provide all support to the Deputy Manager in the execution of the contractor's works engaged for EHS issues in implementation of the proposed project. One Asst. Manager will be dedicated to Environmental issues.
6	Asst. Manager (H&S)	1	B.Sc. Environmental Engineering/ Science or as per DoF's Service Rule	Providing all support to the Deputy Manager in the supervision of file works of proposed project. This Asst. Manager will be dedicated to Health and Safety issues. One must have previous experience in occupational health, and safety issues.
7	Assistant Director (Accounts)	1	Masters/Graduate	Maintaining general ledger book, processing of contractor's bill for payment, preparation of monthly accounts statement for the project related financial transaction. Also responsible for all personnel and administrative matters as per delegation of authority.
8	Communication Specialist	1	MS in Sociologist/ Anthropologist	Maintaining communication with the local people and sort out the grievance to be covered by the project and address the grievance on spot if unable delegate the message to PD.
9	Field Surveyor	1	Diploma Engineering	Providing all support to the Executive Engineer in supervision of field works of the proposed project.

5.9.3 Capacity Building Programs

The environmental and social trainings will help to ensure that the requirements of the ESMP are clearly understood and followed by all project personnel. The primary responsibility of providing these trainings to all project personnel will be that of the contractor, Supervision Engineer, and a designated training consultant. The trainings will be provided to different professional groups separately such as managers, skilled personnel, unskilled labors, and camp staff. Capacity building will be aimed at strengthening the PMU and EHS Unit of PMU staff in the field of environmental management and occupational health and safety. Members of the EHS Unit and PMU staff responsible for supervision of environmental mitigation measures would be trained in environmental management, environmental quality control, ecology, environmental awareness, participatory approach and occupational health and safety. The contractor will also be required to provide environmental and health and safety trainings to its staff, to ensure effective implementation of the ESMP. A budget of USD 0.10 million has been earmarked for capacity building of PMU and EHS Unit staff and the scope of work is included in **Appendix 1** of this Report. The contractors' training plan shall include a program for the delivery of intermittent training, to cover the subjects included in **Table 5.5**. Training should be carried out initially at induction of staff and repeated throughout the project.

Table 5.5: Training Subjects for Inclusion in Contractors Training Plan

Training Subject	Target Audience
Handling, use & disposal of hazardous material	Construction workers with authorized access to hazardous material storage areas and required to use hazardous material during their works
Waste Management	All staff (construction and camp staff)
Efficient & safe driving practices, including road & vehicle restrictions	Drivers & mobile plant operators
Actions to be taken in the event of major or minor pollution event on land	All construction staff
Pollution prevention: Best practice	All staff
Health & Safety: Safe way to work & hazard awareness	All construction staff
Health & Safety: Safe use of equipment	Operators of equipment
Health & Safety: Working near/on water	All staff working on sluice gate strengthening and unloading heavy equipment from barge
Health & Safety: Use of PPE	All construction staff
Emergency procedures and evacuation	All staff
Fire fighting	All staff
Site inductions, including requirements under the Environmental Management Plan & details of environmentally sensitive areas of the site	All staff
Culturally sensitive awareness raising on HIV/AIDS and the spread of sexually transmitted diseases. Awareness raising on risks, prevention and available treatment of vector-borne diseases	All staff
Cultural sensitivities of the local population	On induction of all non-local staff

5.9.4 Formation of a Grievance Redress Committee

Two grievance redress committees (GRCs) will be formed: local grievance redress committee (LGRC); and project grievance redress committee (PGRC). Most of the grievances would be resolved at LGRC within 7 days of receipt of complaint, while a few might be forwarded to PGRC, which will take two weeks to resolve the complaint.

The proposed Institutional Framework for Implementation of ESMP is shown in **Figure 5.5**.

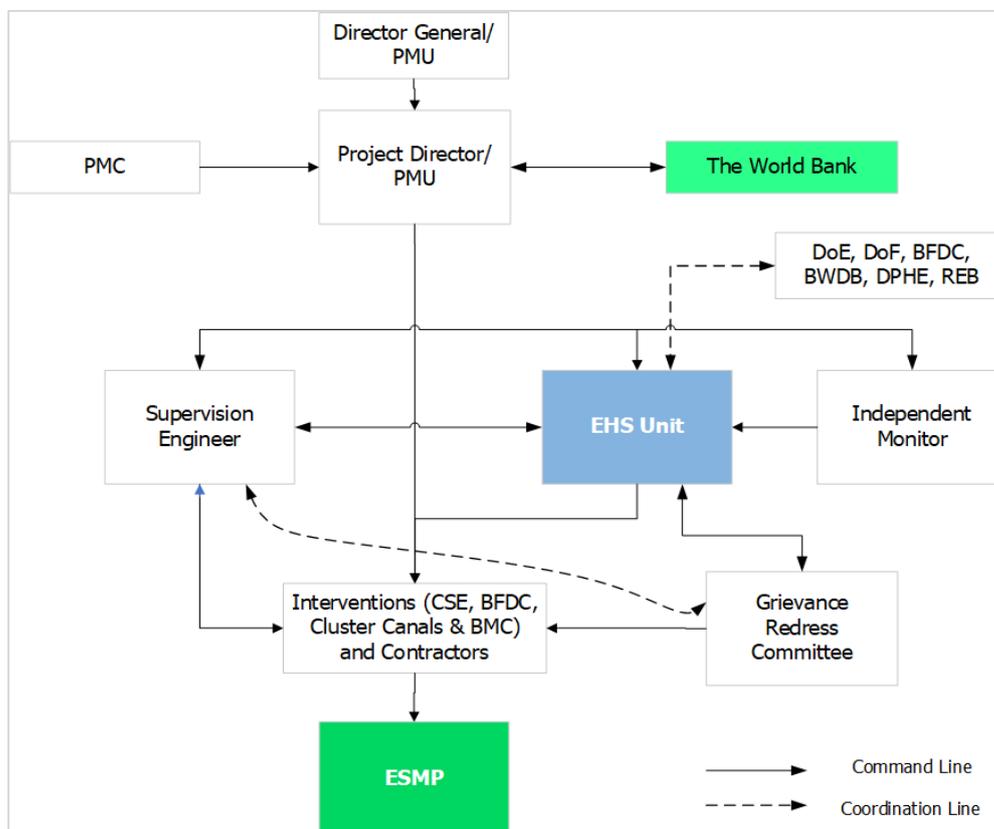


Figure 5.5: Proposed Institutional Framework for EMP Implementation

5.9.5 Cost Estimates for Institutional Strengthening

The cost estimates for all the institutional strengthening measures proposed in this chapter are given in the **Table 5.6**.

Table 5.6: Proposed Budget for Institutional Strengthening and Capacity Building

Sl.	Strengthening/Capacity Building Measure	Amount, USD
1	Strengthening of EHS Unit (Table 4.3)	241,696
2	Capacity Building and Training (Appendix 2 of this Report)	100,000
	Total	341,696

6. Mitigation Plan

The mitigation plan presented in **Table 6.1** is organized around various project activities and includes various actions identified under the mitigation measures discussed in **Chapter 9** of the (**Volume I: Main Report-ESIA Report**), define responsibilities for implementation as well as supervision of each action, and also indicate the timing of these actions. Should any changes to the Project design or methods of construction and operation take place, post this assessment stage, the impacts and mitigation measures discussed may need to be revised to reflect such changes to allow the environmental and social implications of these changes to be addressed.

Table 6.1: Mitigation Plan

Issues	Environmental Impacts	Mitigation Measures	Institutional Responsibilities	
			Implementation	Supervision
Construction Stage				
Biodiversity and Ecosystem	Impact on aquatic habitats, including benthic habitat, due to sliding of re-excavated soil into the canal again and re-excavation of canals for creating proper drainage	<ul style="list-style-type: none"> • Due care should be paid during managing re-excavated soil. • There should be a well-fenced/marked designated site for waste disposal with proper monitoring facilities. • Re-excavation operation should be carried out with proper care. 	Contractor	Design Consultant/ PMU/ EHSU
Fish Habitat	Temporarily disruption of canal ecosystem due to re-excavation work.	<ul style="list-style-type: none"> • Implement sedimentation control measures during construction to minimize sedimentation in water bodies. • Schedule re-excavation avoiding the critical periods such as fish spawning seasons. Re-excavation of canals should be done in the dry season, i.e. November to March; • Excavated materials should be placed at safe distance so the disposing materials do not come back into the canals. • To reduce noise impacts, use quieter machinery and limit working hours. Additionally, ensure the excavator is properly maintained to prevent oil and lubricant leaks, which can deteriorate water quality. • Create a variety of habitats within the canals, such as deep pools, shallow areas, and vegetated zones, to support different life stages and species of fish. • Design embankments with gentle slopes and vegetation to mimic natural riverbanks, enhancing habitat complexity. 	Contractor	SE/ PMU

Issues	Environmental Impacts	Mitigation Measures	Institutional Responsibilities	
			Implementation	Supervision
Fish migration	Fish migration may be hampered due to repairing of sluice gates	<ul style="list-style-type: none"> Engineering design for sluice gate should consider the migratory fish species, their velocity tolerances and swimming speeds. Since majorly small fishes perform lateral migration, so the velocity in a range of 0.5 m/s to 1.5 m/s should be maintained through the structures; Ensure alternative routes for fish migration during excavation activities. Incorporate fish passage structures in sluice gates to facilitate fish migration and minimize barriers to fish movement. 	Contractor	SE/ PMU
Fish species diversity	Fish species structures in the intervened area of the canal may be changed temporarily due to canal re-excavation.	<ul style="list-style-type: none"> Make protection from waste of construction materials. A confinement area should be built by very minute mesh size (0.5 cm) net so that small fish and juvenile do not enter into construction site. Indiscriminate fishing of brood and fry fishes should be prohibited along the canal. 	Contractor	SE/ PMU
Waste management	Unplanned or unorganized storage of old and used equipment and other solid wastes can lead to poor aesthetic view and management of space in the project site.	<ul style="list-style-type: none"> Rubbles generated from the construction site should be stored in appropriate bins/skips, well-covered and later buried in an approved landfill site. All solid wastes, hazardous and non-hazardous, should be stored in designated sites prior to final disposal Food waste and other bio-degradable waste, generated by workers and staff, should be placed at a designated site prior to final collection and disposal by local municipality or contract vendor. 	EPC Contractor	PMU/ EHSU
Air Quality	<p>Emissions of dust and gases will be generated</p> <ul style="list-style-type: none"> Due to rehabilitation of hydraulic structures and re-excavation of soil at Chakaria Shrimp Estate; 	<ul style="list-style-type: none"> Proper and prior planning and appropriate sequencing and scheduling of site preparation activities including land development and construction site preparation. Dust Suppression Mechanism like water spraying should be done at least thrice in a day in dry season to control generation of excessive SPM. 	EPC Contractor	SE/ESHSU

Issues	Environmental Impacts	Mitigation Measures	Institutional Responsibilities	
			Implementation	Supervision
	<ul style="list-style-type: none"> Demolition of existing abandon structures at Chakaria Shrimp Estate, BFDC Harbor, and BMC sub-Project Areas; Excavation of trenches for laying distribution lines; installing GIS and transformer at the substation areas, operation of construction equipment and vehicles, and material transport, which is injurious to human health at BFDC Harbor; and Re-excavation of canals under Satkhira, Khulna, and Bagerhat Districts 	<ul style="list-style-type: none"> Take measure at the whole construction site to minimize dust spreading outside. Construction materials like cement, sand, brick chips, stone chips etc. should be well covered with tarpaulin or other covering sheet. Construction site vehicle speed limit of 10 km/hr-25 km/hr (Fugitive PM Emissions Control efficiency: 0%-80%) should follow strictly. Regular inspection and maintenance of the Project vehicles should be carried out. No unfit vehicles such as dump trucks, construction material trucks/lorries, etc. and other machines should be allowed to be in use. Modern and energy efficient machineries should be used in the construction site. Regardless of the size or type of vehicle, fleet owners /operators should implement the manufacturer recommended engine maintenance programs. Regular operation and maintenance of the machineries should be carried out. Regular monitoring should be conducted for checking air quality. Environmental Code of Practice for Air Quality management ESCOP-10 should be followed. 		
Water quality	Improper storage and handling of fuels, lubricants, chemicals, hazardous goods/materials on-site, wash down from the Sub-project construction sites and and potential spills may contaminate the water bodies and harm the environment and health of construction workers.	The workers should be encouraged to use PPEs every time when handling oils, lubricants, chemicals and other hazardous materials.	Contractor	SE/EHSU

Issues	Environmental Impacts	Mitigation Measures	Institutional Responsibilities	
			Implementation	Supervision
Noise level	Noise will be generated from the moving and idling vehicles, welding operation, and heavy machineries.	<ul style="list-style-type: none"> The machines/equipment/vehicles should be turned off when not in use. Using PPEs during construction work. Reduce unnecessary vehicular movement and speed limit (8 km to 16 km) of these vehicles should be maintained; Limit the Project activities especially the noise generating works such as welding, mixing, breaking bricks etc. within daytime only. 	Contractor	SE/EHSU
SEA/SH Risk	<ul style="list-style-type: none"> Demand for sex by migrant workers will increase SEA/SH Sexual harassment within the labour camp and nearby community. Force and early marriage by construction workers. Community school or college girls may be harassed or sexually abused by the project workers. Salary discrimination among the female workers. Cash transfer potentially inducing greater SEA/SH risks Community mobilization and training activities in rural setting exposing to SEA/SH risks Increase of COVID-19 spreading risk 	<ul style="list-style-type: none"> Public awareness creation. Extend the Shock Response Social Protection System to mitigate future risk and resilience building Awareness creation among local people and project workers. Regular monitoring Arranging workshop with school going girls for self-defense in any case of SEA/SH incident 	Contractor	DoF/PMU
Operation Phase				
Environmental Quality Wastewater	<u>BFDC Harbor at Chattogram</u> <ul style="list-style-type: none"> Process wastewater, generated from the chiller, fish processing plant, shipyard etc. would be sent to the 	<ul style="list-style-type: none"> An internal drainage system might be established through which water may be released to the nearby the Karnaphuli River from the Fish Processing Plant after proper treatment through W/ETP 	PMU	EHSU

Issues	Environmental Impacts	Mitigation Measures	Institutional Responsibilities	
			Implementation	Supervision
	<p>discharge settling pond and afterwards to the river which may increase the pH level of river water at the receiving end;</p> <ul style="list-style-type: none"> Oily waste water, generated from the car parking areas, plant equipment including transformer, oil storage tank and unloading areas, workshops, garage etc. may mix with the river water and create oil slick if it contains more than 10 ppm oil/ grease. 	<p>or directly to the Karnaphuli River if is able to meet the discharge limit;</p> <ul style="list-style-type: none"> The Internal drainage system may be covered up with a slab so that no solid waste is thrown to the drain; Regular monitoring through checking water quality of various parameters might be conducted and verifying with baseline results; Providing training and awareness program to the workers those might be engaged during operation stage. 		
Fish Habitat	Rehabilitating canals ensures consistent water flow and optimal water levels, while also improving connectivity between water bodies.	<p><u>Enhancement Measures</u></p> <ul style="list-style-type: none"> Conduct regular inspections and maintenance of canals to remove debris, repair damages, and ensure unobstructed water flow. Implement a water quality monitoring program to detect and address pollutants or changes in water parameters that could affect fish health. Educate local communities about the importance of canal rehabilitation and encourage practices that support water quality and habitat health. 	Contractor	SE/ PMU
Fish Migration	Fish migration will be improved due to re-excavation of the canals.	<p><u>Enhancement Measures</u></p> <ul style="list-style-type: none"> Maintenance re-excavation work should be conducted properly. Migration route should be maintained properly. 	Contractor	SE/ PMU
Fish Production	Fish production would be increased due to modification of canal fish habitat and increasing aquaculture practice.	Aware the local community to dig fish pond. Provide fish culture training to the pond owner to use scientific fish culture method in their pond for incremental production.	Contractor	SE/ PMU

7. Environmental and Social Monitoring Plan

Environmental and Social Monitoring Plan are given in the following Table 7.1.

Table 7.1: Monitoring Budget for Chakaria Shrimp Estate

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost (USD)
Construction Stage							
Air Quality	PM _{2.5} , PM ₁₀ , SO _x , NO ₂ , CO, O ₃	Selected locations as observed during the baseline study	Quarterly	24 hours Sampling	Third party monitoring	5.0	45,662
Water Quality	Surface water and Groundwater (Temperature, pH, Total alkalinity, Ammonium, BOD ₅ , COD, EC, Oil and Grease, Turbidity, TSS, TDS, TS, etc.)	Selected locations as observed during the baseline study	Quarterly	Composite sampling (In-situ and Lab test)		5.0	45,662
Noise	Day time (6:00 – 21:00) and Night time (21:00 – 6:00) Leq.	Selected locations as observed during the baseline study	Quarterly	Ambient noise level monitoring using ANSI Type II Noise Meter.		2.5	22,831
Fisheries resources	Fish Habitat, Fish biodiversity	Project location	Quarterly	In-situ investigation, FDG, water quality report	Third party monitoring	3.5	31,963
Employment (PAPs and Local people)	Labor Engagement for project activity	All over the study area Project Area	Quarterly	KIIs and FGDs in UPs and project area	Individual consultant	3.0	27,397

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost (USD)
Occupational health and safety	<ul style="list-style-type: none"> • First-aid Cases Medical Treatment Cases • Lost Time Injury • Number of near misses • Number of Walk-through Inspections by Project Managers, Construction Managers, Health and Safety Officer and OHS supervisors 	Project Area	Quarterly	Walk through, Interview with employees and workers, KIIs site manager	Third party monitoring	1.3	11,872
Community Health, Safety and security	<ul style="list-style-type: none"> • Rates of COVID-19 and other communicable disease (Chikungunya and Dengue, and other vector-borne diseases), • Project related safety and security incidents, • Number of grievances or claims of Project related impacts on the community. • Availability of Potable Water, Drinking water quality, • Availability of Hygienic Toilet 	Project Area	Quarterly	Walk through, Interview with employees and workers, KIIs site manager	Third party monitoring	0.75	6,849
Grievance Mechanism	Operation, Procedures, Records and Documents	At work site	Half Yearly	Register/Document review; visual inspection and enquiry to know the Grievance Mechanism	Third party monitoring	1	9,132

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost (USD)
Gender issue	<ul style="list-style-type: none"> • Involvement of women in fisheries-related activities (skilled positions) • Involvement of women in resource management committees • Engagement of women in project-related activities • Women accessing formal credit facilities and the increase in women-led enterprises or businesses in the project areas • Women's access to health center • Disease prevalence among women • Access of women to WASH • Women income and contribution to households • Women's mobility • Presence of GBV • Occurrences of SEA-SH 	Selected locations as observed during the baseline study	Half Yearly	Walk through, Interview with employees and workers, KII, FGDs in union parishad	Third party monitoring	1.1	10,046
Post-Construction Stage							
Air Quality	PM _{2.5} , PM ₁₀ , SO _x , NO ₂ , CO, O ₃	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	24 hours Sampling	Third party monitoring	2.5	22,831
Water Quality	Surface water and Groundwater (Temperature, pH, Total alkalinity, Ammonium, BOD ₅ , COD, EC, Oil and Grease, Turbidity, TSS, TDS, TS, etc.)	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	Composite sampling (In-situ and Lab test)		2	18,265
Noise	Day time (6:00 – 21:00) and Night time (21:00 – 6:00) Leq.	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	Ambient noise level monitoring using ANSI Type II Noise Meter.		1	9,132

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost (USD)
Social Development and PAPs	Compensation of the PAPs, Income equity, livelihood condition, WATSAN condition, perception on the project works, etc.	People affected by proposed project activities within the sub-project sites	Biannually	Survey, Document checking, Institutional survey, KII, Household Survey, FGD	Third party monitoring	2	18,265
Fisheries resources	Fish Habitat, Fish biodiversity	Project location	Half yearly	In-situ investigation, FDG, review of water quality report	Third party monitoring	3	27,397
Grievance Mechanism	Operation, Procedures, Records and Documents	Nearby Project Area	Quarterly	Register/Document review; visual inspection and enquiry to know the Grievance Mechanism	Third party monitoring	2	18,265
Gender issue	<ul style="list-style-type: none"> • Involvement of women in fisheries-related activities (skilled positions) • Involvement of women in resource management committees • Women accessing formal credit facilities and the increase in women-led enterprises or businesses in the project areas • Women's access to health center • Disease prevalence among women • Access of women to WASH • Women income and contribution to household • Women's mobility • Presence of GBV • Occurrence of SEA-SH 	Selected locations as observed during the baseline study	Yearly	Walk through, Interview with employees and workers, KII, FGDs in union parishad	Third party monitoring	0.5	4,566
36.15 Million BDT						330,137	

Table 7.2: Monitoring Budget of BFDC Harbor at Chattogram

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
Construction Stage							
Air Quality	PM _{2.5} , PM ₁₀ , SO _x , NO ₂ , CO, O ₃	Selected locations as observed during the baseline study	Quarterly	24 hours Sampling	Third party monitoring	3.0	27,397
Water Quality	Surface water and Groundwater (Temperature, pH, Total alkalinity, Ammonium, BOD ₅ , COD, EC, Oil and Grease, Turbidity, TSS, TDS, TS, etc.)	Selected locations as observed during the baseline study	Quarterly	Composite sampling (In-situ and Lab test)		2.5	22,831
Noise	Day time (6:00 – 21:00) and Night time (21:00 – 6:00) Leq.	Selected locations as observed during the baseline study	Quarterly	Ambient noise level monitoring using ANSI Type II Noise Meter.		1.5	13,699
Fisheries resources	Fish Habitat, Fish biodiversity	Project location	Quarterly	In-situ investigation, FDG, water quality report	Third party monitoring	3.5	31,963
Occupational diversity		All over the study area	Quarterly	KIIs and FGDs in UPs and project area	Third party monitoring	3.0	27,397
Employment (PAPs and Local people)	Labor Engagement for project activity	All over the study area	Quarterly	KIIs and FGDs in UPs and project area	Third party monitoring	3.5	31,963
Occupational health and safety	<ul style="list-style-type: none"> • First-aid Cases Medical Treatment Cases • Lost Time Injury • Number of near misses • Number of Walk-through Inspections by Project Managers, Construction Managers, Health and Safety Officer and OHS supervisors 	Project Area	Quarterly	KIIs in Project site, manager	Third party monitoring	1.3	11,872

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
Community Health, Safety and security	<ul style="list-style-type: none"> Rates of COVID-19 and other communicable disease (Chikungunya and Dengue, and other vector-borne diseases), Project related safety and security incidents, Number of grievances or claims of Project related impacts on the community. Availability of Potable Water, Drinking water quality, Availability of Hygienic Toilet 	Project Area	Quarterly	Walk through, Interview with employees and workers, KIIs site manager	Third party monitoring	0.75	6,849
Grievance Mechanism	Operation, Procedures, Records and Documents	At work site	Quarterly	Register/Document review; visual inspection and enquiry to know the Grievance Mechanism	Third party monitoring	1	9,132
Gender issue	<ul style="list-style-type: none"> Involvement of women in fisheries-related activities (skilled positions) Involvement of women in resource management committees Engagement of women in project-related activities Women accessing formal credit facilities and the increase in women-led enterprises or businesses in the project areas Women's access to health center Disease prevalence among women 	Selected locations as observed during the baseline study	Half Yearly	Walk through, Interview with employees and workers, KII, FGDs in union parishad	Third party monitoring	0.5	4,566

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
	<ul style="list-style-type: none"> Access of women to WASH Women income and contribution to thoisuehold Women's mobility Presence of GBV Occurrebces of SEA-SH 						
Post-Construction Stage							
Air Quality	PM _{2.5} , PM ₁₀ , SO _x , NO ₂ , CO, O ₃	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	24 hours Sampling	Third party monitoring	2.5	22,831
Water Quality	Surface water and Groundwater (Temperature, pH, Total alkalinity, Ammonium, BOD ₅ , COD, EC, Oil and Grease, Turbidity, TSS, TDS, TS, etc.)	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	Composite sampling (In-situ and Lab test)		2	18,265
Noise	Day time (6:00 – 21:00) and Night time (21:00 – 6:00) Leq.	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	Ambient noise level monitoring using ANSI Type II Noise Meter.		1	9,132
Fisheries resources	Fish Habitat, Fish biodiversity	Project location	Half yearly up to 5 years	In-situ investigation, FDG, review of water quality report		3	27,397
Gender issue	<ul style="list-style-type: none"> Monitor the percentage of women accessing formal credit facilities and the increase in women-led enterprises or businesses in the project areas Track the increase in the percentage of women accessing maternal health services and the number of hygienic latrines constructed. Monitor the 	Selected locations as observed during the baseline study	Yearly	Walk through, Interview with employees and workers, KII, FGDs in union parishad	Third party monitoring	0.4	3,653

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
	<p>percentage of women reporting improved access to sanitation and reduced waterborne Measure the percentage increase in women's participation in management bodies and assess the correlation between women's involvement and improvements in sustainable fishing practices and community incomes</p> <ul style="list-style-type: none"> • Monitor the increase in household incomes from diversified livelihoods, especially those led by women, and track the percentage of women participating in these initiatives • Track the establishment of safe spaces at fish processing facilities and the increase in community awareness • activities related to GBV in fishing communities 						
						29.45 Million BDT	268,950

Table 7.3: Monitoring Budget of Brood Management Center (BMC) Area at DFTC, Teknaf

VEESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
Construction Stage							
Air Quality	PM _{2.5} , PM ₁₀ , SO _x , NO ₂ , CO, O ₃	Selected locations as observed during the baseline study	Quarterly	24 hours Sampling	Third party monitoring	3	27,397
Water Quality	Surface water and Groundwater (Temperature, pH, Total alkalinity, Ammonium, BOD ₅ , COD, EC, Oil and Grease, Turbidity, TSS, TDS, TS, etc.)	Selected locations as observed during the baseline study	Quarterly	Composite sampling (In-situ and Lab test)		2.5	22,831
Noise	Day time (6:00 – 21:00) and Night time (21:00 – 6:00) Leq.	Selected locations as observed during the baseline study	Quarterly	Ambient noise level monitoring using ANSI Type II Noise Meter.		2	18,265
Fisheries resources	Fish Habitat, Fish biodiversity	Project location	Quarterly	In-situ investigation, FDG, water quality report	Third party monitoring	3.5	31,963
Occupational health and safety	<ul style="list-style-type: none"> • First-aid Cases Medical Treatment Cases • Lost Time Injury • Number of near misses • Number of Walk-through Inspections by Project Managers, Construction Managers, Health and Safety Officer and OHS supervisors 	Project Area	Twice in a year	KIIs in Project site, manager	Third party monitoring	1.3	11,872
Grievance Mechanism	Operation, Procedures, Records and Documents	At work site	Monthly	Register/Document review; visual inspection and enquiry to know the Grievance Mechanism	Third party monitoring	1	9,132
Gender issue	<ul style="list-style-type: none"> • Involvement of women in fisheries-related activities (skilled positions) 	Selected locations as observed during the baseline study	Half-Yearly	Walk through, Interview with employees and	Third party monitoring	0.3	2,740

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
	<ul style="list-style-type: none"> • Involvement of women in resource management committees • Engagement of women in project-related activities • Women accessing formal credit facilities and the increase in women-led enterprises or businesses in the project areas • Women's access to health center • Disease prevalence among women • Access of women to WASH • Women income and contribution to households • Women's mobility • Presence of GRV • Occurrences of SEA-SH 			workers, KII, FGDs in union parishad			
Post-Construction Stage							
Air Quality	PM _{2.5} , PM ₁₀ , SO _x , NO ₂ , CO, O ₃	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	24 hours Sampling	Third party monitoring	2.5	22,831
Water Quality	Surface water and Groundwater (Temperature, pH, Total alkalinity, Ammonium, BOD ₅ , COD, EC, Oil and Grease, Turbidity, TSS, TDS, TS, etc.)	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	Composite sampling (In-situ and Lab test)		2	18,265
Noise	Day time (6:00 – 21:00) and Night time (21:00 – 6:00) Leq.	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	Ambient noise level monitoring using ANSI Type II Noise Meter.		1	9,132

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
Fisheries resources	Fish Habitat, Fish biodiversity	Project location	Half yearly up to 5 years	In-situ investigation, FDG, review of water quality report		3	27,397
Gender issue	<ul style="list-style-type: none"> Monitor the percentage of women accessing formal credit facilities and the increase in women-led enterprises or businesses in the project areas Track the increase in the percentage of women accessing maternal health services and the number of hygienic latrines constructed. Monitor the percentage of women reporting improved access to sanitation and reduced waterborne Measure the percentage increase in women's participation in management bodies and assess the correlation between women's involvement and improvements in sustainable fishing practices and community incomes activities related to GBV in fishing communities 	Selected locations as observed during the baseline study	Yearly	Walk through, Interview with employees and workers, KII, FGDs in union parishad	Third party monitoring	0.2	1,826
						22.3 Million BDT	203,653

Table 7.4: Monitoring Budget of Canal Rehabilitation for Cluster Farming under Satkhira, Khulna, and Bagerhat Districts

VEESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
Construction Stage							
Air Quality	PM _{2.5} , PM ₁₀ , SO _x , NO ₂ , CO, O ₃	Selected locations as observed during the baseline study	Quarterly	24 hours Sampling	Third party monitoring	5.0	45,662
Water Quality	Surface water and Groundwater (Temperature, pH, Total alkalinity, Ammonium, BOD ₅ , COD, EC, Oil and Grease, Turbidity, TSS, TDS, TS, etc.)	Selected locations as observed during the baseline study	Quarterly	Composite sampling (In-situ and Lab test)		3.5	31,963
Noise	Day time (6:00 – 21:00) and Night time (21:00 – 6:00) Leq.	Selected locations as observed during the baseline study	Quarterly	Ambient noise level monitoring using ANSI Type II Noise Meter.		2.5	22,831
Fisheries resources	Fish Habitat, Fish biodiversity	Project location	Quarterly	In-situ investigation, FGD, water quality report	Third party monitoring	3.5	31,963
Employment (PAPs and Local people)	Labor Engagement for project activity	All over the study area	Quarterly	KIIs and FGDs in UPs and project area	Third party monitoring	3.0	27,397
Occupational health and safety	<ul style="list-style-type: none"> • First-aid Cases Medical Treatment Cases • Lost Time Injury • Number of near misses • Number of Walk-through Inspections by Project Managers, Construction Managers, Health and Safety Officer and OHS supervisors 	Project Area	Quarterly	KIIs in Project site, manager	Third party monitoring	3.0	27,397
Community Health, Safety and security	<ul style="list-style-type: none"> • Rates of COVID-19 and other communicable disease 	Project Area	Quarterly	Walk through, Interview with employees and	Third party monitoring	3.5	31,963

VEESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
	(Chikungunya and Dengue, and other vector-borne diseases), <ul style="list-style-type: none"> • Project related safety and security incidents, • Number of grievances or claims of Project related impacts on the community. • Availability of Potable Water, Drinking water quality, • Availability of Hygienic Toilet 			workers, KIIs site manager			
Grievance Mechanism	Operation, Procedures, Records and Documents	At work site	Quarterly	Register/Document review; visual inspection and enquiry to know the Grievance Mechanism	Third party monitoring	2.5	22,831
Gender issue	<ul style="list-style-type: none"> • Involvement of women in fisheries-related activities (skilled positions) • Involvement of women in resource management committees • Engagement of women in project-related activities • Women accessing formal credit facilities and the increase in women-led enterprises or businesses in the project areas • Women's access to health center • Disease prevalence among women • Access of women to WASH • Women income and contribution to households 	Selected locations as observed during the baseline study	Half-Yearly	Walk through, Interview with employees and workers, KII, FGDs in union parishad	Third party monitoring	1.5	13,699

VEESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
	<ul style="list-style-type: none"> Women's mobility Presence of GRV Occurrences of SEA-SH 						
Post-Construction Stage							
Air Quality	PM _{2.5} , PM ₁₀ , SO _x , NO ₂ , CO, O ₃	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	24 hours Sampling	Third party monitoring	2.5	22,831
Water Quality	Surface water and Groundwater (Temperature, pH, Total alkalinity, Ammonium, BOD ₅ , COD, EC, Oil and Grease, Turbidity, TSS, TDS, TS, etc.)	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	Composite sampling (In-situ and Lab test)		2	18,265
Noise	Day time (6:00 – 21:00) and Night time (21:00 – 6:00) Leq.	Selected locations as observed during the baseline study	Bi-annually up to five (5) years	Ambient noise level monitoring using ANSI Type II Noise Meter.		1	9,132
Social Development and PAPs	Compensation of the PAPs, Income equity, livelihood condition, WATSAN condition, perception on the project works, etc.	People affected by proposed project activities near the project sites	Biannually	Survey, Document checking, Institutional survey, KII, Household Survey, FGD	Third party monitoring	2	18,265
Fisheries resources	Fish Habitat, Fish biodiversity	Project location	Yearly up to 5 years	In-situ investigation, FDG, review of water quality report		3	27,397
Gender issue	<ul style="list-style-type: none"> Involvement of women in fisheries-related activities (skilled positions) Involvement of women in resource management committees Engagement of women in project-related activities Women accessing formal credit facilities and the increase in 	Selected locations as observed during the baseline study	Yearly	Walk through, Interview with employees and workers, KII, FGDs in union parishad	Third party monitoring	1	9,132

VESC/ Indicator	Monitoring Indicators	Location	Frequency	Method	Responsible Agency	Cost (Million BDT)	Cost USD
	women-led enterprises or businesses in the project areas <ul style="list-style-type: none"> • Women's access to health center • Disease prevalence among women • Access of women to WASH • Women income and contribution to households • Women's mobility • Presence of GRV • Occurrences of SEA-SH 						
						39.5 Million BDT	360,731

7.1 ESMP Cost

The total budget of the Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP) is given in the following **Table 7.5**.

Table 7.5: The Summary of the Budget

Item	Sub-Item	Cost (Million BDT)	Cost (USD)
Environmental and Social Management Plan	Waste management plan	Contractor Cost	
	Biodiversity Management Plan		
	Emergency Response Plan		
	Demolition Plan		
	Drainage management Plan		
	Stakeholder Engagement Plan		
Environmental and Social Monitoring Plan	Sub-project 1	36.15	330,137
	Sub-project 2	29.45	268,950
	Sub-project 3	22.3	203,653
	Sub-project 4	39.5	360,731
Institutional arrangement	PMU budget	39.2	341,696
Indirect Project Benefits	Afforestation	19.6	169,987
DoE approval cost		1,2	10,434
Total Cost		186.2	1,685,587

Appendix 1: Terms of Reference of EHS Consultants of Supervision Engineer

A. Objective

The primary objectives of the consulting services of supervising environmental and health and safety management during dismantling, installation and construction are to:

- ensure that the dismantling, installation and construction methods as proposed by the contractor for carrying out the works are satisfactory, with particular references to the technical requirements of sound environmental standards on the basis of safeguard requirements (proposed in the ESIA, this includes Government and the World Bank environmental guidelines), inspection of contractors' construction equipment, review contractor's health and safety standards, inspect construction yards and work camps, interview contractors' personnel and general public;
- Prepare checklist of monitoring factoring WBG's EHS Guidelines on occupational health and safety procedure and practice, sanitation condition, implementation of ESMP, and waste management practices and efficiency.
- Supervise contractor in implementing ESMP, environmental monitoring plan, and ensuring environmental social safeguarding during construction activities.
- Ensure that the recommendations of the environmental and social management plan (ESMP), environmental monitoring plan and environmental code of practices (ECPs) are strictly followed by the contractors;
- prepare quarterly environmental and health and safety monitoring and annual reports of implementing these plans as part of project implementation report, and carry out environmental management seminars for contractors and DoF staff; and
- monitor the implementation of the health and safety program at work site including the information and education campaign on sexually-transmitted diseases and HIV/AIDS (human immunodeficiency virus/acquired immunodeficiency syndrome) as required by the civil works contracts.

B. Resources

The consulting services will require the following inputs:

Sl. No.	Expertise	Input (PM)
1	Deputy Manager (Environmental Specialist)	24
2	Asst. Manager (Environment)	24
3	Asst. Manager (Occupational, Health, and Safety)	24
4	Communication Specialist	24
5	Field Surveyor (Diploma Engineer)	24
Total		120

C. National Consultants

1. Deputy Manager (Environmental Specialist)

The duties of the Deputy Manager shall include, but not limited to:

- Updating the ESMP provided in the ESIA as required based on the concurrent situation
- Based on the checklist conduct monitoring on implementation of ESMP, sanitation condition, and waste management practices and efficiency
- Supervise the construction methods as proposed by the contractor for carrying out the works are satisfactory, with particular references to the technical requirements of sound environmental and social safeguard standards on the basis of the ESIA
- Assist the PMU in arranging conducting environmental and social management seminars for contractors and DoF staff
- Preparation of quarterly environmental monitoring and annual reports of implementing the ESMP as part of project implementation report.

2. Asst. Manager (Environment)

The major duties are:

- Assist Deputy Manager in updating ESMP given in ESIA
- Collect required data and analyse those and outline report
- Assist PMU in arranging conducting environmental and social management seminars for contractors and DoF staff
- Assist in Preparation of quarterly environmental monitoring and annual reports of implementing the ESMP as part of project implementation report

3. Asst. Manager (Occupational Health, and Safety Specialist)

The duties of the Consultant shall include, but not limited to:

- Assist international Deputy Manager in ensuring that that the construction methods as proposed by the contractor for carrying out the works are satisfactory, with particular references to the technical requirements of sound environmental standards on the basis of ESMP
- Based on the checklist conduct monitoring on occupational safety procedure and practice
- Assist PMU in preparing quarterly environmental monitoring and annual report of implementing this plan as part of project implementation report, and carry out environmental management seminars for contractors and DoF staff
- Assist in plantation and community forest development work
- Ensure worksite health and safety aspects of the contractors' work as per ESMP and ECPs
- Ensure that the contractors do not damage the existing plantations.

4. Communication Specialist

The Communication Specialist will be responsible for the following:

- Reviewing the ESMP including mitigation and monitoring plan, enhancement plan pertaining to social aspects;
- Inspect working and labor condition
- Ensure priorities are giving to the local labor during recruitment of construction labor
- Ensure that gender aspects are adequately covered as per the ESMP
- monitor the implementation of the information and education campaign on sexually-transmitted diseases and HIV/AIDS (human immunodeficiency virus/acquired immunodeficiency syndrome) as required by the civil works contracts
- Monitor grievance redress mechanism
- provide inputs to the quarterly and annual reports

5. Field Surveyor

The Field Surveyor will be responsible for:

- Work under the guidance of the team to collect data and monitor ecological resources, HIV/AIDS program, plantation program in bi-monthly basis as recommended in the ESIA through various defined methodologies such as technical sampling, planting activities, etc.
- Inspect the construction activities to ensure activities are carrying out in line with the EMP under the guidance of the team
- Exclusively engaged in the project site and influence area and responsible for collecting secondary data from the concerned agencies.
- Exclusively engaged to work in close association with the local government institutions, NGOs and maintaining all sorts of liaisons with different institutions and officials.

D. Budget

Sl. No.	Item	Unit	Qty	Unit Cost (USD)	Amount, USD
3	Environmental Specialist	MM	24	2,174	52,174
4	Occupational Health and Safety Specialist	MM	24	1,739	41,739
5	Social Development Specialist	MM	24	1,739	41,739
6	Field Surveyors	MM	24	2,174	52,174
4	International Travel - Airfare	RT	24	870	20,870
				Total	208,696

Appendix 2: Scope of Work for Capacity Building and Training Consultant

A. Background

A capacity building program in environmental impact assessment, environmental management and occupational health and safety has been proposed for PMU and DoF staff. The program will (a) prepare training plan in environmental, health and safety, and (b) conduct training programs to improve the capability of ‘implementation staff’ in monitoring the implementation of environmental management and monitoring plan (EMMoP) of the Project including hazardous waste management and occupational health and safety. This will be done through a program of technical assistance and training over a period of two (02) months.

B. Objectives of the Services

The objectives of the services are: (a) to make PMU and EHS Unit staff familiar with environmental issues and impacts related to the project and to improve their skills in management and evaluation of the ESMP; (b) to develop and deliver training on hazardous waste management; (c) to develop and deliver training programs on occupational health and safety; and (d) to develop and deliver training on environmental monitoring, evaluation, and reporting.

C. Scope of Work

Task 1: Preparation of Training Modules on Environmental Management and Monitoring:

The purpose of this task is to develop training modules on (i) environmental issues and impacts related to the project, (ii) hazardous waste management in the project, (iii) occupational health and safety in the project, and (iv) environmental monitoring, evaluation, and reporting.

Training in Module 1 on environmental issues and impacts will broadly include:

- Fundamentals of ESIA and its Process at DoE and at the World Bank
- Typical Environmental Issues in water control structures, electrical sub-station, ETP, WTP, Fish Processing Plant, etc.
- Analyses of Alternatives and Identification of Preferred Option
- Case studies on Scoping of Issues and Assessment of Alternatives for the project components
- Identification and Prioritization of Issues
- Conducting Baseline Environmental and Socio-economic Information
- Case studies on Collection of Baseline Information in ESIA of multi-type Projects
- Prediction and Assessment of Impacts – Tools and Case studies
- Conducting cumulative impacts and climate change assessments
- Building an Environmental and Social Management Plan
- How to Review an ESIA Report?
- Public Consultation and Information Disclosure – The process with case studies

Training in Module 2 on hazardous waste management will broadly include:

- Overview of hazardous waste regulations (USEPA, OSHA, WBG etc.)
- What is hazardous waste?
- What are the hazardous wastes in water control structures, electrical sub-station, ETP, WTP, Fish Processing Plant?
- What to do with hazardous waste? Segregation, transportation and disposal to permanent site.
- Emergency response

Training in Module 3 on occupational health and safety in the project will broadly include:

- Overview of Labor Act, Factory Act, and international Guidelines (e.g., EHS Guidelines of IFC)
- General construction related standards, such as, scaffolding, fall protection, excavations, ladders, head protection, etc.
- Occupational Health and Environmental Control
- Use of Personal Protective Equipment (PPE)
- Access to Medical and First Aid
- HIV/AIDS and other STD management
- Fire Protection Procedure
- Handling and working with sub-station, processing plant, water control structures, etc.
- Machinery and Machine Guarding, especially extremely heated environment
- Use of Hand and Portable Powered Tools and Other Hand-Held Equipment, precautions in Welding, Cutting, and Brazing
- Working with live electrical equipment
- Commercial Diving Operations
- Toxic and Hazardous Substances

Training in Module 4 on monitoring, evaluation, and reporting will broadly include:

- Monitoring techniques and methods for various components of ESMP
- Environmental Monitoring Plan and Institutional Arrangements
- Identify parameters to be monitored
- Collection and analysis of environmental quality data, and Interpretation of monitoring parameters
- Internal and external monitoring needs during construction and operation
- Organizational responsibilities and implementation schedules
- Reporting requirements of monitoring

Task 2: Deliver Training on Environmental Management and Monitoring:

The purpose of this task is to deliver a series of training programs for all the activities proposed in Task 1 to all the implementing agencies of the Project (DoF, PMU, and BFDC).

Based on the above scope of works, the consultant will carry out the following activities:

- Undertake training need assessment for stakeholders including the implementation/ construction personnel.
- Devise training programs based on ESIA report and site visits to the Project area
- Prepare a staff training plan and associated materials (modules).
- Evaluate the trainings.
- Modify the training modules as necessary.
- Hand over the final training modules to the DoF/ BFDC for use in future training.
- Prepare training reports.

D. Organization and Staffing

The services are expected to be provided over a 2 months period by a team comprising one environmental specialist/team leader and one occupational health and safety specialist. Details of proposed professionals and their required input are shown below.

Table A36.1: Details of Proposed Consultants

Items	Input (Man Months)
Key Professional Staff	
1. Environmental Specialist/Team Leader	2
2. Occupational health and safety (including HIV/AIDS)	2

E. Supervision

The team will work in association with the PMU, reporting to the project director on a day-to-day basis. Overall supervision will be done by the EHS Unit of PMU.

F. Outputs

The team's outputs will include: (i) an inception report after one week of mobilization, (iii) a draft final report at the end of 7th week, containing a description of achievements, details of the training services provided, including all materials, an assessment of their effectiveness in meeting objectives and recommendations for further training assistance, (iii) and a final report at the end of assignment. All reports will be submitted in English.

In addition, the team will prepare training materials for both training programs. Each training program will consist of about 4 modules including some case studies and worked out examples. The draft training modules should be submitted to the PMU before conducting training programs for evaluation and final training modules will be presented at the end of assignment.

G. Budget

Following Table presents the estimated budget for the capacity building and training program.

Item	Unit	Unit Cost, US\$	Quantity	Total Cost, US\$
A. Remuneration and Per Diems				
i. Key Professional Staff				
Team Leader and Environmental Specialist	m-m	6,000	2	12,000
Natl Occupational health and safety Specialist (including HIV/AIDS)	m-m	5,000	2	10,000
Sub-Total A				22,000
B. Transport				
i. Transport	LS			7,000
Sub-Total B				7,000
C. Training Module Preparation and Production	No.	2,500	1	10,000
D. Trainee Allowance	days	50	100	6,000
E. Contingency (10% of subtotal, A+B+C)	LS	1		3,900
Grand Total (A+B+C+D+E)				48,900

Appendix 3: Matching of Contents of ESMP Report with the Contents of ESMP Report as in Schedule 11 of ECR 2023

EIA_ECR, 2023	Main ESMP report
1. Introduction	Chapter 1; Section 1.1
2. Project Description	Chapter 1; Section 1.2 (A detail Description with the project location, lay-out, Schedule, timeline and other required information has described in chapter-3 of the ESIA main report)
3. Environmental Policy	Chapter 1; Section 1.3 (Regulatory Framework and Policy those triggered by the Project are given in Chapter 4: Legislative Framework, Guidelines, and Standards has included in the ESIA Main Report) Detailed Description is given in Annex E .
4. Environmental Compliance Requirements	Chapter 1; Section 1.4
5. Environmental Impacts and Mitigation Measures	Chapter 5: table 5.1 Detail Environmental Impact and Mitigation Measures has been described in Chapter 9 of the (Volume I: Main Report-ESIA Report)
6. Environmental Surveillance, Monitoring and Auditing	Chapter 6 Environmental and Social Monitoring Plan; Table 6.1 Chapter 4: Institutional Arrangement
7. Contingency Planning	Chapter 4: Contingency Planning
8. Organizational Structure	Chapter 4: Institutional Arrangement
9. Budget and Implementation Programme	Chapter 6: Section 6.1



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