Environmental Management Framework (EMF) (Updated)

Climate Smart Agriculture and Water Management Project (CSAWMP)

Government of the People's Republic of Bangladesh
Ministry of Water Resources (MOWR)
Bangladesh Water Development Board (BWDB)

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ACRONYMS

AD	Alluvion-Diluvion
ADB	Asian Development Bank
amsl	Above Mean Sea Level
BBS	Bangladesh Bureau of Statistics
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BMD	Bangladesh Meteorological Department
BNBC	Bangladesh National Building Code
BP	(World) Bank Procedure
BRE	Brahmaputra Right-bank Embankment
BWDB	Bangladesh Water Development Board
CARINAM	Centre for Advanced Research in Natural Resource and Management
CC	Cement Concrete
CEGIS	Center for Environmental and Geographic Information Services
CHT	Chittagong Hill Tracts
CLSC	Central land allocation committee
CPUE	Catch Per Unit Effort
CSA	Climate Smart Agriculture
CUL	Compensation Under Law
CSAWMP	Climate Smart Agriculture and Water Management Project
CSC	Construction Supervision Consultants
DC	Deputy Commissioner
DEM	Digital Elevation Model
DFID	Department of International Development
DG	Director General
DoArch	Department of Archeology
DoE	Department of Environment
DoF	Department of Forest
DPP	Development Project Proforma
DSC	Design and Supervision Consultant
EA	Environmental Assessment
ECA	Environment Conservation Act
ECC	Environmental Clearance Certificate
ECoP	Environmental Code of Practice
ECR	Environment Conservation Rules
EHS	Environment, Health, and Safety
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMIS	Environmental Management Information System
EMP	Environmental Management Plan
ERP	Emergency Response Plan
ESC	Environmental and Social Cell
ESU	Environmental and Social Unit
EQS	Environmental Quality Standards

FAP	Flood Action Plan
FGD	Focus Group Discussion
FHRC	Environmental Management Information System
FI	Financial Intermediary
GHG	Green House Gases
GIS	Geographical Information System
GoB	Government of Bangladesh
GPP	Guidelines for People's Participation
GRM	Grievance Redress Mechanism
GSB	Geological Survey of Bangladesh
HH	Household
HIV/AIDS	Human Immuno-Deficiency Virus/Acquired Immune Deficiency Syndrome
HL	High Land
HSE	Health, Safety, and Environment
IBWTA	International Boundary Waters Treaty Act
ICZM	Integrated Coastal Zone Management
IDA	International Development Association
IEC	Important Environmental Component
IEC	Information, Education and Communication
IEE	Initial Environmental Examination
IEC	Important EnvironmentalComponent
IDA	International Development Association
IUCN	International Union of Conservation of Nature
IWFM	Institute of Water and Flood Management
JICA	Japan International Cooperation Agency
JMREMP	Jamuna Meghna River Erosion Mitigation Project
km	Kilometer
LL	Low Land
m	meter
MHL	Medium High Land
MLL	Medium Low Land
MoC	Ministry of Commerce
MoEF	Ministry of Environment and Forests
MoH	Ministry of Health
MoL	Ministry of Land
MoLG	Ministry of Local Governance
MoS	Ministry of Shipping
MoWR	Ministry of Water Resources
MPO	Master Plan Organization
MSDS	Material Safety Data Sheet
NAPA	National Adaptation Program of Action
NEMAP	National Environment Management Action Plan
NEP	National Environment Policy
NFP	National Fisheries Policy
NGO	Non-Governmental Organization
NLDP	National Livestock Development Policy
NLUP	National Land Use Policy
NWMP	National Water Management Plan
NWP	National Water Policy

O&M	Operation and Maintenance
OHS	Occupational Health and Safety
OP	Operational Policy
PAP	Project Affected People
PCU	Project Co-ordination Unit
PD	Project Director
PHAP	Public Health Action Plan
PCR	Physical Cultural Resources
PPE	Personal Protective Equipment
PMU	Project management unit
PRSP	Personal Protective Equipment
PWD	Public Works Department
RAP	Resettlement Action Plan
RMIP	River Management Improvement Program
RC	Resettlement Consultant
RCC	Reinforced Cement Concrete
RD&C	Research Development and Collaboration
RHD	Roads and Highway Department
RS	Resettlement Specialist
SDP	Social Development Plan
SIS	Small Indigenous (Fish) Species
TMP	Traffic Management Plan
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
VLL	Very Low Land
WARPO	Water Resources Planning Organization
WB	World Bank
WBG	World Bank Group
ZO	Zonal Office

EXECUTIVE SUMMARY

Introduction

Bangtladesh Water Development Board (BWDB) under the Ministry of Water Resources has prepared the Climate Smart Agriculture and Water Management Project (CSAWMP) for climate resilient agricultural water management introducing new activities related to long-term water use efficiency and climate smart irrigation and water management technologies. The proposed project, i.e., CSAWMP will scale up to the pilot reforms program initiated under completed Water Management Improvement Project(WMIP)

BWDB intends to carry out an Environmental Assessment (EA) of the schemes of the proposed project at the preparation stage, prior to implementation to ensure that the proposed infrastructure takes environmental concerns into account. A framework approach to environmental safeguards implementation has been adopted since, the nature of schemes, exact locations and design information will only be known at the implementation stage to identify key environment risks and impacts.Bangladesh Water Development Board (BWDB) has finally identified 19 potential schemes. Initially 42 potential schemes have been identified for financing under the CSAWMP. An Environmental Management Framework (EMF) is prepared& updated based on 19 FCD/FCDI schemes to provide guidance and directions, thus the guiding framework for the subsequest EA of the schemes. The objective of the EMF of the proposed project is to ensure that during the rehabilitation of embankment, drainage systems and water control structures and xcavation of canals in selected schemes, the environmental impactaspects of the project schemes are considered and appropriate mitigation measures are appropriately addressed throughout the project activities.

Additonally this Environmental Mangement Framework (EMF) intends to guide the detailed scoped environmental assessments of the subsequent of the program schemes to be carried out once the detailed design of the works is completed. This document shall also be applicable to, and guide the detailed environmental assessment, planning and implementation process for, any civil works undertaken as part of the current project, which are not already covered by the EMP prepared specifically for the priority schemes.

This EMF has been prepared based on careful environmental scrutiny of CSAWMP carried out through assessment of relevant literatures on similar project, stie vistis, baseline data review, impact analysis, appropriate environmental mitigation and stakeholders' consultation.

Project Description

The primary objectives of the project are:

1. To improve national water resources management by including the local communities to play an expanded role in all stages of the Participatory Scheme Cycle Management (PSM) from planning & design to operation and management.
2. To enhance institutional performance and capacity building of BWDB.
3. To transfer the management of BWDB infrastructures of the schemes to beneficiaries through WMO's.
4. To enhance agriculture & aquaculture production by improving the irrigation infrastructure & activities related to onfarm water use efficiency and climate smart water management.

This is expected to result in reduced vulnerability and enhanced livelihood opportunities for the beneficiaries, enhance agriculture & aquaculture production by improving the irrigation water use efficiency and will create a favorable environment for improved water resources management by the core water institutions, in partnership with the beneficiaries. The objectives would be achieved by gradually changing a centralized top down approach to a more decentralized and participatory water sector management approach for efficient and sustainable operations and management of the existing BWDB schemes.

BWDB has identified 19 potential Subprojects/ schemes for rehabilitation covering 09(Nine) BWDB zones located all over the country. The scheme civil works have beenselected based on consultation with local BWDB offices based on priority of schemes that requires immediate repair, rehabilitation and reconstruction. The works under 19 schemes will be implemented in different years for flood control/management, drainage improvementy and enhancing of irrigation facilities & to provide communication through the roadw ay on the embankment. The schemes are flood control and drainage (FCD); flood control, drainage and irrigation (FCDI) projects with the purpose of development and management of water resources relating to; riverbank erosion control; and provides irrigation, drainage, flood protection, bank erosion

protection, regulators, sluices, canals, cross-dams, embankments and sea-dykes along the banks of the rivers and the coast, etc.

CSAWMP has four components

- Component 1: Improved Climate Resilience of Flood Control, Drainage and Irrigation (FCDI) Infrastructure systems;
- Component 2: Climate Smart Agricultural Production and Marketing;
- Component 3: Project Management Support; and
- Component 4: Contingency Emergency Response.

BWDB has identified 19 potential subprojects/schemes for rehabilitation covering 09(Nine) BWDB zones located all over the country. BWDB also will work with DAE and DOF to identify the nature of agriculture and fisheries/aquaculture activities that will be carried out in these priority schemes, including needed actions to facilitate farmers' access to markets. In addition, this component will also support management transfer of schemes to the Water Management Organizations (WMOs).

Component 1 is sub divided into three two-components, such as:

1. Sub-component1.1: FCD and FCDI Scheme Rehabilitation and Modernization
2. Sub-component 1.2: Management Transfer and Capacity Builiding of BWDB and WMO's

This Component will includes interventions that promote and facilitate increased agricultural productivity, enhanced resilience (adaptation), and reduced GHG emissions(mitigation),as well as improved market access. The component aims to strengthen institutional capacity and increase farmers' adoption of climate-smart practices in selected rural landscapes associated with specific schemes being rehabilitated under sub-component A.1. In addition, this component will also support capacity building of DAE officials for delivering improved extension serviced that focus on integrated agricultural water management.

Component 2 is sub divided into two sub-components, such as:

1. Sub-component 2.1: Support to Climate Resilient Crop Production and Marketing
2. Sub-component 2.2: Support to Climate Resilient Aquaculture Production and Marketing.

The proposed civil works CSAWMP for the schemes have been categorized into six different type of activities that have listed in the following table . The Bangladesh Water Development Board (BWDB) has initially identified 42 potential schemes for financing under the CSAWMP.

Summary of Physical Interventions

Sl. no	Intervention	Quantity
1	Re-sectioning of embankment	335.47 Km
2	Re-excavation/dredging of canal/khal/river	357.88 Km
3	Rehabilitation of Water Control Structures	85 Nos
4	Rehabilitation of Inlet/Outlet Structures	193 Nos
5	River Bank Protection/Embankment slope Protection Work	8.924 Km
6	Rehabilitation/Repair of Pump house	06 nos.
7	Construction of Flood wall	2.00 Km
8.	Construction of WMO/WMG Building	16 Nos

Policy and Regulatory review

According to the Rule 7 (1) of the Environmental Conservation Rules 1997; for the purpose of issuance of Environmental Clearance Certificate (ECC), every industrial units or projects, in consideration of their site and impact on the environment, will be classified into the four categories and they are: Category I (green), Category II (Orange-A), Category III (Orange B) and Category IV (Red). According to the location, size, severity of pollution loads WMIP was considered to be medium impact on the important environmental components (IEC). Therefore CSAWMP, as follow on of WMIP falls under the 'Orange B' category.

The World Bank classifies the proposed project into one of the four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts, where categeory A is projects with most signinificant, category B with moderate and Category C with minimal environmental impactsThese categories are defined below.The proposed CSAWMP has been classified as Category B, since the environmental impacts are likely to be moderate and reversible. Therefore, scoped

EIAs will need to be carried out for the limited environmental effects of CSAWMP, in accordance with OP 4.01.

Environmental/Social Screening

All project schemes to be implemented under the proposed project will be subject to an environmental/social screening in order to prevent execution of projects with significant negative environmental impacts. The environmental/social screening would involve: (i) reconnaissance of the sub-project areas and their surroundings; (ii) identification of the major sub-project activities; and (iii) preliminary assessment of the impacts of these activities on the ecological, physic-chemical and socio-economic environment of the sub-project surrounding areas.

Environmental Baseline

The baseline condition of environmental quality in the locality of project site serves as the basis for identification, prediction and evaluation of impacts. The baseline environmental quality is assessed through field studies within the impact zone for various components of the environment, viz. air, noise, water, land and socio-economic, etc

Information of baseline environmental status of the project area is useful for impact assessment process of assessing and predicting the environmental consequences of the significant actions. EMF presents an overall baseline of the proposed schems area. Howeverr, based on the existing environmental scenario potential impacts of subprojects associated will be identified and accordingly management plan will be proposed in the scheme specific assessment report. . The baseline environmental conditions will help in comparing and to monitor the predicted negative and positive impacts resulting from the project during pre-construction, construction and operation phases

Assessment and Prediction of Impacts

First of all, the improved embankment will also significantly reduce the flooding events and associated economic losses. The riverbank protection will discontinue the recurring bank erosion and the associated loss of homesteads and cultivated land. The repaired sluice gate will reduce waterlogging and improve agricultural production finally, the rehabilitated embankment will facilitate local mobility as well as long-distance transportation. All of these factors are likely to have profound positive impacts on the local people and their economic condition.

The channel excavation will cause increased sediment in the channel within the reach of excavation. Additionally, the increase sediment laden water can potentially migrate downstream. The channel excavation will disrupt the aquatic habitat as well as vegetation on the banks and the increased sediment can adversely affect the benthic organism. The increased sediment load can also be potentially harmful to the fisheries in the excavated reach and further downstream if water in the excavated reach is not contained appropriately.

The riverbank protection would require existing bank vegetation and potentially trees to be removed from the river bank. This would adversely affect the terrestrial habitat on the river bank and the aquatic habitat adjacent to the riverbank. The increased sediment load and the removal of in water aquatic vegetation can also affect the fish habitat within the vicinity of the bank protection works.

Environmental Management Plan

The Environmental Management Plan (EMP) provides substantial guidance on how the IEC's (Important Environmental Components) will be managed during the implementation of the civil works. An overall outline is provided in this chapter so the subsequent project schemes civil works can be implemented and the required environmental compliance can be ensured adhering to the mitigation and monitoring plan described in this chapter.

The environmental management program should be carried out as an integrated part of the project planning and execution. It must not be seen merely as an activity limited to monitoring and regulating activities against a pre-determined checklist of required actions. Rather it must interact dynamically as a scheme implementation proceeds, dealing flexibly with environmental impacts, both expected and unexpected. For all schemes to be implemented under CSAWMP, the EMP along with required bill of quantity(BOQ)should be a part of the contract document. A generic EMP is shown in the table below for guding to prepare scheme specific EMP.

Generic Environmental Mitigation Plan

Scheme Activity	Potential Environmental Impacts	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision

Scheme Activity	Potential Environmental Impacts	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Re-excavation of Drainage channel	Obstruction of natural connection between river and wetlands inside scheme	• Natural flow of internal water bodies will be kept dynamic. • Excavated spoils will not be deposited which will obstruct movement of water. • Connectivity of all khals and beels will be restored as quickly as possible, if interrupted.	Cost included in the relevant pay item of the bid document.	Contractor	BWDB, DSC
	Fish habitat, fish migration and fish biodiversity	• The deepest portion of the khal will be untouched until other portion will be re-excavated for fish habitat. • Khal will not be re-excavated in Spawning/breeding period of fish.		Contractor	BWDB, DSC
Re-sectioning of Embankment	Tree and Vegetation	• Trees on slope will be kept untouched. More space will be available for plantation after new slope is developed. In addition, slope will be turfed with grass. • If any tree is cut two trees of same or better species for one will be planted.		Contractor	BWDB, DSC'
Repairing of Regulator and pipe inlet/outlet work	Dust/Air Pollution	• Water should be sprayed over the stacked material for controlling the dust			
	Noise Pollution	• Transportation of the construction materials and disposal of waste from scheme area has to be carried in scheduled time. The noisiest operations should be performed during daytime.		Contractor	BWDB, DSC
Re-excavation of Drainage Channel	Drainage Congestion and Water Logging	• Khal should not be excavated in rainy season as heavy rainfall causing water logging in this scheme. • Excavated spoil should be disposed in such a waythat itdoes not create any obstacle to annual flushing of the area would not contribute any risk to natural systems. • Precautions should be made to ensure that such areas don't become waterlogged or congested for water drainage and have adequate capacity to effectively remove suspended solids.		Contractor \	BWDB, DSC

Scheme Activity	Potential Environmental Impacts	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
	Populations of Corridors &Movement	• Problem will be very temporary. Communication system will be improved after completion of embankment. • Inlet/Outlet pipe and construction material should not be kept on passage way or corridors.		Contractor	BWDB, DSC
Labor Camp	Agricultural Land	• Precaution should be taken so that excavated and construction equipment is not placed on the agricultural land. • Excavated materials should not be deposited on cultivable land and spoils from fallow land must be timely disposed of. * • Agricultural land should be avoided for selection as borrow pit.		Contractor •	BWDB, DSC
	Surface and Ground Water Pollutions	• Construction waste will be kept at the corner of construction site and will be disposed properly. • Food waste from labor camp will be disposed at a cornerof labor shed by making a hole of dimension (1x1x1.25)m. • Wastes from labor camp will be reduced by deploying maximum number of local people, as local labor doesn't need to stay at labor shed during night time. • The septic tank and soak well should be sited not less than 10 m from any ditch, drain or watercourse and preferably not closer than 15 m to any dwelling.			

Institutional Arrangement for Safeguard Compliance

GoB will implement the project under the overall responsibility for project management and coordination through its MoWR, MoA and MoFL. BWDB under the MoWR, DAE under MoA and DoF underMoFL are the Executing Agency (EA) of the Project. BWDB, DAE and DoFshall be responsible for the execution and implementation of the Project BWDB will set up a PCU and DAE and DoF will set up their own PIUto oversee the development and

management of the project. The PCU will be led by a Project Co-ordinating Director (PD) appointed by BWDB. The DAEand DoF will have respective Project Directors.

The BWDB, PCU will have a central project office located at the headquarters of BWDB in Dhaka. The PD will be the rank of an Additional Chief Engineer/Senior Superintending Engineer, and will report directly to the concerned Additional Director General (ADG). In addition, executing field offices will be led by an Executive Engineer, who will report to the respective Superintending Engineer and Chief Engineer of the field office. The role of the PCU is, therefore, largely to contract competent organizations, to carefully supervise their performance, to enable them to perform efficiently, and to ensure transparent and regular reporting to BWDB and MoWR.

The BWDB will hire and use the design and supervision consultancy (DSC) services of international /national firm through competitive selection in engineering surveys, designs, construction supervision including quality assurance, preparation of bidding documents and final certification of quantity and quality compliance of works completed by the contractors.

Capacity building for effective implementation of the environmental safeguard requirements is a key element of the EMP. Capacity building for environmental safeguard management will need to be carried out at all tiers of the program, including BWDB, PCU, DAE, DoF, DSC, M&E consultant and contractors. During the O&M phase of the program, these trainings will need to be continued by BWDB staff for all relevant O&M personnel and community.

Public Consultation

Objective of the public consultation is to minimize adverse impacts, gaining support and cooperation of local government bodies like UP's, stakeholder groups like beneficiary communities including water management organizations, and any entities looking after community interests, and the affected squatters, business owners, and traders on embankments and others, who would directly face the adverse impacts and temporary inconveniences. Suggestions/feedbacks received from the consultations will be considered in schemes designs

For carrying out EMF some consultations were held in three BWDB zones, i.e., Central Zone, Dhaka, Mid Western Zone Faridpur, South Easter Zone, Chittagong. Meetings were held with the officials of local BWDB offices, Union Chairman and local representatives of the concerned schemes for some of the visited schemes and with the Upzilla Officials of the respective schemes

Focus Group Discussions (FGDs) were held during these field visits to identify issues and problems to enable the institution to corrective measures and to identify lessons and opportunities to enhance project implementation mechanism. Discussions also have been held with the BWDB officials on different aspects of project implementation and management, particularly focusing on existing capacity and institutional arrangement forsocial impact issues. In accordance with guidance of EMF scheme specific consultation need to be conducted during the preparation of site specific environment assessment.

Training Requirements

Both BWDB, DoF andDAE will need to ensure that their engineers/officials receive advanced training on environmental management and monitoring.

Access to Information

Summary of the EMF report and impact mitigation measures have been translated into Bengali language and disseminated locally. Copies of the full report (in English) and the summary (in Bengali) will be sent to all the concerned offices of BWDB, DoF and DAE, and will be made available to the public. The EMF will also be uploaded in the agencies website and in the Bank portal before appraisal completion.

In addition, a national workshop will be planned for presenting the EMF and SMF to the key stakeholders including field level staff of the implementing agencies, community representatives, NGOs, civil society etc. The comments and the findings from the workshop and other public meetings will be reviewed and incorporated in the final report.

1 INTRODUCTION

1. Bangtladesh Water Development Board (BWDB) under the Ministry of Water Resources has prepared the Climate Smart Agriculture and Water Management Project (CSAWMP) for climate resilient agricultural water management introducing new activities related to longterm wateruse efficiency and climate smart irrigation and water management technologies. The proposed project, i.e., CSAWMPwill scale up to the pilot reforms program initiated under recently completed Water Management Improvement Project (WMIP). Further, the project is aimed to widespread implementation ofthe participatoryscheme management approach on a larger scale and institutionalization within BWDB structure. The proposed project will also strengthen Water Management Organizations (WMO) formed under WMIPand include lessons from the pilot phase information of new WMOs.

2. BWDB intends to carry out an Environmental Assessment (EA) of the proposed project schemes at the preparation stage, prior to implementation to ensure that the proposed infrastructure takes environmental concerns into account. An Environmental Management Framework (EMF) is prepared to provide guidance and directions, thus the guiding framework for the subsequest EA. The objective of the EMF of the proposed project is to ensure that during the rehabilitation of embankment, drainage systems and water control structures in selected schemes, the environmental impactaspects of the project schemes are considered and appropriate mitigation measures are appropriately addressed throughout the project activities.

3. The present Environmental Mangement Framework (EMF) has also been prepared to guide the detailed scoped environmental assessments of the subsequent of the program to be carried out once the detailed design of the works is completed. This document shall also be applicable to, and guide the detailed environmental assessment, planning and implementation process for, any civil works undertaken as part of the current project, which are not already covered by the EMP prepared specifically for the priority schemes. This would include, for example, adjustments to the planned priority reach civil works to account for unplanned changing conditions.

1.1 Program Background

4. The Government has adopted a new approach to mainstream the local community and stakeholders in water management to ensure Integrated Water Resources Management (IWRM) in the country. The main elements of this approach are to reform and strengthen the key institutions involved in water sectors like Bangladesh Water Development Board (BWDB); ensure local user community participation at all stages of the cycle of water management projects; minimize adverse effects of water sector interventions on fisheries and the environment; ensure environmentally sustainable utilization of existing facilities through rehabilitation and effective O&M, including the transfer of management of FCD/FCDI schemes to Water Management Organizations (WMO). The WMIP was aimed to widespread implementation of the approach on large scale throughout the country along with reform process and capacity development of the key water sector institutions. Nevertheless, due to AILA and SIDR, WMIP had to take up emergency Flood Damage & Rehabilitation (FDR) works as emergency and a considerable amount of fund was diverted to FDR works. For this reason, WMIP was restructured and scope of work has to be reduced.

5. The WMIP has implemented the programs for only 67 schemes out of the selected 200 schemes of BWDB. However, the programs should be continued or replicated for other Water Resources Projects to achieve the final goals of NWMP and subsequent NWMP. The Climate Smart Agriculture and Water Management Project (CSAWMP) has been conceived for climate resilient agricultural water management and would continue the programs for establishing a sustainable and effective Water Management System in Bangladesh through participatory approach.

1.2 Project Rationale

6. Bangladesh is a small riverine country which is vulnerable to different types of natural disasters due to contemporary climate change and her geographical location. The major disasters and environmental vulnerabilities this country is facing are floods, water stagnancy, droughts, cyclone, tidal surge, river erosion, salinity, extreme temperature and low light intensity etc. As predicted, that the vulnerabilities due to the mentioned climate change may likely to be aggravated more in the future. As a result, the agriculture production systems, economic and social development of the country has been hindered firstly through damaging of crops, livestock, fisheries and agro-forestry, natural resources,

establishments and infrastructures due to these catastrophic events significantly. Secondly adverse impacts of natural disasters are hindering the on-going developments, business and trade at local, regional and even global levels. WMIP had been undertaken to tackle the above-mentioned emerging situation. In WMIP, System Improvement & Management Transfer (SIMT) and Operation & Maintenance Improvement (OMPI) of 67 schemes were completed through active participations of Project beneficiaries of the Water Management Organization (WMO). It is worth mentioning that the management of the Scheme was handed over to the beneficiaries after Joint Trial O&M for one year. The active involvement of WMOis the prime objective of the project for sustaining the Project.

7. The WMIP had initiated, established and promoted participatory water management to possible extent as a pioneer project. What WMIP had done in case of participatory water management might be just a beginning. As such participatory management concept drew adequate attention to undertake and accomplish necessary works to establish the benefits of the concept in general and make it sustainable in particular.

8. Now there is a need to continue the momentum of WMIP further along with expanding such participatory water management beyond the WMIP project areas. The Project Preparation Advance (PPA) support from WB will be utilized for the preparation of DPP and other necessary activities related to DPP. In water sector, such national level countrywide programs have been taken with a view to frame sustainable and long-term multipurpose development. The programs proposed to be taken under this project are relevant to the short/medium/long term policies/plans/programs of the Government of Bangladesh.

9. As such all programs planned and committed under WMIP could not be funded with the available funds. Some works planned under WMIP could not be taken up for implementation due to several reasons, such as, withdrawal of Govt. contribution, diversion of considerable amount in FDR works, time consuming PSM approach in whole of the country, lose of considerable amount due exchange of rate from EURO to USD & BDT etc. The achievement of theWMIP as well as the active involvement of WMO, which is the prime objective of the project will sustain if the programs under CSAWMP are continued. The aim of the CSAWMP is to ensure food security of the ultra-poor and the climate vulnerable farmers promoting climate-smart agricultural system using ICT in the projects located under the nine zonal offices of the BWDB.

10. Thus, CSAWMP is a follow on project of WMIP,which was completed in December 2016. All programs planned and committed under WMIP could not be funded with the available funds. Some works planned under WMIP could not be taken up for implementation due to several reasons as mentioned earlier, will be taken up in CSAWMP;

    - ❖ Under the WMIP, originally 200 projects were planned to be taken under SIMT and OMPI and accordingly schemes selection program was executed. But during restructuring of WMIP, only 67 schemes have been taken for implementation;
    - ❖ By this time, WMIP has gathered extensive experience in the field of participatory water management and now is able to implement it in continuation programs under a follow on project, i.e. CSAWMP more quickly, efficiently and effectively;
    - ❖ Strengthening, deepening & consolidations of the result of WMIP may play a guiding role in CSAWMP. Lessons learnt and experience gathered from the past programs will be helpful to take initiative for sustainability of WMOs and will create the scope for sustainability of the achievement;
    - ❖ Continuation of the programs under proposed CSAWMP isneeded to address the growing demand of Agriculture Water Management;
    - ❖ Eight years' period is not sufficient for substantially sustainable achievement in Institutional Improvement of BWDB and it needs continuation for more time;
    - ❖ Huge field level arrangement, trained, experienced and committed manpower and field level mobilization is required for implementation of a project like WMIP. WMIP has recruited required manpower, carried out extensive training programs for them and they have gathered extensive knowledge & experience in participatory water management. If the programs under WMIP is continued under CSAWMP, the existing manpower may be made available to the new project where their knowledge & experience may be of immense benefit to the execution of programs related to participatory water management; and
    - ❖ The momentum of the programs, already taken under WMIP, will be lost if not continued further; what WMIP has done in case of participatory water management is just a beginning. The works are yet to be accomplished to establish the benefits of participatory management concept and make it sustainable. To accomplish the works, continuation of programs is required.

11. The BWDB has initiated the preparation of DPP for the proposed "Climate Smart Agriculture and Water Management Project (CSAWMP)". A Technical team had been constituted by the Board to identify and primary selection of the schemes for the proposed project. BWDB approach to World Bank for financial assistance for the prepatory activities of the proposed CSAWMP and Bank agreed. Accordingly, BWDB engaged a dedicated team to expedite the preparation of CSAWMP in order to minimize time lag between WMIP

and follow on project (CSAWMP). The Project Preparation Advance (PPA) had been utilized for the preparation of DPP and other necessary activities related to the DPP.

1.3 Rationale for Environmental Management Framework (EMF)

12. The Climate Smart Agriculture and Water Management Project (CSAWMP) seeks to enhance productivity and climate resilience of agriculture through improved water management and increased market opportunities for smallholder farmers, especially women, in selected schemes; and in the event of an emergency, to provide immediate and effective response. Project supports will be primarily focused on: (i) rehabilitating and modernizing FCD and FCDI infrastructure for climate-resilient water resources management; (ii) improving the management and sustainability prospects of FCD and FCDI infrastructure by supporting local communities to play an expanded role at all stages of scheme management (including contributing to O&M); (iii) promoting more efficient use of water resources through improved on-farm water use efficiency and water productivity; (iv) supporting the dissemination and adoption of Climate-Smart Agricultural (CSA) practices under both crop and fisheries production systems (to promote adoption and mitigation of climate change); and (v) improving the marketing of agricultural products for beneficiaries.

13. The Project approach is to undertake identification and selection of scheme level water management infrastructures for design and rehabilitation to withstand climate change impacts in water management. Under this programmatic planning approach, environmental impacts including safeguards compliance issues will be identified when the specific sites for civil works will be selected and designed for implementation. Project activities will largely be on existing available lands, but in special circumstances, additional private land may be required and existing public land may need to be resumed from authorized or unauthorized private uses. Works and site selection will be done through all-inclusive consultative process. However, exact locations with construction boundary as well as associated environmental impacts including safeguards compliance issues will be identified when site-specific design will be prepared at the implementation stage. To support the programmatic approach in project implementation, the BWDB has prepared this Environmental Management Framework (EMF) to deal with safeguards compliance and other social issues likely to arise during design and implementation of the subprojects under the Project.

14. The EMF is based on quick environmental assessment of the proposed project including review of past and ongoing experiences and consultation with the stakeholders. The level of environmental risk is estimated to be low to moderate, stemming from the rehabilitation nature of most investments. The Project has been assigned Environmental Risk Assessment Category B and triggers the following World Bank Safeguard Policies: Environmental Assessment (OP 4.01). In review of past experiences, the project activities trigger other safeguards operational policies of world Bank including on Pest Management (OP 4.09), Indigenous Peoples (OP 4.10), and Involuntary Resettlement (OP 4.12). The EMF includes an Environmental Management Framework (EMF) with a generic Environmental Management Plan (EMP), a Resettlement Policy Framework (RPF), a Tribal Peoples Development Framework (TPDF), Inclusion and Gender Action Plan (IGAP), a Communications and Consultation Plan (CCP), and Labor Influx Management Plan (LIMP) for identification and management of environmental issues in the implementation stage. This EMF will guide environmental screening of project interventions, environmental impact assessment, citizen engagement, gender mainstreaming, consultation and participation and preparation of environmental management plans including Resettlement Action Plan (RAP) and / or Tribal Peoples Development Plan (TPDP). A separate Pest Management Plan (PMP) has been prepared to promote the use of biological or environmental control methods and reduce reliance on synthetic chemical pesticides.

15. The EMF is conducive to the approach of participatory scheme cycle management through water management organizations (WMO) including Water Management Groups (WMG) at the hydrological unit level and Water Management Association (WMA) at the scheme level. The EMF will be updated in the subsequent project phases based on experience and lessons learnt from preceding phases.

1.4 Approach and Methodology

16. This EMF has been prepared based on environmental assessment of CSAWMP carried out through review of relevant literatures on similar projects and stakeholders' consultation. Searching and reviewing the above-mentioned literatures include comprehensive desk work on specific objectives related to preparation of this EMF. More specifically, literature review includes past experiences of water resources management, agricultural technology project, etc., in the context of contemporary climate change and social safeguards management in rehabilitation/improvement and construction of water resources management infrastructures for making use of gained insight in the CSAWMP financed by

the World Bank. The Environmental Assessment (EA) carried out before appraisal of the project enabled the preparation of EMF.

17. Interviews, focused group discussion (FGD), IEE, Initial social screening of subprojects/schemes, etc., were conducted/done to identify social impacts and risks including land acquisition, resettlement and other social impacts due to implementation of the subprojects/schemes. Schemes sites were selected for water management infrastructures through all-inclusive consultative process. The stakeholders including the beneficiaries and the affected persons and their communities had been consulted for carrying out EA. Attention was paid to avoid or minimize land acquisition to possible extent during the stakeholders' consultations. The stakeholders (the beneficiaries, the likely affected persons, the poor, asset less, women and other disadvantaged and vulnerable groups) were informed about requirement of acquisition of private and public lands along with confiscating the existing public land from authorized or unauthorized private uses in special circumstances for implementing the subprojects/schemes.

1.5 Structure of EMF

18. Thereport onEMF of CSAWMP Project has a total of 8 chapters, as outlined below:

- Chapter1: Introduction: This chapter describes the background of the project, rationale of the EMF and methodology to prepare the EMF.
- Chapter2: Description of the Proposed Project: This chapter includes brief description of the proposed interventions under CSAWMP project.
- Chapter3: Environmental Policies, Legal and Administrative Framework: This chapter contains the brief of the relevant national and international policies, regulations and administrative procedures relevant for the CSAWMP project.
- Chapter 4: Environmental Baseline: The key environmental component and baseline indicators that are important in terms of the affect to the environment are discussed in this chapter.
- Chapter 5: Assessment and Prediction of Impacts: This chapter outlines the qualitative and quantitative method of identifying the impacts. An example of scheme with predicted impact is provided.
- Chatper 6: Environmental Management Plan: This chapter presents the Methodology of environmental screening and conducting Initial Environmental Examination (IEE) and process of conducting Environmental Impact Assessment (EIA) and preparing environmental management plan to mitigate negative impacts, enhance positive impacts for specific schemes under the CSAWMP.

- Chapter 7: Institutional Arrangement and Capacity Building: This chapter identified the process in strengthening in the institutional capacity of the BWDB and required institutional arrangements for implementing EMP.
- Chapter 8:Public Consultation and Disclosure: This chapter describes the Public Consultation and Disclosure that is mandatory for the EA study of any development project according to the EIA Guidelines of the DoE as well as World Bank.

2 PROJECT DESCRIPTION

19. The Government of Bangladesh has prepared the Climate Smart Agriculture and Water Management Project (CSAWMP) for climate resilient agricultural water management introducing new activities related to long term water use efficiency and climate smart irrigation and water management technologies. The proposed project, i.e., CSAWMP will scale up the pilot reforms program initiated under recently completed Water Management Improvement Project (WMIP) and will incorporate climate change aspects in the project design. Further, the project is aimed to widespread implementation of the participatory scheme management approach on a larger scale and institutionalization within BWDB, DAE and DoF structure. The proposed project will also strengthen Water Management Organizations (WMO) formed under WMIP and include lessons learned from the pilot phase information of new WMOs.The proposed project, ieCSAWMP is located in the nine zones (8 old zones) of the BWDB (Figure 2.1).

20. The Government has adopted a new approach to mainstream the local community and stakeholders in water management to ensure Integrated Water Resources Management (IWRM) in the country. The main elements of this approach are to reform and strengthen the key institutions involved in water sectors like Bangladesh Water Development Board (BWDB); ensure local user community participation at all stages of the cycle of water management projects; minimize adverse effects of water sector interventions on fisheries and the environment; ensure environmentally sustainable utilization of existing facilities through rehabilitation and effective O&M, including the transfer of management of FCD/FCDI schemes to Water Management Organizations (WMOs).

Figure 2.1: Zonal Map of the BWDB

2.1 Objectives of the Proposed Project

21. The primary objectives of the proposed project are:

    1. To improve national water resources management by including the local communities to play an expanded role in all stages of the Participatory Scheme Cycle Management (PSM) from planning & design to operation and management.
    2. To enhance institutional performance and capacity building of BWDB& WMO.
    3. To transfer the management of BWDB infrastructures of the schemes to beneficiaries through WMO's.
    4. To enhance agriculture & aquaculture production by improving the irrigation infrastructure & activities related to on farm water use efficiency and climate smart water management.

22. This is expected to result in reduced vulnerability and enhanced livelihood opportunities for the beneficiaries, enhance agriculture & aquaculture production by improving the irrigation water use efficiency and will create a favorable environment for improved water resources management by the core water institutions, in partnership with the beneficiaries. The objectives would be achieved by gradually changing a centralized top down approach to a more decentralized and participatory water sector management approach for efficient and sustainable operations and management of the existing BWDB schemes.

2.2 Design of the CSAWMP

23. The CSAWMP will include agricultural water management by not only improving irrigation infrastructure, but also introducing activities related to on-farm water use efficiency, as well as climate smart and climate resilient agriculture practices and technologies. The CSAWMP will scale up the participatory reforms initiated under the predecessor project.

24. The project design is based on integrated approach to climate resilient agriculture with specific interventions related to irrigation and drainage management, improved on- farm water management technologies, and improved agricultural and aquaculture management within the coverage areas of project schemes including introduction of climate-smart technologies for production, post-harvest, value-addition, and market access. As Bangladesh is extremely vulnerable to climate shocks, the project design remains sensitive to agro-climatic conditions in different parts of the country and promotes specific technologies and practices relevant to the various agro-ecological systems.

2.3 Climate Smart Agriculture and Water Management Project (CSAWMP)

25. The CSAWMP consists of four components and these are:

- ❖ Component 1: Improved Climate Resilience of Flood Control, Drainage and Irrigation (FCDI) Infrastructure systems;
- ❖ Component 2: Climate Smart Agricultural Production and Marketing;
- ❖ Component 3: Project Management Support; and
- ❖ Component 4: Contingency Emergency Response.

2.3.1 Component 1: Improved Climate Resilience of Flood Control, Drainage and Irrigation (FCDI) InfrastructureSystems

26. BWDB has finally identified 19 potential subprojects/schemes initially for rehabilitation covering 9 BWDB zones located all over the country. In consideration of Climate Resilience, the rehabilitation & improvement cost of the schemes will be revisited andthe feasibility in terms of technical, economical, social and environmental will be done. In addition, BWDB will also work with DAE and DOF to identify the nature of agriculture and fisheries/aquaculture activities that will be carried out in these priority schemes, including needed actions to facilitate farmers' access to markets. In addition, this component will also support management transfer of schemes to the Water Management Organizations (WMOs).

27. This Component is divided into two sub-components:

3. Sub-component1.1:FCD/FCDI Scheme Rehabilitation and Modernization

2.3.2 Sub-component 1.2: Management Transfer and Capacity Building of BWDB and WMO'sComponent 2: Climate Smart Agriculture Production and Marketing

28. The advantage of the improved and resilient water management conditions (both in terms of flood control and drainage in the monsoon season, and increased availability in the dry season) accruing out of investments in Component 1, project support under this component will focus on increasing the productivity and resilience of both crop and aquaculture production systems to climate change while also pursuing opportunities for reducing Greenhouse Gas (GHG) emissions from these production systems. This component is to improve farmers' incomes and livelihoods which would in turn also improve the prospects of sustainability of investments under Component 1.

29. Both DAE and DoFhave prepared a list of proposed activities. Bangladesh country CSA profile which, among others, identifies entry points for investing in CSA at scale may be sheared. This will be a basis for further refining, and fine-tuning component design, especially with respect to the kinds of activities which will be funded. The component description and implementation arrangements will be updated for clearly bringing out truly transformative and integrative aspects in the component design, interventions and activities focusing on a small number of high impact interventions.

30. This Component is sub-divided into two sub-components, such as:

    Sub-component 2.1: Support to Climate Resilient Crop Production and Marketing

    Sub-component 2.2: Support to Climate Resilient Aquaculture Production and Marketing.

2.3.3 Component 3: Project Management Support and Monitoring

31. This component will cover the project management including implementation of EMF, monitoring and evaluation of all project activities in line with the Results Framework, and set-up adequate fiduciary, governance, audits and accountability mechanisms; grievance redressal mechanism, communication and monitoring and evaluation, and special studies. This component will also support introduction of interactive voice response (IVR) system to promote effective citizen engagement through disseminating information of project schemes and associated agriculture and aquaculture interventions to seek community feedback.

2.3.4 Component-4: Contingency Emergency Response

32. This zero-cost component will finance eligible expenditures under the Immediate Response Mechanism (IRM) in case of natural or man-made crises or disasters, severe economic shocks, or other crises and emergencies in Bangladesh. In such cases, funds from an unallocated category or other project components will be reallocated to finance emergency response expenditures to meet the emergency needs. The emergence response would include mitigation, recovery, and reconstruction following natural disasters, such as severe droughts, floods, disease outbreaks, and landslides, among others.

2.4 Scheme Selection Criteria

33. It was agreed that scheme selection criteria will prioritize schemes: (i) that are most vulnerable to climate change impacts; (ii) ranging between 1,000 ha to 15,000 ha; (iii) with

high poverty levels; (iv) with existing WMOs/CBOs or willingness to form WMOs; and (v) and cost effectiveness of the rehabilitation.

34. In addition, under this component, support will be provided for Participatory Scheme Cycle Management (PSM) to promote the participatory and community mobilization aspects of system management transfer and the involvement of communities in operations and (routine) maintenance (O&M) management. The participatory process is based on the Participatory Water Management Regulation 2014 adopted by the Government. The scheme selection criteria is given in the followingTable 2-1:

Table 2.1 :Selection criteria table

Criteria	Requirement
Type of Scheme	FCD/FCDI
Vulnerability	Most vulnerable to climate change impacts
Size	>1000ha to ≤15000ha
Social status	High poverty levels
Institutional status	Existence of Water Management Organizations(WMOs)/Community-Based Organizations(CBOs) or willingness to form WMOs/CBOs
Economic	Rehabilitation cost is economically feasible

2.5 Participatory Scheme Cycle Management

35. Beneficiaries will be mobilized for their participation in the identification, design, construction of civil works and operation and maintenance of FCD and FCDI structures after improvement. Committees will be strengthened or established in all project schemes to determine the competing needs and uses for water resources, and to decide on the operation of hydraulic infrastructure. Intensive social mobilization may be piloted in some subprojects/schemes under CSAWMP to establish participatory water management organizations (WMO) that will be responsible for the operation and minor maintenance works. Lessons learned from the WMIP schemes on establishment and operation of water management organizations may be replicated or scaled up in other schemes subsequently. The establishment of WMOs will follow anten step process, as identified in the Guidelines for Integrated Planning for Sustainable Water Resources Management, published by BWDB in 2008. Social mobilization is expected to last around two years, during which time the WMOs will be established and trained in participatory planning, as well as in operation and minor maintenance activities. It is expected that with WMOs are piloted, the detailed design of schemes under the Project will be discussed in a participatory manner with BWDB to ensure their full participation at early stage. Small

works, including minor periodic maintenance and operation of minor hydraulic infrastructure would be undertaken by the WMOs under a memorandum of understanding with BWDB.

36. BWDB will engage The Chief Water Management office of BWDB for social mobilization and with project staff will facilitate to form Water Management Groups (WMGs) at the hydraulic unit level and Water Management Associations (WMA) at the scheme level. The WMA at the project scheme level will represent the beneficiary communities having representatives from the WMGs in its general council.

2.6 Institutional Coordination

37. An institutional arrangement is required for management and implementation of schemes under the project ensuring environmental safeguard compliance, satisfying the World Banks safeguard requirements. In addition to management and implementation of the project, the institutional arrangement will also include organizational support, training needs and plan and information system management.

38. GoB will have the overall responsibility for project management and coordination through MoWR as a lead Ministry and in cooperation with MoA and MoFL. BWDB under the MoWR is the Executing Agency (EA) for BWDB part of the Project. BWDB shall be responsible for the execution and implementation of the BWDB part of the Project through the Project Co-ordination Unit (PCU), while DAE under MoA and DoF under MoFL are responsible for DAE part & DoF part of the project respectively and implementing through PIUs of the respective agency. A Project Steering Committee (PSC) would provide the forum for overall guidance, policy advice and coordination of the project activities and addressing the inter-agency issues.

2.7 CSAWMP Schemes Civil Works

39. The scheme civil works have been selected based on consultation with local BWDB offices based on priority of schemes that requires immediate repair, rehabilition and reconstruction. The selected 19 sechemes will be implemented in different yeares for providing flood control, drainage & irrigation facilities and to provide communication through the roadway on the embankmentThe schemes are flood control and drainage (FCD); flood control, drainage and irrigation (FCDI) projects with the purpose ofdevelopment and management of water resourcesrelating to; riverbank erosion control;

and provides irrigation, drainage, flood protection, bank erosion protection,regulators, sluices, canals, cross-dams, embankments and sea-dykes along the banks of the rivers and the coast, etc.

40. The proposed civil works CSAWMP for the schemes have been categorized into eight different type of activites that have listed in the following table (Table 2.2):

41. The Bangladesh Water Development Board (BWDB) has finally identified 19 potential schemes for financing under the CSAWMP.

The list of the schemes is attached in Appendix 2-1.The total physical activities under19 schemes are shown in the list attached in appendix 2-1.

Table 2.2: Summary of Physical Interventions

Sl. no	Intervention	Quantity
1	Re-sectioning of embankment	335.47 Km
2	Re-excavation/dredging of canal/khal/river	357.88 Km
3	Rehabilitation of Water Control Structures	85 Nos
4	Rehabilitation of Inlet/Outlet Structures	193 Nos
5	River Bank Protection/Embankment slope Protection Work	8.924 Km
6	Rehabilitation/Repair of Pump house	06 nos.
7	Construction of Flood wall	2.00 Km
8.	Construction of WMO/WMG Building	16 Nos

2.7.1 Civil Works Details of Selected Priority Schemes

Moreover 06 nos. priority schemes are selected from the potential 19 schemes for implementation in first 18 months. (The list of the schemes are provided). Followings are the details of the physical works of priority schemes (Table 2.3):

Table 2.3: Physicalwork details of priority schemes

Sl. no	Intervention	Quantity (Unit)
1	Re-sectioning of embankment	53.75 Km
2	Re-excavation of canal	60.30 Km
3	Rehabilitation of Water Control Structures	37 Nos
4	Rehabilitation of Inlet/Outlet Structures	161 Nos

Sl. no	Intervention	Quantity (Unit)
5	Protective Work	.50 Km
6	Rehabilitation of Pump House	4nos. Pump House
7	Construction of WMO/WMG Building	5 Nos

3 POLICY AND REGULATORY REVIEW

42. This Chapter-3 presents a review of the national policy, legal, and regulatory framework relevant to the environmental aspects of the Program. Also reviewed in the Chapter are the WB environmental safeguard policies.

3.1 National EnvironmentalPolicies

43. The key national policies, strategies, and plans relevant to environmental management are briefly discussed below.

3.1.1 Bangladesh Environmental Conservation Act (ECA), 1995

44. The Environmental Conservation Act (ECA) of 1995 is the main legislative framework relating to environmental protection in Bangladesh. This umbrella Act includes laws for conservation of the environment, improvement of environmental standards, and control and mitigation of environmental pollution. This Act has established the Department of Environment (DoE), and empowers its Director General to take measures as he considers necessary which includes conducting inquiries, preventing probable accidents, advising the Government, coordinating with other authorities or agencies, and collecting and publishing information about environmental pollution. According to this act (Section 12), no industrial unit or project shall be established or undertaken without obtaining, in a manner prescribed by the accompanying Rules, an Environmental Clearance Certificate (ECC) from the Director General of DoE.

45. In accordance with this Act, the CSAWMP will need to be cleared by DoE before commencing the project following procedures given in the Environment Conservation Rules (ECR) 1997 (discussed below). Also the Ecologically Critical Areas, defined by DoE under this act, will be considered while planning and designing of the CSAWMPinterventions.

3.1.2 Bangladesh Environmental Conservation Act (ECA), (Amendments) 2010

46. The ECA 1995 was amended in 2010, which provided clarification of defining wetlands as well as Ecologically Critical Areas and included many important environmental concerns such as conservation of wetlands, hill cutting, ship breaking, and hazardous waste disposal. This amendment empowered the government to enforce more penalties than

before. Moreover, affected persons were given provision for putting objections or taking legal actions against the polluters or any entity creating nuisance to affected person.

3.1.3 Bangladesh Environmental Conservation Rules (ECR), 1997

47. The Environmental Conservation Rules, 1997 were issued by the Government of Bangladesh in exercise of the power conferred under the Environment Conservation Act (Section 20), 1995. Under these Rules, the following aspects, among others, are covered:

- ❖ Declaration of ecologically critical areas;
- ❖ Classification of industries and projects into four categories;
- ❖ Procedures for issuing the Environmental Clearance Certificate; and
- ❖ Determination of environmental standards.

48. The Rule 3 defines the factors to be considered in declaring an area 'ecologically critical area' (ECA) as per Section 5 of ECA95. It empowers the Government to declare an area 'ECA', if it is satisfied that the ecosystem of the area has reached or is threatened to reach a critical state or condition due to environmental degradation. The Government is also empowered to specify which of the operations or processes shall not be carried out or shall not be initiated in the ecologically critical area.

49. The Rule 7 classifies industrial units and projects into four categories depending on environmental impact and location for the purpose of issuance of ECC. These categories are: Green, Orange A, Orange B, and Red.

50. All existing industrial units and projects and proposed industrial units and projects, that are considered to be low polluting are categorized under "Green" and shall be granted Environmental Clearance. For proposed industrial units and projects falling in the Orange-A, Orange-B and Red Categories, firstly a site clearance certificate and thereafter an environmental clearance certificate will be required. A detailed description of these four categories of industries has been given in Schedule-1 of ECR'97. Apart from general requirement, for every Orange B category proposed industrial unit or project, the application must be accompanied with feasibility report, Initial Environmental Examination (IEE), EMP. The CSAWMP is an ‘Orange B’ category project which requires IEE, and EMP for environmental clearance from DoE.

51. The ECR'97 describes the procedures for obtaining Environmental Clearance Certificates (ECC) from the Department of Environment for different types of proposed units or

projects. Any person or organization wishing to establish an industrial unit or project must obtain ECC from the Director General. The application for such certificate must be in the prescribed form together with the prescribed fees laid down in Schedule 13, through the deposit of a Treasury Challan in favor of the Director General (DG). The fees for clearance certificates have been revised in 2010. Rule 8 prescribes the duration of validity of such certificate (three years for green category and one year for other categories) and compulsory requirement for renewal of certificate at least 30 days before expiry of its validity.

3.1.4 Bangladesh Environmental Court Act, 2010

52. Bangladesh Environment Court Act, 2010 has been enacted to resolve the disputes and establishing justice over environmental damage raised due to any development activities. This act allows government to take necessary legal action against any parties who creates environmental hazards/ damage to environmentally sensitive areas as well as human society. According to this act, government can take legal actions if any environmental problem occurs due to CSAWMP interventions.

3.2 Relevant National Policies, Strategies and Plans

3.2.1 National Environment Policy, 1992

53. The National Environment Policy (NEP) is one of the key policy documents of the Government. The policy addresses 15 sectors in all, in addition to providing directives on the legal framework and institutional arrangements. Marine environment is one of the key sectors covered in this policy. Regarding water resource development, flood control and irrigation sector, the policy seeks to:

- Ensure environmentally-sound utilization of all water resources;
- Ensure that water development activities and irrigation networks do not create adverse environmental impact;
- Ensure that all steps are taken for flood control, including construction of embankments, dredging of rivers, digging of canals, etc, be environmentally sound at local, zonal and national levels;
- Ensure mitigation measures of adverse environmental impact of completed water resources development and flood control projects;
- Keep the rivers, canals, ponds, lakes, *haors*, *baors* and all other water bodies and water resources free from pollution;

- ❖ Ensure sustainable, long-term, environmentally sound and scientific exploitation and management of the underground and surface water resources; and
- ❖ Conduct environmental impact assessment before undertaking projects for water resources development and management.

54. The Policy is applicable to the CSAWMP and the proposed interventions are required to comply with all the policy directives emphasizing particularly on reducing adverse environmental impacts. The EIA studies of the proposed CSAWMP are required to clearly address the potential impacts and propose mitigation measures.

3.2.2 National Environment Management Action Plan, 1995

55. The National Environment Management Action Plan (NEMAP, 1995) identifies the main national environmental issues, including those related to the water sector. The main water related national concerns include flood damage, riverbank erosion, environmental degradation of water bodies, increased water pollution, shortage of irrigation water and drainage congestion; various specific regional concerns are also identified.

3.2.3 NationalWater Policy, 1999

56. Endorsed by the GoB in 1999, the National Water Policy (NWP) aims to provide guidance to the major players in water sector for ensuring optimal development and management of water. According to the policy, all agencies and departments entrusted with water resource management responsibilities (regulation, planning, construction, operation, and maintenance) are required to enhance environmental amenities and ensure that environmental resources are protected and restored in executing their tasks.

57. The policy has several clauses related to water resource development projects for ensuring environmental protection. Some of the relevant clauses are:

- ❖ Clause 4.5b: Planning and feasibility studies of all projects will follow the Guidelines for Project Assessment, the Guidelines for People's Participation (GPP), the Guidelines for Environmental Impact Assessment, and all other instructions that may be issued from time to time by the Government.
- ❖ Clause 4.9b: Measures will be taken to minimize disruption to the natural aquatic environment in streams and water channels.
- ❖ Clause 4.9e: Water development plans will not interrupt fish movement and will make adequate provisions in control structures for allowing fish migration and breeding.
- ❖ Clause 4.10a: Water development projects should cause minimal disruption to navigation and, where necessary, adequate mitigation measures should be taken.

- ❖ Clause 4.12a: Give full consideration to environmental protection, restoration and enhancement measures consistent with National Environmental Management Action Plan (NEMAP) and the National Water Management Plan (NWMP).
- ❖ Clause 4.12b: Adhere to a formal environment impact assessment (EIA) process, as set out in EIA guidelines and manuals for water sector projects, in each water resources development project or rehabilitation program of size and scope specified by the Government from time to time.
- ❖ Clause 4.13b: Only those water related projects will be taken up for execution that will not interfere with aquatic characteristics of those water bodies.

3.2.4 National Water Management Plan, 2001 (Approved in 2004)

58. The National Water Management Plan (NWMP) 2001, approved by the National Water Resources Council in 2004, envisions to establish an integrated development, management and use of water resources in Bangladesh over a period of 25 years. Water Resources Planning Organization (WARPO) has been assigned to monitor the national water management plan. The major programs in the Plan have been organized under eight sub-sectoral clusters: i) Institutional Development, ii) Enabling Environment, iii) Main River, iv) Towns and Rural Areas, v) Major Cities; vi) Disaster Management; vii) Agriculture and Water Management, and viii) Environment and Aquatic Resources. Each cluster comprises of a number of individual programs, and a total of 84 sub-sectoral programs have been identified and presented in the investment portfolio.

3.2.5 National Land Use Policy (MoL, 2001)

59. The National Land Use Policy (NLUP), enacted in 2001, aims at managing land use effectively to support trends in accelerated urbanization, industrialization and diversification of development activities. The NLUP urges that increasing the land area of the country may be not possible through artificial land reclamation process, which is cost-effective only in the long run. Therefore, land use planning should be based on the existing and available land resources. The policy suggests establishing land data banks where, among others, information on accreted riverine and coastal chars will be maintained. Among the 28 policy statements of NLUP, the following are relevant to CSAWMP:

- ❖ Forests declared by the Ministry of Environment and Forests will remain as forest lands; and
- ❖ Reclassification of forest lands will be prevented.

60. The CSAWMP will be designed in accordance with this Strategy and will comply with the above listed requirements.

3.2.6 National Agriculture Policy, 1999

61. The overall objective of the National Agriculture Policy is to make the nation self-sufficient in food through increasing production of all crops including cereals and ensure a dependable food security system for all. The policy particularly stresses on research on the development of improved varieties and technologies for cultivation in water-logged and salinity affected areas. The policy also recognizes that adequate measures should be taken to reduce water-logging, salinity and provide irrigation facilities for crop production.

62. The proposed CSAWMP is expected to contribute to achieve the objectives of the agriculture policy.

3.2.7 National Fisheries Policy, 1996

63. The National Fisheries Policy (NFP), 1996 recognizes that fish production has declined due to environmental imbalances, adverse environmental impact and improper implementation of fish culture and management programs. The policy particularly focuses on aquaculture and marine fisheries development.

64. The policy suggests following actions:

- Biodiversity will be maintained in allnatural water bodies and in marine environment;
- Chemicals harmful to the environment will not be used in fish shrimp farms;
- Environment friendly fish shrimp culture technology will be used;
- Expand fisheries areas and integrate rice, fish and shrimp cultivation;
- Control measures will be taken against activities that have a negative impact on fisheries resources and vice-versa; and
- Laws will be formulated to ban the disposal of any untreated industrial effluents into the water bodies.

65. The proposed CSAWMP is expected to contribute to achieve the objective of the Fisheries Policy

3.2.8 Private Forest Policy 1994

66. The policy suggested for extended effort to bring about 20% of the country's land under the afforestation programs of the government and private sector by year 2015 by accelerating the pace of the program through the coordinated efforts of the government and NGOs and active participation of the people in order to achieve self-reliance in forest products and maintenance of ecological balance. The policy viewed equitable distribution of benefits

among the people, especially those whose livelihood depend on trees and forests; and people's participation in afforestation programs and incorporation of people's opinions and suggestions in the planning and decision-making process. The people-centered objectives of the policy are creation of rural employment opportunities and expansion of forest-based rural development sectors; and prevention of illegal occupation of forest lands and other forest offences through people's participation. The policy statements envisage: massive afforestation on marginal public lands through partnerships with local people and NGOs; afforestation of denuded/encroached reserved forests with an agro forestry model through participation of people and NGOs; giving ownership of a certain amount of land to the tribal people through forest settlement processes; strengthening of the Forest Department; strengthening of educational, training and research facilities; and amendment of laws, rules and regulations relating to the forestry sector and if necessary, promulgation of new laws and rules. Thus, over time the policy has shifted somewhat from total state control to a management regime involving local communities in specific categories of forests.

67. Because of limited amount of forestland, the policy underscores for effective measures for afforestation in rural areas, in the newly accreted chars, and in the denuded Unclassed State Forest areas of Chittagong Hill Tract and northern zone of the country including the Barind tract. The policy also encourages the private sector participation in afforestation.

3.2.9 National Policy for Safe Water Supply and Sanitation (1998)

68. The National Drinking Water Supply and Sanitation Policy (1998) goal is accessibility to all of water and sanitation services within the shortest possible time at a price that is affordable to all. The Policy will be achieved through strategies formulated at various levels in consultation with the Ministry of Planning. Policy objectives are (i) to improve the standard of public health and (ii) to ensure an improved environment. Policies for rural and urban areas are presented separately as they differ in institutional aspects, content, and magnitude.

3.2.10 National Adaptation Programme of Action (NAPA)

69. In 2005, the Ministry of Environment and Forest (MOEF), Government of the People's Republic of Bangladesh has prepared the National Adaptation Program of Action (NAPA) for Bangladesh, as a response to the decision of the Seventh Session of the Conference of the Parties (COP7) of the United Nations Framework Convention on Climate Change (UNFCCC). The basic approach to NAPA preparation was along with the sustainable

development goals and objectives of the country where it has recognized the necessity of addressing climate change and environmental issue and natural resource management. The NAPA is the beginning of a long journey to address adverse impacts of climate change including variability and extreme events and to promote sustainable development of the country. There are 15 adaptation strategies suggested to address adverse effects of climate change. Among the 15 adaptation strategies the following strategies are relevant for reducing climate change induced vulnerability:

- Construction of flood shelters, and information and assistance center to cope with enhanced recurrent floods in major floodplains; and
- Promotion of research on drought, flood and saline tolerant varieties of crops to facilitate adaptation in future.

70. The CSAWMP broadly contributes toward achieving the aims and objectives of the climate change adaptation strategies.

3.2.11 Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009

71. The Government of Bangladesh has prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009. The BCCSAP is built on six pillars:

1. **Food security, social protection and health** to ensure that the poorest and most vulnerable in society, including women and children, are protected from climate change and that all programs focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.
2. **Comprehensive disaster management** to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.
3. **Infrastructure** to ensure that existing assets (e.g., coastal and river embankments) are well maintained and fit for purpose and that urgently needed infrastructures (cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.
4. **Research and Knowledge management** to predict that the likely scale and timing of climate change impacts on different sectors of economy and socioeconomic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on climate change.
5. **Mitigation and low carbon development** to evolve low carbon development options and implement these as the country's economy grows over the coming decades.
6. **Capacity building and Institutional strengthening** to enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change.

72. The CSAWMP will contribute towards achieving the objective of pillars such as (i), (ii), (iii), (iv), and (vi).

3.3 National Agricultural Extension Policy 2013

73. A revised National Agricultural Extension Policy (NAEP) which sets extension policy directions for transferring technologies to crop, fisheries and livestock sector development. Here, key elements of lesson learnt from existing policy, macroeconomic scenario, agro ecology /bio-ecological zones and current issues in agriculture such as natural disaster, production stagnation, land ownership and tenancy, poor soil health status, decreasing agricultural land, irrigation water scarcity, lack of good agricultural practices, high demand of quality seeds/planting materials etc., livestock and fishery issues including emerging challenges and perspectives have been pointed out for strong consideration. In light of these elements, this policy document has been formulated.

74. The mission of this NAEP is to provide efficient and effective decentralized demand responsive integrated extension services to all categories of farmers, producers and small & medium entrepreneur (SME) in agriculture through farmers group (FG) and their federations at union, upazila, district and national level, to enable them to optimize their use of resources, in order to promote sustainable agricultural, agri-business and socio-economic development.

75. Wide range of people directly and indirectly involved in agricultural growth will be benefited from NAEP. The primary beneficiaries of the policy are: all categories of farmers, especially the small and marginal farmers comprising about 86% of the farming community through “Farmers Group” and their federations (Farmers Organization-FO) at union, upazila, district and national level.

3.4 Other Environmental Relevant Acts, Laws and Rules

3.4.1 Bangladesh Wildlife (Preservation) Order (1973) and Act (1974)

76. The Bangladesh Wildlife Preservation (Amendment) Act 1974 regulates the hunting, killing, capture, trade and export of wild life and wild life products. It designates a list of protected species and game animals. It empowers the Government to declare areas as game reserves, wildlife sanctuaries, and national parks to protect the country’s wildlife and provides the following legal definitions:

- The game reserve is defined as an area declared by Government wherein the capture of wild animals is unlawful, to protect wildlife and increase the population of important species;
- The national park is defined as an area declared by Government comprising a comparatively large area of outstanding scenic and natural beauty with the primary objective of protection and preservation of scenery, flora, and fauna in their natural state, to which access for public recreation and education, and for scientific research, may be allowed; and
- Wildlife sanctuary is defined as an area declared by Government that is closed to hunting, shooting, or trapping of wild animals as an undisturbed breeding ground, primarily for the purpose of protecting all natural resources, including wildlife vegetation, soil, and water.

77. The Act allows Government to relax any or all specified prohibitions for scientific purposes, for aesthetic enjoyment, or betterment of scenery.

3.4.1 Protection and Conservation of Fish Act (1950)

78. This Act provides power to the government to: make and apply rules to protect fisheries; prohibit or regulate erection and use of fixed engines; and construction of temporary or permanent weirs, dams, bunds, embankments and other structures. The Act prohibits: destruction of fish by explosives, guns, and bows in inland or coastal areas; destruction of fish by poisoning, pollution, or effluents. The Act prescribes the seasons during which fishing is allowed, prohibits fishing during spawning periods, and specifies officials having authority to detect breaches of this Act.

3.4.2 Embankment and Drainage Act, 1952

79. The *East Bengal Act No. 1,* 1953 has been adapted by the People Republic of Bangladesh, by the Bangladesh Order (adaptation of Existing Laws), 1972 (President's Order No. 48 of 1972). The Act consolidates the laws relating to embankments and drainage providing provision for the construction, maintenance, management, removal and control of embankments and water courses for the better drainage of lands and for their protection from floods, erosion or other damage by water. The specific Sections and Articles relevant to the CSAWMP are mentioned below.

- Section 4 (1) of the Act states that the embankment, water-course, and tow-path, earth, pathways, gates, berms and hedges of the embankments shall vest in the Government of the Authority (BWDB).
- Section 56 (1) states that, person will be subject to penalty (500 taka or imprisonment… if he erects, or causes of willfully permits to be erected, any new embankment, or any

existing embankment, or obstructs of diverts, or causes or willfully permits to be obstructed or diverted, any water course.

- Section 15 allows for the engineer (engineer in charge of Divisional level BWDB) for constructing new embankment or enlarging, lengthening or repairing existing embankments.
- The other sections of the Act give powers and access to the Government or Authority or Engineers to commence necessary Project activities, for land acquisition (through the Deputy Commissioner), and site clearing activities including removal of trees or houses (if necessary).

3.4.3 Bangladesh Water Act, 2013

80. The recently published Water Act, 2013 is based on the National Water Policy, and designed for integrated development, management, extraction, distribution, usage, protection and conservation of water resources in Bangladesh. In general, if one takes a critical look at the Act, the new law has provided the right framework for better management of water resources in the country.

81. As per this Act, all forms of water (e.g., surface water, ground water, sea water, rain water and atmospheric water) within the territory of Bangladesh belong to the government on behalf of the people. The private landowners will be able to use the surface water inside their property for all purposes in accordance with the Act. A worthwhile initiative is the requirement for permits/licenses for large scale water withdrawal by individuals and organizations beyond domestic use. Without prior permission issued by the Executive Committee, no individuals or organizations will be allowed to extract, distribute, use, develop, protect, and conserve water resources, nor they will be allowed to build any structure that impede the natural flow of rivers and creeks. However, the maximum amount of surface water or groundwater that can be withdrawn by individuals or organizations is not mentioned in the Act. Setting up a priority order for water usage in an area where the water resources is in critical condition is also a significant step.

3.4.4 Bangladesh Labor Act, 2006

82. The Bangladesh Labor Act, 2006 provides the guidance of employer's extent of responsibility and workmen's extent of right to get compensation in case of injury by accident while working. Some of the relevant Sections are:

- ***Section 150. Employer's Liability for Compensation:*** (1) If personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation in accordance with the provisions of this Act; and (2)

Provided that the employer shall not be so liable - (a) in respect of any injury which does not result in the total or partial disablement of the workman for a period exceeding three days; (b) in respect of any injury, not resulting in death or permanent total disablement, caused by an accident which is directly attributable to - (i) the workman having been at the time thereof under the influence of drink or drugs, or (ii) the willful disobedience of the workman to an order expressly given, or to a rule expressly framed, for the purpose of securing the safety of workmen, or (iii) the willful removal or disregard by the workman of any safety guard or other device which he knew to have been provided for the purpose of securing the safety of workmen.

- ***Section 151.*** (1) *Amount of Compensation:* Subject to the provisions of this Act, the amount of compensation shall be as follows, namely :- (a) where death results from the injury, an amount equal to fifty cent of the monthly wages of the deceased workman multiplied by the relevant factor; or an amount of fifty thousand taka, whichever is more; (b) where permanent disablement results from the injury an amount equal to sixty per cent of the monthly wages of the injured workman multiplied by the relevant factor.

3.4.5 Bangladesh National Building Code, 2006

83. The Bangladesh National Building Code (BNBC) clearly sets out the constructional responsibilities according to which the relevant authority of a particular construction site shall adopt some precautionary measures to ensure the safety of the workmen. According to Section 1.2.1 of Chapter 1 of Part 7, “In a construction or demolition work, the terms of contract between the owner and the contractor and between a consultant and the owner shall be clearly defined and put in writing”. These however will not absolve the owner from any of his responsibilities under the various provisions of this Code and other applicable regulations and bye-laws. The terms of contract between the owner and the contractor will determine the responsibilities and liabilities of either party in the concerned matters, within the provisions of the relevant Acts and Codes (e.g.) the Employers' Liability Act, 1938, the Factories Act 1965, the Fatal Accident Act, 1955 and Workmen's Compensation Act 1923”. (After the introduction of the Bangladesh Labor Act, 2006, these Acts have been repealed.)

84. The BNBC also stipulates the general duties of the employer to the public as well as workers. According to this section, “All equipment and safeguards required for the construction work such as temporary stair, ladder, ramp, scaffold, hoist, run way, barricade, chute, lift shall be substantially constructed and erected so as not to create any unsafe situation for the workmen using them or the workmen and general public passing under, on or near them”.

85. The Code also clarifies the issue of safety of workmen during construction and with relation to this, set out the details about the different safety tools of specified standard. In relation with the health hazards of the workers during construction, this chapter describes the

nature of the different health hazards that normally occur in the site during construction and at the same time specifies the specific measures to be taken to prevent such health hazards. According to this chapter, exhaust ventilation, use of protective devices, medical checkups etc. are the measures to be taken by the particular employer to ensure a healthy workplace for the workers.

86. To prevent workers falling from heights, the Code sets out the detailed requirements on the formation and use of scaffolding. Every open sided floor or platform 1.2 meters or more above adjacent ground level shall be guarded by a railing on all open sides except where there is entrance to ramp, stairway or fixed ladder, the above precautions shall also be taken near the open edges of the floors and the roofs".

3.5 World Bank's Environmental Safeguard Policies

87. The World Bank has developed a number of Safeguard Policies to ensure that all possible impacts are considered and mitigation measures are spelled out prior to the implementation of any proposed project. These policies ensure that the quality of operations is uniform across different settings worldwide. If the decision is taken that a Safeguard Policy should be applied, mitigation measures and plans must be developed and in place before the implementation of a proposed project.

88. The Bank requires environmental screening and classification for all investment projects[2] (including ones financed by Trust Funds, Project Preparation Facilities and Guarantees) proposed for Bank financing, to help ensure that they are environmentally and socially sound and sustainable. Screening and classification take into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, Indigenous Peoples); cultural property; and trans-boundary and global environmental aspects.

89. The objectives of environmental screening and classification are: to evaluate the environmental risks associated with a proposed operation; to determine the depth and breadth of Environmental Assessment (EA); and to recommend an appropriate choice of EA instrument(s) suitable for a given project. The Bank recognizes that environmental screening and classification is not absolute and involves professional judgment on a case by case basis. When screening, careful consideration needs to be given to potential environmental impacts and risks associated with the proposed project. Judgment is

exercised with reference to the policy expectations and guidance; real impacts on the ground; and established regional and Bank-wide precedence and good practice.

3.5.1 Environmental Assessment (OP/BP 4.01)

90. **EA requirement**. The World Bank requires Environmental Assessment (EA) of projects proposed for Bank support to ensure that they are environmentally sound and sustainable, and thus to improve decision making. The Bank Policy OP/BP 4.01 considers that EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. The EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The EA takes into account the natural environment (air, water and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples and physical cultural resources); and trans-boundary and global environmental aspects. The Bank Policy also envisages that the borrower Government is responsible for carrying out the EA and the Bank advises the borrower on the Bank's EA requirements.The present EMF has been prepared in compliance with this OP/BP.

91. **EA classification**. The World Bank classifies the proposed project into one of the four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. These categories are defined below.

- ***Category A:*** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.
- ***Category B:***A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects.
- ***Category C:***A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

- ***Category FI***: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary (FI), in subprojects that may result in adverse environmental impacts.

92. The proposed CSAWMP has been classified as Category B, since the environmental impacts are likely to be moderate and reversible. Therefore, scoped EIAs will need to be carried out for the limited environmental effects of CSAWMP, in accordance with OP 4.01.

3.5.2 Natural Habitats (OP 4.04)

93. The Policy describes the conservation of natural habitats, like other measures that protect and enhance the environment, to be essential for long-term sustainable development. The Bank therefore supports the protection, maintenance, and rehabilitation of natural habitats and their functions in its economic and sector work, project financing, and policy dialogue. The Bank also supports, and expects borrowers to apply a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. The Bank- promotes and supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions. Furthermore, the Bank promotes the rehabilitation of degraded natural habitats. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

3.5.3 Physical Cultural Resources (OP 4.11)

94. The World Bank's general policy regarding cultural properties is to assist in their preservation, and to seek to avoid their elimination. The specific aspects of the Policy are given below:[1]

- The Bank normally declines to finance projects that will significantly damage non-replicable cultural property, and will assist only those projects that are sited or designed so as to prevent such damage.
- The Bank will assist in the protection and enhancement of cultural properties encountered in Bank-financed projects, rather than leaving that protection to chance. In some cases, the project is best relocated in order that sites and structures can be preserved, studied, and restored intact in situ. In other cases, structures can be relocated, preserved, studied, and restored on alternate sites. Often, scientific study, selective salvage, and museum preservation before destruction is all that is necessary. Most such projects should include the training and strengthening of institutions entrusted with safeguarding a nation's cultural

[1] Excerpts from the OPN 11.03.WB Operational Manual. September 1986.

patrimony. Such activities should be directly included in the scope of the project, rather than being postponed for some possible future action, and the costs are to be internalized in computing overall project costs.

- Deviations from this policy may be justified only where expected project benefits are great, and the loss of or damage to cultural property is judged by competent authorities to be unavoidable, minor, or otherwise acceptable. Specific details of the justification should be discussed in project documents.
- This policy pertains to any project in which the Bank is involved, irrespective of whether the Bank is itself financing the part of the project that may affect cultural property.

95. As part of the environmental assessment studies for the of the CSAWMP, baseline assessment will be carried out, including consultations, to identify any physical cultural resources (PCR) in the project influence area during the feasibility study and scoped EIA.

96. This Policy recognizes the need to reduce deforestation and promote sustainable forest conservation and management in reducing poverty. The Bank believes that forests are very much essential for poverty reduction and sustainable development irrespective of their location in the world. The Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank also assists borrowers with the establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable forest plantations to help meet growing demands for forest goods and services. The Bank does not finance projects that, in its opinion, would involve significant conversion or degradation of critical forest areas or related critical natural habitats. Furthermore, the Bank does not finance projects that contravene applicable international environmental agreements.

97. Though the proposed program will support some compensatory tree plantation on the re-constructed embankment, this OP is not expected to be triggered since the program is not located in any forested area as defined by the policy, and will not have any direct or indirect impact on forests.

3.5.4 Pest Management (OP/BP 4.09)

98. Through this OP, the WB supports a strategy that promotes use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides. Agricultural sector projects have to avoid using harmful pesticides. Other pesticides can be used, but only as an element of an Integrated Pest Management Plan (IPMP) that emphasizes environmental and biological controls.

3.5.5 Safety of Dams (OP 4.37)

99. The Policy seeks to ensure that appropriate measures are taken and sufficient resources provided for the safety of dams the WB finances. However this OP is not relevant since the proposed program does not involve construction of dams.World Bank Policy on Access to Information

100. This BP deals with the World Bank policy on disclosure of information. It is a mandatory procedure to be followed by the borrower and Bank and supports public access to information on environmental aspects of projects.

101. Once finalized, the EMF and Bengali translation of its executive summary will be disclosed to the public and will also be available on the official website of the BWDB. EMF will also be sent to the WB InfoShop.

3.5.6 Environment, Health and Safety Guidelines

102. The Environment, Health, and Safety (EHS) guidelines2contain the performance levels and measures that are generally considered achievable in new facilities or project by existing technology at reasonable costs. These guidelines will be applicable to the CSAWMP.

3.6 International Treaties Signed by GOB

103. Bangladesh has signed most international treaties, conventions and protocols on environment, pollution control, bio-diversity conservation and climate change, including the RamsarConvention, the Bonn Convention on migratory birds, the Rio de Janeiro Convention on biodiversity conservation, and the Kyoto protocol on climate change. An overview of the relevant international treaties signed is given in the following Table 3-1.

Table 3.1: Treaty or Convention and Responsible Agency

Treaty	Year	Brief Description	Relevant Department
Protection of birds (Paris)	1950	Protection of birds in wild state	DoE/DoF
Ramsar Convention	1971	Protection of wetlands	DoE/DoF
Protocol Waterfowl Habitat	1982	Amendment of Ramsar Convention to protect specific habitats for waterfowl	DoE/DoF

[2] EHS Guidelines available at: http://www.gcgf.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES

Treaty	Year	Brief Description	Relevant Department
World Cultural and Natural Heritage (Paris)	1972	Protection of major cultural and natural monuments	DoArch
CITES convention	1973	Ban and restrictions on international trade in endangered species of wild fauna and flora	DoE/DoF
Bonn Convention	1979	Conservation of migratory species of wild animals	DoE/DoF
Prevention and Control of Occupational hazards	1974	Protect workers against occupational exposure to carcinogenic substances and agents	MoH
Occupational hazards due to air pollution, noise & vibration (Geneva)	1977	Protect workers against occupational hazards in the working environment	MoH
Occupational safety and health in working environment (Geneva)	1981	Prevent accidents and injury to health by minimizing hazards in the working environment	MoH
Occupational Health services	1985	To promote a safe and healthy working environment	MoH
Convention on oil pollution damage (Brussels)	1969	Civil liability on oil pollution damage from ships	DoE/MoS
Civil liability on transport of dangerous goods (Geneva)	1989	Safe methods for transport of dangerous goods by road, railway and inland vessels	MoC
Safety in use of chemicals during work	1990	Occupational safety of use of chemicals in the work place	DoE
Convention on oil pollution	1990	Legal framework and preparedness for control of oil pollution	DoE/MoS
Vienna convention	1985	Protection of ozone layer	DoE
London Protocol	1990	Control of global emissions that deplete ozone layer	DoE
UN framework convention on climate change (Rio de Janeiro)	1992	Regulation of greenhouse gases emissions	DoE
Convention on Biological Diversity (Rio de Janeiro)	1992	Conservation of bio-diversity, sustainable use of its components and access to genetic resources	DoE
International Convention on Climate Changes (Kyoto Protocol)	1997	International treaty on climate change and emission of greenhouse gases	DoE
Protocol on biological safety (Cartagena protocol)	2000	Biological safety in transport and use of genetically modified organisms	DoE

3.7 Implication of GoB Polices, Acts and Rules on CSAWMP and their Classification

104. The legislations relevant for environmental assessment for CSAWMP are the Environmental Conservation Act 1995 (ECA'95) and the Environmental Conservation Rules 1997 (ECR'97). Department of Environment (DoE), under the Ministry of Environment and Forest (MoEF), is the regulatory body responsible for enforcing the ECA'95 and ECR'97. According to the Rule 7 (1) of the Environmental Conservation Rules 1997; for the purpose of issuance of Environmental Clearance Certificate (ECC), every industrial units or projects, in consideration of their site and impact on the environment, will be classified into the four categories and they are: Category I (green), Category II (Orange-A), Category III (Orange B) and Category IV (Red). According to the location, size, severity of pollution loads WMIP was considered to be medium impact on the important environmental components (IEC). Therefore CSAWMP, as follow on of WMIP falls under the '**Orange B**' category.

105. The procedures for "Orange B" Category include submission of:

- An Initial Environmental Examination (IEE); and
- An Environmental Management Plan (EMP)

106. Environment clearance has to be obtained by the respective implementing agency or project proponent (private sector) from the Department of Environment (DoE). The environmental clearance procedure for "Orange B" Category projects can be summarized as follows:

107. Application to DoE→Obtaining Site Clearance →Applying for Environmental Clearance →Obtaining Environmental Clearance→Clearance Subject to annual renewal.

108. The Department of Environment (DoE), the technical arm of the Ministry of Environment and Forest (MoEF) is the regulatory body and the enforcement agency of all environmental related activities. Like all other projects, this project also needs to meet the requirement of the DOE. An environmental assessment (EA) study needs to be undertaken for obtaining the environmental clearance. As per ECR 1997, the proposed CSAWMP falls under the Orange B Category and hence, necessitates IEE and EMP. Steps to be followed for obtaining Environmental Clearance Certificate (ECC)for the CSAWMP (Orange B Category) from DOE are outlined in the following Figure 3.1.

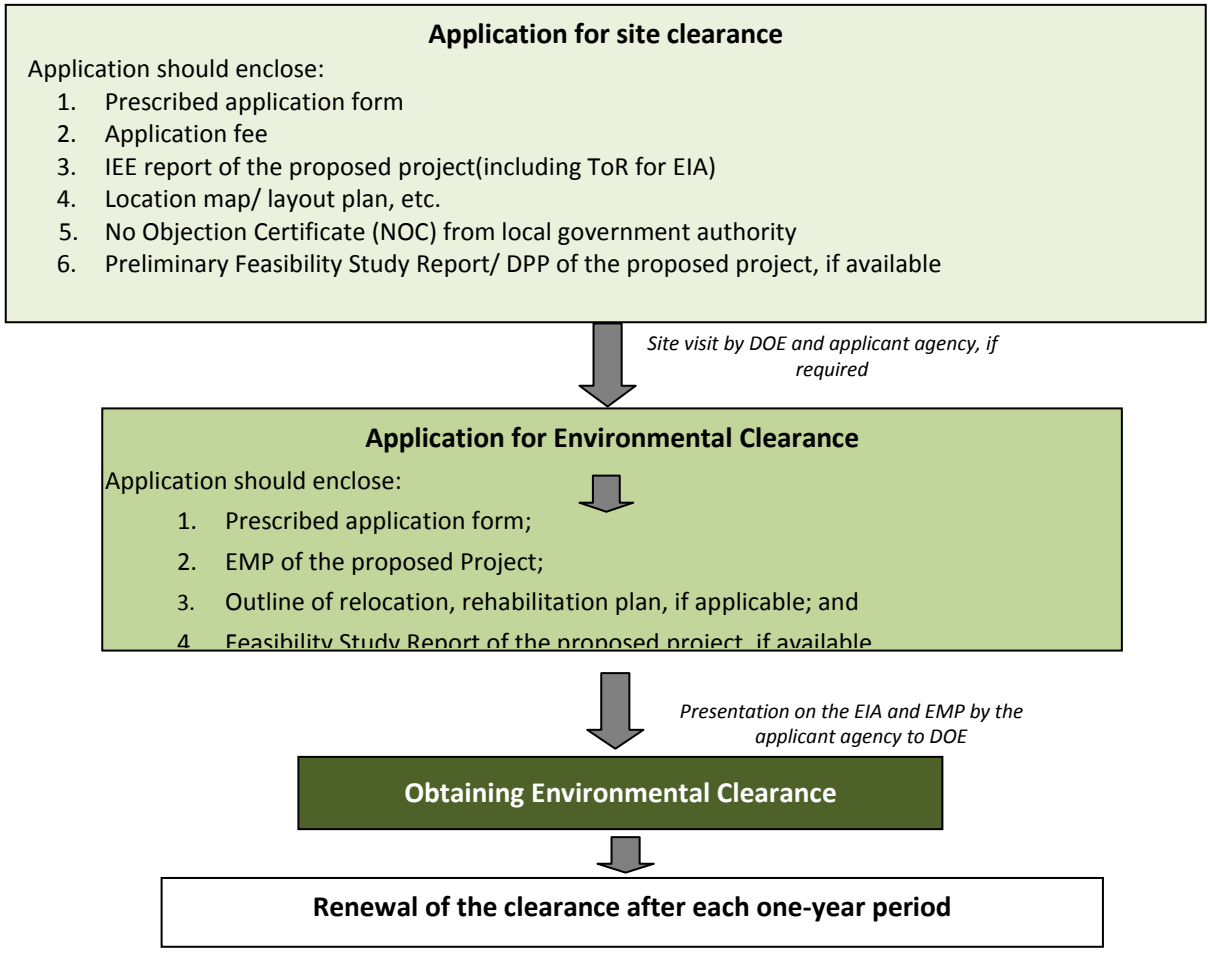

Figure 3.1: Process of obtaining Environmental Clearance Certificate from DoE

109. Public participation or consultation is not a condition in the ECR 1997 and or EIA Guidelines, however, DOE prefers the proponent to engage in public participation and put conditions while providing site clearance or during the approval of the EIA TOR.

3.8 Applicable World Bank Policies

110. The CSAWMP is classified as a Category B project, due to the moderate complexity of environmental issues associated with program activities involving civil works by reconstruction and rehabilitation of the embankment to protect against inundation and excavation of channel to improve flow of water for agriculture. Since some of the areasare of high economic value and ecological sensitivity, certain negative environmental impacts may occur during the implementation and operational phase of the CSAWMP. There may be localized impacts on the natural habitats especially on the fish spawning areas during

the implementation of the civil works. The project does not foresee any significant or irreversible environmental impacts.

111. The Environment Assessment (OP/BP 4.01), Pest Management (OP/BP 4.09), and Involuntary Resettlement (OP/BP 4.12) have been triggered for the proposed operation. Although no direct impacts on physical cultural resources are expected, screening mechanism incorporated into the EA process will identify places and or objects of archeological, paleontological, historical, religious, or unique natural values. Physical cultural resources (OP/BP 4.11) are considered in the environmental framework preparation. The status of the environmental safeguard policies of the World Bank is provided below in Table 3.2**:**

Table 3.2: Triggering the World Bank Policies

Directive	Policy	Triggered	Comments
Environmental Assessment	OP/BP 4.01	Yes	The project falls into Category B, The project is expected to undertake similar physical interventions as were implemented under the recently completed WMIP. The Project does not envisage any significant or irreversible environmental impacts. However, the project overall, will contribute to generate significant positive environmental impacts. The environmental impacts that could arise due to the project are mainly from the construction related activities. OP/BP4.01 is triggered to avoid any potential adverse environmental, avoid or minimize adverse social impacts and enhance positive environmental and social development outcomes of The many individual schemes. BWDB will carry out partial environmental and social assessment of the proposed project at the preparation stage and prepare an Environmental Management Framework (EMF) for safeguards management guidance during the implementation stage. The EMF will include anEnvironment Management Framework (EMF) and a Social Management Framework (SMF) having also a Resettlement Policy Framework (RPF), a Tribal Peoples Development Framework (TPDF), a Gender Action Plan and communications frame for the schemes to be identified and designed during implementation stage. The EMF will be prepared, cleared and disclosed before appraisal of the project along with a Bangla translation of the document. Also the Environmental, Health, and Safety (EHS)

			Guidelines of the World Bank Group is applicable to the Project.
Natural Habitats	OP/BP 4.04	No	The project or subproject activities will not impose impacts on any natural habitat formed largely by native plant and animal species.
Physical Cultural Resources (PCR)	OP 4.11	No	No Physical Cultural Resources will be affected. However, chance finds will be encountered and special precautions will be taken to avoid damaging cultural heritage sites and property.
Forests	OP/BP 4.36	No	The Project doesn't expect that there would be any impact on the management, protection, or utilization of natural forests or plantations
Pest Management	OP 4.09	Yes	The Project is expected to finance agricultural activities. Any synthetic chemical pesticides may be used and the policy has been triggered. Although no agro-chemicals will be used in any part of the program activities, the program may induce changes in cropping pattern (if not further intensification of cropping) in the area because of increased protection against riverbank erosion and flooding in polders. This change in cropping pattern can in turn potentially increase usage of agro-chemicals. However, a standalone pest management plan(PMP) will be developed and disclosed to promote the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides.
Involuntary Resettlement OP/BP 4.12		Yes	The project is expected to limit its activities within existing available lands without land acquisition encumbrances for rehabilitation of embankments and construction of water control structures. However, in special circumstances of riverbank erosion and retirement of embankment sections and replacement of water control structures acquisition of private land might be required. Further, resectioning of existing embankment sections in few cases may displace informal settlers on the existing embankment. Thus, OP 4.12 will be triggered if such cases arise and a Resettlement Policy Framework (RPF) is prepared with the EMF to provide future guidance for the preparation and implementation of site specific Resettlement Action Plan or Abbreviated RAP where required. Further, the EMF will provide guidance on preparing site specific Social Impact Assessment and

			appropriate compensation and GRM.
Indigenous Peoples OP/BP 4.10		Yes	The project will cover FCD and FCDI schemes across the country and there is likelihood that some of the project activities might touch upon areas inhabited by indigenous communities officially recognized as tribal peoples. The SMF (Social Management Framework) will therefore, include a TPDF to provide guidance for social screening and preparation and implementation of site specific Tribal Peoples Development Plan (TPDP) where applicable. The framework will be fully cognizant of local and cultural nuances associated with designing and proposing alternative livelihood measures, grievance redress processes and all other project interventions including free, prior and informed consultation process.
Safety of Dams	OP/BP 4.37	No	Not triggered since no dams are involved under the program.
Projects in Disputed Areas	OP/BP 7.60	No	Not triggered since no disputed areas exist in or around the program area.
Access to Information			World Bank has developed a new approach to the disclosure of information, transparency and sharing of knowledge. The public will have access to a broad range of information about project in preparation and implementation. The EMF, EIA report, and RAP will be disclosed on BWDB website and also sent to WB InfoShop. Consultations have been held while conducting EIA and preparing EMF as well as RAP. Workshops will be held in entire program area to disclose the present EMF. The EMF will be placed on BWDB website and also in relevant offices in the program area. The EMMF will also be sent to WB InfoShop. Similar disclosure will be carried out for the EIAs of the subsequent phases of the CSAWMP.

3.9 Public Consultation and Disclosure Requirements by the World Bank

112. The Bank reaffirms its recognition and endorsement of the fundamental importance of transparency and accountability to the development process. Accordingly, it is Bank's policy to be open about its activities and to welcome and seek out opportunities to explain

its work to the widest possible audience. According to ‘OP 4.01: Environmental Assessment’ of World Bank, the following conditions applies to the CSAWMP.

113. **Consultations**. For Category B projects, the borrower should consult these groups at least: once a draft EA report is prepared. In addition, the borrower should consult with such groups throughout project implementation as necessary to address EA-related issues that affect them.

114. **Disclosure**: For a Category B project, the borrower should provide relevant information on project interventions in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted. The borrower should provide a summary of the proposed project's objectives, description, and potential impacts for the initial consultation. For consultation after the draft EA report is prepared, the borrower should provide a summary of the EA's conclusions. In addition, for a Category B project, the borrower makes the draft EA report available at a public place accessible to project-affected groups and local NGOs. The borrower alsoensures that EA reports for Category B subprojects are made available in a public place accessible to affected groups and local NGOs. The document needs to be translated into Bengali. Public availability of the EA report for Category B project in the borrowing country and official receipt by the Bank are prerequisites to Bank appraisal of these projects.

4 ENVIRONMENTAL BASELINE

4.1 General

115. The BWDB has identified 19 potential subprojects/schemes for rehabilitation covering new 9 BWDB zones (but old 8 zones), located all over the country.

116. The baseline condition of environmental quality in the locality of project site serves as the basis for identification, prediction and evaluation of impacts. The baseline environmental quality is assessed through field studies within the impact zone for various components of the environment, viz. air, noise, water, land and socio-economic, etc.

117. Information of baseline environmental status of the project area is useful for impact assessment process of assessing and predicting the environmental consequences of the significant actions. Based on the existing environmental scenario potential impacts of subprojects associated will be identified and accordingly management plan will be proposed in forthcoming sections. The baseline environmental conditions will help in comparing and to monitor the predicted negative and positive impacts resulting from the project during pre-construction, construction and operation phases. Significant action depicts direct adverse changes caused by the action and its effect on the health of the biota including flora, fauna and human being, socio-economic conditions, current use of land and resources, climate change aspects, physical and cultural heritage properties and biophysical surroundings. Baseline data generation of the following environmental attributes is essential.

118. Data was collected from secondary sources for the macro-environmental setting like climate (temperature, rainfall, humidity, and wind speed), physiography, geology etc. Firsthand information has been collected to record the micro-environmental features within and adjacent to the project corridor. Collection of primary information includes extrapolating environmental features on proposed subprojects design, tree inventories, location and measurement of socio-cultural features adjoining proposed subprojects. Ambient air and noise quality have been assessed based on visual inspection to prepare a baseline database. Consultation was another source of information and to explain local environmental conditions, impacts, and suggestions, etc.

119. The following table describes the baseline environment in three broad categories:

- ❖ Physical Environment- factors such topography, geology, earthquake, climate and hydrology/drainage, environmental pollution;
- ❖ Biological Environment- factors related to life such as flora, fauna and ecosystem; and
- ❖ Socio-economic Environment- anthropological factors like land use, land requirement, infrastructure etc.

120. As mentioned earlier, all the schemes under the project of BWDB are located in new 9 zones (old 8 zones) of BWDB. The environmental baseline chapter is described according to the classification, nature and primary observation during field survey. The BWDB zone (as mentioned in Figure 2.1) wise environmental baseline data are given in the following tabular form in Table 4.1.

Table 4.1: Overall Environmental Baseline Data/Information of the Project

Sl. No.	BWDB Zone	Location in Districts	Type of Land (%)	Inun. during HFL (m)	Topography	Earthquake Zone	Air	Noise Pollution	Water Bodies & water quality	Affected Trees	Wildlife	Climate
1	Northen Zone (Rangpur)	Rangpur, Panchagarh, Dinajpur, Gaibanha, Nilphamari districts	3 and 2 cropped agricultural land	Inundated and not inundated	Flat Terrain with undulation	Zone II	Fair air in rural areas but dusty in urban areas	Low to medium	Mainly karatoya &Gaghot river and ponds. Water quality is good.	Various trees such as mango, jackfruits, boroi, bel, tamarind, lichi, neem, koroi,shegun, meheguni, shisu, akasmoni, shimul etc.	Sparrow, kingstork, dove, crow, fox, mouse, grew musk shrew, squirrel, bengal monitor, common house lizard, snakes, frog	Temp=25-38 0C in summer & 6-20 0c in winter; Yearly Av. Rainfall= 1800-2300mm; Humidity=20-96% and Wind Speed=2-9 knot/hour
2	North Western Zone (Rajshahi)	Rajshahi, Natore, Noagoan, Bogra, Joypurhat, Pabna & Sirajganj districts	3 and 2 cropped agricultural land	Major lands inundated and minor not inundated	Flat Terrain with undulation	Zone-II &III	Fair air in rural areas but dusty in urban areas	Low to medium	Mainly karatoya Ganges, Jamuna and other rivers and ponds. Water quality is good.	Various trees such as coconut, datpulm, mango, jackfruits, boroi, bel, tamarind, lichi, neem, koroi, shegun, meheguni, shisu, akasmoni, shimul etc.	Dove, sparrow, doyel, kingstork, crow, fox, mouse, grew musk squirrel, bengal monitor, common house lizard, snakes, frog,	Temp=25-42 0C in summer &8-20 0c in winter; Yearly Av. Rainfall= 1500-2100mm; Humidity=20-96% and Wind Speed=2-9 knot/hour
3	Central Zone (Dhaka)	Mymensingh, Netrokona, Kishoreganj, Dhaka, Narayanganj, Gazipur, Manikganj and Munshiganj districts.	3 and 2 cropped agricultural land	Major lands inundated and minor not inundated	Flat Terrain with undulation	Zone-II	Fair air in rural areas but dusty and smoky in urban areas	Low to high	Mainly Buriganga, Shitalakhaya, Dhaleshawri & other rivers, lakes, and ponds. Water quality is poor.	Various trees such as coconut,mango, jackfruits, boroi, bel, tamarind, lichi, neem, shegun, meheguni, shisu, akasmoni, shimul etc.	sparrow, kingstork, dove, crow, fox, mouse, shrew, squirrel, common house lizard, snakes, frog	Temp=25-35 0C in summer &10-20 0c in winter; Yearly Av. Rainfall= 1700-2500mm; Humidity=20-96% and Wind

Sl. No.	BWDB Zone	Location in Districts	Type of Land (%)	Inun. during HFL (m)	Topography	Earthquake Zone	Air	Noise Pollution	Water Bodies & water quality	Affected Trees	Wildlife	Climate
												Speed=3-10 knot/hour
4	North Eastern Zone (Sylhet)	Comilla, Chandpur, B baria, Sylhet, Moulovibazar, Sunamganj, Habiganj districts.	3 and 2 cropped agricultural land	Major lands inundated and minor not inundated	Flat Terrain with undulation	Zone-II	Fair air in rural areas but dusty and smoky in urban areas	Low to high	Mainly Surma, Kushiyara, Meghna, Gumti rivers and ponds. Water quality is good.	Various trees such as mango, jackfruits, boroi, bel, tamarind, lichi, neem, shegun, meheguni, shisu, akasmoni, shimul etc.	Moyna, sparrow, kingstork, dove, crow, fox, mouse, grew musk shrew, squirrel, bengal monitor, common house lizard, snakes, frog	Temp=25-38 0C in summer & 6-20 0c in winter; Yearly Av. Rainfall= 1800-2400mm; Humidity=20-95% and Wind Speed=4-12 knot/hour
5	South Western Zone (Khulna)	Khulna, Jessore, Bagerhat, Narail, Magura, Shariatpur districts	3 and 2 cropped agricultural land	Major lands inundated and minor not inundated	Flat Terrain	Zone-III	Fair air in rural areas but dusty and smoky in urban areas	Low to medium	Mainly Passur, Modhumati, Rupsha river and ponds. Water quality is good.	Various trees such as mango, jackfruits, boroi, bel, tamarind, lichi, neem, shegun, meheguni, shisu, akasmoni, shimul etc.	Doyel, sparrow, kingstork, dove, crow, fox, mouse, grew musk shrew, squirrel, bengal monitor, common house lizard, snakes, frog	Temp=25-38 0C in summer & 6-20 0c in winter; Yearly Av. Rainfall= 1800-2300mm; Humidity=18-97% and Wind Speed=5-13 knot/hour
6	Southern Zone (Barisal)	Barisal, Barguna, Jhalokati, Patuakhali Districts	3 and 2 cropped agricultural land	Major lands inundated and minor not inundated	Flat Terrain	Zone-III	Fair air in rural areas but dusty in urban areas	Low to medium	Mainly rivers and ponds. Water quality is good.	Various trees such as mango, jackfruits, boroi, bel, tamarind, lichi, neem, shegun, meheguni, shisu, akasmoni, shimul etc.	Shalik, sparrow, kingstork, dove, crow, fox, mouse, grew musk shrew, squirrel,	Temp=25-38 0C in summer & 6-20 0c in winter; Yearly Av. Rainfall= 1800-2300mm; Humidity=20-

Sl. No.	BWDB Zone	Location in Districts	Type of Land (%)	Inun. during HFL (m)	Topography	Earthquake Zone	Air	Noise Pollution	Water Bodies & water quality	Affected Trees	Wildlife	Climate
											bengal monitor, common house lizard, snakes, frog	96% and Wind Speed=3-12 knot/hour
7	Mid Western Zone (Faridpur)	Chuadanga, Jinaidah, Kusthia, Faridpur, Rajbari, Shariatpur, Madaripur ,Gopalganj districts.	3 and 2 cropped agricultural land	Major lands inundated and minor not inundated	Flat Terrain	Zone-III	Fair air in rural areas but dusty and smoky in urban areas	Low to medium	Mainly Kumar, Arial Khan, Modhumati, Ganges, Gorai, river and ponds. Water quality is good.	Various trees such as Dad pulm, bettlenut, mango, jackfruits, boroi, bel, tamarind, lichi, neem, shegun, meheguni, shisu, akasmoni, shimul etc.	Doyel , sparrow, kingstork, dove, crow, fox, mouse, grew musk shrew, squirrel, bengal monitor, common house lizard, snakes, frog	Temp=25-38 0C in summer & 6-20 0c in winter; Yearly Av. Rainfall= 1700-2500mm; Humidity=20-96% and Wind Speed=3-9 knot/hour
8	Southern Zone (Chittagong)	Chittagong , Bandarban, Rangamati, Khagrachari, Coxsbazar, Noakhali and Feni districts	3 and 2 cropped agricultural land	Major lands inundated and minor not inundated	Flat Terrain and hilly	Zone-II	Fair air in rural areas but dusty and smoky in urban areas	Low to high	Mainly Karnaphuli, Bay of Bengal, Halda, Sangu river and ponds. Water quality is good.	Various trees such as mango, jackfruits, boroi, bel, tamarind, lichi, neem, shegun, meheguni, shisu, akasmoni, shimul etc.	Shalik, Crow, sparrow, kingstork, dove, , fox, mouse, grew musk shrew, squirrel, bengal monitor, common house lizard snakes, frog	Temp=23-37 0C in summer & 6-20 0c in winter; Yearly Av. Rainfall= 1700-2500mm; Humidity=20-96% and Wind Speed=5-20 knot/hour

5 ASSESSMENT AND PREDICTION OF ENVIRONMENTAL IMPACTS

121. Once the scheme detail activities have been identified, the next step involves assessment/ prediction of the impacts of these activities on the baseline environment. This chapter outlines the qualitative and quantitative method of identifying the impacts.

5.1 Overview of Predicted Potential Environmental Impacts

122. After completion of the selected scheme, the program is expected to have a multiple positive and beneficial effects on the people and economy of the area.

123. First of all, the improved embankment will also significantly reduce the flooding events and associated economic losses. The riverbank protection will discontinue the recurring bank erosion and the associated loss of homesteads and cultivated land. The repaired sluice gate will reduce waterlogging and improve agricultural production finally, the rehabilitated embankment will facilitate local mobility as well as long-distance transportation. All of these factors are likely to have profound positive impacts on the local people and their economic condition. In addition, increased safety against river bank erosion and flooding as well as improved mobility and connectivity, and increase in production of agriculture and fisheries will bring in further development and investment in the area that is currently not possible because of the vulnerability of the area due to flooding and water logging.

124. Most of the proposed interventions pertain to rehabilitation and improvement of the existing embankment, river bank protection, channel excavation and water control structure repair; hence the potentially negative environmental impacts will primarily be limited to the construction activities.

- ❖ Rehabilitation of Embankment

125. The key potentially negative impacts and issues associated with the construction phase of the proposed program include changes in aquatic habitat because of ; changes in land form and land use because of rehabilitation of existing embankment;; operation of construction machinery; air quality deterioration because of operation of construction vehicles and machinery as well as excavation activities; noise generation caused by the operation of construction machinery and vehicles; contamination of land and water caused by wastes generated from construction activities and camp operation; loss of trees that need to be removed for construction of embankment; risk of accidents associated

withmovement of construction vehicles and machinery; blockage of local routes caused by construction activities; and impacts on sensitive receptors along the embankment.

- Re-Excavation of Channels

126. The channel excavation will cause increased sediment in the channel within the reach of excavation. Additionally, the increase sediment laden water can potentially migrate downstream. The channel excavation will disrupt the aquatic vegetation on the banks and the increased sediment can adversely affect the benthic organism. The increased sediment load can also be potentially harmful to the fisheries in the excavated reach and further downstream if water in the excavated reach is not contained appropriately. The excavated channel spoil that will be stored along the channel bank or in the vicinity can cause sediment laden water to migrated back into the stream due to overland surface runoff generated due to rainfall ir irrigation activities. The excavation of channel will also disrupt the natural connection of wetland and beels to the river system and cause water logging.

- Riverbank Protection

127. The riverbank protection would require existing bank vegetation and potentially trees to be removed from the river bank. This would adversely affect the terrestrial habitat on the river bank and the aquatic habitat adjacent to the riverbank. The increased sediment load and the removal of in water aquatic vegetation can also affect the fish habitat within the vicinity of the bank protection works.

- Rehabilitation of Water Control Structures

128. The rehabilitation of water control structure can cause localized impact by disrupting the flow of water or localized sedimentation. However, the significance of the impact is temporary and minimal.

129. The potentially negative impacts associated with the O&M phase of the program include changes in river morphology caused by riverbank protection; blockage of local routes caused by the embankment and road, effects on water bodies and associated habitats caused by disruption of hydrological and ecological connectivity between main river and internal rivers, beels and khals; noise generation and air quality deterioration caused by the vehicular traffic on the embankment road; risks of accidents associated with vehicular traffic on the embankment road; and increased usage of agro-chemicals caused by agricultural intensification Assessment Methodology

130. The assessment of effects and identification of residual impacts takes account of any incorporated mitigation measures adopted due to any potential impact of Program activities, and will be largely dependent on the extent and duration of change, the number of people or size of the resource affected and their sensitivity to the change. Potential impacts can be both negative and positive (beneficial), and the methodology defined below will be applied to define both beneficial and adverse potential impacts.

131. The criteria for determining significance are generally specific for each environmental aspect but generally the magnitude of each potential impact is defined along with the sensitivity of the receptor. Generic criteria for defining magnitude and sensitivity used for the program are summarized below.

5.2 Summary of Key Environmental Impacts

132. Basedonthe constructionactivities,the followingenvironmentalissueswill beraised generally:

- Surface Water Pollution;
- GroundWaterPollution;
- Air Pollution;
- SoilErosion;
- Noise Pollution;
- Disruptionof Natural Systems;
- NegativeImpact on Fisheries;
- Damageof Treesand Vegetation;
- Waste Management;
- Excavated MaterialsManagement; and
- Borrowpit Management.

133. Theimpactscanbesubdividedintopre-construction,constructionandoperation&maintenance phase.Thefollowingsectionswilldescribeenvironmentalimpactsindifferentphasesduetothe schemeactivities.

5.2.1 Pre-construction Phase

134. **Loss of Land-**The schemes were chosen that it does not require private land acquisition or trigger loss of any agricultural land or very minimal loss of agricultural land as the embankments will be re-sectioned along the existing embankment and follow the original design. During design phase it should be assessed and alternate options must be explored which has less impact on agricultural production. Further, the excavated soil from channel re-excavation will be placed in places where it does not affect existing agricultural land.

5.2.2 Construction Phase

135. **Surface Water Pollution-**Nearby water body may be polluted due to disposal of construction wastes or wastes from labor camps of the sub projects. Due to excavation of channel there can be excess sedimentation in the streams. The resectioning of the embankment can cause sediment to be transported to adjacent water courses.

136. **Ground Water Pollution-**Septic tank and soak-well deepened up to underground water table may act as media to pollute water, which may be cause of waterborne disease.

137. **Air Pollution-**Air pollution may be triggered from a wide range of construction activities, including movement of vehicles, operation of construction equipment and generators. Further, air can be polluted from dust from the existing embankment and soil piles.

138. **Drainage Congestion-**Temporary drainage congestion often results from obstruction to natural flow of drainage water due to the storage of materials, piled up excavated material/soil, and temporary embankments constructed to keep the work area dry. Improper dumping shall impact natural drainage courses. The channel re-excavation and construction of sluice gates can also cause drainage congestion.

139. **Soil Erosion-**Soil erosion increases in the construction site because of indiscriminate removal of grasses and turf from the site and dumping of carried earth on the site without proper compaction layer by layer. Further, soil can be also eroded from spoil resulting from channel excavation. Increased construction traffic can also exacerbate the top soil of the embankment and result in increase in soil erosion.

140. **Noise Pollution and increased Vehicular Traffic-**Could generate from Heavy machineries used during construction, especially from movement of vehicles, operation of construction equipment and generators.

141. **Disruption of natural Systems-**Remove of vegetation and natural covers along the embankment can disrupt the wildlife that have natural habitat there. Further, excavation of channel can affect the fisheries and aquatic habitat.

142. **Trees and Vegetation-**Tree felling may be required to clear the site for embankment and river bank erosion protection construction. Aquatic vegetation can also be affected due to channel excavation.

143. **Ecological Impacts**-Based on primary assessment of the nature and scale of the proposed sub- projects and assessment of scheme locations (based on field visits), it appears that ecological impacts are not likely to be significant for most of the proposed schemes. However, the ecological impact should focus on:

1. Impact on flora (aquatic and terrestrial);and
2. Impact on fauna (aquatic and terrestrial) including fish.

144. ***EnvironmentalPollutionfromSolid/ConstructionWaste***-inmanyschemes, solidwasteswillbegeneratedfromlaborsheds,particularlyforlabor-intensive schemes.Impropermanagementofconstructiondebrisandsolidwastecouldcauseblockageof drainage line/path andcause environmentalpollution.

5.2.3 OperationandMaintenancePhase

145. WaterLogging-Duetoimproperplanningandlack of stormwater drainagecan cause drainagecongestionand water logging.Thismayhave negative impact to some of the residents. Further, raising the embankments can cause increase flooding to residents who are not protected by the embankment polder.

146. OperationandMaintenanceofEnvironmentalUtilities-LackofO&Mof the sluice gates can cause large debris and solid waste to be stuck at the gates.

5.3 Example of Environmental Impacts

147. An example of impact scoring for the Sunamukhi FCDI scheme has been provided in Appendix 5.

6 ENVIRONMENTAL MANAGEMENT PLAN

148. The Environmental Management Plan (EMP) provides substantial guidance on how the IEC's (Important Environmental Components) will be managed during the implementation of the civil works. An overall outline is provided in this chapter so the subsequent project schemes civil works can be implemented and the required environmental compliance can be ensuredadhering to the mitigation and monitoring plan described in this chapter.

149. The basic objective of the EMP is to manage adverse impacts of program interventions in a way that minimizes the adverse impact on the environment and people of the program influence area. The specific objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified during the present EIA and discussed earlier in the document;
- Maximize potential program benefits and control negative impacts;
- Draw responsibilities for program proponent, contractors, consultants, and other members of the program team for the environmental management of the program;
- Define a monitoring mechanism and identify monitoring parameters;
- Ensure the complete implementation of all mitigation measures;
- Ensure the effectiveness of the mitigation measures;
- Maintain essential ecological process, preserving biodiversity and where possible restoring degraded natural resources; and
- Assess environmental training requirements for different stakeholders at various levels.

150. The EMP will be managed through a number of tasks and activities and site specific management plans. One purpose of the EMP is to record the procedure and methodology for management of mitigation identified for each negative impacts of the program.

6.1 General Principles of the EMP

151. TheprimaryobjectiveoftheEMPistorecordenvironmental impactsresultingfromtheschemes activities and toensureimplementationoftheidentified "mitigationmeasures",inordertoreduceadverseimpactsandenhancepositiveimpacts.Besides,it wouldalsoaddressanyunexpectedorunforeseenenvironmentalimpactsthatmayariseduring constructionandoperational phasesof the schemes.

152. TheEMPshouldclearlylayout:

a. Themeasurestobetakenduringbothconstructionand operationphasesofa

schemetoeliminateoroffsetadverse environmentalimpacts, orreducethem toacceptablelevels;

b. Theactionsneededtoimplementthesemeasures;and

c. A monitoringplanto assesstheeffectivenessofthemitigationmeasures employed.

153. Theenvironmentalmanagementprogramshouldbe carried outasanintegratedpart of the projectplanningandexecution.Itmust notbe seen merelyasanactivity limited to monitoringand regulatingactivitiesagainst a pre-determined checklistofrequired actions.Ratherit must interactdynamicallyasaschemeimplementationproceeds, dealing flexiblywithenvironmentalimpacts, bothexpected and unexpected.Forallschemestobe implemented underCSAWMP,theEMP should be a partof thecontractdocument.

154. Themajor components of the EMPinclude:

- Mitigationandenhancement measures;
- Monitoringplan;
- Grievance redressmechanism;
- Estimationofcostof EMP; and
- Institutional arrangement for the implementationofEMP.

6.2 Identifications and Analysis of Key Environmental Issues

6.2.1 Environmental Sensitivity Investigation

155. First the ecologically critical area as per Environment Conservation Rules (ECR), 1997 should be identified for the site and properly the boundaries of the critical areas will have to be mapped. Further any archaeological or any cultural sites must also be identified in the scheme area that might be affected by the activities of the scheme during implementation and after rehabilitation.

6.2.2 Environmental Assets Closest to the Working Sites

156. Environmental assets, if any, along drainage channel, embankment or surrounding to any regulator repair sites that might be adversely affected due to implementation of these proposed works must be properly identified by the Environmental Specialists for the project.

6.2.3 Environmental Impacts

157. Field investigation and reconnaissance visits in this Scheme area could potentially reveal some short-term impacts of the re-excavation work of drainage channel, embankment re-sectioning and repairing of Water Control Structures (WCS). Different environmental impacts require different mitigation measures and approaches.

The same impact may require multiple measures, and mitigation measures for one impact may help mitigate other negative impacts caused by scheme activities. The most commonly expected short-term (construction phase) impacts in the scheme area are outlined below:

6.2.3.1 Wetland and Natural Connection BetweenRivers/Khals/Beels

158. All khal, beel and flood plain area must be identified through field reconnaissance and analysis of high resolution aerial photography. Beels of the wetland areas are depressions which generally retain water round the year. During re-excavation of drainage channel, natural connection among rivers, khals and beels may be temporary disrupted.

159. Mitigation:

- ❖ Natural flow of internal water bodies will be kept dynamic;
- ❖ Excavated spoils will not be deposited which will obstruct movement of water; and
- ❖ Connectivity of all khals and beels will be restored as quickly as possible, if interrupted.

6.2.3.2 Agricultural Land

160. The total agricultural land must be accounted based on Upzilla DAE data and should be validated through latest aerial imagery. During construction phase, adjacent agricultural area may be affected temporary by re-excavated spoil, re-sectioning of embankment and repairing work of WCSs.

161. Mitigation:

- ❖ Excavated and construction equipment will not be placed on agricultural land as it could hamper crop production;
- ❖ Excavated material will not be deposited on cultivable land and spoils from fallow land must be timely disposed of; and
- ❖ Cultivable land should not have been considered as source of borrow earth.

6.2.3.3 Populations Corridors &Movement

162. During re-sectioning work of embankment and construction activities, movement and communication may be disturbed.

163. Mitigation:

- ❖ The traffic communication must be maintained during construction allowing the local residents access to their homes. It should be informed to the local residents that the disruption is temporary in nature and communication system will be improved after completion of embankment;

and

- ❖ Flushing Inlet pipe and construction material will not be kept on passage way or corridors.

6.2.3.4 Tree and Vegetation

164. The trees that might be affected due to the re-sectioning work and river bank protection must be accounted

165. Mitigation:

- ❖ Trees on slope should be protected to the extent possible with placing earth on the existing trees. Plantation can be done on the additional space if available. In addition, slope will be turfed with grass; and
- ❖ If any cutting of tree is absolutely unavoidable then same or better species will be planted.

6.2.3.5 Fish Habitat, Fish Migration and Fish Biodiversity

166. Fisheries resources base in this scheme area inkhals, beels, floodplains and ponds should be accounted based on interview with locals and the Upzilla fisheries office. During re-excavation of drainage channel, internal fish movement and migration may be interrupted.

167. Mitigation:

- ❖ If the schemes involve re-excavation of khal, then deepest portion of the khal will be untouched until other portion will be re-excavated for fish habitat; and
- ❖ Khal should not be re-excavated in Spawning/breeding period of fish.

6.2.3.6 Drainage Congestion and Water Logging

168. The scheme could potentially suffer from drainage congestion both during the pre-monsoon and monsoon seasons due to siltation of drainage channels and damage of regulators. During construction phase, excavation activities and regulator repairing work may create drainage congestion or water logging in the scheme area.

169. Mitigation:

- ❖ Precaution should be taken to drain out the water, during repairing work of regulators;
- ❖ Khal excavation work should be scheduled at dry season, as heavy rainfall and flood from adjacent river can cause water logging in thescheme during wet season;
- ❖ Excavated spoil will be disposed such a way that it will not create any obstacle to annual flushing of the area would not contribute any risk to natural systems; and

- ❖ Precautions should be made to ensure that such areas don't become waterlogged or congested for water drainage and have adequate capacity to effectively remove suspended solids.

6.2.3.7 Surface and Ground Water Pollution

170. During construction phase, some activities may cause pollution of both ground and surface water. In the scheme surface water may be contaminated due to improper disposal of construction wastes or wastes from labor camps. Ground water also may be polluted due to septic tank and soak well of toilets deepened up to water table.

171. Mitigation:

- ❖ Construction waste will be kept at the corner of construction site and will be disposed properly;
- ❖ Food waste from labor camp will be disposed at a corner of labor shed by making a hole of dimension (1x1x1.25)m;
- ❖ Wastes from labor camp will be reduced by deploying maximum number of local people, as local labor doesn't need to stay at labor shed during night time; and
- ❖ The septic tank and soak well should be sited not less than 10 m from any ditch, drain or watercourse and preferably not closer than 15 m to any dwelling.

6.2.3.8 Dust/Air Pollution

172. During re-sectioning of embankment, repairing of regulator and inlet/outlet work, dust from fine aggregates (both stacked material and machineries operation) may pollute the air.

173. Mitigation:

- ❖ Water should be sprayed over the stacked materials for controlling the dust.

6.2.3.9 Noise

174. Noise may increase due to transportation of equipment and construction materials, day-to-day construction activities. However, sensitive area Masjid, temple, school is likely to be affected from the road side noise.

175. Mitigation:

- ❖ Transportation of the construction materials and disposal of waste from scheme area has to be carried in scheduled time. The noisiest operations should be performed during daytime.

6.2.4 Occupational Health, Safety and Sanitation

176. The construction workers should have the provision for sanitation and drinking water facilities at work sites. The lack of the latter facilities might severely affect the construction workers' health condition and work efficiency.

177. Mitigation:

- ❖ Personal Protective Equipment (PPE) should be ensured for concerned personnel. For reexcavation and re-sectioning work gloves, goggles and for construction work gloves, goggles, mask, safety boot etc. should be available. In addition, First Aid Box at each camp site will also be made available.
- ❖ Adequate lighting facilities should be provided in the nighttime.
- ❖ Site office and labor shed with provision of hygienic toilet and pure drinking water facility for all must be ensured. Effluent from toilet must not be disposed into khals or any other water bodies and should be handled properly.

6.2.5 WasteDisposal

178. Waste management is a crucial issue for environmental protection. In this scheme, waste/garbage generated during construction activities of water control structure (regulator, inlet/outlet pipe) may pollute the area or water bodies.

179. Mitigation:

- ❖ It has to plan to dump the rubbish and debris from construction activities of water control structure into proper place;
- ❖ In such case the contractors are obliged to guarantee and ensure the proper disposal of waste under the conditions of contract; and
- ❖ It needs continuous monitoring by supervisors. Care must be taken not to expose or drop any debris while transporting.

6.2.6 Management of Borrow Materials

180. For embankment re-sectioning work the following methods would be followed for borrow pit management.

181. Mitigation:

- ❖ Excavated earth from nearby khal will be used as borrow material to the maximum extent possible.
- ❖ Places for borrow pits should beidentified in consultation with the population including local government representative and WMOs.
- ❖ The borrow earth would be collected from barren land or land without trees.
- ❖ Borrow pits would not be dug within 5m of the toe of the final section of the

embankment. The bed level of the borrow pit would be sloped as far as possible.

6.2.7 Management of Dredge/Excavated Materials

182. During re-excavation of khal, dredged material may impediment on adjoining environment. So before starting re-excavation the following have been considered for disposal of dredged material.

183. Mitigation:

- Excavated material should not be disposed near the bank permanently to avoid washout during rainy season as well as re-fill drainage channel;
- Volume of dredged/excavated material has to be estimated prior to starting of works for disposing spoil;
- In this scheme, dredged materials should beidentified for filling of embankment work and other construction purpose in consultations with local population including local government and community leaders; and
- WMOs should be consulted for identification of these areas and to allow the public to carry the materials and also for setting up a monitoring procedure for transport of material without causing any environment degradation.

6.2.8 Time of Construction

184. Works should be scheduled for the driest months of the year and the lowest flow of the waterway.

6.2.9 Environmental Mitigation Plan

185. Specific Environmental Management Plan (EMP) has been prepared toeliminate, reduce or regulate the adverse impacts for this scheme.

186. One of the components of EMP is Environmental Mitigation Plan. Different environmental impacts require different mitigation measures and approaches. The same impact may require multiple measures, and mitigation measures. The Environmental Mitigation Plan of the scheme is given below in Table 6.1.

Table 6.1: Generic Environmental Mitigation Plan

Scheme Activity	Potential Environmental Impacts	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Re-excavation of Drainage channel	Obstruction of natural connection between river and wetlands inside scheme	• Natural flow of internal water bodies will be kept dynamic. • Excavated spoils will not be deposited which will obstruct movement of water. • Connectivity of all khals and beels will be restored as quickly as possible, if interrupted.	Cost included in the relevant pay item of the bid document.	Contractor	BWDB, DSC
	Fish habitat, fish migration and fish biodiversity	• The deepest portion of the khal will be untouched until other portion will be re-excavated for fish habitat. • Khal will not be re-excavated in Spawning/breeding period of fish.		Contractor	BWDB, DSC
Re-sectioning of Embankment	Tree and Vegetation	• Trees on slope will be kept untouched. More space will be available for plantation after new slope is developed. In addition, slope will be turfed with grass. • If any tree is cut two trees of same or better species for one will be planted.		Contractor	BWDB, DSC'
Repairing of Regulator and pipe	Dust/Air Pollution	• Water should be sprayed over the stacked material for controlling the dust			

Scheme Activity	Potential Environmental Impacts	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
inlet/outlet work	Noise Pollution	• Transportation of the construction materials and disposal of waste from scheme area has to be carried in scheduled time. The noisiest operations should be performed during daytime.		Contractor	BWDB, DSC
Re-excavation of Drainage Channel	Drainage Congestion and Water Logging	• Khal should not be excavated in rainy season as heavy rainfall causing water logging in this scheme. • Excavated spoil should be disposed in such a waythat itdoes not create any obstacle to annual flushing of the area would not contribute any risk to natural systems. • Precautions should be made to ensure that such areas don't become waterlogged or congested for water drainage and have adequate capacity to effectively remove suspended solids.		Contractor \	BWDB, DSC

Scheme Activity	Potential Environmental Impacts	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
	Populations of Corridors &Movement	• Problem will be very temporary. Communication system will be improved after completion of embankment. • Inlet/Outlet pipe and construction material should not be kept on passage way or corridors.		Contractor	BWDB, DSC
Labor Camp	Agricultural Land	• Precaution should be taken so that excavated and construction equipment is not placed on the agricultural land. • Excavated materials should not be deposited on cultivable land and spoils from fallow land must be timely disposed of. * • Agricultural land should be avoided for selection as borrow pit.		Contractor •	BWDB, DSC

Scheme Activity	Potential Environmental Impacts	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
	Surface and Ground Water Pollutions	• Construction waste will be kept at the corner of construction site and will be disposed properly. • Food waste from labor camp will be disposed at a cornerof labor shed by making a hole of dimension (1x1x1.25)m. • Wastes from labor camp will be reduced by deploying maximum number of local people, as local labor doesn't need to stay at labor shed during night time. • The septic tank and soak well should be sited not less than 10 m from any ditch, drain or watercourse and preferably not closer than 15 m to any dwelling.			

6.3 Mitigation and ComplianceMonitoring Program

187. It is imperative to record the environmental impacts resulting from the scheme activities. Further, the 'mitigation measures" must be recorded to ensure the environmental due diligence has been implemented, thus the adverse impacts have been mitigated and the positive impacts of the scheme activities has outweighed the temporary negative environmental impacts

188. During implementation of all schemes, the BWDB with support from the DSCwill be responsible to monitor and make sure that the environmental mitigation/enhancement measures (including health and safety measures) outlined in the EMP for the particular schemes are being implemented in accordance to the provisions of the Tender Document.

189. A number of indicators on the key environmental issues have been proposed to identify changes taking place in respect of the issues relevant to the project. Apart from general monitoring of mitigation/enhancement measures, important environmental parameters to be monitored during the construction phase of the schemes include air quality, noise level, water quality, drainage congestion, and traffic problems. However, the requirement and frequency of monitoring would depend on the nature of scheme and field situation. The parameters and their frequency of monitoring should be provided along with cost of monitoring plan and institutional arrangements for conducting monitoring. Reportingformats would be provided along with an arrangement for reporting and taking corrective action.

6.3.1 Compliance Monitoring

190. The purpose of the compliance monitoring is to ensure that the contractor implements the mitigation measures given in the EMP are effectively and timely implemented. This monitoring will generally be carried out by the CSC with the help of checklists prepared on the basis of the Mitigation Plan table 8-2 Effects Monitoring during Construction

191. Effects monitoring is a very important aspect of environmental management to safeguard the protection of environment. The monitoring plan, proposed for the CSAWMP is presented in Table 6-2; for the later phases, this program will be revisited and revised. The monitoring will comprise surveillance to check whether the contractor is meeting the provisions of the contract during construction and operation of the program including the responsible agencies for implementation and supervision. Further, the listed environmental parameters will be monitored for selected baseline monitoring sites.

Table 6.2: Monitoring Plan

Parameter / Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Supervised By
Soil Pollution	Embankment	Visual inspection that filling is through several compartments Ensure no contaminated effluent is leaving from the filling area to the nearby agricultural lands	Beginning of earth filling works Weekly	Contractor Contractor	DSC DSC
	Material storage sites	Visual inspection.	Monthly	Contractor	DSC
Erosion	Side slopes	Visual inspection of erosion prevention measures and occurrence of erosion	At the end of filling activity	Contractor	DSC
Hydrocarbon and chemical storage	Construction camps	Visual Inspection of storage facilities	Monthly	Contractor	DSC
Damage to local roads	Approach Roads to the construction sites	Visual inspection to ensure local roads are not damaged	Monthly	Contractor	DSC
Traffic Safety	Haul Roads	Visual inspection to see whether proper traffic signs are placed and flag-men for traffic management are engaged	Monthly	Contractor	DSC
Air Quality (dust, smoke)	Construction sites	Visual inspection to ensure good standard equipment is in	Daily	Contractor	DSC

Parameter / Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Supervised By
		use and dust suppression measures (eg, spraying of waters) are in place.			
	Asphalt Plant	Visual inspection to ensure asphalt plant is located >500 m from residential areas	Monthly	Contractor	DSC
	Material storage sites	Visual inspection to ensure dust suppression work plan is being implemented	Monthly	Contractor	DSC
	Sensitive receptors along construction corridor	Continuous monitoring with the help of appropriate instruments and analyzers	Quarterly during the construction phase	Contractor	DSC
Noise	Construction sites	Physical inspection to ensure good standard equipment are in use; Noise measurement using noise meter	Weekly	Contractor	DSC
	Construction sites	Visual inspection to ensure ear plugs are in use by the construction workers	Weekly	Contractor	DSC

Parameter / Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Supervised By
		Ensure work restriction between 21:00-06:00 close to the sensitive locations	Weekly	Contractor	DSC
Ground/Drinking Water Quality (pH, As, Mn, Fe, and coliforms)	Locations of tube-well installation	Depth of tube well should be more than 300m. Test water for arsenic, iron and manganese before installing of casing. If the quality is found not suitable further deepening will be done.	During drilling of wells	Contractor trough a nationally recognized laboratory	DSC
	Near camp sites and other sensitive locations along the construction corridor	Laboratory analysis	Monthly during construction phase	Contractor trough a nationally recognized laboratory	DSC
Plantation	Embankment /road	Visual inspection to ensure plantations in green areas and other designated sites.	Monthly	Contractor	DSC
Waste Management	Construction camps	Visual inspection that solid waste is disposed at designated site	Monthly	Contractor	DSC
Drinking Water and Sanitation	Camps, offices	Ensure the construction workers are provided with safe water and	Weekly	Contractor	DSC

Parameter / Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Supervised By
		sanitation facilities in the site			
Flora and Fauna	Sensitive habitats in program influence area	Survey and comparison with baseline environment	Six-monthly	Contractor through nationally recognized institute	DSC, M&E Consultant,
Fish Migration	Khals, beels and river	Survey and comparison with baseline environment	Six-monthly	Contractor through nationally recognized institute	DSC, M&E Consultant,DoF
Cultural and Archeological Sites (if any)	At all work sties	Visual observation for chance finds	Daily	Contractor	DSC, M&E Consultant,
Restoration of Work Sites	All Work Sites	Visual Inspection	After completion of all works	Contractor	DSC, M&E Consultant, BWDB
Safety of Workers Monitoring and Reporting Accidents	At work sites	Usage of Personal Protective equipment	Monthly	Contractor	DSC, M&E Consultant, BWDB
During Operation and Maintenance:					
Surface Water Quality (pH,TDS, Turbidity, pH, DO, BOD, COD etc.)	At the selected baseline monitoring sites	Sampling and analysis of surface water quality	Six-monthly	Contractor through a nationally recognized laboratory	DSC
Pesticide Sesidue in Soil and	Cultivation fields, khals and beels	Laboratory analysis	Six-monthly	Contractorthrough a nationally recognized	DCS/DAE

Parameter / Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Supervised By
Water				laboratory	
Air Quality (Dust, PM_{10}, $PM_{2.5,}$)	At the selected baseline monitoring sites	24 hours Air quality monitoring	Yearly	Contractorthrough a nationally recognized laboratory	DSC
Flora and Fauna specially Fisheries	Sensitive habitats in program influence area	Detail species assessment and compare with baseline	Yearly		DSC
Agriculture	In the program influence area	Compare the production with the baseline	Yearly		DSC/DAE
Operation of Regulators and Fish Passes	In the program influence area	Visual inspection and public feedback	Yearly	BWDB	BWDB

6.4 Performance Indicators

192. For evaluating the performance of the environmental management and monitoring plan, performance indicators are identified to for efficient and timely implementation of measures/actions proposed in EMP. The indicators are defined both for implementation phase and for operation phase. DSC will be responsible for compiling the information on these indicators and report to BWDB. The reporting format is attached in Appendix.

193. To measure the overall environmental performance of the program, an additional list of performance indicators is given below.

- Number of inspections carried out by DSC per month;
- Number of non-compliances observed by DSC;
- Availability of environmental specialists;
- Availability of environmental specialists withDS;

- ❖ Availability of environmental specialists with contractors;
- ❖ Timely reporting of documents (as defined in Monitoring Plan);
- ❖ Number of trainings imparted to stakeholders/other capacity building initiatives;
- ❖ Availability of staff for sample collection and a reliable laboratory for sample analysis;
- ❖ Number of grievances received;
- ❖ Number of grievances resolved; and
- ❖ Number of construction related accidents.

6.5 Inclusion of Relevant Components of EMP in Contract Documents

194. The specific EIA should include a section on special environmental clauses (SECs) to be incorporated in the Tender Document under General/Particular Specification. These clauses are aimed at ensuring that the Contractor carries out his responsibility of implementing the environment management plan (EMP), monitoring plan as well as other environmental and safety measures. Such clauses may specify, for example, penalties for non-compliance as well as incentives to promote strong compliance. The contractors must be made accountable to implement the plans and mitigation measures which pertain to them through contract documents and/or other agreements of the obligations and importance of the environmental components of the program. In addition, the specific EIA will ask to submit an Environment Management Action Plan (EMAP) to encompass all of the detailed plans, measures and management systems they are required to develop and implement, to be based on this EIA, their work methodology, work force involvement, equipment's standard, and work scheduling.

6.5.1 Payment Milestones

195. Payments to contractors should be linked to environmental performance, measured by completion of the prescribed environmental mitigation measures. Contractors would be required to join forces with the executing agency, project co-ordination unit, supervising consultants and local population for the mitigation of adverse impacts of the program. For effective implementation of the proposed mitigation and monitoring measures they would attract trained and experienced environmental management staff.

6.5.2 Guideline to Incorporate Environmental Management in Bid Document

196. The design consultants will be responsible to incorporate environmental management requirements in the bidding documents, with the assistance of the environmental consultants. The generic guidelines to incorporate environmental aspects in the bidding documents are listed below. These are examples only and shall

be further elaborated and expanded upon based on the findings and recommendations of the phase-specific EIAs.

- ❖ Prepare cost estimates, to be incorporated in Bid Documents.
- ❖ Contractor version of the Environmental Management Plan along with the ECoPs to be incorporated in the bid document's work requirements.
- ❖ Penalty clauses for not complying with EMP requirements to be incorporated. Indicative penalty clauses are presented below (Addendum to Clause 17.2 Contractor's Care of the Works of FIDIC).
    - The contractor has to follow all traffic safety measures as defined in the technical specification. Damage shall be levied at the rate of up to BDT10,000 per day per location for non – conformity of traffic safety measures as per the decision of the BWDB Engineer.
    - The contractor has to follow all environmental mitigation and management measures as defined in the technical specification read along with the Environmental Management Plan for the specific CSAWMP activities. Damage shall be levied at the rate of up to BDT 10,000 per day per location for nonconformity of EMP measures as per the decision of the BWDB Engineer.
    - The contractor has to ensure that prior to every monsoon season, during the construction period; all the temporary and permanent cross drainage structures are free from debris as defined in the Technical Specifications read along with the EMP. Damage shall be levied at the rate of BDT 3,000 per day per location for non-conformity as per the decision of the BWDB Engineer.
    - The contractor has to ensure that a comprehensive Health and Safety program is in place for the duration of construction. Implementation of the program will include, among other aspects, ensuring that sufficient numbers and good quality Personnel Protective Equipment (PPE), should be provide to staff and labor all time as defined in the labor codes read along with the EMP. Damage shall be levied at the rate of up to BDT 5,000 per day for non-conformity as per the decision of the BWDB Engineer.
    - In addition, for any non-compliance causing damages or material harm to the natural environment, 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 engineer, or pay BWDB for the cost (as assessed by BWDB) of contracting a third party to carry out the remediation work.
- ❖ Since many contractors do not have clear understanding the need of environmental management, some quote very low price for implementation of EMP and eventually cannot implement EMP as per design. To avoid this problem, fixed budget may be assigned for EMP implementation. The contractors may need orientation on the requirement of the EMP in the pre-bidding meeting.

6.6 Grievance Redress Mechanism[3]

197. It is imperative the local residents can voice their concern in a formal manner and should be effectively and timely resolved in an appropriate Grievance Redress

[3] Further details on GRM are available in Chapter 9.

Mechanism. The process should be properly documented and appropriate institutional mechanisms should be in place so any grievance of a resident can be appropriately resolved.

198. The program will establish a grievance redress mechanism (GRM) for addressing grievances and complaints received from the program-affected persons. Grievance Redress Mechanism (GRM) is a valuable tool which will allow affected people to voice concerns regarding environmental impacts for CSAWMP's activities. The fundamental objective of GRM will be to resolve any program -related grievances locally in consultation with the aggrieved party to facilitate smooth implementation of the social and environmental action plans. Another important objective is to democratize the development process at the local level and to establish accountability to the affected people. BWDB would ensure that grievance redress procedures are in place and would monitor those procedures to ensure that grievances are handled properly. The BWDB office will establish a procedure to answer sub- program -related queries and address complaints, disputes, and grievances about any aspect of the sub- program, including disagreements regarding the assessment and mitigation of environmental impacts. Grievance Redress Committee (GRC) will be formed as suggested in the Social Management Framework (SMF). Additional details regarding the functioning of GRC is presented in Chapter 14.

6.7 Documentation

199. The PCU with assistance from DSC and contractors will produce the following environmental reporting documentation:

- *Environmental Monitoring Reports:* The environmental monitoring reports will include environmental mitigation measures undertaken, environmental monitoring activities undertaken, details of monitoring data collected, analysis of monitoring results particularly the non-compliances, recommended mitigation and corrective measures, environmental training conducted, and environmental regulatory violations observed. The environmental monitoring reports will be submitted quarterly during the construction period and annually for twoyears after completion of construction.
- *ProgramCompletion Environmental Monitoring Report:*One year after completion of construction, the DSCwill submit a Program Completion Environmental Monitoring Report which will summarize the overall environmental impacts from the program to World Bank and the BWDBEMP Implementation Cost

200. Cost estimates will need to be prepared for all the mitigation and monitoring measures to be proposed in the specific EIAs in accordance with the EMF. The cost estimates for some of the mitigation measures to be identified in the EMP will be part of civil works contract.

201. The Development Project Proposal (DPP) of GoB for the proposed program should reflect the EMP activities with budget for successful environmental management of the program.

7 INSTITUTIONAL ARRANGEMENT AND CAPACITY BUILDING

7.1 Introduction

202. An institutional arrangement is required for management and implementation of the project ensuring environmental safeguard compliance to the satisfaction of the World Banks safeguard requirements. In addition to management and implementation of the project, the institutional arrangement will also include organizational support, training needs and plan and information system management.

203. The following section captures these institutional arrangements for EMF implementation by concerned officials of BWDB, DAE and DoF their consultant and working contractors. The organization structure that will be adopted by BWDB, DAE and DoF headquarter and field level to ensure the proper implementation of the project in general and the EMF in particular.

7.2 Implementation Arrangement

7.2.1 Project Executing Agency

204. GoBwill implement the project under the overall responsibility for project management and coordination through its MoWR, MoA and MoFLBWDB under the MoWR, DAE under MoA and DoF underMoFL are the Executing Agency (EA) of the Project. BWDB, DAE and DoFshall be responsible for the execution and implementation of the Project through the Project Co-ordination Unit. A PSC would provide the forum for overall guidance, policy advice and coordination of the project activities and addressing the inter-agency issues.

7.2.2 Project Steering Committee (PSC)

205. The PSC would be chaired by the Secretary, Ministry of Water Resources and will include the representation from Ministry of Planning and of Finance, Agriculture, Fisheries and Livestock, other concerned Ministries and additional members from government organizations according to the directive of GoB on PSC, The PSC will oversee the project; provide policy-level guidance and inter-ministrycoordination for the project. The Senior Assistant Chief/Assistant Chief/Assistant Secretaryof theMoWR will act as the secretary of the PSC.

7.2.3 Project Co-Ordination Unit (PCU) and Project Implementation Unit

206. BWDB will set up a PCU and DAE and DoF will set up their own PIUto oversee the development and management of the project. The PCU will be led by a Project Co-ordinating Director (PD) appointed by BWDB. The DAEand DoF will have respective Project Directors

207. The BWDB, PCUwill have a central project office located at the headquarters of BWDB in Dhaka. The PD will be the rank of an Additional Chief Engineer/Senior Superintending Engineer, and will report directly to the concerned Additional Director General (ADG). In addition,executing field offices will be led by an Executive Engineer, who will report to the respective Superintending Engineer and Chief Engineer of the fieldoffice The role of the PCU is, therefore, largely to contract competent organizations, to carefully supervise their performance, to enable them to perform efficiently, and to ensure transparent and regular reporting to BWDB and MoWR.

208. The BWDB will hire and use the design and supervision consultancy (DSC) services of international/national firm through competitive selection in engineering surveys, designs,construction supervision including quality assurance, preparation of bidding documents and final certification of quantity and quality compliance of works completed by the contractors.

209. Environmental assessments, preparation of EMPs, social screening of subprojects and preparation of SMP (Social Management Plans) along with RAP or abbreviated RAP (if any) including data collection will be performed by a separate consulting firm through subcontracting by theDSC will be supported by an experienced and reputable Resettlement Consultant if needed,will be hired directly by the PCU or by the DSC, under the discretion for social mobilization activities related to compensation, resettlement and rehabilitation of project affected persons.The Resettlement Consultant will perform its activities directly under the supervision of the Project Co-ordinating Director, but will coordinate with the Design and Supervision Consultant (DSC) acting as the Representative Engineer for the project.

210. An M&E firm will be hired for the project,PCU, with the assistance from the M&E consultant will be designated to review all environmental screening, assessment, mitigation measures and costing. The M&E consultant will also oversee the implementation of the EMF and the EMPs, SMP and RAP (if needed). The prime duty of the M&E consultant regarding environmentalactivities would be to:

- ❖ Reviewthe screening and categorization of the schemes;
- ❖ Review and update theEA,as required by the EMF;
- ❖ Assist the Executive Engineers to supervise the implementation or the EMP by the contractors; and
- ❖ Ensure that construction activities are carried out in an environmentally sound and sustainable manner.

211. PCU with help of M & E Consultant will submit the overall quarterly progress report on environment compliance to the WB. A format of quarterly monitoring report is shown in Annex 6.

212. The PCU, BWDB will carry out monitoring of community engagement, social screening and impact assessment, and implementation of SMP with assistance from the M &E consultant.

7.2.4 DoF Project Implementation Arrangement

213. Department of Fisheries (DoF) will be responsible for the execution of the project. One officer (Grade–5) from DoF will be deputed as Project Director (PD). He will responsible for the implementation of the project and will liable to the Director General, DoF (DG/DoF). He will be supported by two Assistant Director (Grade-6), one Monitoring and Evaluation Officer (Grade-9), one Accountant-cum-Cashier, one Driver, and two MLSS. Two Assistant Directors, one Monitoring and Evaluation Officer and one Accountant-cum-Cashier will be deputed from DoF. However, rest of the manpower (1 Computer Operator, 1 Driver and 2 MLSS) will be directly recruited as per the Government recruitment rule. The officers and staffs of the DoF in the project command area will also work for the smooth implementation of the project. They will get all kinds of logistic support (TA/DA, fuel & maintenance of the vehicle etc.) from the project. The Project Implementation Unit (PIU) will be established at Dhaka in a rental house. One Jeep will be procured under the project for supervision and monitoring of the project activities.

214. The project will be managed under the overall guidance of the PD. He will co-ordinate and liaise with the other related departments and agencies. The project personnel and the DoF personnel within the project command area will support the PD for smooth implementation of the project. Upazila level Officers and staffs will be involved for the selection of the farmers/fishers & formation of groups of farmer's/fisher communities, training and other fisheries support activities.

7.2.5 DAE Project Implementation Arrangement

215. Department of Agricultural Extension (DAE) will be responsible for the execution of the project. One officer (Grade–5/6) from DAE will be deputed as Project Director (PD). He will responsible for the implementation of the project and will liable to the Director General, DAE.

7.3 Capacity Building & Training

7.3.1 Capacity Building

216. Capacity building for effective implementation of the environmental safeguard requirements is a key element of the EMP. Capacity building for environmental safeguard management will need to be carried out at all tiers of the program, including BWDB, PCU, DAE, DoF, DSC, M&E consultant and contractors. During the O&M phase of the program, these trainings will need to becontinued by BWDB staff for all relevant O&M personnel and community.

7.3.2 Training Program for Existing Staff

- Technical Assistance: knowledge sharing with consultants, having requisite expertise;
- Capacity building training programs should be undertaken in the following area: Training of the management level officials of BWDB, BWDB environmental compliance personnel on the overall environmental concerns and responsibilities for implementing EMP;
- Recruitment of new professionals with background on environment, if required and provide necessary training;
- Organizing workshop, seminar, with stakeholders on the environmental concerns of CSAWMP;
- Training of the WMOs on successful operation of hydraulic structures; and
- Training on structured format in reporting for all stages of implementation and those of relevant agencies who are involved in EMP implementation.

217. The training programs should be arranged before implementation of the interventions in the scheme area.

8 PUBLIC CONSULTATION AND DISCLOSURE

8.1 Objective of Public Consultation

218. Objective of the public consultation is to minimize adverse impacts, gaining support and cooperation of local government bodies like UP's, stakeholder groups like beneficiary communities including water management organizations, and any entities looking after community interests, and the affected squatters, business owners, and traders on embankments and others, who would directly face the adverse impacts and temporary inconveniences. Suggestions/feedbacks received from the consultations will be considered in schemes designs.

8.1.1 Disclosure

219. Participation/consultation is defined as a continuous two-way communication process consisting of 'feed-forward' the information on the project's goals, objectives, scope and social impact implications to the project beneficiaries, and their 'feed-back' on these issues (and more) to the policymakers and project designers. Selection of schemes and civil works will include extensive discussion on social safeguard issues associated with displacement from BWDB's own and other public lands; minimizing adverse impacts; gaining support and cooperation of local government bodies like UPs; stakeholder groups like beneficiary communities including water management organizations, and any entities looking after community interests; and most of all the affected squatters, business owners, and traders on embankments and others, who would directly face the adverse impacts and temporary inconveniences. Suggestions/feedbacks received from the consultations will be considered in project design.

220. In preparing a resettlement action plan consultation must be held with the stakeholders including the affected people and their communities based on sufficient information made available to them in advance. In addition to seeking feedback on project specific issues, the participatory planning approach also serves and contributes to public relations, information dissemination and conflict resolution in all development projects. CSAWMP is an exception of that. The consultation and participation process will continue during implementation of the project and suggestions/feedbacks received from the consultations will be considered in project design, implementation, and monitoring and evaluation. The communities will be engaged through Water Management Organizations

(WMO) in the decision-making and implementation of the RAPs/ARAPs. The other instruments for engagement of the communities during implementation of the RAPs/ARAPs are Grievance Redress Committees (GRC), Property Assessment and Valuation Committees (PAVC) and Physical Relocation Assistance Committees (PRAC).

221. Physical and economic displacement of Project Affected Persons (PAP) under the schemes under CSAWMP in the nine Zonal Offices of BWDB, improvement and rehabilitation schemes of water management infrastructures entails consultation and participation with the different stakeholders[4] including the PAPs and the beneficiaries. Effective resettlement planning and implementation require regular consultation with a wide range of project stakeholders. The stakeholders include the affected people, the beneficiaries, the local elites and elected representatives (Union Parishad Chairmen and Members) and any individual or group having any sort of stake in development projects. Consultation at different stages aims to facilitate managing public expectations concerning the impact of development projects and its expected benefits, negotiating compensation packages and eligibility requirements, 458resettlement assistance, and the timing of resettlement activities. Disclosures of SIA and SMF and RAPs/ARAPs are the prerequisite to ensure transparency and accountability in implementation of land acquisition and resettlement of the schemes under CSAWMP.

8.2 Consultation and Participation Tool

222. Methods will be used for consultation with primary and secondary stakeholders under schemes of CSAWMP may include participatory rapid appraisal approach, such as (i) transect walk and small talk, (ii) participatory rapid appraisal, (iii) focus group discussions (FGD), (iv) stakeholder's consultation meetings, (v) issue specific consultation meetings, (vi) open meetings, (vii) interview, and (viii) workshops. The consultation and participation process facilitate all the stakeholders, both primary and secondary to participate in selection, design, preparation and implementation of schemes of CSAWMP.

8.2.1 Participation Mechanisms

223. The primary and the secondary stakeholders are to be identified during census, socioeconomic survey and inventory of assets and losses due to undertaking of

[4] As broadly defined, stakeholders include any individual and group affected by, or that believes it is affected by the project; and any individual and group that can play a significant role in shaping or affecting the project, either positively or negatively, including the host community (IFC Handbook for Preparing a Resettlement Action Plan).

development projects. This may be the first and most important step in the process of resettlement planning. The identified stakeholders will be brought for participation in process of resettlement planning and subsequently in resettlement implementation. Focus group discussions/meetings and consultation meetings are the main mechanisms for promoting participation of the people. Participation provides opportunities for people to voice their concerns and propose alternatives to mitigate their anticipated impacts of the Project.

224. Women may comprise a disproportionately big number of the poor in the project affected areas. Existing gender discrimination may limit access of the project affected women, especially the affected poor women to resources, opportunities, and public services necessary to improve the standard of living for themselves and their families during and after their relocation, resettlement and rehabilitation. The affected poor women and their children will often suffer to large extent if necessary remedial actions will not be included in resettlement plan and implementation effectively. Here an example of appropriate use of participation mechanism for ensuring women's increased participation in preparation and implementation of schemes of the Project is presented. BWDB will recruit some female enumerators who will facilitate the women to provide information about their losses, appropriate mitigation measures including effective women's participation. Women's participation should be encouraged and promoted by BWDB so that they can adapt themselves to resettlement sites or relocation sites. The following practical initiatives may be considered to women's adaptation at the resettlement site or relocated site:

- Provision for separate and confidential consultation,
- Facilitate relocation near to kin and former neighbors,
- Ensuring compensation for women's losses,
- Improving health services, and providing assistance for water and sanitation facilities,
- Imparting skill training, credit support and access to market,
- Some strategic initiatives may be considered for women's livelihoods in resettlement site or relocation site include:

    - ✓ Providing literacy and numeracy training, providing girls' education,
    - ✓ Improving access to productive assets (e.g., credit, legal reform, etc.),
    - ✓ Improving participation in decision making (support for women's interest group), and
    - ✓ Promoting equal opportunity for women's employment.

- Assistance with dismantling salvageable materials from their original home, and
- Priority access to all other mitigation and development assistance.

225. Public participation should be facilitated, promoted and ensured at three different stages in project cycle of CSAWMP, improvement and rehabilitation of schemes for water resource management. Firstly, public consultation is essential at project preparation stage in general and resettlement planning stage in particular. Secondly, public consultation will be held during implementation of RAP/ARAPs and implementation of civil works of the Project. Thirdly, public consultation will also be required during monitoring and evaluation of RAP/ARAPs implementation.

8.3 Issues and Concerns

226. It has already been mentioned earlier that BWDB will apply participatory tools, techniques and approaches in selection and design of schemes. It will offer the stakeholders to share their anticipated issues and concerns concerning these schemes. BWDB follow a time-table to consult the stakeholders in the likely affected people and their communities at different stages of the project cycle to facilitate effective participation. The primary objectives are to examine whether there is broad community consensus in support of the subproject and to seek community inputs/feedback to avoid or minimize the adverse impacts associated with the chosen subproject activities; identify the impact mitigation measures; and assess and adopt economic opportunities which BWDB could promote to complement the measures required to mitigate the adverse impacts.

8.4 Issues discussed in the Public Consultation Meetings

227. Knowledge of the participants about the CSAWMP and attitude of people towards the proposed project interventions.

228. Perception of local people about problems regarding the polder and suggestions for solution of the perceived problems considering:

- Water resources (surface water, siltation, water salinity, drainage, ground water salinity, water infrastructure management etc.)
- Land and agriculture resources (Soil quality & fertility, agriculture production & yield, crop damage etc)
- Fishery resources (open water fishing, brackish water fish culture, shrimp production & yield, virus infestation etc)

- ❖ Socio-economic resources (occupation & employment, migration, quality of life, communication, conflict of interest of shrimp-rice farming, gender aspect etc.)

229. Sustainable solution of the above potential problems of the polder in the line with the aspects of:

- Water resources management
- Land and agriculture recourses management
- Fishery recourses management
- Socio- economic resources management, and
- Disaster management.

230. Suggestions on enhancement (positive impacts) and mitigation (negative impacts) measures.Identify the need for resettlement and land acquisition/ land access for implementing the project and to assess the local representatives and public support regarding this issue.

8.4.1 Findings of the Public Consultation Meetings

231. Focus Group Discussions(FGDs) were held during these field visits to identify issues and problems to enable the institution to corrective measures and to identify lessons and opportunities to enhance project implementation mechanism. Discussions also have been held with the BWDB officials on different aspects of project implementation and management, particularly focusing on existing capacity and institutional arrangement forsocial impact issues. The findings obtained from the consultation meetings are summarized below:

- ❖ Crisis of irrigation water during agriculture practices, fish culture (Fresh/sweet water), plant etc. due to Salinity increase/salinity intrusion;
- ❖ The agricultural land is losing its normal productivity day by day because of salinity intrusion;
- ❖ Proper irrigation facilities are required for dry season crop production;
- ❖ Silted up rivers and khals (canals);
- ❖ Drainage congestion/water logging is hampering agriculture, fisheries, shrimp/prawn culture
- ❖ Over flow of water during rainy season into the unprotected area;

- ❖ Early flood due to storm surges in the coastal area are affecting agriculture, fisheries, shrimp/prawn culture and salt culture;
- ❖ Weak WMO activities; and
- ❖ Absence of LGI's participation during implementation of project.

8.4.1.1 Solutions/ Mitigations

- ❖ Initiate re-excavation of river and khals;
- ❖ River training should be taken up;
- ❖ Initiate river bank protection along the erosion side of the embankment;
- ❖ Construction and repairing of the sluice gate /regulator;
- ❖ Raisingthe height of the embankment;
- ❖ Afforestation in the slope of embankment and in fallow land of BWDB/Government;
- ❖ Raisingand repairing of the embankment; and
- ❖ Ensure active participation of LGI during project implementation.

8.4.1.2 Knowledge about intervention and location:

- ❖ Some participants know about the proposed project; and
- ❖ They have very positive attitude towards the proposed project.
- ❖ They believe that CSAWMP project will reduce their sufferings

8.4.2 Details of Public Consultations

232. Consultations were held in three BWDB zones, i.e., Central Zone, Dhaka,Mid Western Zone Faridpur, South Easter Zone,Chittagong.Meetings were held with the officials of local BWDB offices, Union Chairman and local representatives of the concerned schemes for some of the visited schemes and with the Upzilla Officials of the respective schemes. Photos of several public consultations are given in photo no 10.1-10.3 and list of public consultations held in varios subproject areas is given in Table 8.1.

Figure 8.1: Site Meeting at Smomitirhat Chittagong

Figure 8.2: Focused Group Discussion- Ujanpara Tangail

Figure 8.3: Meeting at Shomitirhat Union Chairman office


Figure 8.4: Site Meeting at Gopalgonj

Table 8.1: List of Public Consultations

Sl.	Name of scheme	Project area		Scheme visited by BWDB Team / Consultants	
		District	Upazila	District	Upazila
Central Zone, Dhaka					
1	Kabariabari FCD sub-Project	Jamalpur	Sarishabari	Jamalpur	Sarishabari
2	Protabogri-Boulaerpara FCD sub Project	Jamalpur	Melandaha, Sadar	Jamalpur	Melandaha, Jamalpur Sadar
3	Ujanpara-Komarbhanga FCDI sub-project (FCDI)	Mymensingh	Nandail & Iswarganj	Mymensingh	Nandail & Iswarganj
4	Balushair Flood Embankment FCDI	Narsingdi	Narsingdi Sadar	Narsingdi	Narsingdi Sadar
5	Binnabaid FCDI Scheme	Narsingdi	Belabo	Narsingdi	Belabo
6	Kamar-Naogaon (FCD) Project	Tangail	Delduar	Tangail	Delduar
Western Zone, Faridpur					
7	Baramanikadi Sub project (remaining works)	Faridpur	Faridpur Sadar	Faridpur	Faridpur Sadar
8	Parulia Charbihatpara (FCDI)	Gopalgong	Kasiani	Gopalgong	Kasiani
9	Satla-Bagda FCDI (Polder-1)	Gopalgong	Tungi para Kotuali Para	Gopalgong	Tungi para Kotuali Para
10	Sauth Kalkini FCDI Sub-Project	Madaripur	Kalkini	Madaripur	Kalkini
11	Ramshil - Kafulabari FCD Project (ramaining works)	Gopalgong	Kotalipara	Gopalgong	Kotalipara
12	Modhukhali-Baliakandi Sub-project (Remaining Work)	Rajbari	Baliakandi	Rajbari	Baliakandi

Eastern Zone, Comilla					
13	Muhuri-Kahua FCDI Project (Remaining Part)	Feni	Parshuram Fulgazi Chagalnaiya	Feni	Parshuram Fulgazi Chagalnaiya
North-Eastern Zone, Sylhet					
14	Khai Haor (Polder-2) (Kawajuri Haor) FCD Project	Sunamganj	South Sunamganj	Sunamganj	South Sunamganj
North-Western Zone, Rajshahi					
15	Nagar River Embankment Sub-aproject (FCDI)	Natore	Singra	Natore	Singra
16	Raktadaha lohachura beel drainage scheme (FCD)	Naogaon	Naogaon sadar Raninagar Atri	Naogaon	Naogaon sadar Raninagar Atri
17	Protuppur Irrigation Scheme (Remaining Works)	Bogra	Kahaloo	Bogra	Kahaloo
18	Chari-Shameshpur FCD Sub-Project	Rajshahi	Chapai Nawab-ganj Sadar & Godagari	Rajshahi	ChapaiNawab-ganj Sadar & Godagari
South-Western Zone, Khulna					
19	Barakpur - Digholia sub-project	Khulna	Digholia	Khulna	Digholia
20	Doiboggohati sub project	Bagerhat	Bagerhat sadar, Moralgonj	Bagerhat	Bagerhat sadar, Moralgonj
21	Chanchuri Beel Irrigatin sub-Project	Narail	Narail Sadar & Kalia	Narail	Narail Sadar & Kalia
22	Chitra-Bhairab-Afra Sub- Project (Narail Part)	Narail	Narail Sadar & Kalia	Narail	Narail Sadar & Kalia
23	Sonamukhi banmandar and other beel	Jessore	Jhikargasa & Sharsa	Jessore	Jhikargasa & Sharsa

	drainage sub-project				
South-Eastern Zone, Chittagong					
24	Halda Extension Irrigation Sub-Project	Chittagong	Hathagari	Chittagong	Hathagari
25	Fatikchari Flood Control & Irrigation Project	Chittagong	Fatikchari	Chittagong	Fatikchari
26	Karnafuli Irrigation (Halda) Project	Chittagong	Hathagari Rauzan	Chittagong	Hathagari Rauzan
27	Karnafuli Irrigation (Ichamati Unit) Project	Chittagong	Rangunia	Chittagong	Rangunia

8.5 Framework for Future Consultations

233. Consultations with the key stakeholders will need to be carried out throughout the program life. These will include consultations and liaison with communities and other stakeholders during the construction phase and also extensive consultations with the grass-root as well as institutional stakeholders during the EIA studies. The framework for the future consultations is presented in below Table 8.2:

Table 8.2: Consultation Framework

Description	Objective/Purpose	Responsibility	Timing
Consultations with communities and other stakeholders during feasibility stages	Consultations are done during pre-feasibility and feasibility stages to conduct social screening and social impact assessment to obtain peoples' perspectives, feedback and suggestions about subprojects.	CWM SIA Team	feasibility
Consultations with communities and other stakeholders during SIA, census and socioeconomic survey in the schemes areas.	Sharing TOR for SIA, preparation of RAPs/ARAPs, implementation of RAPs/ARAPs, Dissemination of information on CSAWMP and its key impacts and proposed mitigation measures; soliciting views, comments, concerns, and	CWM, SIA team, Resettlement Consultant	During SIA, census and socioeconomic survey (sharing preliminary findings of analyzed census and survey data which will be fed in

	recommendations of stakeholders		preparation of RAP/ARAPs for their feedback)
Consultations with communities and other stakeholders during construction phase	Information dissemination; public-relation; confidence building; awareness about risks and impacts; minimizing conflicts and frictions.	CWM; Contractors; DSC	Construction phase
Consultations with communities	Liaison with communities and program beneficiaries	CWM	O&M phase

8.6 Documentation and Reporting

234. The EMF of CSAWMP will be disclosed to the local and national level stakeholders through different methods as described below.

8.6.1 Workshop

237. A national workshop will be held in Dhaka to present the detailed design including safeguard aspects of CSAWMP to the key stakeholders. In addition, workshops have been planned to disclose the SMF. Representatives of Executive Agency, BWDB, the study team, and the government officials from different concerned departments (DAE, DoF, DoE, etc.,), representatives from NGOs, local communities of different occupations, journalists, and local elite/civil society may attend the workshops. In the workshops, the participants will share their observations, views, and remarks with the study team. Appropriate suggestions and recommendations on different issues from the stakeholders of the meeting would be incorporated in the SMF which can be followed during conducting social screening and social assessments of the schemes under the nine Zonal Offices of BWDB. The workshops will also help to resolve conflicting issues among stakeholders as far as social safeguards issues are concerned

238. Publication in electronic and print media: The information on program interventions and the findings of environmental assessment would also be disclosed through printed and electronic media. The report would be disclosed in Bengali language.

8.6.2 Availability of Documents

239. Summary of the Social Assessment (SA) and Social Management Framework (SMF) report along with Social Management Plan (SMP) will be translated into Bengali language and disseminated locally. The full report (in English) and the summary (in Bengali)

will also be uploaded in the website of BWDB and World Bank Info shop. Hard copy of the SA and SMF will also be available at the nine Zonal Offices of the BWDB.

Appendix 1: Environmental Screening Example

(1) Name of scheme : Tangaria-Gobindapur Sub-project

(2) Brief description of scheme (Provide the details of the project including the functions i.e. floodcontrol, drainage, agricultural, etc, year implemented and the command area**) :** The scheme is a Flood control and Drainage & Irrigation (FCDI) project. This project was implemented in the year of 1977-85 for controlling of flood water entrance, enhancing of irrigation facilities & to provide communication through the roadway on the embankment. The project included two water control structures, 4 outlets & 9 km of flood control embankments. Total project area is approximately 5000 ha.

(3) Location of scheme (include location map): The scheme area is located northern part of Bangladesh in Upazilla Horipur, Dist: Thakurgaon (Location map attached).

(4) Layout of the scheme : Scheme layout map is attached.

(5) Ownership of scheme land :

(a)Government/ ULB owned : Government of Bangladesh

(b)Private land (need acquisition) : N/A

(6) Brief description of scheme site:

- Indicate the information on present land use, HFL for last 30 years: The land of the scheme is using mainly for agricultural & fishing activities. High flood level of the scheme area is approximately 51.26 m (PWD) based on data for the last 30 years.
- Important Environmental Features[5] (IEFs) adjacent the site: (beel, haor, forest, plants, trees, wetland) Also a rich biodiversity has been observed on the said area.

(7) Brief information of environment within scheme influence area (provide details of activities of economic significance i.e fisheries, agriculture, farming, any important cultural, natural heritage area, flora and fauna i.e plants and wildlife, details of community and business activity-i. e bazar, hat, major roads, highway, transportation route etc**):**The name of the river within the project scheme is Kulik which is an international river. After implementation of this project, numerous irrigation facilities had been created in this scheme area. Additionally, fishing activities also expanded significantly. The source of water of the scheme comes from rainwater and river water. The quality of water is good and essential to increase agriculture & fish production. Some flora & fauna are also found in this scheme area.

After implementation of this project people settled adjacent to the scheme, that include mostly farmers & fisher men. In this scheme area there are several educational and religious institutions i.e., primary & high school, madrasah, college and mosques. Some health care institutions (Community health care centre) are also located within the scheme area.

5

There are several ponds and canals within the scheme area to support the fishing and agricultural activities. Canal is used to supply irrigation water & provide transport for the farmer. Being located upstream of the river catchment system the community face scarcity of irrigation water most of the time in the year. So canal plays a key role as the source and distribution of water.

There is not any major transportation infrastructure within the scheme catchment area.

(8) Key activities of scheme: (please provide the project category: FCD or FCDI) FCDI

(9) A description of current agricultural activities and fisheries activities: In this scheme the main agricultural production are rice, wheat, jute & different fruits. Fisheries include carp and varieties of native fish.

(10) Potential Environmental Impact during Construction Phase: (provide N/A, negligible, moderate, significant and details if applicable)

- Felling of trees: Type of species and the number of trees : N/A
- Potential impact on species of aquatic (i.e., water) environment: minor sediment into water during embankment resectioning.
- Impact on air, noise, storm water drainage and traffic: N/A
- Potential hydrological, hydraulic and morphologic impacts for the intervention: N/A
- localized flooding impact: N/A

(11) Public Consultation (Provide details and date of public consultation including the stakeholders, government officials and public representative present**):** Public Consultations of the scheme were arranged several times by the local BWDB office. The people requested for immediate repair of the water control structure, outlet & flood control embankment for providing the required water for additional area for agriculture and fisheries and to reduce crop damage within the command area.

(12) Proposed mitigation measure: (please provide a schematic map for the repair, rehabilitation, resectioning) At present to continue support for fisheries and agricultural activities, appropriate rehabilitation & repair are required for the water control structure. Repair of water control structure 2 nos, Outlets 4 nos, resectioning of embankment about 9.000 K.M are proposed.

(13) Overall Comments: The proposed rehabilitation is essential for this scheme. After implementation of the above mentioned works, project area will not be inundated from frequent flood water. Additionally, 40 thousand m.t. of crops & significant amount of fish will be produced after completing the required works. Further, the people adjacent scheme areas will be benefited by the improved communication system due to resectioning of the embankment

(14) Prepared by: (Name, designation, mobile number, signature, date) ----------

(15) Reviewed by: (Name, designation, mobile number, signature, date) ----------

B. Social Safeguards Screening

Subproject Name: Tangaria-Gobindapur Sub-project

Proposed physical interventions: 1. Embankment Resectioning: ___09_____ km

2. Embankment Retirement: ___00_____ km

3. Riverbank Protection: ___00____ m

4. Slope protection: __00__ m

5. Re-excavation of canal/khal: __00____ m

6. Repair of water control structures: _02____ nos.

7. Repair of irrigation Outlets: 4 nos

Possible Involuntary Resettlement Impacts	Yes	No	Not known	Intervention
1. Will there be need for additional lands rehabilitation and construction of structures?		No		1. Embankment resectioning
		No		2. Embankment retirement
		No		3. Riverbank protection
		No		4. Re-excavation of canal
		No		5. Water control structure
2. Will there be need for additional lands obtained through voluntary donation?		No		1. Embankment resectioning
		No		2. Embankment retirement
		No		3. Riverbank protection
		No		4. Re-excavation of canal
		No		5. Water control structure
3. Is the land under any of the existing structures proposed for rehabilitation owned by private people?		No		1. Embankment resectioning
		No		2. Embankment retirement
		No		3. Riverbank protection
		No		4. Re-excavation of canal
		No		5. Water control structure
4. Will the subproject be implemented fully within an existing Right of Way (ROW)?	Yes			1. Embankment resectioning

				2. Embankment retirement
		NO		3. Riverbank protection
		NO		4. Re-excavation of canal
	Yes			5. Water control structure
5. Will there be loss of shelter and residential land due to the subproject?		NO		
6. Will there be loss of agricultural and other productive assets due to the subproject?		NO		
7. Will there be losses of crops, trees, and fixed assets due to the subproject?		NO		
8. Will there be loss of businesses or enterprises due to the subproject?		NO		
9. Will there be loss of income sources and means of livelihoods due to subproject?		NO		

Are any displaced persons from indigenous or ethnic minority groups? [✓] No [ ] Yes If yes, how many? ___
Are any beneficiaries of the subproject belonging to indigenous or ethnic minority groups? [ ] No [✓] Yes If yes, how many? _about 2000 nos

_____

_____

Name of the Official, BWDB Signature

Division/Subdivision: _____

Date of screening: ____/_____/_____

Appendix 2: Environmental Code of Practice (ECoP)

The Environmental Code of Practice (ECoP) is a guideline for reducing or eliminating environmental risk due to various activities associated with different types of schemes considered in the MDSP.

ECoP 1.0: Planning and Design Phases of the Project

General:

This code of practice details the factors to be considered during project preparation to avoid/address

environmental concerns through modifications in project design and incorporation of mitigation measures.

Finalization of Alignment/Project Location:

- Adequate consultations with the communities to identify the concerns and preferences need to be taken up during selection of the location of subproject.
- The proposed location of shelter and the connecting road shall confirm to the natural topography as far as possible to avoid excessive cut and fill.
- Consultations with the local communities are to be conducted to obtain their suggestions and incorporate their concerns to address the potential environmental impacts.
- In case of flood prone areas and/or areas with very flat slopes, hydrological surveys have to be conducted before alignment finalization.

Compliance to Legal Requirements:

The bid document shall include the various applicable clearances pertaining to environmental management and shall contain the necessary procedures for compliance of the same.

Cost Estimation:

Some activities included in ECoP1.0 have certain monetary involvement. These activities are outlined below:

1. There will be one Focus Group Discussion(FGD), with atleast 15 participants from different communities of the society, for adequate consultations to identify the concerns and preferences related to a particular infrastructure development project.

2. One survey or will carry out a Key Informant Information(KII) of at least 50participants from different communities of the society affected by the infrastructure development project.

3. One survey or will carry out a hydrological survey before finalizing alignments and/or reduced levels for infrastructure development projects in a flood prone area and/or with very flat slopes.

ECoP 2.0: Site Preparation

The preparation of site for construction involves:

i. Marking and clearance of the required project area of all encroachments prior to mobilization of Contractor;

ii. Informing the local community about construction schedule; and

iii. Site preparation by the contractor prior to commencement of construction. Scope of this ECoP includes only the measures to address environmental concerns expected during the site preparation:

- Site Preparation Activities by the Contractor. The contractor shall submit the schedules and methods of operations for various items during the construction operations.

- The clearance of site shall involve the removal of all materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, part of top soil and rubbish. Towards this end, the Contractor shall adopt the following measures:

- To minimize the adverse impact on flora and vegetation, only ground cover/shrubs that impinge directly on the permanent works shall be removed.

- In locations where erosion or sedimentation is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion and sedimentation control features can follow immediately, if the project conditions permit.

- The disposal of wastes shall be in accordance with the provisions of ECoP5.0, “Waste Management”.

All regulatory clearances shall be obtained before actual start of work

ECoP 3.0: Construction Camps

Construction Camp Location: Construction camp sites shall be located such that permanent adverse environmental effects can be avoided or mitigated against and

transient adverse environmental effects are minimized. Camp shall no be occupied any class room of existing school building. Camp sites shall not be located in areas identified during the planning stage as unsuitable for such use. The site or site shall be selected such that mitigation measures stipulated in this ECoP can be implemented with reasonable facility.

ECoP 3.0: Construction Camps

Construction Camp Location: Construction camp sites shall be located such that permanent adverse environmental effects can be avoided or mitigated against and transient adverse environmental effects are minimized. Camp shall no be occupied any class room of existing school building. Camp sites shall not be located in areas identified during the planning stage as unsuitable for such use. The site or site shall be selected such that mitigation measures stipulated in this ECoP can be implemented with reasonable facility.

Construction Camp Facilities: The construction camp shall be provided with the following minimum facilities:

- A perimeter security fence at least 1.5min height constructed from appropriate materials. Ablution block with a minimum of one water closet toilet or Pota-cabin, one urinal and one shower for personnel engaged either permanently or temporarily on the project. Pota-cabins or separate toilet and wash facilities shall be provided formale and female employees.

- A sick bay and first aid station.

- Areas for the storage of fuel or lubricants and for a maintenance workshop. Such an area shall be bounded and have a compacted/impervious floor to prevent the escape of accidental spillage of fuel and or lubricants from the site. Surface water drainage from bounded areas shall be discharged through purpose designed and constructed oil traps. Empty fuel or oil drums may not be stored on site.
- Storm water drainage system to discharge all surface runoff from the camp site to a silt retention pond which shall be sized to provide a minimum of 20 minutes' retention for storm water flow from the whole site that will be generated by a 20 year return period rainfall having a duration of atleast 15 minutes. The run-off coefficient to be used in the calculation of the silt pond volume shall be 0.9. Silt ponds shall be maintained in an efficient condition for use throughout the construction period with trapped silt and soil particles being regularly removed and transported and placed in waste material disposal areas as per ECoP 7.0.

- All discharge from the silt retention pond shall be channeled to discharge to natural water via a grassed swale at least 10 meters in length with suitable longitudinal gradient.

- All camp facilities shall be maintained in a safe clean and or appropriate condition throughout the construction period.

Construction Camp Development Plan: A development plan of the construction camp shall be prepared describing the following:

- Perimeter fence and lockable gates
- Workshop
- Accommodation
- Ablutions
- Water supply
- Wastewater disposal system
- Bounded fuel storage area
- Proposed power supply

- Proposed all weather-surfaced areas.

3.3 Site Restoration: At the completion of the construction work, all construction camp facilities shall be dismantled and removed from the site and the whole site restored to a similar condition to that prior to the commencement of the works or to a condition agreed to with the owner of the land.All oil or fuel contaminated soil shall be removed from the site and transported and buried in waste soil disposal areas.

ECoP 4.0: Borrow Areas

General:

Embankment or filling material is to be procured from borrow areas designated for the purpose. The scope of this ECoP extends to measures that need to be incorporated during borrow area identification, material extraction and rehabilitation with regard to environment management.

Pre-construction stage:

The contractor shall identify the borrow area locations in consultation with the owners, after assessing the suitability of the material. The suitable sites shall be selected and finalized in consultation with the LGED.

Construction Stage:

The contractor should adopt the following precautionary measures to minimize any adverse impacts on the environment:

i. Borrow pits situated less than 0.5km (if unavoidable) from villages and settlements should not be dug for more than 30 cm after removing 15 cm of top soil and should be drained.

ii. The Contractor shall maintain erosion and drainage control in the vicinity of all borrow-pits and make sure that surface drains do not affect the adjacent land or future reclamation.

iii. In case the borrow pitis on agricultural land, the depth of borrow pits shall not exceed 45 cm and may be dugout to a depth of not more than 30 cm after stripping the15 cm top soil a side.

iv. In case of river side, borrow pit should be located not less than15 m from the toe of the bank, distance depending on the magnitude and duration of flood to be withstood.

Post construction stage:

It needs to been sured that all reclamation has been carried out in accordance with the restoration plan. Certificate of completion of reclamation is to be obtained by the Contractor from the land owner that “the landis restored to his satisfaction”.

ECoP 5.0: Waste Management

General:

This code of practice describes procedures for handling, reuse and disposal of waste materials.

The waste materials generated can be classified into:

i. Construction waste; and

ii. Domestic waste.

Pre-

construction

Stage:

- The contractor shall identify the activities during construction that have the potential to generate waste and work out measures for the same in the construction schedule.

- The Contractor shall educate his workforce on issues related to disposal of waste, the locationof disposal site as well as the specific requirement for the management of these sites.

Constructio

n Stage:

- The contractor shall either re-use or dispose the waste generated during construction depending upon the nature of waste.
- The contractor shall dispose off wastes that could not be re-used safely.
- The waste management practices adopted by the Contractor shall be reviewed by the BWDB during the progress of construction.

Post

Construction

Stage:

- After decommissioning of construction sites, the Contractor shall handover the site after clearing the siteof all wastes to the BWDB.
- In case of disposal of wastes on private land, certificate of completion of reclamation is to be obtained by the Contractor from the landowner that “the land is restored to his satisfaction”.

ECoP 6.0: Water Bodies

General:

Water bodies may be impacted when the infrastructure development project activities are adjacent to it or the runoff to the water body is affected by change of drainage pattern due to construction of embankment. The following activities are likely to have an adverse impact on th eecology of the area:

- Earth moving
- Removal of vegetation
- Waste disposal from construction

works.

Pre-construction Stage:

Following are the Contractor'sresponsibilities:

- Restriction on use of water during construction, if any, should be intimated to the community in advance.

- Alternate access to the water body is to be provided in case the re-interruption to use of exiting access.

• If the water body affected is a drinking water source for a habitation, alternate sources of water are to be provided to the users during the period for which its use is affected.

Construction Stage:

- It should be ensured by the contractor that the run off from construction site entering the water body is generally free from sediments.

- Silt/sediment should be collected and stockpiled for possible reuse as surfacing of slopes where they have to be re-vegetated.

- Cutting of embankment reduces the water retention capacity and also weakens it, hence:

i. The contractor should ensure that the decrease in water retention should not lead to flooding of the construction site and surroundings causing submergence and interruption to construction activities.

Post Construction Stage:

- The zones of the water body have to be left clean and tidy with the completion of construction.
- Engineers ofthe BWDB will check if drainage channels of adequate capacity have been provided for the impacted water body.

ECoP 7.0: Water Qualities

General:

- Small-scale small-scale drainage, and small-scale embankment construction may affect the aquatic environment, by lowering or raising water levels, and decreasing water quality.

- Deterioration of water quality and disturbance of aquatic environment by lowering or rising of water levels.

Pre-construction Stage:

Following measures are to be undertaken by the contractor prior to the commencement of construction:

- Base line data of the water quality is necessary.

- In addition, the availability of enough water during the lean season needs to be assessed as part of the baseline data collection.

Construction Phase:

- Improper disposal of solid and liquid waste including excreta generate from sites will pollute the water quality and proper prevention measure should be taken.

- Waste water disposal, sanitation/latrines may have positive cumulative effects on human health, but if not improperly implemented may affect ground and surface and ground water quality; the contractor should give proper attention on it during construction stage.

- Protect water bodies from sediment loads by silt screen or bubble curtains or other barriers.

Post Construction

- Inspection"of water quality shall be done regularly.

ECoP 8.0: Drainage

General:

- Drainage is designed for and installed on roads to direct surface or sub surface flow away to a safe out fall without damage to the structure, adjoining property or agricultural fields.

- A road with good drainage is a good road. Inadequate and faulty drainage arrangements result in obstruction to natural drainage pattern. Provision of cross-

  drainage and longitudinal drainage increases the life of the road and consequently reduces water logging and related environmental impacts.

- The present code seeks to address the environmental concerns related to drainage aspects during different stages of the project execution.

Pre-construction Stage:

- Following measures are to be undertaken by the contract or prior to the commencement of construction:

i. The downstream as well as upstream user shall be informed one month in advance.

ii. The contractor shall schedule the activities based on the nature of flowin the stream.

iii. The contractor should inform the concerned departments about the scheduling of work. This shall form part of the overall scheduling of the civilworks to be approved by BWDB. Erosion and sediment control devises if site conditions,are to be installed prior to the start of the civil works.

iv. All the safety/warning signs are to be installed by the contractor before start of construction.

- In case of utilization of water from the stream,for the construction, the contractor has to take the consent from the concerned department.

Construction Phase:

- Drainage structures at construction site shall be provided at the earliest to ensure proper compaction.
- In hilly areas sub-surface drains, if required, shall be provided immediately after cutting the slopes and forming the road bed (subgrade).
- Safety devises and flood warning signs to be erected while working over streams and canals.

Post Construction:

- Inspection and cleaning of drain shall be done regularly to remove any wastes or vegetative growth that may interrup tthe flow.
- Temporary structures constructed during construction shall be removed before handing over to ensure free flow through the channels.

ECoP 9: Public Health and Safety (PHS)

General:

The safety and health of the public is impacted due to the hazards created during the construction period. This code of practice describes the measures that need to be taken to mitigate the impacts.

Pre-construction Stage:

- In order to incorporate public health and safety concerns, the BWDB and the Contractor shall disseminate the following information to the community:

i. Location of subproject activities,

ii. Borrow areas,

iii. Extent of work,

iv. Time of construction,

v. Involvement of local labors in the road construction, and

vi. Health issues- exposure to dust, communicable diseases

etc.

Construction Stage:

- The Contractor shall schedule the construction activities taking into consideration factors such as:

  i. Sowing of crops,

  ii. Harvesting,

  iii. Local hindrances such as festivals etc., and

  iv. Availability of labor during particular periods.

- Proper safety/warning signs are to be installed by the contractor to inform the public of potential health and safety hazard situations during the construction phase in the vicinity of the project.

- The BWDB shall carry out periodic inspections in order to ensure that all the measures are being under taken as per this ECoP.

Post-construction Stage:

The construction site shall be cleaned of all wastes, scrap materials and machinery on completion of construction for the safety of public and users.

ECoP 10.0: Material Storage,Transport and Handling

General:

Activities related to materials storage,handling and transfer that are considered to potentiallyhave negative environmental impacts include:

- Transportation,storage,handlingandof constructionmaterials;
- Storage,handling, andtransferof petroleum,oil, andlubricant (POL) products;
- Applicationof asphalticconcreteandasphalt binder;
- Storageandhandlingof hazardous materialsother thanPOLproducts;and
- Storageandapplicationofsaltandsand.

Some materials used during implementation of projects associated with MDSP may have potentially hazardous impacts on the environment if not properly stored and handled.

Transportation, Handling and Storage of Cement and Aggregates:

- The Contractor shall be responsible for ensuring that all truck sand carriers are clean and dry prior to loading them with cement or aggregates. All trucks and carriers for transporting cement/aggregates shall be equipped with weather proof closures on all openings.
- All cement/aggregates that will be brought to the site shall be kept free from contact with deleterious matter.
- All cement/aggregates shall be placed on impervious matspread over the storage area to prevent direct contamination of top soil in the storage area. Stockpiling of cement/aggregates should be limited to minimum space and should be covered with weather proof closures.
- Stock piles shall be built up in horizontal or gently sloping layers. Overlap of different materials shall be prevented by suitable walls of ample distance between stockpiles.
- The Engineer shall approve the site for the storage of all aggregates.
- The Engineer shall approve the methods of handling aggregates and the equipment used.

Environmental Concerns with Materials used for Construction and Maintenance ofInfrastructure Development Projects:

Concerns are related to accidental releases into the environment, such as spills, refueling losses, and leakage from equipment that could result in contamination of soil, groundwater, or surface water. Ground water may transport the contaminant soff-site to down-gradient aquifers or water supplies, or discharge them into surface water. Therefore, release of potential contaminants on the ground surface could have significant environmental impacts that could run in to ground water (well supplies).

Petroleum, Oil, and Lubricants:

The toxic effect of a petroleum product in the aquatic environment varies considerably due to the different chemical composition of each petroleum product. The toxicity of petroleum products is related largely to its solubility in water. Petroleum pollution from accidental spills may affect aquatic birds, fish and vegetation. The impact of oil on birds' feathers (loss of insulation) is an important cause of death. Oil polluting the water may also be toxic to birds if they ingest it. Plants in marshes or in wet lands (haor, baor, ponds and others) and steams may die off for short periodsLong-term impacts of spilled petroleum products are associated with the portion, which sinks and becomes incorporated into bottom sediments. This causes the petroleum products to degrade very slowly and they may persist for many years.

Ground water sources contaminated with petroleum products may have potentially toxic impacts on consumers.

Asphalt Products:

Environmental concerns with tack asphalt binder, and asphaltic concrete area so related to the hydrocarbon components, which are toxic to aquatic life, wildlife, and humans. As mentioned above, if these materials sink to the bottom, they may destroy the fish's source of food supply.

Other Hazardous Materials:

Thefollowing other hazardous materials are used in structures construction or maintenance activities and have potential environmental concerns:

- Paints;
- Solvents; and
- Fresh concrete andadmixtures.

CoP 11.0: Vegetation Management

General:

- Besides improving aesthetics and ecology of the area, the vegetation provides fuel wood, act as noise barriers, provide visual screen for sensitive areas and also generate revenue by sale of its produce.
- This code of practice elaborates on the approach towards planting trees. Emphasis has been laid on a greater involvement of communities in planting and maintenance of trees.

Project Planning and Design Stage (Pre-construction):

- Tree felling, if unavoidable, shall be done only after compensatory plantation of at least three saplings for every tree cut is done. The species shall be identified in consultation with officials of forest department/local community, giving due importance to local floraltis recommended to plant mixed species in case of both avenue or cluster plantation.

- The plantation strategy shall suggest the planting off root bearing trees and other suitable trees.

Post-construction Stage:

- The project proponents would take up the planting of fruit bearing and other suitable trees on both sides of the roads or other infrastructure development projects location from their own funds.
- Watering of trees during the initial period of two to three years shall be the responsibility of the BWDB or the agency designated by it.

The Cost Estimation of ECoPs

Some activities included in the ECoPs have certain monetary involvement. The generic method of determining the cost of the ECoP is outlined below:

1. The Engineer of the BWDB will carry out a survey of the intended projects and identify appropriate locations and also identify sites unsuitable interms of topography, proximity to water courses, and environmental sensitive areas such as forests, wet lands, or other sensitive area.
2. Survey and monitoring works must be carried out by Engineer appointed by the BWDB authorities, throughout the pre-construction, construction, and post-construction phases to make sure the items and specifications (e.g low cost top soil management, waste disposal, tree plantation, storm water drainage etc) provided in this ECoP are properly addressed and estimated the cost.

Appendix 3: Environmental Monitoring for Embankment/Canal Excavation

WMIP - BWDB

Field Visit Checklist

Monitor(s) Name: Contract No & Location:

Contractor Name: Monitoring Dates:

Issues	**Mitigation Measures**	**Complies (Yes / No)** **If yes, description on measures taken**	**Instruction** **(if any)**
Erosion/ siltation	Proper slope for embankment or river bank to prevent slumping, slippage and erosion		
	Re-vegetation of barren surfaces Restore disturbed soil		
Water logging/ drainage problem/	Maintain proper drainage		
Dust pollution/ air pollution	Watering dusty embankments for control of dust		
Noise pollution	Work during daylight hours only to reduce disturbance to neighborhood due to noise pollution.		
Loss of agricultural land	Disposed material on suitable land, agricultural land not affected		
	Suitable barren land for construction of camps		
Loss of top soil of agricultural	Collections of soil from existing borrow pits to ensure preservation of topsoil		

Issues	Mitigation Measures	Complies (Yes / No) If yes, description on measures taken	Instruction (if any)
land			
Wetland and aquatic habitat/ plantation	Absence of critical areas of ecological importance in the site will be ensured.		
	Special care if there's any near embankment.		
Trees and vegetation	Restoration of disturbed soil and re-vegetation of barren surface to reduce soil erosion		
Fisheries	Identification of critical fish breeding areas to maintain fish migratory routes will be done.		
	Soil can be collected from existing borrow pits/ ponds nearby without disturbing		
Wild life	Identification and non disturbing the critical habitat areas of major species will be done.		
	Special care if there's any near embankment.		
Dredge Material (in case of canal excavation)	• Dispose at appropriate location. Disposal location far away (min 7m) from bank. • Dredge material will be given to local people/community. (Ensure dredge material do not contain heavy metal/toxic)		
Water supply and sanitation	Ensure adequate supply of drinking water, sanitation facilities for workers		
Health and safety	• Ensure adequate safety gears for workers. (PPE, accommodation, First Aid box) • Safety signboard at all sites in bangla & English languages.		

Appendix 4: Format for Quarterly Progress Report

1.0 Introduction

- Basic project information including a synopsis of the project organization,
- Description of the physical component of project and the updated progress,
- A synopsis of work undertaken during the quarter, and
- Project environmental key personnel, contact names and telephone numbers.

2.0 Environmental Requirements

- Summarizethe environmental protection and pollution control/mitigation measures, as recommended in the agreed EMFreport and subprojects pecific EMP;
- Summarize the major activities undertaken by the different schemes during the quarter with showing the inter relationship with environmental protection/mitigation measures;
- Describe the monitoring methodology;
- A quarterly assessment of construction impacts on water, air and noise quality aswellas the construction waste management, labor camp management and safety assurance at the subproject site;
- Suggestion of appropriate mitigation measures if the quarterly assessment results demonstrate that the environment is declining;
- A summary description of the actions taken in the even to non-compliance of the schemes sites those were visited last quarter;
- A summary description of the actions to be taken in the even to non-compliance those werev isited this quarter and any follow-up procedures related to earlier non-compliance; and
- A summary record of all complaints received (written or verbal) and subsequent redress for each subproject during this quarter.

• Submission the list of schemes for those site specific environment screening/assess ent have been carried out during this period., and

• Summarize the key environmental issue of these schemes.

3.0 Other Requirements

• Weather conditions during the period at coastal areas;

• Weather conditions that may affect the results;

• Any other factors which might affect the monitoring results;

• Graphical plots of the monitored parameters during the period;

• Regulatory compliance progress (environment clearance certificate/renewal certificate from department of environment) etc.

4.0 Meeting and Discussion

Summarize the meeting and the subsequent decision on the environment management those have been taken this quarter.

5.0 Conclusions and Recommendations

Annexess:

- Photograph of the different schemes;
- Environmental Monitoring Report; and
- Laboratory Test Results/Report.

(Notes:Format is shown for Quarterly Monitoring Report(QMR) on environment compliance. Same format can be followed for QMR on social compliance).

অতিরিক্ত প্রধান প্রকৌশলীর দপ্তর
আইসিজেড এন্ড ক্লাইমেট চেঞ্জ ম্যানেজমেন্ট
বাপাউবো,ঢাকা।

বিষয়: বিশ্ব ব্যাংকের চাহিদা অনুযায়ী সিএসএডব্লিউএমপি প্রকল্পের Safe guard documents বাপাউবো এর Website-এ disclose করা প্রসঙ্গে।

IDA অর্থায়নে CSAWMP প্রকল্পের দর কষাকষি (Negotiation) ৩১/১২/২০২০ ইং তারিখের মধ্যে অনুষ্ঠিত না হলে নির্দিষ্ট করা ১২০ বিলিয়ন ডলার স্থানান্তর করা হবে মর্মে বিশ্ব ব্যাংক কর্তৃপক্ষ অবহিত করে (সংযুক্তি-১)।

২। ইতিমধ্যে প্রস্তাবিত প্রকল্পটির ডিপিপি অনুমোদন প্রক্রিয়ায় ১৯/১১/২০২০ ইং তারিখ PEC সভা অনুষ্ঠিত হয়েছে। বর্তমানে ঐ সভার কার্য বিবরনী অনুযায়ী ডিপিপি সংশোধনের কাজ চূড়ান্ত পর্যায়ে আছে।

৩। অদ্য ২১/১২/২০২০ ইং তারিখ ই-মেইল পত্রে (সংযুক্তি-২) বিশ্ব ব্যাংক জানিয়েছে যে Safe guard documents গুলো ইতি পূর্বে disclose করা হয়েছিল যাহাতে অধিক সংখ্যক/উপ-প্রকল্প ও ভৌত অঙ্গ অন্তর্ভুক্ত ছিল। যাহা বর্তমানের ১৯ টি উপ-প্রকল্প ও সর্বশেষ ভৌত অঙ্গের তথ্য/সংখ্যা/পরিমান ও ব্যয় অন্তর্ভুক্ত হওয়াসহ পুনরায় বাপাউবো Website-এ প্রকাশ করা প্রয়োজন। Preferably অদ্য ২১/১২/২০২০ ইং তারিখের মধ্যে পুনরায় disclose করে তাদেরকে অবহিত করতে বলা হয়েছে।

৪। এমতাবস্থায় Climate Smart Agriculture and Water Management Project (CSAWMP) প্রকল্পের (1) Environmental and Social Management FRAMEWORK (ESMF), December 2020. (2) Integrated Pest Management Plan (IPMP), December 2020.(3) Environmental Management Framework (EMF), December 2020 ডকুমেন্ট বাপাউবো এর Website-এ disclose করার জন্য মহা-পরিচালক মহোদয়ের সদয় অনুমোদনসহ সিনিয়র সিস্টেম এনালিষ্ট ,বাপাউবো এর নিকট প্রেরনের জন্য হার্ড ও সফট কপি (PDF) অত্রসাথ পেশ করা হলো।

21.12.2020
(এ.কে.এম.শরিফুল ইসলাম)
তত্ত্বাবধায়ক প্রকৌশলী
আইসিজেড এন্ড ক্লাইমেট চেঞ্জ ম্যানেজমেন্ট
বাপাউবো,ঢাকা

২১/১২/২০২০
(মোহাম্মদ মিজানুর রহমান)
অতিরিক্ত প্রধান প্রকৌশলী
আইসিজেড এন্ড ক্লাইমেট চেঞ্জ ম্যানেজমেন্ট
বাপাউবো,ঢাকা

অ:দা:নং-ডিপিপি-২২৬
তারিখ:২১/১২/২০২০খ্রি:

অতিরিক্ত মহা-পরিচালক(পরিকল্পনা)
বাপাউবো,ঢাকা।

৭৯২৩ তারিখ: 22/12/2020

০৫। অনুচ্ছেদ-৪ বর্ণিত ডকুমেন্ট সমূহ বাপাউবো এর Website-এ disclose করণ সাপেক্ষে অত্রসহ অনুমোদনের জন্য পেশ করা হলো।

৪৪১৫ তারিখ: 22/12/2020

(এ কে এম ওয়াহেদ উদ্দিন চৌধুরী)
অতিরিক্ত মহাপরিচালক (পরিকল্পনা)
বাপাউবো, ঢাকা।

০৬। সদয় অবগতের জন্য।

22-12-2020
(এ. এম. আমিনুল হক)
মহাপরিচালক
বাপাউবো, ঢাকা।