GOVERNMENT OF THE PEOPLES' REPUBLIC OF BANGLADESH

MINISTRY OF FOOD

DIRECTORATE GENERAL OF FOOD

MODERN FOOD STORAGE FACILITIES PROJECT (MFSP)

IDA Credit # 5265-BD

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) REPORT FOR THE CONSTRUCTION OF GALVANIZED CORRUGATED FLAT BOTTOM STEEL SILO WITH RCC FOUNDATION AND IT'S ANCILLARY WORKS AT MADHUPUR SILO SITE

PROJECT DIRECTOR

MODERN FOOD STORAGE FACILITIES PROJECT

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ACRONYMS & ABBREVIATIONS

ADB	Asian Development Bank
AEZ	Agro-Ecological Zones
ARIPO	African Regional Intellectual Property Organization
AP	Affected Person
AD	Alluvion Dilluvion
BP	Bank Procedure
BECA	Bangladesh Environmental Conservation Act
BBS	Bangladesh Bureau of Statistics
BMD	Bangladesh Meteorological Department
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BoQ	Bill of Quantities
BNBC	Bangladesh National Building Code
BFIDC	Bangladesh Forest Industries Development Corporation
BADC	Bangladesh Agriculture Development Corporation
CHT	Chittagong Hill Tracts
CoP	Conference of the Parties
CIP	Country Investment Plan
CLAC	Central Land Allocation Committee
DPHE	Department of Public Health Engineering
DG	Directorate General
DoE	Department of Environment
DC	Deputy Commissioner
EIA	Environmental Impact Assessment
ECA	Environmental Conservation Act
ECR	Environmental Conservation Rules
EA	Environmental Assessment
ESIA	Environmental and Social Impact Assessment
ECC	Environmental Clearance Certificate
EMP	Environmental Management Plan
EHS	Environment, Health & Safety
EMF	Environmental Management Framework
ESMP	Environmental and Social Management Plan
ESMoP	Environmental and Social Monitoring Plan
GIIP	Good International Industry Practice
GoB	Government of Bangladesh

GIS	Geographic Information System
GW	Ground Water
HDC	Hill District Councils
HSE	Health, Safety and Environment
HQ	Headquarter
IEE	Initial Environmental Examination
IPM	Integrated Pest Management
IDA	International Development Association
IUCN	International Union for Conservation of Nature
LSD	Least Significant Difference
MoEF	Ministry of Environment and Forest
MFSFP	Modern Food Storage Facilities Project
MDG	Millennium Development Goal
MoL	Ministry of Land
NFP	National Food Policy
NAPA	National Adaption Program of Action
NIOSH	National Institute of Occupational Safety and Health
NGO	Non-Governmental Organization
OP	Operational Plan
O&M	Operation and Maintenance
PPE	Personal Protective Equipment
PoA	Plan of Action
PRSP	Property Reduction Strategy Papers
PIA	Project Influenced Area
RAP	Resettlement Action Plan
SIA	Social Impact Assessment
SRDI	Soil Resources Development Institute
SOD	Standing Orders on Disaster
SMPRF	Social Management and Resettlement Policy Framework
SPM	Suspended Particular Matter
USEPA	United States Environmental Protection Agency
UNFCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Program
WHO	World Health Organization
WB	World Bank

EXECUTIVE SUMMARY

INTRODUCTION

Bangladesh is the most vulnerable country in the world to natural disasters that are likely to be exacerbated due to climate changes, and 60% of the world-wide deaths, caused by natural disasters during the last 20 years, were in Bangladesh. Climate change is anticipated to lead to more intense and frequent cyclones, floods, and droughts, as well as sea level rise and associated salinity intrusion in the coastal areas leading to growing pressure on ensuring adequate food security and nutrition. The Directorate General of Food (DG Food) estimates that, by 2020, grain storage requirements would be about 3 million tons for a population of about 170 million people. Based on current and project storage availability, it is expected to result in estimated shortages of grain storage space of about 1.7 million tons by 2020.

The modern food storage facilities proposed for construction under this project could considerably improve the efficacy of the government's emergency response and recovery efforts in disaster-prone areas, and could enhance the efficiency of its Public Food Distribution System. In response to the above challenges, GoB seeks to improve its capacity to respond to short and longer term post-disaster food and nutrition security needs by enhancing its network of food grain storage facilities and building modern food storage facilities; at the same time, it aims to improve the efficacy and accountability of the public food grain system.

METHODOLOGY

The study is based on both primary and secondary data and information. The primary data includes data collected from field observations, survey and secondary data includes review of the Bangladesh statistical and relevant information from Government Departments. Discussions were held with stakeholders including community representatives and local people.

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

Legislative bases for Environmental Impact Assessment (EIA) in Bangladesh 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 Forests (MoEF) is the regulatory body responsible for enforcing the ECA'95 and ECR'97. It is the responsibility of the project proponent to conduct an Environmental and Social Impact Assessment (ESIA) of development proposal and the responsibility to review ESIAs for the purpose of issuing Environmental Clearance Certificate (ECC) rests on the DOE and fulfill the world bank social safe guard issues. The project authority already got the site clearance certificate (SCC) from the DoE.

DESCRIPTION OF THE PROPOSED PROJECT

Madhupur is one of the 12 Upazila in Tangail District of Dhaka Division. The Upazila is a part of the Madhupur highland of the greater Mymensingh area. Madhupur has a Government khas land area of 5.81 acre which is 3.5 km away towards north from the Madhupur Upazila road. The proposed site is located at the coordinate of N24°37′43′′ and E90°03′39′′. The site is adjacent to Mymensingh-Tangail-Jamalpur high-way.

Total project activities were considered in two phases. In the first phase, the sub-project preparation works like; the boundary wall, site development by earth filling, office building etc. has been done. In the second phase; main construction works like 16 nos. flat bottom prefabricated steel silo bins and silo related ancillary works as well as interventions will be constructed/ installed. Design and estimates of the silo bins and ancillary works has been completed and awaiting for the engagement of contractors of the construction works.

There are sixteen nos. of steel silo bins will be constructed under this project. Each silo bin capacity for storage is 3000 T. There are lot of equipment will be used during silos operation like belt conveyor, bagging station, chiller etc. The speed control time is 60 t/h. The total capacity of storage will be 48000 T.

DESCRIPTION OF THE BASELINE ENVIRONMENT

The project area is, under Dhaka Division, located in the South-central climatic zone. The region has a tropical climate with three main seasons–the hot and humid summer, the rainy season and the mild and relatively dry winter. The highest average recorded temperature in this weather station was 33.8°C in April. The lowest average recorded temperature was found in the month of January which was 11.3°C. Statistical data of 1987 to 2013 shows that Tangail station experiences almost 320 mm rainfall during monsoon. In the month of December and January of winter season around 10 mm rainfall occurred in the region of Tangail weather station. Humidity in the above area maximized in June to September in the year which ranges from 83% to 85%. On the other hand, humidity falls around 70% in February, March and April during the winter season in the Tangail station area. Average wind speed maximum value is 1.85 mps in June. The minimum wind speed was 0.68mps in the month of December. Noise level has been monitored at inside and outside of the project location during day time. Results of the noise level monitored were within the standard limit of Bangladesh.

The project area falls in the Jamuna (Young Brahmaputra) River Floodplain physiographic unit. On 11th October 2016, groundwater sample was collected by environmental team from a tube well depth about 120 ft near the project area. The Department of Public Health Engineering (DPHE) analyzed the sample. From the result it is found that all the quality parameters were well within the Bangladesh ground water quality standard set by Department of Environment (The ground water quality result is attached in Appendix D). No surface water was found nearby to the project site and surface water quality test was not done.

The soil near the project area is Non-Calcareous Alluvium soils and Deep Red Brown Terrace soils. As per the seismic zone map, project area falls in the zone II of low seismic

intensity. According to the bioecological map zones the project area falls in Madhupur Sal Tract and Brahmaputra-Jamuna Floodplain ecological zone. No endangered/ critically endangered or threatened terrestrial or aquatic species were found in the project area. No archaeological or culturally protected areas were found that would have anticipated impact.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental impacts assessment was carried out considering present environmental setting of the project area, and nature and extent of the proposed activities. Potential environmental impacts associated with the proposed project activities are classified as: (i) impacts during pre-construction phase, (ii) impacts during construction phase and (iii) impacts during operation phase.

Here the project has no land acquisition and involuntary resettlement impact. Most of the impact will occur duing construction activities of the silos. Some anticipated impacts will have to be considered, especially, during construction and operation periods and those are to be well managed, to minimize environmental and social impacts and hazards, as the means of mitigation measures to the probable impacts. For the sustainable development as well as to maintain environmental friendly infrastructure, measures start from design phase. Madhupur silo site, with 5.81acres of land, is now well protected by boundary wall. Before starting the construction works, an well planning is required to place the laborers' shed, drinking water facility, sanitary latrines, equipment and materials yards, lubricant and fuel keeping facility, temporary drainage facilities, solid waste management facilities etc. The traffic and machineries' movement routes etc. are to be established in the construction site. Essential facilities like; labor-shed with proper living, lighting and cooking arrangement, waste water drainage arrangement from the kitchen area, waste bins and solid waste management facilities, and adequate drinking water supply, sanitary latrine facilities, personal protection equipments and first aid box etc. are to be provided before starting the construction works. The construction materials' yard and place for keeping the prefabricated steel sheets will be fixed in ahead of starting the silo bins' super-structure setting. As, the area is not so large (5.81 acres only), no stone/ brick crushing will be allowed within the silo site. Only pre-fabricated steel sheet will be carried to the construction site and separate areas/ yards will have to be maintained for that. For carrying the construction materials, care should be taken on traffic management. Safety measures will be taken for the local pedestrians, school children, local Madhupur-Mymensingh bound traffic.

ARRANGEMENT OF SILO BINS AND ANCILLARY FACILITIES

For the environmental and social safeguard compliances, the construction and installation of water supply and sanitation facilities, along with the labor-camp placement, will have to be done with precaution. The areas, along the western boundary wall, will be suitable for setting the workers' facilities like labor-shed, toilet and solid waste management. Cleaning of labor-camp site, toilets etc. will have to be done cautiously, because; the west boundary wall is just by the side of Madhupur-Mymensingh highway. Also, the toilet facilities may be accommodated at the north-west corner of the silo campus. Precaution will have to be taken

on cleaning the toiletry facilities, because, the office building is with the north boundary wall. The Supervision Consultant's Engineer and the Contractor will take a careful decision for setting the workers' facilities, material stocking yard etc. within the limited area.

Proper traffic management is necessary during carrying construction materials. The environmental and social safeguard issues have been accommodated with the engagement of people for traffic management during construction and operation periods.

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Environmental Management Plan has been developed to address all adverse impacts pertaining to the implementation of the project. The plan presented in tabular form includes impacts, their sources of occurrence, their mitigation measures, actors responsible for implementation of mitigation measures and their responsibilities.

Environmental Monitoring Plan has been incorporated key environmental components and parameters to be monitored their indicators, frequency, timing and locations of monitoring and also the actors responsible for carrying out such monitoring. Grievance Redress Mechanism, Institutional Arrangement, Environmental Safeguard Compliance cost etc. has been incorporated in the Environmental Management and Monitoring chapter.

GRIEVANCE REDRESS MECHANISM

A grievance can be defined as an actual or perceived problem that might give grounds for complaint. As a general policy, DG-Food along with the MFSP will work proactively towards arising and minimizing grievances through the implementation of impact mitigation measures and community liaison activities that anticipate and address potential issues before they become grievances. The Grievance redress mechanism (GRM) sets out the information and communications strategy to ensure that PAPs and communities are fully informed about their rights to offer suggestions and make complaints, and the different mechanisms through which they can do so, including grievances through creating more sounds during construction, pollution through improper solid waste management, traffic disturbance during the movement of more vehicles during construction and operation phases etc. This will be the responsibility of the PMU, CSC, and contractors and persons designated to be responsible for stakeholder liaison.

INSTITUTIONAL ARRANGEMENT FOR PROJECT IMPLEMENTATION AND OPERATION PHASES

A Project Management Unit (PMU) has been established under the DG Food for day–to-day implementation and monitoring of the project activities. The PMU is headed by a Project Director who is assisted by; (i) Deputy-Project Director; (ii) technical specialists (Civil, Mechanical and Electrical); (ii) Senior Procurement Specialist, and Procurement Analyst; (iii) Senior Financial Management Specialist, and accountant and a book keeper; (iv) Senior Environmental Specialist, (v) Senior Social Specialist, and (vi) Senior Communication Specialist. Each Silo site is headed by the Project Coordinator for coordination with the

contractors, consultants and local administration as well as with communities, along with a Technical Specialist.

The PMU has a Senior Environmental Specialist (SES) to ensure implementation of EMP and other environmental management responsibilities. The SES is maintaining liaison with WB safeguards team, regulatory agencies, and other stakeholders during the Project implementation. The SES will also coordinate with the environmental staff of the Construction Supervision Consultants.

The Supervision Consultants will have dedicated, properly qualified and experienced, site-based Environment Monitor (EM) at each construction site (before starting the construction works). The EMs will monitor and supervise the EMP implementation at the field level. The EMs will maintain coordination with SES at the PMU level and supervise and monitor the construction contractor. The EMs need to be a graduate preferably in environmental science/engineering with at least 5 years' experience in the related field.

The construction contractors will have dedicated, properly qualified and experienced, site-based Environment Supervisors (ESs) at each construction site. The ESs will be responsible to implement various aspects of the EMP particularly the mitigation measures to ensure that the environmental impacts of the construction works remain within acceptable limits. The Contractor will prepare the Environmental Action Plan (EAP) prior to start working and will submit the same to the Engineer in Charge of MFSP for approval. The ESs will maintain coordination with the EMs at the field level. The ESs will also be responsible to conduct environmental trainings for the construction crews. The EM needs to be a graduate preferably in environmental science/engineering with at least 3 years' experience in the related field.

The (Health, Safety and Environment) HSE function will be a key element of the operation and maintenance arrangements at each of the silo facility. Dedicated HSE personnel will be part of the O&M staff and will be responsible to prepare and implement the relevant parts of the Operations Manual for ensuring health and safety during project operation.

TRAINING PLAN

A series of training programs has been proposed under the MFSP Silo project to enhance the skills of the MFSP as well as contractor staff in environmental aspects especially Environmental Management Plan (EMP) and Environmental Safeguard arrangements. The Environmental and Social consultants (PMU and D&S consultants) will be responsible for imparting training to the engineers and supervisors engaged in construction and operation works. The following training programs are to be included for effective implementation of environmental safeguard issues during construction period and operation stages:

- ✓ Implementation of Environmental Management Plan (EMP) and auditing of Environmental Management System (EMS)
- ✓ Documentation requirements of ISO 14001 2004
- ✓ Internal and external communications
- ✓ Internal audit

PUBLIC CONSULTATIONS

Four consultation meetings were held during October 2016 at the project areas. The consultation meetings were conducted with different level of local people. Total 60 (sixty) participants, different level of people like; local representatives, businessmen, day laborers, farmers, shop keepers etc, were in the meetings. In consultation meetings; environmental and social issues were examined. The main focus was to dig out the mental supports from different level of stakeholders regarding the new concept of food storage facilities, i.e. the silo construction works in lieu of the traditional food storage facilities. The issue on potential impact of construction works has also been raised.

Most of participants appreciated because of the benefit from the proposed project. They also discussed about noise, water and soil pollution issue that are evolving because of existing project and the future possibilities. They expect improved technology to minimize the problem.

The outcome of the consultation meetings were as follows.

- ✓ There should be effective mitigation measures in order to reduce noise pollution during construction period. Improved technology and proper management plan would help to mitigate the noise pollution.
- ✓ Surface water and soil pollution should be controlled by monitoring the runoff of waste materials to the surroundings.
- ✓ Air pollution from the construction materials and emission from machineries might create problem. Contractor should spray water during material transportation and use cover for air pollution sources if possible.
- ✓ It will generate more employment in terms of using more laborers, more rice mills will be established, transport business will boost, poultry farming will enrich further and so on. The local people requested that local labor should be used during construction and operation.

CONCLUSION AND RECOMMENDATION

On the basis of the analysis, it may be concluded that the project stands environmentally sound and sustainable when the recommended mitigation measure and environmental management processes are adopted properly.

Seasonal weather conditions would have an impact on the construction activities. The construction activities may even have to be stopped during these periods. So it is recommended that commencing construction in early winter season may help to reap the benefit of full dry spell of the season.

In order to enhance the occupational health and worker safety during the construction period, construction equipment would have to be kept in good order. Adequate safety measures should be taken and safety related equipment including personal protective and safety equipments (PPE), firefighting equipment etc. must be provided in order to reduce the potential accidents.

Solid waste will be generated during the construction period from excavation and refuse from construction camps and that would be under control management.

The major issue is the need to minimize disturbance to the local population in the areas of construction.

A positive policy of employing local people during the construction phase should be adopted.

Since, the implementation of the proposed project will bring benefit through helping to meet the food security, certain minor environmental impacts of the associated project will have to be compromised for the better interest of the country. However, the anticipated impacts are mostly of short duration and relatively minor in nature.

To ensure compliance with the EMP the contractor should deploy an environmental specialist to monitor and report project activities throughout the project construction phase.

In view of the above considerations and the fact that the executing agency will maintain standard quality of implementation of the program with due consideration to other standing rules and regulations including but not limited to the ECA 1995 (amended 2010) and ECR 1997 the project is recommended for implementation.

1. INTRODUCTION

1.1. Background

Bangladesh is the most vulnerable country in the world to natural disasters that are likely to be exacerbated due to climate changes, and 60% of the world-wide deaths caused by natural disasters during the last 20 years were in Bangladesh. Climate change is anticipated to lead to more intense and frequent cyclones, floods, and droughts, as well as sea level rise and associated salinity intrusion in the coastal areas leading to growing pressure on ensuring adequate food security and nutrition. Growing climate variability and natural disaster risks is anticipated to increase pressure on the Government of Bangladesh to effectively distribute food packets and food aid as a part of its post-disaster recovery programs. During the 2007 floods and the subsequent Cyclones Sidr and Aila (in 2007 and 2009, respectively), crop losses were estimated to be over one million tons each. However, while floods typically cause damage to crops and food stocks (both household and government stocks), post-flood crop yields are typically higher than average ("bumper crops") because of rich silt deposited on the topsoil, leading to high production that has often served to replace stock shortages. In the case of cyclones, it is not only the losses during the cyclone but production is also severely hampered in the years to follow because saline sea water from storm surges is often deposited on agricultural lands, resulting in food stock shortages for at least two years.

The Directorate General of Food (DG Food) estimates that, by 2020, grain storage requirements would be about 3 million tons for a population of about 170 million people. Based on current and project storage availability, this is expected to result in estimated shortages of grain storage space of about 1.7 million tons by the year 2020. However, given the current implementation capacity of the DG Food, and in order to avoid overstocking, it is recommended that the expansion of storage facilities occur in a phased approach.

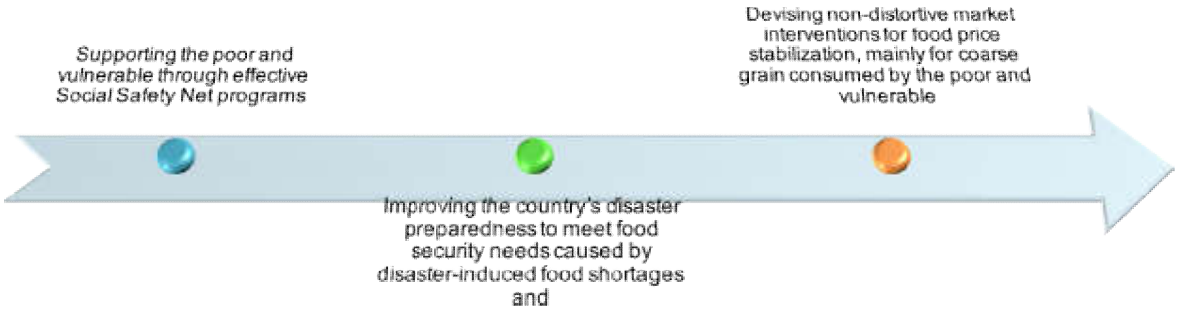
Government of The People's Republic of Bangladesh has received an IDA credit toward the costs of the Modern Food Storage Facilities Project (MFSP), being implemented by the Directorate General of Food, Ministry of Food. Bangladesh experiences frequent catastrophic weather events resulting in heavy losses in lives and property. Because of these weather related challenges, the Government of Bangladesh is implementing programs aimed at minimizing loss and expediting recovery from these events.

The modern food storage facilities proposed for construction under this project could considerably improve the efficacy of the government's emergency response and recovery efforts in disaster-prone areas, and could enhance the efficiency of its Public Food Distribution System. To respond to the above challenges, GoB seeks to improve its capacity to respond to short and longer term post-disaster food and nutrition security needs by enhancing its network of food grain storage facilities and building modern food storage facilities; at the same time, it aims to improve the efficacy and accountability of the public food grain system.

1.2. Objectives of the Project

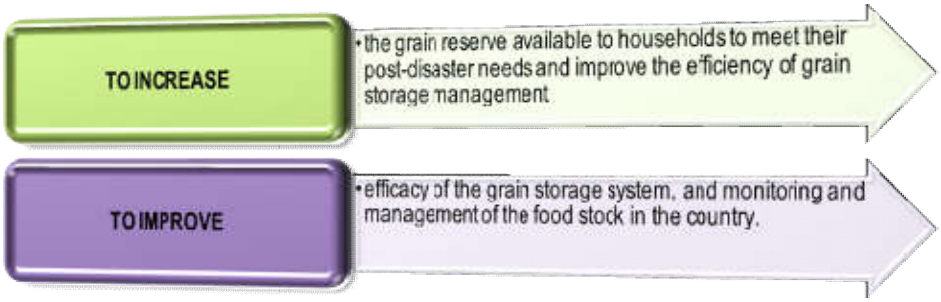
1.2.1 Strategic Objectives

Modern storage facilities proposed for construction under this project in different strategic locations across the country will allow grain to be kept in bulk for up to two to three years in better conditions relative to the godowns used currently, with reduced grain losses and enhanced nutritional value of the grain distributed. With strengthened capacity for improving stock management in the modern silos, and comprehensive analyses for enhancing the overall policy framework on strategic grain reserves, GoB will be in a position to make sound and informed decisions as it reconciles the three strategic objectives that impact the domestic food market:



1.2.2 Specific Objectives

The specific objectives of this project are:



1.3. Key Results

The key results are expected from the project as follows:

Increased availability of grain stocks immediately after a major disaster,
Increased food grain facilities to more disaster prone households,
Change in cost per ton in storing grain relative to pre-project cost,

Reduced loss in grain stocks relative to pre-project losses,
Better monitoring, and improved governance and management of food stocks.

1.4. Scope of Study

The scope of environmental and social impact assessment (ESIA) study associated with the silo construction and ancillary facilities comprise with the acts like; to present a general description of the project activities, describing the baseline environment, outlining the socio-economic environment around, suggesting the plan for managing the socio-environmental impacts during implementation and operation, and finally estimating the cost for environmental and social safeguard compliance issues involved during construction and operation phases. The scope of the ESIA included:

- ✓ Identify the activities are to be done under Madhupur Silo sub-project, with ancillary works associated in Madhupur silo site,
- ✓ Explore the present environment and socio-economic condition of Madhupur and surrounding areas,
- ✓ Finding the probable socio-economic and environmental impacts associated with Madhupur silo and surrounding areas,
- ✓ Investigating the future benefits of the people around Madhupur or grievances among them if any, due to the implementation of such new storage facilities like silo,
- ✓ Investigating the public opinion of Madhupur areas, on the issues of silo construction,
- ✓ Categorize the pollutions, may come out during construction and operation phases, in Madhupur and surrounding areas,
- ✓ Come across the solutions to the probable evolved problems and impacts during implementation and operation phases in the Madhupur silo areas (both in the silo campus and surrounding areas),
- ✓ Finding the optimum solutions to every impact during implementation and operation phases at Madhupur silo site,
- ✓ Assessment of institutional aspects, and development of Environmental Management and Monitoring Plan,
- ✓ Estimating the environmental and social safeguard costs o be involved with the construction cost of Madhupur silo and ancillary works.

1.5. Approach and Methodology

The ESIA study was carried out using reconnaissance survey, field visits, consultation with stakeholders, household survey, review of existing data, assessment to identify adverse impacts and preparation of EMP and post-project Environmental Monitoring Program. Physical assessments were made for entire project site with respect to terrestrial and aquatic aspects.

The task of preparing the ESIA report consisted of the following sequential components:

- ✓ Identification and screening of the environmental parameters relevant to the proposed project through a scoping process;
- ✓ Assessment of the magnitude of the potential negative impacts for relevant environmental parameters;
- ✓ Formulation of avoidance/mitigation measures to address the potential negative impacts, and preparation of a monitoring program during the period of project implementation;

Scoping and field visits to the project sites identified the environmental parameters/ components (relevant to the project actions) which are susceptible to be affected. The field visit also included participatory approach, which involved discussions with local people in order to determine the perceptions and priorities of the stakeholders in the Project area. Apart from the local people, information were also obtained from the local school teacher and local government. Information were also derived from secondary sources like different reports, journals, Satellite Image Analysis, research papers, NGO, government officials etc. The Location of Sample Collection Map is shown in Figure 1.1.

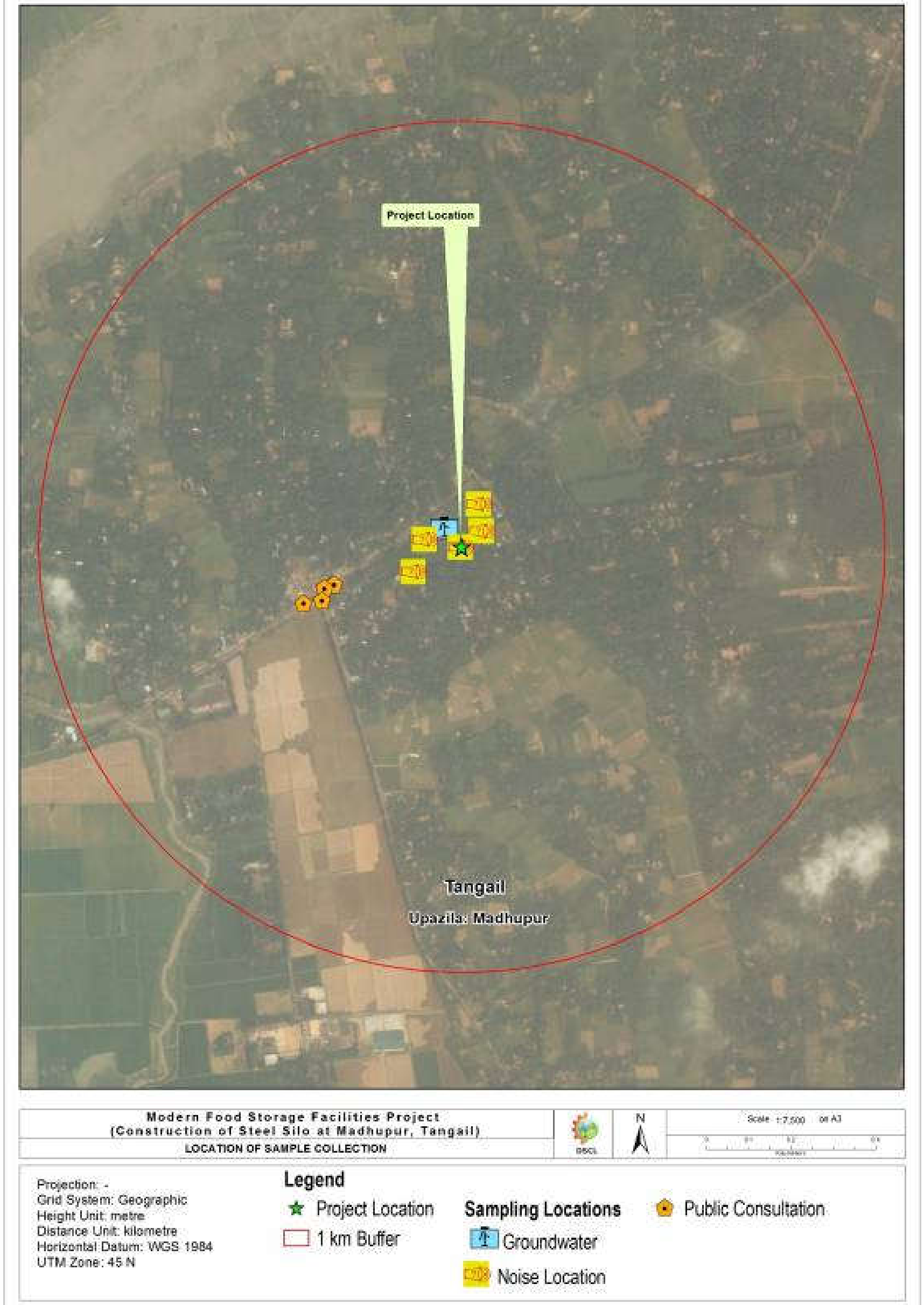


Figure 1.1: Location of Sample Collection

1.6. Structure of the Report

The report fulfills the requirements of ESIA under ECR, 1997 and has been prepared in accordance with the TOR provided by the Department of Environment (DOE). The report contains ten chapters and the chapter details are discussed below:

- ✓ Chapter 1 describes the background information of Madhupur silo site and selection of silo site (strategic location), objectives of the sub-project (silo bins and ancillary works to be done), key results to be achieved after silo construction at Madhupur site, scope of ESIA study and approach and methodology for the ESIA study associated with the Madhupur silo and ancillary works,
- ✓ Chapter 2 is on policy, legal and administrative framework describing the relevant policy and legal frameworks for the ESIA process, including the process of obtaining environmental clearance from the competent authorities.
- ✓ Chapter 3 contains detailed project description along with all the sub-project interventions are to be constructed and implemented.
- ✓ Chapter 4 describes environmental and social baseline condition with details on physical environment, land resources, agricultural resources, fisheries, ecosystem, socio-economic condition and social characteristics of the area.
- ✓ Chapter 5 describes Social Management and resettlement policy framework, emphasizing the inclusion and integration of society people in all activities.
- ✓ Chapter 6 presents the impacts assessment and mitigation measures for minimizing the adverse impacts and enhancing the benefits of the project and specific works to be done during design, construction and operation phases.
- ✓ Chapter 7 describes the arrangements for setting different type of interventions (silo bins, office, residential arrangement etc.) associated with the sub-project within the specified allocated area.
- ✓ Chapter 8 describes the environmental and social management plan (ESMP) and monitoring plan along with the monitoring indicators.
- ✓ Chapter 9 describes public consultation discussion with local stakeholders with their ideas, views about the project through knowledge sharing
- ✓ Chapter 10 concluding the ESIA report along with the recommendations.

1.7. Limitation of the Study

The present ESIA Report has been prepared based on the primary field investigations / assessment, and secondary data collected from various government departments, climatic data has been used from Bangladesh Meteorological Department (BMD), Department of Environment, Bangladesh (DoE) and published journals, and books, public consultation with local stakeholders and site observations. The environmental and social assessment is based on

the information collected from the various Agencies, community consultations and observations. Professional judgment and subjective interpretation of facts and observations has been applied for the preparation of the ESIA Report.

1.8. The ESIA Study Team

A multidisciplinary team of ESIA experts having experience of conducting Environmental and Social Impact Assessment of large scale industrial and infrastructural development projects. Table 1.1 presents the professionals' names with their positions.

Table 1.1: The ESIA Study Team

No.	Name	Position
1	Mr. S. M. Sanaul Kafi	Environmental Specialist
2	Mr. Md. Shafiqur Rahman	Social Safeguard Specialist
3	Ms. Tanzia Sharmin	Junior Environmental Engineer-1
4	Mr. Masfiq Bashir	Junior Environmental Specialist-1
5	Ms. Mafia Mostafa	Junior Environmental Specialist-2
6	Md. Atiqur Rahman	Junior Social safeguard Specialist-2
7	Mr. Madhu Shudan Das	GIS Expert
8	Mr. Abdul Malek	Surveyor-1
9	Mr. Liton	Surveyor-2
10	Mr. Shahidul Islam	Surveyor-3
11	Mr. Bappy Rahman	Surveyor-4

2. LEGISLATION, REGULATION AND POLICY CONSIDERATION

The Environmental and Social Impact Study (ESIA) has been performed in accordance with the rules, laws and regulations governed by the Bangladesh Government and according to the operation policy of the World Bank.

The laws, rules and regulations, adapted by the government of Bangladesh, for overall environmental improvement and to provide environmental and social safeguards, during implementation and operation of any physical infrastructure, considered during the ESIA study for Madhupur Silo site, are; National Environment Action Plan, 1992, Bangladesh Environment Conservation Act, 1995, Environment Conservation Rules, 1997, National Water Policy, 1999, National Fisheries Policy, 1996, Standing Orders on Disaster, 2010, National Integrated Pest Management Policy, 2002, National Adaption Program of Action (NAPA), Bangladesh Country Investment Plan (CIP), 2011, Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009, Bangladesh Labor Act, 2006, Bangladesh National Building Code, 2006 (for demolition of Structure and for Occupational Health & Safety), National Agricultural Policy, 2010, National Food Policy, 2006 etc. As per criterion set forth in the ECR 1997, Madhupur silo sub-project is under Orange-B category.

On the other hand, as the sub-project is associated with the World Bank' s investment, the Bank's Operation Policy (OP)/ Bank Procedure (BP) are involved with the ESIA study, and those are; Environmental Policies like, (OP/BP 4.01-Environmental Assessment, OP/BP 4.04-Natural Habitats, OP/BP 4.09-Pest Management, OP/BP 4.11-Physical Cultural Resources, OP/BP 4.36-Forests and OP/BP 4.37-Safety of Dams, Social Policies like, OP/BP 4.10-Indigenous Peoples and OP/BP 4.12-Involuntary Resettlement and the Legal Policies like, OP/BP 7.50-International Waterways and OP/BP 7.60-Disputed Areas, were carefully observed during the study. According to World Bank OP/BP the project has been considered as a Category B project.

2.1. National Environmental Laws

2.1.1. General Description

A wide range of laws and regulations related to environmental issues are in place in Bangladesh. Many of these are cross-sectoral and partially related to environmental issues. The most important of these are the Bangladesh Environment Conservation Act, 1995 (ECA, 1995), and the Environment Conservation Rules (ECR, 1997). In addition to the Bangladesh Environmental Conservation Act and Rules, there are a number of other policies, plans and strategies which deal with the water sector, agricultural development, coastal area, protected area disaster management and climate change. These are the National Water Policy, 1999; the Forest Act 1927 (last modified 30th April 2000); National Forest Policy, 1994; the National Conservation Strategy1992; National Environmental Management Action Plan (NEMAP), 1995; National Agricultural Policy, 2010; National Food Policy 2006; National Food Policy Plan of Action, 2008-2015; Food Grain Movement Policy, 2008; Bangladesh Country Investment Plan (CIP), 2011; National Fisheries Policy, 1996; Standing Orders on Disaster, 1999 (revised in 2010); Bangladesh Climate Change Strategy and Action Plan, 2009;

National Plan for Disaster Management, 2010-2015. Some of these policies and legislations are described in this chapter for reference.

2.1.2. Bangladesh Environment Conservation Act, 1995

The national environmental legislation known as Environmental Conservation Act, 1995 (ECA'95) is currently the main legislative document relating to environmental protection in Bangladesh, which replaced the earlier environment pollution control ordinance of 1992 and has been promulgated in Environmental Conservation Rules, 1997 (ECR'97). This Act is amended in 2000, 2002 and 2010. The main objectives of ECA'95 are: i) conservation of the natural environment and improvement of environmental standards; and ii) control and mitigation of environmental pollution.

Department of Environment (DoE) implements the Act. DoE is under the Ministry of Environment and Forest and is headed by a Director General (DG). The Act states that *before beginning new development project, the project proponent must obtain Environmental Clearance from DoE*. The procedures to obtain such clearance are in place. Failure to comply with any part of ECA'95 may result in punishment by a maximum of 10 years imprisonment or a maximum fine of BDT. 1000,000 or both.

2.1.3. Environment Conservation Rules, 1997

The Environment Conservation Rules, ECR 1997, provide a first set of rules under the Environment Conservation Act 1995, further amended in 2002 and 2010. These provide, amongst others items, standards and guidelines for:

- ✓ Categorization of industries and development projects
- ✓ Procedure for obtaining environmental clearance
- ✓ Environmental quality standards in relation to water pollution, air pollution and noise, as well as permitted discharge/emission levels of water and air pollutants and noise by projects

The Rules incorporate "inclusion lists" of projects requiring varying degrees of environmental investigation. The Government is also empowered to specify which activities are permissible and which restricted in the ecologically critical area. Under this mandate, MoEF has declared Sunderban, Cox's Bazar-Tekhnaf Sea Shore, Saint Martin Island, Sonadia Island, HakalukiHaor, Tanguar Haor, Marzat Baor and Gulshan-Baridhara Lake as ecologically critical areas and accordingly has prohibited certain activities in those areas. Four rivers respectively Buriganga, Balu, Turag and Dhaleshwari of surrounding Dhaka city have also declared as ecologically critical area.

Environmental Conservation Rules (1997) classifies industrial units and development projects into four categories for the purpose of issuance of Environmental Clearance Certificate (ECC). These categories are: (i) Green (ii) Orange-A (iii) Orange-B and (iv) Red.

Green Category projects are considered relatively pollution-free and hence do not require initial environmental examination (IEE) and EIA. An environment clearance certificate

(ECC) from the Department of Environment (DoE) is adequate. **Orange Category** projects fall into two categories. Orange A projects are required to submit general information, a feasibility report, a process flow diagram and schematic diagrams of waste treatment facilities along with their application for obtaining DoE environmental clearance. Orange B projects are required to submit an Initial Environmental Examination (IEE) report, along with their application and the information and papers specified for Orange B projects. **Red** Category projects are those which may cause 'significant adverse' environmental impacts and are, therefore, required to submit an EIA report. It should be noted that they may obtain an initial site clearance on the basis of an IEE report, and subsequently submit an EIA report for obtaining environmental clearance along with other necessary papers, such as feasibility study reports and no objections from local authorities. As per ECR '97 all existing industries and projects in Orange B and Red category require an Environmental Management Plan (EMP) to be prepared and submitted along with other necessary papers while applying for environmental clearance.

2.1.4. Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009

The Government of Bangladesh prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008 and revised in 2009. This is a comprehensive strategy to address climate change challenges in Bangladesh. It is built around the following six themes:

- ✓ **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. All programs focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.
- ✓ **Comprehensive disaster management** to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.
- ✓ **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.
- ✓ **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.

Mitigation and low carbon development to evolve low carbon development options and implement these as the country's economy grows over the coming decades.

Capacity building and Institutional strengthening to enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change.

2.1.5. National Environment Action Plan, 1992

The National Environment Action Plan recommended sector specific action plan to achieve the objectives and implement the policy recommendations of the National Environment Policy. The followings are sector relevant key recommended actions:

Agriculture

- ✓ Use of chemical insecticides and pesticides has to be regulated. Production, import and use of those chemical insecticides and pesticides, which have a long-term residue and keep on accumulating in the environment, have to be phased out gradually.
- ✓ Proper and regulated use of chemical fertilizers will be ensured. Use of organic fertilizers will be increasingly emphasized.
- ✓ Imported seeds, seedlings and plants will be properly quarantined to exercise necessary caution against probable adverse environmental impact.
- ✓ Natural methods of pest control will be encouraged through ensuring protection and safety.

Steps should be taken to establish an agricultural system based on local ecosystem, rate of population growth and demand of national economy.

2.1.6. National Water Policy, 1999

The National Water Policy was promulgated in 1999 with the intention of guiding both public and private actions to ensure optimal development and management of water in order to benefit both individuals and the society at large. The policy aims to ensure progress towards fulfilling national goals of economic development, poverty alleviation, food security, public health and safety, a decent standard of living for the people and protection of the natural environment. According to the policy, all agencies and departments entrusted with water resource management responsibilities (regulation, planning, construction, operation and maintenance) will have to enhance environmental amenities and ensure that environmental resources are protected and restored while executing their activities. Environmental needs and objectives will be treated equally with the resources management needs. The policy has several clauses related to the protection and conservation of the natural environment to ensure sustainable development. The strategy of the policy to conserve environment and resource can be summarized as:

- ✓ Promoting modern eco-friendly technology and infrastructure for a safe and sustainable future;
- ✓ Biodiversity conservation and sustainable land & water management;
- ✓ Restricting the conversion of agricultural land for non-agricultural purposes.

2.1.7. Standing Orders on Disaster, 2010

The 'Standing Orders on Disaster, 2010' is a substantial improvement over the previous edition (English 1999) New features introduced in this edition include, among others, the following: i) an outline of disaster management regulative framework, ii) an introduction of core groups for emergency response at various levels, iii) multi-agency disaster incident management system, iv) risk reduction roles and responsibilities for all committees and agencies, v) new outlines for local level plans, vi) revised storm warning signals, vii) a report on cyclone shelter design. Conceptually, this edition follows a comprehensive approach emphasizing risk reduction as well as emergency responses relating to all hazards and all sectors.

The Standing Order is designed to enhance capacity at all tiers of government administrative and social structures for coping with and recovering from disasters. Provision of emergency water, food, and sanitation and shelter space for livestock during such periods should also be considered for future construction of shelters.

The Standing Orders on Disaster (SOD) specifically focuses on community vulnerability and capacity development of the community to adapt disaster (cyclone, tidal surge, tsunami, earthquake, tornado, flood, water logging, salinity, high tide, cold wave) resistant features like disaster resistant agriculture and other livelihood options. The SOD also delineates the activity of different administration at pre, during and post disaster period.

2.1.8. National Integrated Pest Management Policy, 2002

The objective of the policy is to enable farmers to grow healthy crops in an increased manner and thereby increase their income on a sustainable basis while improving the environment and community health. Maintaining ecological balance is the first priority of the IPM policy. In order to reduce misuse of agro-chemicals that could easily lead to ecological disturbance threatening the sustainability of agricultural production, the policy suggests for the following measurers:

- ✓ Efforts will be made to conserve and augment populations of bio-control agents in crop fields through the adoption of the principles and practices of IPM; and
- ✓ Priorities will be given to the management of pests through the use of parasitoids, predators, insect pathogens, appropriate cultivation techniques, pest tolerant varieties, mechanical control measures, crop diversification, botanical products and bio-pesticides.

2.1.9. National Fisheries Policy, 1996

The National Fisheries Policy, 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 suggests following actions:

- ✓ To conserve fish habitats from damage, appropriate care should be taken during the implementation of all development activities such as flood control, irrigation and drainage projects, agriculture, industries, road and development projects.
- ✓ Shrimp and fish culture will not be expanded to the areas which damage mangrove forest in the coastal region
- ✓ Biodiversity will be maintained in all natural water bodies and in marine environment. Chemicals harmful to the environment will not be used in fish and shrimp farms
- ✓ Breeding ground of fish and fresh water giant prawn will be conserved
- ✓ Environment friendly shrimp culture technology will be used
- ✓ Control measures will be taken against activities that have a negative impact on fisheries, resources and vice-versa
- ✓ Laws will be formulated to ban the disposal of any untreated industrial effluents into the water bodies

2.1.10. National Adaption Program of Action (NAPA)

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 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 have been suggested for Bangladesh to address adverse effects of climate change. Among the 15 adaptation strategies the following strategies have taken for the coastal region for reducing climate change induced vulnerability.

- ✓ Reduction of climate change hazards through coastal afforestation with community participation
- ✓ Providing drinking water to coastal communities to combat enhanced salinity due to sea level rise
- ✓ Construction of flood shelter, and information and assistance centre to cope with enhanced recurrent floods in major floodplains
- ✓ Promotion of research on drought, flood and saline tolerant varieties of crops to facilitate adaptation in future
- ✓ Promoting adaptation to coastal crop agriculture to combat increased salinity
- ✓ Promoting adaptation to coastal fisheries through culture of salt tolerant fish special in coastal areas of Bangladesh

2.1.11. Bangladesh Labor Act, 2006

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 an amount equal to fifty from the injury cent of the monthly wages of the deceased workman multiplied by the relevant factor; or an amount of fifty thousand rupees, whichever is more; (b) where permanent total an amount equal to disablement results from sixty the injury per cent of the monthly wages of the injured workman multiplied by the relevant.

2.1.12. Bangladesh National Building Code, 2006

2.1.12.a. Demolition of Structure

BNBC sets guideline for demolition of structure. The highlights of the guideline are as follows:

- ✓ At planning stage, detailed survey and study shall be carried out before demolishing the structure.
- ✓ A written notice will be delivered to the adjoining property holder.
- ✓ Required pedestrian precaution should be taken into account before commencing the demolition
- ✓ All utility lines will be disconnected and the sequence of demolition will be maintained as mentioned in the BNBC
- ✓ The owner will provide compensation for all damages and loss of life.

2.1.12.b. Occupational Health & Safety

Bangladesh National Building Code-BNBC (Part-7, Chapter-1) 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 make written document. 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).

Section 1.4.1 of chapter-1, part-7 of the BNBC, states 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 etc 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”.

Part-7, Chapter-3 of the Code has clarified 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.

To prevent workers falling from heights, the Code in section 3.7.1 to 3.7.6 of chapter 3 of part 7 sets out the detailed requirements on the formation and use of scaffolding. According to section 3.9.2 of the same chapter, “every temporary floor openings shall either have railing of at least 900 mm height or shall be constantly attended. Every floor hole shall be guarded by either a railing with toe board or a hinged cover. Alternatively, the hole may be constantly attended or protected by a removable railing. Every stairway floor opening shall be guarded by railing at least 900 mm high on the exposed sides except at entrance to stairway. Every ladder way floor opening or platform shall be guarded by a guard railing with toe board except at entrance to opening. 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”.

The major challenge is the proper implementation of the Code as section 2.1 of chapter 2 of part 1 duly states that, “The Government shall establish a new or designate an existing agency responsible for the enforcement of this Code with a given area of jurisdiction. For the purpose of administering and enforcing the provisions of the Code, the enforcing agency shall have the authority of the Government and shall herein be referred to as the Authority.”

Part 9, 1.2.1 states that if the land is changed and the occupants of the area are against the change, no change in use of an existing building will be allowed.

2.1.13. National Agricultural Policy, 2010

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. One of the specific objectives of National Agricultural Policy is to take necessary steps to ensure environmental protection as well as 'environment-friendly sustainable agriculture' through increased use of organic manure and strengthening of the integrated pest management program. The policy identifies that the available technologies for agricultural production is not sufficient to cope with the unfavorable environment (climate change, flood, drought, storm, salinity, pest and diseases, river erosion). The policy also suggests creating awareness so that the chemical fertilizers and pesticides used for increased crop production do not turn out to be responsible for environmental pollution. Water logging and salinity are identified as one of the serious problem in some parts of the country including the coastal areas for agricultural activities and environmental damage. The policy recommends for crop rotation and salt tolerant crop varieties.

2.1.14. National Food Policy, 2006

The goal of the food policy is to ensure a dependable food security system for all people of the country at all times. The objectives of the food policy are:

Objective-1: to ensure adequate and stable supply of safe and nutritious food;

Objective-2: to enhance purchasing power of the people for increased food accessibility; and

Objective-3: to ensure adequate nutrition for all (especially women and children).

Policy 1.2.2.1 of National Food Policy, 2006 states the Development of private sector food grain storage and movement system. The storage facilities presently available in the private sector are not suitable for long-term storage of grain and other food commodities. For this, construction of warehouses of scientific standard specifications is necessary. The government policy should be to encourage the process by amending and simplifying banking regulations on credit facilities to private sector entrepreneurs for construction of appropriate commodity specific warehouses, cold storages and acquiring transportation vehicles for freightage. To promote development of storage and movement system of food commodities in the private sector, the Government will:

- ✓ allow unrestricted movement of foodstuff in the country; and
- ✓ ensure credit facilities to develop storage structures in appropriate places.

Under the Public food grain stock (Policy 1.3.2) the stated major objective of the public food distribution system is to supply required quantity of grain to the food-assisted development and income transfer programs for the poor, who are unable to purchase minimum required quantity of food from the market at prevailing market prices. In addition to maintaining working stock of food grains to operate various food-based safety net programs, the

Government also maintains a security reserve to cope for emergency needs during disasters. In order to handle uncertainties of import arrival and emergency off take requirements, the Government has decided to maintain a public stock of 1.0 million tons of food grains.

Policy 2.1 Transitory shock management highlights on emergency preparedness. Emergency preparedness is needed to alleviate the transitory food insecurity caused by floods, cyclones and other natural disasters that often occur in Bangladesh. Emergency relief programs are operated to mitigate the distress of the affected people. To satisfy the emergency distribution needs public food grain stocks equal to three months of emergency demand along with a relief system to distribute food, clean water, medicines and other essentials are being maintained. In addition, the required level of minimum public food grain stocks should be reviewed annually considering the changing situations in domestic and global markets coupled with disaster proneness.

According to 2.1.2, Emergency distribution from public stock, to provide for the emergency food needs of households in the disaster-affected areas, the policy of the Government is to:

- ✓ ensure quick distribution of food in affected households in times of disaster;
- ✓ hold enough food grain stocks to cover at least three months of emergency distribution need in addition to its normal working stock needed for the regular food-based programs;

Strategy 3.5: Safe, quality food supply focuses on ensuring the quality of food at all levels of marketing (e.g. assembling, cleaning, sorting, processing and packaging). The following programs will be undertaken to ensure supply of safe and quality food through formulating new regulations by proper amendments of the existing ones and through encouraging the private sector initiatives:

- ✓ formulation of uniform arrangement, development of testing techniques, setting of standards and their application and compulsory enforcement;
- ✓ investment in development of packing or packaging and safe storage facilities;
- ✓ increase laboratory facilities and impart practical knowledge for development of the quality of food and food products;
- ✓ training for concerned officials and institutions in protecting the grades and standards of food products;
- ✓ campaign for nutrition enhancing quality and safe food; and
- ✓ develop and enforce appropriate regulatory mechanism to control indiscriminate use of harmful additives, preservatives and toxic elements in production and in the marketing chain for foodstuffs

2.1.15. National Food Policy Plan of Action, 2008-2015

The National Food Policy Plan of Action (PoA) translated the provisions of the National Food Policy, 2006 towards achieving its three core objectives into 26 strategic area of

intervention, priority actions to be undertaken in the short, medium and long term over the period 2008-2015. The policy mentioned that strengthened efforts to raise productivity and efficiency in food grain production, to support agricultural commercialization and diversification, in due consideration of environmental impacts (agricultural conservation), will be paramount. Actions are needed on many fronts, including agricultural technology development, input (seeds, fertilizers, irrigation, and machinery) supply and access expansion, and, critically, rural financing, which currently stands far below rural producers' needs, especially those of small and marginal farmers. In line with **MDG7 (Ensure environmental sustainability),** environmental sustainability has been effectively mainstreamed into the NFP agricultural policy agenda for enhancing food supply and also biodiversity.

2.1.16. Bangladesh Country Investment Plan (CIP), 2011

The Bangladesh Country Investment Plan provides a coherent set of priority investment programs to improve food security and nutrition in an integrated way. It is a comprehensive plan, builds on the existing framework**,** reflects the Government's investment priorities and aims to: (i) plan and invest resources in a coordinated way; (ii) increase convergence and alignment of budget and external sources of funding, and; (iii) to mobilize additional resources. Proposed investments relate to strengthening physical, institutional and human capacities in the field of agriculture, water management, fisheries, livestock, agricultural marketing, food management, safety nets, and nutrition and food safety.

2.2. World Bank's Environmental Safeguard Policies

The World Bank's environmental and social safeguard policies are a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. Safeguard policies provide a platform for the participation of stakeholders in project design, and act as an important instrument for building ownership among local populations. The effectiveness and development impact of projects and programs supported by the Bank has substantially increased as a result of attention to these policies. The World Bank has ten environmental, social, and legal safeguard policies. The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment. This policy is considered to be the umbrella policy for the Bank's environmental "safeguard policies" which among others include: Natural Habitats (OP 4.04), Forests (OP 4.36), Pest Management (OP 4.09), Physical Cultural Resources (OP 4.11), and Safety of Dams (OP 4.37). Operational Policies (OP) are the statement of policy objectives and operational principles including the roles and obligations of the Borrower and the Bank, whereas Bank Procedures (BP) is the mandatory procedures to be followed by the Borrower and the Bank. The complete list of policies is given below and the Environment and Social policies are discussed.

Environmental Policies

- ✓ OP/BP 4.01 Environmental Assessment

- ✓ OP/BP 4.04 Natural Habitats
- ✓ OP/BP 4.09 Pest Management
- ✓ OP/BP 4.11 Physical Cultural Resources
- ✓ OP/BP 4.36 Forests
- ✓ OP/BP 4.37 Safety of Dams

Social Policies

- ✓ OP/BP 4.10 Indigenous Peoples
- ✓ OP/BP 4.12 Involuntary Resettlement

Legal Policies

- ✓ OP/BP 7.50 International Waterways
- ✓ OP/BP 7.60 Disputed Areas

In addition to the 10 safeguard policies, BP 17.5 exists as the Bank Disclosure Policy, which also relates to safeguards. Bank disclosure Policy supports decision making by the Borrower and Bank by allowing the public access to information on environmental and social aspects of projects. The policy requires disclosure in both English and Local language before project appraisal and must meet the World Bank standards.

2.2.1 OP/BP 4.01 Environmental Assessment

Environmental Assessment is the umbrella safeguard policy to identify, avoid, and mitigate the potential negative environmental and social impacts associated with Bank lending operations. In World Bank operations, the purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, sitting, 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. 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 borrower is responsible for carrying out the EA and the Bank advises the borrower on the Bank's EA requirements.

The Bank classifies the proposed project into three major categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

Category A: The proposed project 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: The proposed project's potential adverse environmental impacts on human population or environmentally important areas-including wetlands, forests, grasslands, or other natural habitats- are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than Category A projects.

Category C: The proposed project is likely to have minimal or no adverse environmental impacts.

2.2.2 OP/BP 4.04 Natural Habitats

The conservation of natural habitats is 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 supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

2.2.3 OP/BP 4.09 Pest Management

To manage pests that affect either agriculture or public health, the Bank supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides. In Bank- financed projects, the borrower addresses pest management issues in the context of the project's environmental assessment. In appraising a project that will involve pest management, the Bank assesses the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management. As necessary, the Bank and the borrower incorporate in the project components to strengthen such capacity. The Bank uses various means to assess pest management in the country and support integrated pest management and the safe use of agricultural pesticides: economic and sector work, sectoral or project-specific environmental assessments, participatory IPM assessments, and investment projects and components aimed specifically at supporting the adoption and use of IPM.

In Bank-financed agriculture operations, pest populations are normally controlled through IPM approaches, such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest. The procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended user. With respect to the classification of pesticides and their specific formulations, the Bank refers to the World

Health Organization's Recommended Classification of Pesticides by Hazard and Guidelines to Classification (Geneva: WHO 1994-95).

2.2.4 OP/BP 4.11 Physical Cultural Resources

Physical cultural resources are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Their cultural interest may be at the local, provincial or national level, or within the international community. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements. The borrower addresses impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process.

2.2.5 OP/BP 4.36 Forests

Forest is defined as an area of land of not less than 1.0 hectare with tree crown cover (or equivalent stocking level) of more than 10 percent that have trees with the potential to reach a minimum height of 2 meters at maturity *in situ*. A forest may consist of either closed forest formations, where trees of various stories and undergrowth cover a high proportion of the ground, or open forest. The definition *includes* forests dedicated to forest production, protection, multiple uses, or conservation, whether formally recognized or not. The definition *excludes* areas where other land uses not dependent on tree cover predominate, such as agriculture, grazing or settlements. In countries with low forest cover, the definition may be expanded to include areas covered by trees that fall below the 10 percent threshold for canopy density, but are considered forest under local conditions. The Bank's forests policy aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development. The Bank 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.

2.3 Environment, Health & Safety Guidelines

The Environment, Health, and Safety (EHS) Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities or project by existing technology at reasonable costs. These Guidelines will be applicable to the Project particularly with respect to air emissions, ambient air and noise quality standards, waste water quality, hazardous material and waste management, and occupational and community health and safety management. They contain performance levels and measures that are considered to be achievable in new facilities at reasonable costs using existing technologies. Table 2.1 shows the EHS guidelines of World Bank.

Table 2.1 EHS Guidelines of World Bank

Environmental Health and Safety Guidelines	The Environment, Health, and Safety (EHS) Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities or project by existing technology at reasonable costs.	These Guidelines will be applicable to the Project particularly with respect to air emissions, ambient air and noise quality standards, waste water quality, hazardous material and waste management, and occupational and community health and safety management.
Environmental, Health, and Safety Guidelines PORTS, HARBORS, and TERMINALS	The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. For complex projects, use of multiple industry-sector guidelines may be necessary. The EHS Guidelines for Ports, Harbors, and Terminals are applicable to commercial ports, harbors, and terminals for cargo and passengers transfer. Shipping (including repair and maintenance of ships), fuel terminals, or railways are addressed in separate industry sector EHS Guidelines, specifically the EHS Guidelines for Shipping, Crude Oil and Petroleum Product Storage, Railways, respectively.	Relevant as the project includes provision of improved navigation routes and terminal facilities. MP section of the ESIA report has been dedicated to mitigate adverse impact due to the proposed intervention.
The EHS Guidelines for Shipping	The EHS Guidelines for Shipping include information relevant to the operation and maintenance of ships used for the transport of bulk cargo, and goods. Cargo handling, vessel maintenance, and other in-port activities are covered under the EHS Guidelines for Ports and Harbors while issues specific to the transfer and storage of bulk fuels are covered in the EHS Guidelines for Crude Oil and Petroleum Product Terminals.	Broadly applicable as the project provides improved navigation routes and terminal facilities. The EMP is prepared to address mitigation measures due to proposed interventions.

2.4 Social Policies & Legislation of Bangladesh

2.4.1 General Description

Infrastructure development projects using lands in Bangladesh is designed and implemented under the legislative and regulatory framework to compensate the affected persons due to land acquisition using the power of eminent domain. Whenever it appears to the Government that any property in any locality is needed or is likely to be needed for any public purpose or in the public interest, the property is acquired using power of eminent domain. Land acquisition is governed by the Acquisition and Requisition of Immovable Property Ordinance, 1982 (Ordinance II of 1982). The ordinance supersedes earlier laws including the Land Acquisition Law of 1894 and others that have been in force between 1947 and 1982. In addition to the Ordinance, acquisition of any land or forest area, in Chittagong Hill-Tracts (CHT) districts require consent under the Chittagong Hill-Tracts (Land Acquisition) Regulation 1958, the CHT Regional Council Act 1998 and the Forest Act (1927). There is no national policy in Bangladesh governing social effects of infrastructure development projects on the project area communities. However, the Constitution of Bangladesh and the national development strategy (Poverty Reduction Strategy Paper 2005-2009) provides some rights to the affected persons, communities and groups those are not upheld in the Ordinance II of 1982, the instrument followed for land acquisition. The active instruments under the legislative and regulatory framework in Bangladesh are discussed hereunder.

2.4.2 Constitution of Bangladesh

The fundamental rights under the Constitution indicate the general guidelines for a policy on resettlement/rehabilitation of citizens adversely affected (whatever be the mechanism) due to any activity of the State. Article 40 of the constitution states categorically that every citizen has the right to practice any lawful occupation which implies that anything that impedes such right (a) should not be done or (b) there should be supplementary measures to make good the losses incurred by the citizen. Resettlement and rehabilitation of adversely affected people due to infrastructure projects very clearly falls within this requirement for supplementary measures. However, as per Article 42, sub-clause 2, no law with provision of compensation for acquisition of land can be challenged in a court on the ground that such compensation has been inadequate.

2.4.3 The Acquisition and Requisition of Immovable Property Ordinance, 1982

This Ordinance is the basic instrument governing land acquisition in Bangladesh. It is restricted to “legal” owners of property as supported by records of ownership such as deeds, title or agreements to compensating for land as well as any business, structure, trees and crops on the land. The owners of acquired land receive cash compensation at market value with a premium of 50 per cent on the assessed price. The law specifies methods for calculation of market value of property based on recorded prices obtained from relevant Government departments such as Registrar (land), Public Works Department (structures), Department of Forest (trees), Department of Agriculture (crops) and Department of Fisheries (fish stock).

The Ministry of Land (MOL) is authorized to deal with land acquisition. The MOL delegates some of its authority to the Commissioner at Divisional level and to the Deputy Commissioner at the District level. The Deputy Commissioners (DCs) are empowered by the MOL to process land acquisition under the Ordinance and pay compensation to the legal owners of the acquired property. Khas (government owned land) lands should be acquired first when a project requires both khas and private land. If a project requires only khas land, the land will be transferred through an inter-ministerial meeting following the acquisition proposal submitted to DC or MOL as the case may be. The DC is empowered to acquire a maximum of 50 standard bigha (6.75 ha) of land without any litigation where the Divisional Commissioner is involved for approval. Acquisition of land more than 50 standard bigha is approved from the central land allocation committee (CLAC) headed by the chief executive of the Government of Bangladesh proposed by the MOL.

The land owner needs to establish ownership by producing record-of-rights in order to be eligible for compensation under the law. The record of rights prepared under Section 143 or 144 of the State Acquisition and Tenancy Act 1950 (revised 1994) are not always updated and as a result legal land owners have faced difficulties trying to “prove” ownership. The affected person (AP) has also to produce rent receipt or receipt of land development tax, but this does not assist in some situations as a person is exempted from payment of rent if the area of land is less than 25 bigha (3.37 ha).

2.4.4 The East Bengal State Acquisition and Tenancy Act, 1950 (Revised, 1994)

The State Acquisition and Tenancy Act (Sections 86 & 87) also define the ownership and use right of alluvion (payosti or reformation in situ or original site) and diluvion land (nadisikosti) in the country. In legal terms, eroded lands (sikosti) inside the alluvion-diluvion (AD) line (i.e. including submerged land or underwater land) are considered khas land once declared by concerned Deputy Commissioner (DC) demarcating the AD Line. However, the "original" owner(s) can claim the land if it reappears through natural process within 30 years. The original private owners cannot claim any eroded land if developed by the government through land filling for use in public purpose.

2.4.5 Constitutional Right of the Tribal Peoples Rights

In the context of People’s Republic of Bangladesh, the Constitution of Bangladesh does not mention the existence of the cultural and ethnic minorities in Bangladesh. The only protective provision for the ethnic minorities that the policy makers often refer to in the context is Article 28 (4) which states that: Nothing shall prevent the state from making special provision in favour of women and children or for the advancement of any backward section of the citizens. The above provision is an ambiguous one and it does not define who or what constitutes "backward". However, the Government recognizes existence of “tribal peoples” and the need for special attention and in general tribal people are essentially viewed as backward, poor and socio-economically & culturally inferior. Towards this end a special program was initiated in 1996-97 by the Prime Minister’s Secretariat aimed at improving the socio-economic situation of the indigenous people of Bangladesh, resident outside the Chittagong Hill Tracts.

2.4.6 The Chittagong Hill Tracts Regulation, 1990

The Chittagong Hill Tracts Regulation, 1900 (Regulation I of 1900) is the regulatory framework for State sovereignty over the traditional rights of the tribal peoples living in the Chittagong Hill Tracts (CHTs) region.4 They are governed through Revenue Circle Chiefs5 who are local revenue collectors vide an amalnama (authorization by the Government). The Deputy Commissioner and the Commissioner from the Central Government reserve the authority to settle land to the hill-men or non-hill residents or lease out land (non-transferable) for rubber plantation or establishing industries in the CHTs. The regulation provides the right to possessing plough cultivable land up to 5 acres by hill men or non-hill residents. The headman is responsible for the conservation of the resources of his mouza through exercising his authority to (i) prohibit the removal of forest produces by residents of respective mouzas other than for their domestic purposes or by non-residents for any purpose, (ii) exclude any area or areas in his mouzas from the jhuming (shifting cultivation), (iii) prevent new comers from cutting jhums in his mouza, and (iv) prevent a person from grazing cattle in his mouza.

2.4.7 The Chittagong Hill Tracts (Land Acquisition) Regulation, 1958

The Chittagong Hill Tracts (CHT) region has been enjoying the status of a special region since British period. Most of the land in CHT belongs to the Government either as reserve forest or as unclassified state forest. The CHT Regulation I of 1900 was the sole legal instrument for the governance

and administration of the Hill Tracts. Under the regulation, the DC could resume land even though settlement of the same might have been given earlier. The rule prescribed payment of compensation for various interests as in the case of land acquisition. It was expedient to provide for the acquisition of land in CHT the Government made the Chittagong Hill-Tracts (Land Acquisition) Regulation, 1958. This regulation has provision for payment of compensation for requisitioned property. The compensation may be fixed by agreement or by rules framed on this behalf.

2.4.8 The CHT Regional Council Act, 1998

The National Parliament of Bangladesh in 24 May 1998 passed the Peach Accord 1997 as the "Chittagong Hill Tracts Regional Council Act, 1998 (Act 12 of 1998). In addition to re-establishing peace, the Accord recognized the ethnic people's right to land, culture, language, and religion. The Accord set out detailed provisions for strengthening the system of self-governance in the CHT, and redressing the most urgent land-related problems including resolution of land disputes by a commission on land, the transfer of authority for land administration to the hill district councils (HDCs), the cancellation of lease granted to non-residents during the conflict period, the distribution of land to ethnic or "tribal" villages, and the strengthening of customary land rights.

Within the meaning of the Act 12 of 1998, no lands, hills and forests within the control and jurisdiction of the HDCs shall be acquired or transferred by the government without consultation and consent of the Regional Council. No law will be executed in the region which is not developed and enacted in consultation and agreement with the tribal peoples in

CHT. A ministry on CHT Affairs was established by appointing a Minister from among the tribal communities of hill districts. An Advisory Council from the CHT region assists this ministry. However, there is a demand for extending the scope of the CHT Affairs Ministry to include the tribal peoples in other areas of the country.

2.4.9 Ethnic Minority Rights in PRSP, 2005

Relevant strategic suggestions in the PRSP 2005 to preserve the cultural, social and economic identity and interests of the ethnic populations in and outside CHT are as follows:

- ✓ Effective recognition of ethnic minority communities and their specific needs in all relevant government policies and programs towards improving the socio-economic conditions of these communities.
- ✓ Proper actions for protecting the rights of ethnic minority people, particularly their rights to land and forests.
- ✓ Transfer of land administration in CHT to the hill districts councils in accordance with the 'Hill District Councils Acts of 1989'.
- ✓ Provide education to ethnic minority people with a curriculum that allows learning in their own language at the primary level.
- ✓ Strengthen their competence in job markets through affirmative action's at higher levels of education and skill training to promote their inclusion in mainstream economic life.
- ✓ Scale-up efforts to provide health care, clean water and sanitation facilities to ethnic minority areas in general and to the more disadvantaged groups among them in particular.
- ✓ Increase and utilize property the fund available in the Prime Minister's office for the development of the ethnic minority people of the plane lands.
- ✓ Provide wider access to electrification and telecommunications for ethnic minority communities, particularly in the Hill Tracts.

2.4.10 GOB Laws and Land Acquisition

The principle legal instrument governing land acquisition in Bangladesh is the Acquisition and Requisition of Immovable Property Ordinance, 1982(Ordinance II of 1982 with amendments up to 1994) and other land laws and administrative manuals relevant to land administration in Bangladesh. According to the Ordinance, whenever it appears to the Government of Bangladesh that any property in any locality is needed or is likely to be needed for any public purpose or in the public interest, the Government can acquire the land provided that no property used by the public for the purpose of religious worship, graveyard and cremation ground. The 1982 Ordinance requires that compensation be paid for (i) land and assets permanently acquired (including standing crops, trees, houses); and (ii) any other damages caused by such acquisition. The Deputy Commissioner (DC) determines (a) market

value of acquired assets on the date of notice of acquisition (based on the registered value of similar property bought and/or sold in the area over the preceding 12 months), and (b) 50% premium on the assessed value (other than crops) due to compulsory acquisition. The 1994 amendment made provisions for payment of crop compensation to tenant cultivators. Given that people devalue land during title transfer to minimize tax payment, compensation for land paid by DC including premium largely remains less than the actual market price.

2.5 World's Bank Social Safeguard Policy

2.5.1 Involuntary Resettlement (OP 4.12)

The WB's experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks: production systems are dismantled; people face impoverishment when their productive assets or income sources are lost; people are relocated to environments where their productive skills may be less applicable and the competition for resources greater; community institutions and social networks are weakened; kin groups are dispersed; and cultural identity, traditional authority, and the potential for mutual help are diminished or lost. This policy includes safeguards to address and mitigate these impoverishment risks. The overall objectives of the Policy are given below.

- ✓ Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.
- ✓ Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.

Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

2.5.2 Indigenous People (OP 4.10)

For purposes of this policy, the term "Indigenous Peoples" is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:7 The tribal peoples living in the Chittagong Hill Tract districts and some scattered in the plain districts as well are indigenous peoples as per their cultural distinction. The OP defines the process to be followed if the project affects the tribal people. The tribal peoples are indigenous as they have

- self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;

- customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- an indigenous language, often different from the official language of the country or region.

2.6 Implication of National Policies and Legislations on this Project

The Categorization list mentioned in ECR'97 is performed based on the activity. There is no direct mention of the category for Modern Food Grain Silo in ECR'97. However, cold storage is categorized as "Orange B" under ECR'97. Therefore the project is considered as "Orange B". The project is aimed to construct modern food grain storage silo which will not involve demolishing of any structure and use of modern Chiller system and use of Nitrogen for disinfection during operation period. DG Food is responsible for carrying out Initial Environmental Examination, developing Environmental Management Plan and obtaining No Objection Certificate, site clearance and environmental clearance certificate.

2.7 Implication of Environmental Safeguard Policies of WB on the Project

The project has been considered as a Category B project, due to the risk associated with the extent of foundation construction, construction of super structure from prefabricated steel sheet, environmental and occupation health and safety during project operation. The Project has triggered the environmental safeguard policy for environmental assessment (OP/BP 4.01). The Silo will introduce modern cooling facilities which will reduce the existence of rodents and insecticides. Chiller system will be used during the operation phase of the Silo for temperature control and Nitrogen gas for disinfection. The use of nitrogen will be through mechanised and automated system. As per Bank requirement, the borrower needs to consult project-affected groups and local nongovernmental organizations about the project's environmental aspects and takes their views into account. The borrower initiates such consultations as early as possible. In addition, the borrower consults with the community people around throughout project implementation as necessary to address EA-related issues that affect them.

2.8 Implication of Social Safeguard Policies of WB on the Project

The legislatives and regulatory framework is not adequate to deal with the adverse impacts associated with land acquisition and involuntary displacement of peoples for project purpose. The law does not cover project-affected persons without title and does not ensure replacement value of the property acquired. The law does not initiate any measure for restoration of livelihoods of the affected persons. As a result, land acquisition potentially diminishes productive base of affected farm families which is against the spirit of the Bank policy on involuntary resettlement (OP 4.12).

Specific to the project, no land will need to be acquired and no resettlement will need to be carried out in the first phase construction. However, in subsequent construction phase(s), the government may like to acquire private land and/or public land from private uses. The acts therefore, trigger the Bank OP 4.12 on involuntary resettlement. No tribal people are existent in and around the sites reviewed for the project. Therefore the Bank OP 4.10 is not triggered to the project. However, if such groups are identified during the detailed engineering design, the proponents will select to drop the site from construction.

3. PROJECT DESCRIPTION

3.1. Location of the Project

Madhupur is one of the 12 Upazilas in Tangail District of Dhaka Division. The Upazila is a part of the Madhupur highland of the greater Mymensingh area. Madhupur has a Government khas land area of 5.81 acre which is 3.5 km away towards north from the Madhupur Upazila road. The proposed site is located at the coordinate of N24°37′43′′ and E90°03′39′′. The site is adjacent to Mymensingh-Tangail-Jamalpur high-way.

The Madhupur Silo sub Project located in Madhupur Upazila, at about 3.5 km from the Upazila HQ, into the north, in Ramkrishnabari Mouza, near Kakraid Bazar. Again, Madhupur Upazila HQ is at about 150 km away into the north from Dhaka City and 50 km away from the Tangail District HQ. Madhupur is bounded by Jamalpur Sadar Upazila in the north, Gopalpur and Ghatail Upazilas in the south, Muktagachha and Fulbaria Upazilas in the east and Sarishabari and Gopalpur Upazilas in the west. Its coordinate is at 24°37’00”N90°01’30”E (24.6167°N 90.0250°E). The total area of the Upazila or Sub District is 500 sq km. The population of the District is 375,295 (1991) with density of 750 per sq km. Main rivers are Jhinai, Bangshi, Banar and Atrai. The present Madhupur LSD is situated on the Tangail to Mymensingh Highway, in Madhupur Upazila HQ, connected to road, has 4 godowns in all, out of which one is unworkable and rest are workable having its maximum capacity of 3,250 tons. All the working godowns are fully loaded with rice and have no space at all. Rice comes from the northern districts and distributed locally and sometimes to other LSDs. The mode of transport is truck. The location of proposed Madhupur silo site in Google earth is shown in Figure –3.1.The location map of proposed Madhupur silo site in GIS is shown in Figure –3.2.

The Madhupur BFIDC (Rubber Division) office is at east side of Silo boundary where there is a small mosque for the BFIDC official people. On the western side, there is a primary school and UP office building. All these physical infrastructures (primary school and mosque) are outside the Silo boundary wall. There is no other physical and cultural resources near the silo campus.

Figure-3.1: Location Map of Madhupur Silo Site in Google earth

Figure 3.1: Location Map of Madhupur Silo Site in Google earth

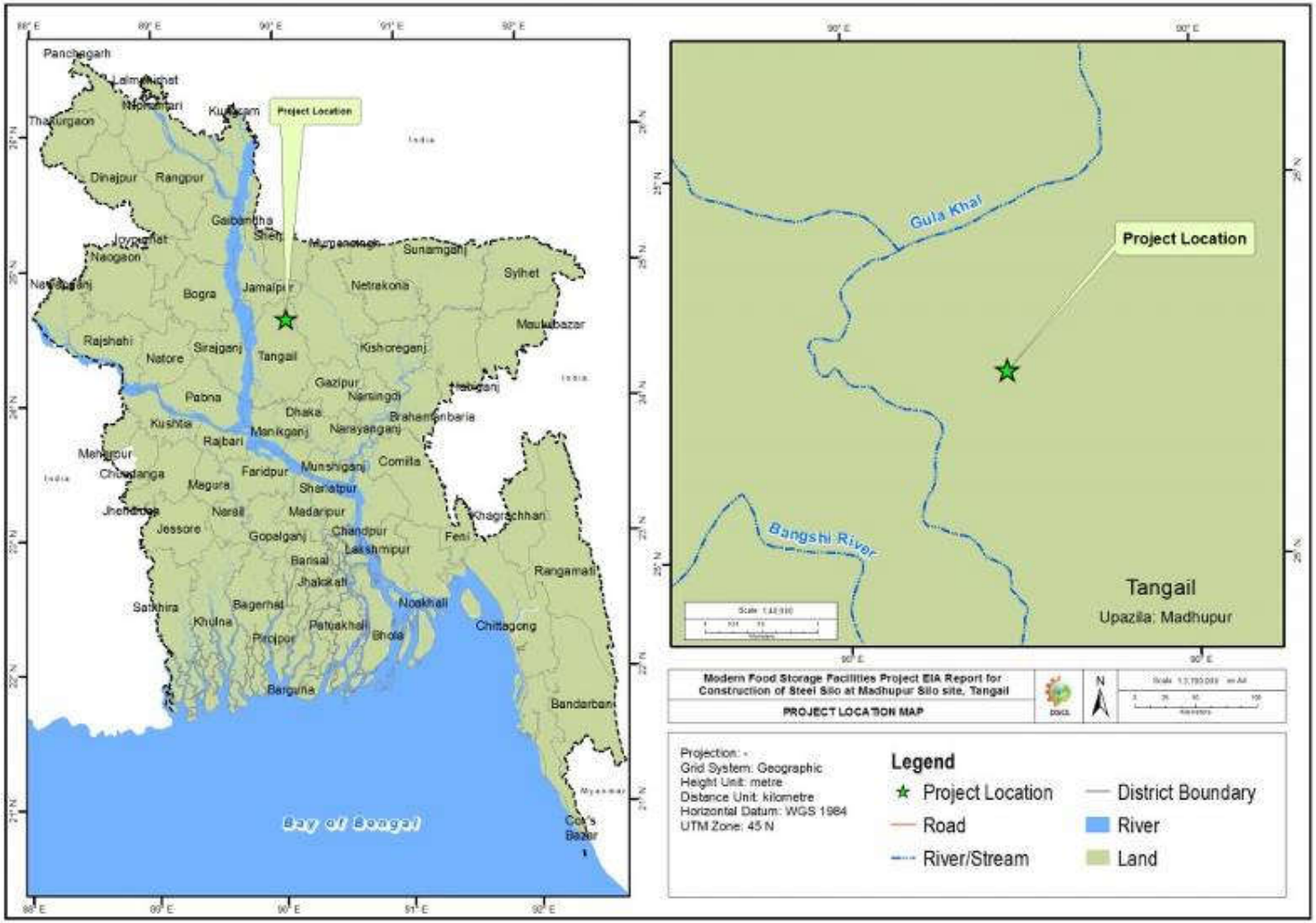


Figure 3.2: Location Map of Madhupur Silo Site in GIS

3.2. Description of Project Works

Total project works has been considered in two phases. In the first phase, the sub-project preparation works like; the boundary wall, site development by earth filling, office building etc. has been done. In the second phase; main construction works like 16 nos. flat bottom prefabricated steel silo bins and silo related ancillary works as well as interventions will be constructed/ installed. Design and estimates of the silo bins and ancillary works has been completed and awaiting for the engagement of contractors of the construction works. A preliminary layout plan is given in Figure 3.3.The following interventions will be constructed under Madhupur sub-project:

1. Gate
2. Guardroomandgate4.4m x6m.
3. Truck scale
4. Sampling house
5. Laboratoryhouse+weightcontrol15.6x6m.
6. Truck parking
7. Bulktruckreceiving26x16m.
8. Control room 9x10m.
9. Bulkelevatortower8.9x6m.
10. 16steelsilo bins
11. Surges bin tower
12. Bulkhouse12x15m.
13. Bagginghouse30x18m.
14. Emptygunnybaggodown7.5x24m.
15. Workshopcumstore12.6x15.4m.
16. Substation17x10m.
17. Inspection bungalow
18. Silo office
19. Car parking
20. Public toilet for drivers and other 4.8x7.8m.
21. Canteen
22. Fence
23. 4storieddormitoryforsupportstaff
24. 3storiedofficersdormitory
25. Fortifiedricebagsreceiving6x18m.

Figure 3.3: Preliminary Layout Plan of Madhupur Silo Site

3.3. Structures in Existing LSD and Silo Site of Madhupur

The present Madhupur LSD has four godown buildings, out of which one godown is not in good condition and the LSD is running with its maximum capacity of 3,250 tons. All the working godowns are fully loaded with rice. Rice comes from the northern districts and distributed locally. About 2 km from Madhupur LSD to east along Tangail - Mymensingh highway Government khas land has been allotted to DG Food and now this land is unused and open are proposed silo site as shown in the Figure-3.3.

The office of the Bangladesh Forest Industries Development Corporation, BFIDC (Rubber Division) is in the east, and the land at the south side, leased from Government, is used for seed production for Bangladesh Agriculture Development Corporation (BADC), at the west Dhaka-Tangail high-way & at the east Government land are using for producing Rubber garden. There is no other existing structure in the Madhupur silo site (Figure 3.4)

Figure 3.4: Proposed Silo Site (Open Land)

3.4. Construction of Steel Silos

There are sixteen nos. of steel silos will be constructed under this proposed project. Each silos capacity for storage is 3000 MT. There are lot of equipment will be used during silos operation like belt conveyor, bagging station, chain conveyor, chiller etc. The speed control time is 60 t/h. The total capacity of storage will be 48000 MT. A preliminary steel silos design is shown in Figure 3.5.

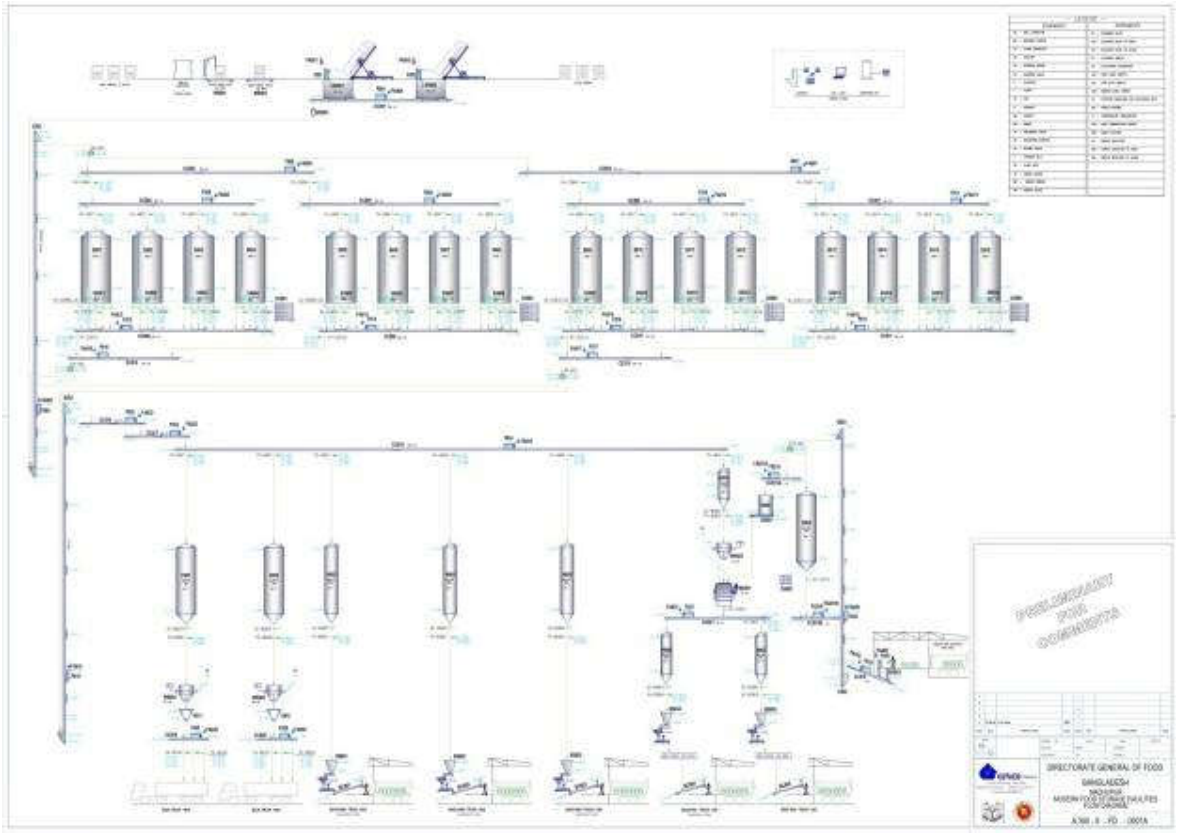


Figure 3.5: Preliminary design of steel silos

3.5. Implementation Schedule

Sl. no.	Activities	Year-1 (months)			Year-2		
		1-4	5-8	9-12	1-4	5-8	9-12
1	Design, drawing, bid documents tendering, contractor selection etc.						
2	Foundation works for silos and ancillary works						
3	Superstructures and all other ancillary works						
4	Post operation testing and commissioning						

4. DESCRIPTION OF THE ENVIRONMENT

4.1 Physical Environment

4.1.1 Climate

Although less than half of Bangladesh lies within the tropics, the presence of the Himalaya mountain range has created a tropical macroclimate across most of the east Bengal land mass. Bangladesh can be divided into seven climatic zones (Rashid 1991). According to the classification, the project area is located in the South-central climatic zone (Figure 4.1).

South-Central Zone:In this zone rainfall is abundant, being above 1,900 mm. The range of temperature is, as can be expected, much less than to the west, but somewhat more than in South-eastern zone. This is a transitory zone between the South-eastern, North-western and South-western zones and most of the severe hail storms, nor'westers and tornadoes are recorded in this area.

Like other parts of the country, the project area is heavily influenced by the Asiatic monsoon, and it has these three distinct seasons:

- ✓ Pre-monsoon hot season (from March to May),
- ✓ Rainy monsoon season (from June to October), and
- ✓ Cool dry winter season (from November to February).

The pre-monsoon hot season is characterized by high temperatures and thunderstorms. April is the hottest month in the country with mean temperatures ranging from 27°C in the east and south, to 31°C in the west-central part of the country. After April, increasing cloud-cover reduces the temperature. Wind direction is variable during this season, especially during the early part. Rainfall, mostly caused by thunderstorms, at this time can account for 10 to 25 percent of the annual total.

The rainy monsoon season is characterized by southerly or south-westerly winds, very high humidity, heavy rainfall and long periods of consecutive days of rainfall. The monsoon rain is caused by a tropical depression that enters the country from the Bay of Bengal. About 80% of the annual precipitation occurs during the five-month monsoon season from May to September.

The cool dry season is characterized by low temperatures, cool air blowing from the west or northwest, clear skies and meager rainfall. The average temperature in January varies from 17°C in the northwest and north-eastern parts of the country to 20°C to 21°C in the coastal areas. Minimum temperatures in the extreme northwest in late December and early January reach between 3°C to 4°C.

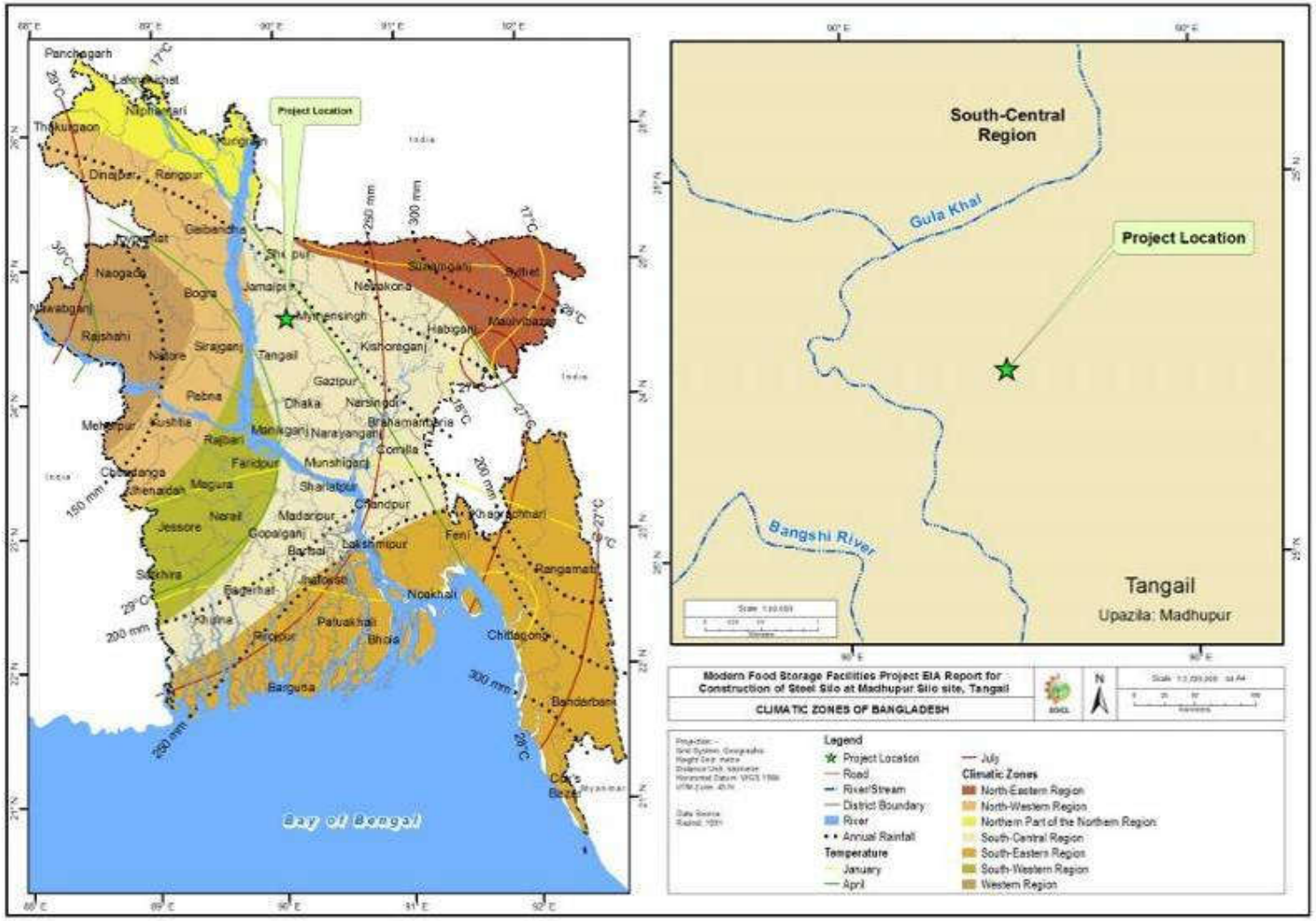
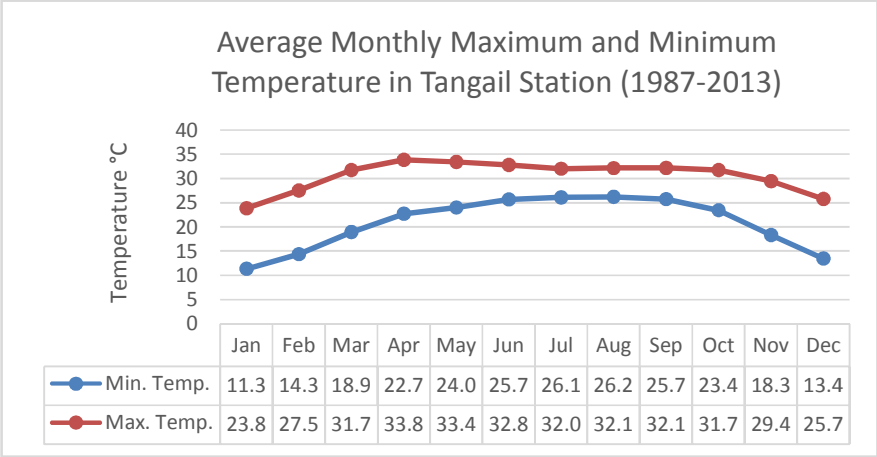


Figure 4.1: Climatic Zones of Bangladesh

4.1.1.1. Temperature

Long-term average monthly temperature data (1987-2013) collected at Tangail weather station of Bangladesh Meteorological Department. The highest average recorded temperature in this weather station was 33.8°C in April. The lowest average recorded temperature was found in the month of January which was 11.3°C. Both of the average monthly temperature graphs show that this area faces high temperature from March to June and lowest temperature during winter remains from December to February in the year.

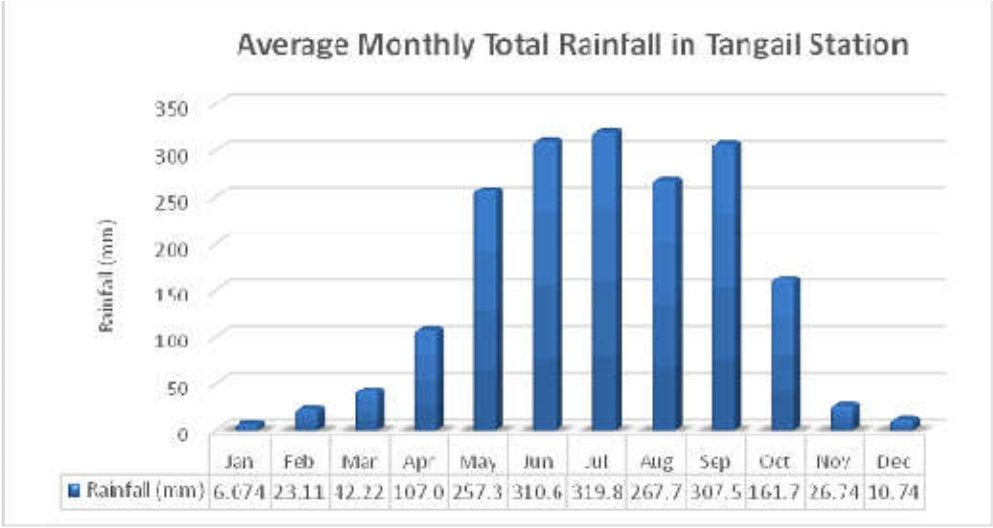


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min. Temp.	11.3	14.3	18.9	22.7	24.0	25.7	26.1	26.2	25.7	23.4	18.3	13.4
Max. Temp.	23.8	27.5	31.7	33.8	33.4	32.8	32.0	32.1	32.1	31.7	29.4	25.7

Figure 4.2: Average Monthly Maximum & Minimum Temperature

4.1.1.2. Rainfall

The rainfall data collected from Tangail Meteorological station represents that maximum rainfall occurs during June to September and the lowest rainfall occurs in November to February during winter season. Statistical data of 1987 to 2013 shows that Tangail station experiences almost 320 mm rainfall during monsoon. In the month of December and January of winter season around 10 mm rainfall occurred in the region of Tangail weather station.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	6.674	23.11	42.22	107.0	257.3	310.6	319.8	267.7	307.5	161.7	26.74	10.74

Figure 4.3: Average Monthly Total Rainfall in Tangail Station

4.1.1.3. Humidity

Humidity remains high in summer and comparatively low in winter season. The statistical data of humidity from 1987 to 2013 indicates that humidity in the above area maximized in June to September in the year which ranges from 83% to 85%. On the other hand, humidity falls around 70% in February, March and April during the winter season in the Tangail station area (Figure 4.4).

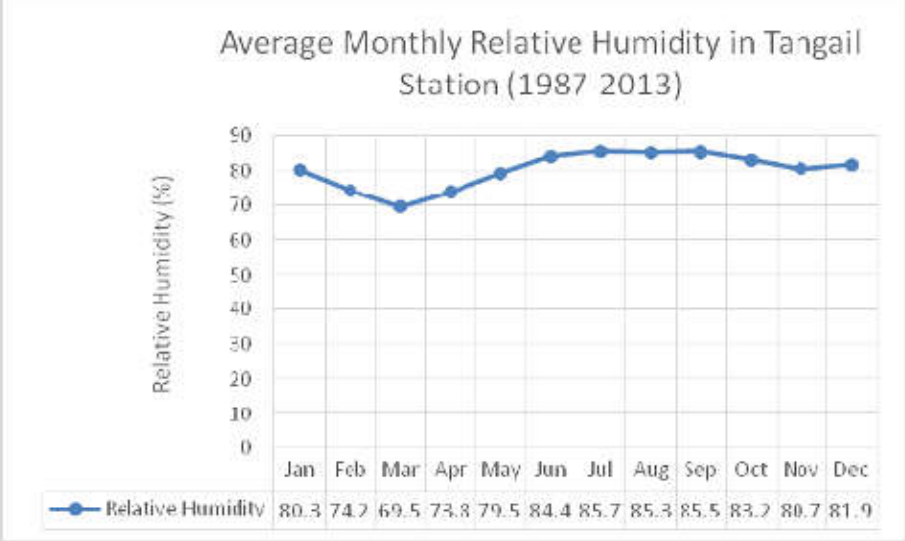


Figure 4.4: Average Monthly Relative Humidity in Tangail Station

4.1.1.4. Wind Speed

The statistical wind speed data from 1987 to 2013 (Figure 4.5) shows that average wind speed remained maximum with 1.85 mps in June. The minimum wind speed was 0.68mps in the month of December in the area of Tangail weather station.

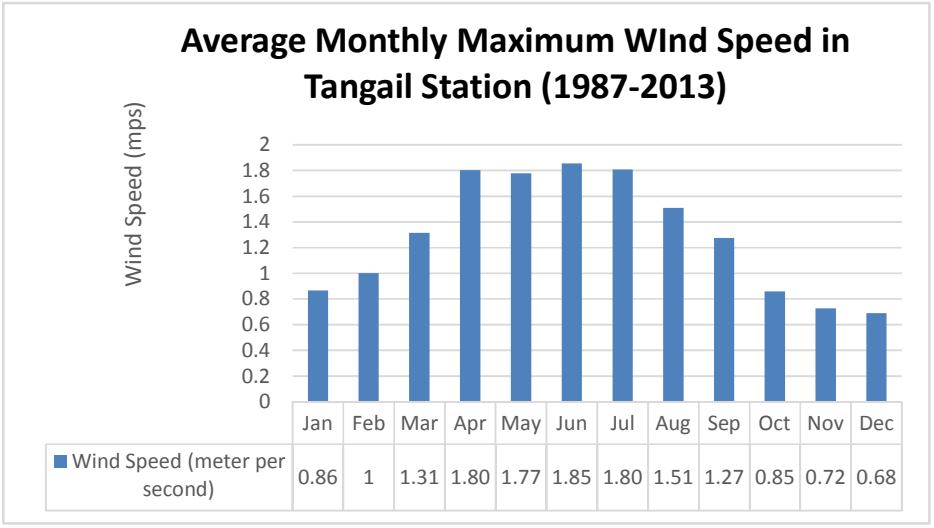


Figure 4.5: Average Monthly Maximum Wind Speed in Tangail Station

4.1.1.5. Sunshine

The statistical sunshine data from 1987 to 2013 (Figure 4.6) shows that average sunshine remained maximum with 7.7 hours in March. The minimum sunshine was 4.13 hours in the month of July in the area of Tangail weather station. Once a crop is harvested, it may have to be stored for a period of time before it can be marketed or used as feed. The length of time crop can be safely stored will depend on the condition it was harvested and the type of storage facility being utilized. The sunshine is very much required for crop drying. Lower moisture content and lower temperature can be kept food in storage for longer periods of time. This impact is related with the operation of silos.

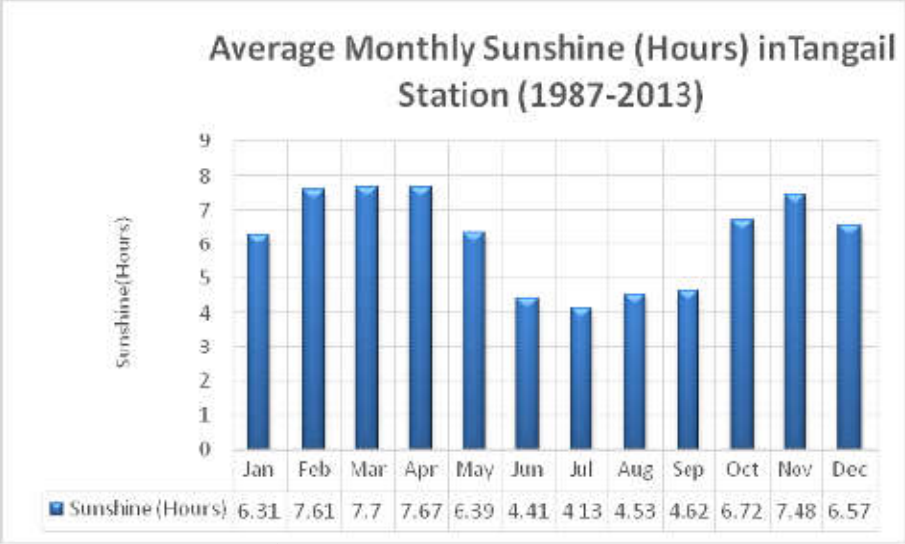


Figure 4.6: Average Monthly Sunshine in Tangail Station

4.1.1.6. Cloud Coverage

The statistical cloud coverage data from 1987 to 2013 (Figure 4.7) shows that average cloud coverage remained maximum from 5 octas to 6octas during June to August. The minimum cloud coverage was 1.04octas in the month of December in the area of Tangail weather station.

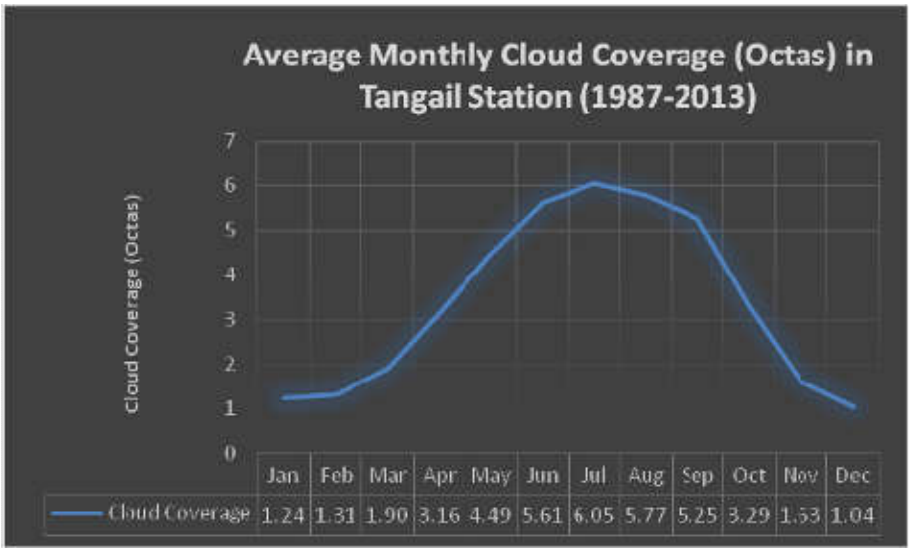


Figure 4.7: Average Monthly Cloud Coverage in Tangail Station

4.1.2 Noise Level

Excessive noise is a potential issue for both human and biological receivers and can potentially cause a range of negative issues, from mild annoyance and moderately elevated levels of aggression to significant disturbance of behavioral patterns and in severe cases temporary or permanent hearing loss. According to World Health Organization's Guidelines for Community Noise (1999), daily sound pressure levels of 50 decibels (dB) or above can create discomfort amongst humans, while ongoing exposure to sound pressure levels over 85 dB is usually considered the critical level for temporary hearing damage.

Results of the noise level monitored along with details of the sampling locations have been showed in Table 4.1. The results show that time weighted average value of the sound monitored at inside and outside of the project area did not exceed the standard fixed for the respective areas.

Figure 4.8: Noise Level Monitoring in the Project Area

Table 4.1: Noise Level at Different Locations of Project Area (11 October 2016)

ID	Sampling Location	GPS Location	Zone*	Noise Level Day dB (A)	Bangladesh Standard at Day dB (A)**	Remarks
NM-01	Project Site (East)	24.62982°N 90.06440°E	Commercial Area	49.30	70	Good
NM-02	Project Site (South)	24.62925°N 90.06445°E	Commercial Area	46.22	70	Good
NM-03	Project Site (Centre)	24.62892°N 90.06396°E	Commercial Area	46.68	70	Good
NM-04	Project Site (South-West)	24.62842°N 90.06284°E	Commercial Area	48.14	70	Good
NM-05	Project Site (North)	24.62910°N 90.06312°E	Commercial Area	47.01	70	Good

Note:
** According to Environmental Quality Standard 1997 and subsequent amendment in 2006.*
*** Bangladesh Standard for Noise Level at different types of areas (as per Noise Pollution (Control) Rules, 2006).*
The sound level standards for residential area are 55 dBA, for silent area 50 dBA and for commercial area 70 dBA at day time. The sound level standards for residential area are 45 dBA, for silent area 40 dBA and for commercial area 60 dBA at night time.
Abbreviation:
NM- Noise Measurement, dB- decibel

4.1.3 Physiography

In the context of physiography, Bangladesh can be divided into three broad categories based on topography, physical features, and geological history (Brammer, 1996):

1. Floodplains
2. Terraces
3. Hills

Within these 3 broad categories, a number of authors have further divided the land surface into a series of Physiographic Units based on a combination of topographical/landscape features, underlying geology and surface soils (Brammer, 1996, Rashid, 1991, Morgan and McIntyre, 1959). The most recent study was undertaken by the Soil Resource Development Institute (SRDI) who further refined the previous classifications into 26 Physiographic Units (20 primary units and 6 sub-units) based on an assessment of more recent and detailed data (SRDI, 1997).

The project area falls in the Madhupur Tract physiographic unit (Figure 4.9)

Madhupur Tract Another Pleistocene upland block in the Bengal Basin is located in the central part of Bangladesh comprising greater Dhaka and Mymensingh districts, between the courses of the Old Brahmaputra and the Jamuna rivers. Towards the south, this physiographic sub-region extends to as far as Dhaka, the capital of the country. Madhupur Tract measures about 4,105 sq km. Comparable to the Barind Tract, the area belongs to a Pleistocene terrace consisting mainly of red coloured and mottled clays. It is characterised by plateau-like hillocks varying in height from 9 to 18.5m, and a dendritic drainage pattern, typical of all Pleistocene terraces in Bangladesh. The valleys, mostly flat, are cultivated. The Madhupur jungle contains Shal trees (Shorearobusta), the hardwood which is second to teak in value.

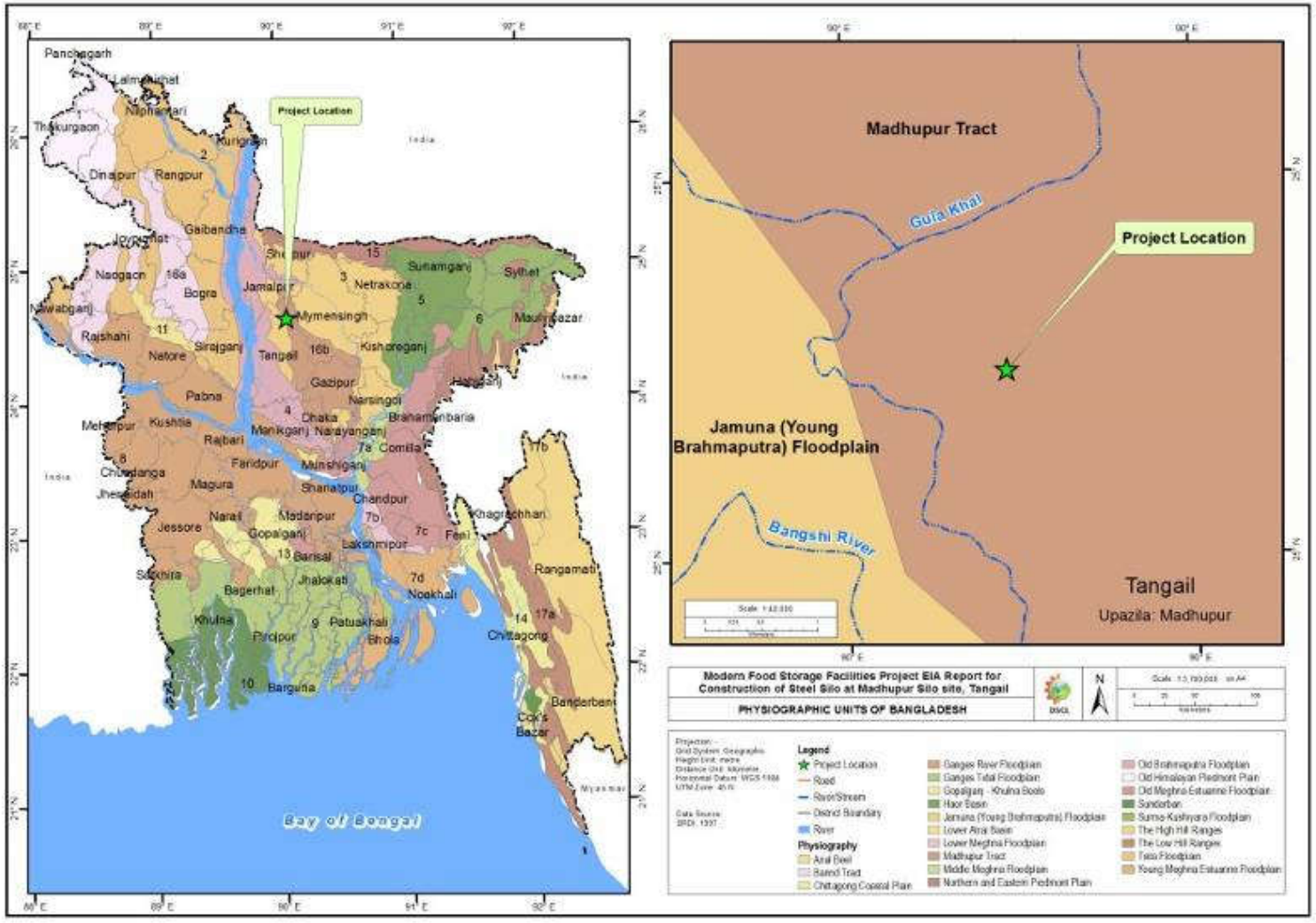


Figure 4.9: Physiographic Units of project area

4.1.4 Topography

Topography configuration of a land surface including its relief and contours, the distribution of mountains and valleys, the patterns of rivers, and all other features, natural and artificial, that produce the landscape. Although Bangladesh is a small country, it has considerable topographic diversity. It has three distinctive features: (i) a broad alluvial plain subject to frequent flooding, (ii) a slightly elevated relatively older plain, and (iii) a small hill region drained by flashy rivers. On the south, a highly irregular deltaic coastline of about 600 km featured by many estuarine rivers and channels flowing into the Bay of Bengal. The alluvial plain is part of the larger plain of Bengal, which is sometimes called the Lower Gangetic Plain. Elevations of the plains are less than 10m above the sea level; elevation furthers decline to a near sea level in the coastal south.

The general topography of the project area is relatively flat. The topography of the specific project location is 10.85 – 14.94 m a.m.s.l (Figure 4.10).

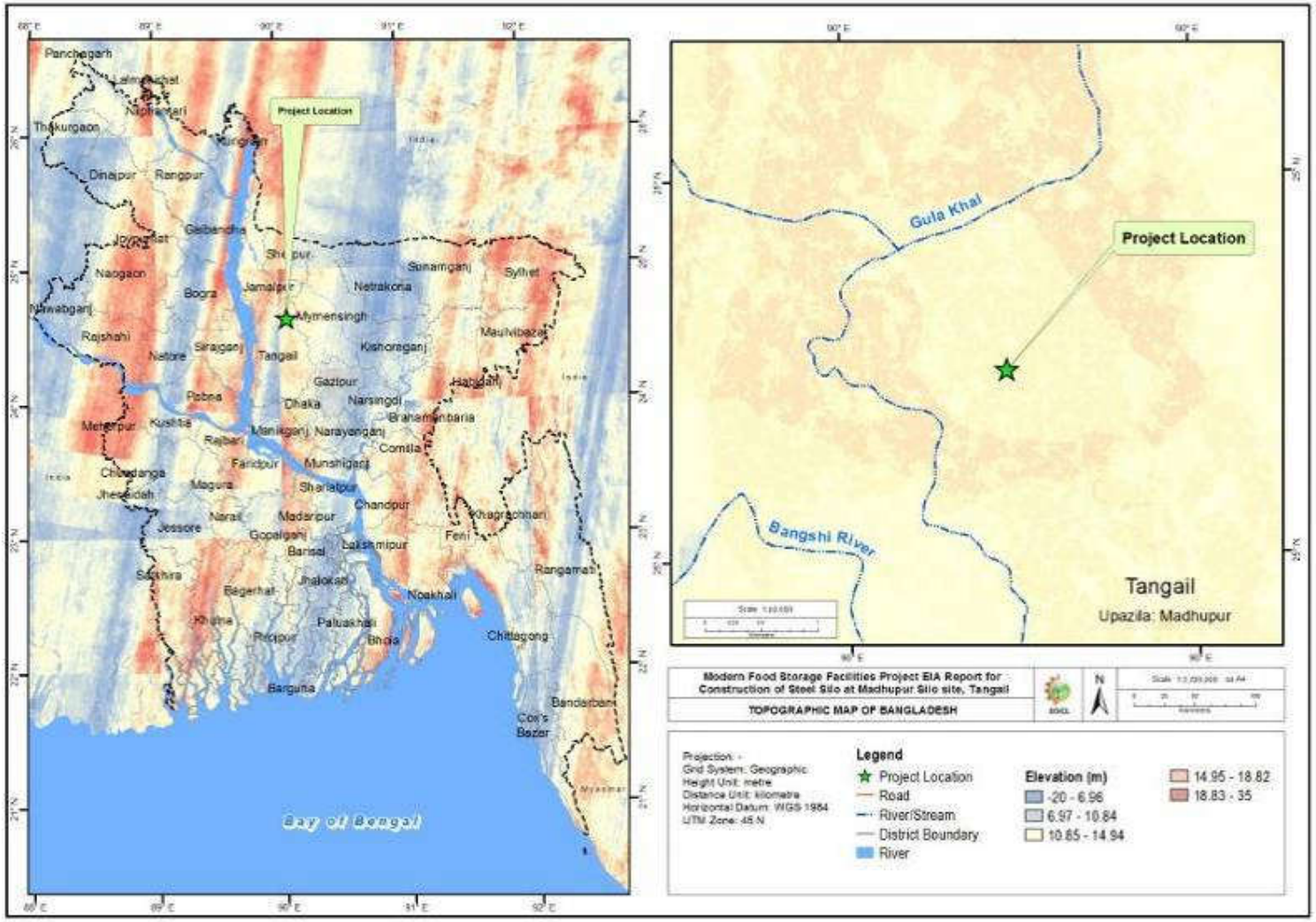


Figure 4.10: Topographic Map of project area

4.1.5 Geology

Bangladesh is situated to the east of the Indian sub-continental plate. Nearly 85% of Bangladesh is underlain by deltaic and alluvial deposits of the Ganges, Brahmaputra, and Meghna river systems. The Hinge Zone is a narrow strip of about 25 km wide complex flexure zone, which separates the Bengal Fore deep from the shelf zone. It trends approximately N 30' E along the Calcutta-Pabna-Mymensingh gravity high and extends upto the western tip of Dauki fault. This zone is characterized by the sharp change in the dip of the basement rocks associated with deep-seated displacements in faults and is reflected on the gravity and magnetic anomalies. The Eocene limestone dips at about 20 in this zone as compared to 2-3 in the shelf zone. The seismic interpretation shows that the depth of the Sylhet Limestone - a strong seismic reflector - increases from 4000m to 9000m within a narrow zone of 25-km. During the subsurface interpretation of the south-eastern part of the West Bengal in India, a zone of flexure in the top of the Sylhet limestone was recognized which is the extension of the Hinge Zone in India.

Hinge Zone is connected with Bengal Fore deep by deep basement faults that probably started with the breakup of Gondwanaland. Since then they have been repeatedly reactivated. In the northeast of Bangladesh the Hinge Zone turns to the east and seems to be connected with the Dauki Fault, probably by a series of east-west trending faults. [ASM Woobaidullah]

Bengal Fore deep occupies the vast area between Hinge Line and ArakanYoma Folded System and plays the most important role in the tectonic history of Bengal Basin. Tectonically, Bengal Fore deep can be divided into two major regions- (a) Western Platform Flank and (b) Eastern Folded Flank. The Western Platform flank is further subdivided into (a) Faridpur Trough (b) Barisal-Chandpur High (c) Hatiya Trough (d) Madhupur High and (e) Sylhet Trough.

Faridpur Trough situated adjacent to Hinge Zone is characterized by a general gravity low with development of Neogene sequence. Sylhet Limestone is 6500 m deep in area south of the confluence of the Padma and the Jamuna. Chalna and Bagerhat are the notable structural highs of very low amplitude.

The generalized geological feature of the project area is shown in the geological map of Bangladesh (Figures 4.11).

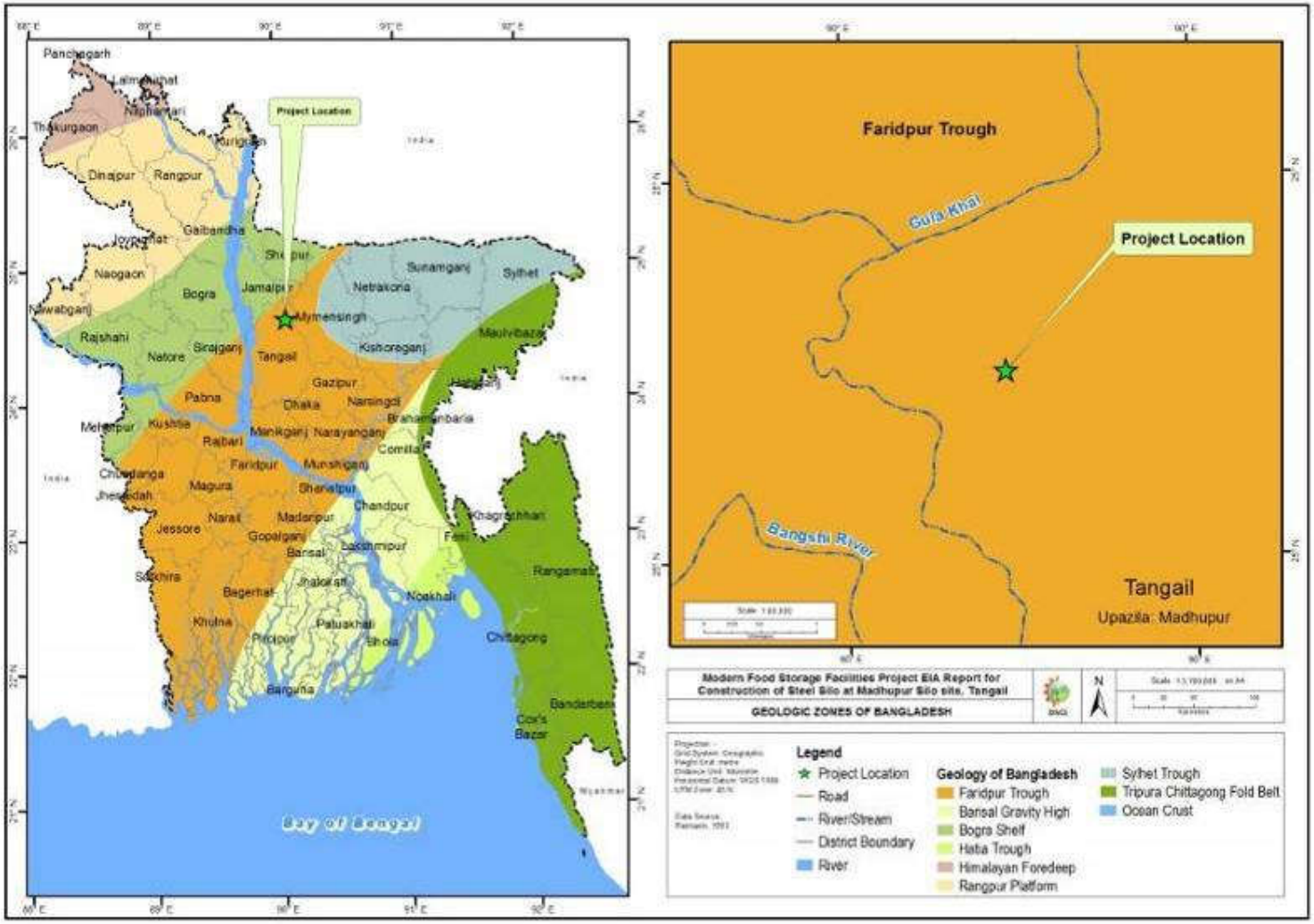


Figure 4.11: Geology of project area

4.1.6 Air quality

There is no official record of secondary air quality data due to non-availability of a regular air quality monitoring program for ambient conditions or emissions. The present condition of the air quality is presented in the following Table 4.2 (Source ESAMF of MFSP). From the test results, it is found that SPM, CO, SOx and NOx of the ambient air in the sampling points are within the atmospheric environmental standards for the industrial and mixed.

Table 4.2: Air Quality Monitoring Data

Date dd/mm/yy	Sampling point	Duration	SPM µg/m^3	CO µg/m^3	SOx µg/m^3	NOx µg/m^3
21/12/12	North end	8 hours	220	390	30	32
21/12/12	South end	8 hours	210	410	28	30
Bangladesh Standard for Industrial and Mixed			**500**	**5000**	**120**	**100**

Source: Environmental Screening Report, Madhupur, April 2015

4.1.7 Water Resources

Bangladesh is located over a subsiding basin of tectonic origin overlain with a great thickness of sedimentary strata. This sedimentary stratum is an unconsolidated alluvial deposit of recent age overlaying marine sediments. The recent delta and alluvial plains of the Ganges, Brahmaputra and the Meghna Rivers constitute the upper formation. The near surface Quaternary alluvium contains good aquifer characteristics (transmission and storage coefficients). The groundwater (GW) storage reservoir has three divisions: upper clay and silt layer, a middle composite aquifer (fine to very fine sand) and a main aquifer consisting of medium to coarse sand. Drinking water is generally taken from deep tube wells with strainers set between depths of 200 meters to around 400 meters (DPHE, 2011). The Ground water level is at or very close to the surface during the monsoon; whereas, it is at maximum depth during the months of April and May (Banglapedia, 2014). There are no remarkable surface water resources in the project site. One khal named Gula and Bangshi River is far away from the proposed site. During dry season Gulakhal is almost dry carrying low water level.

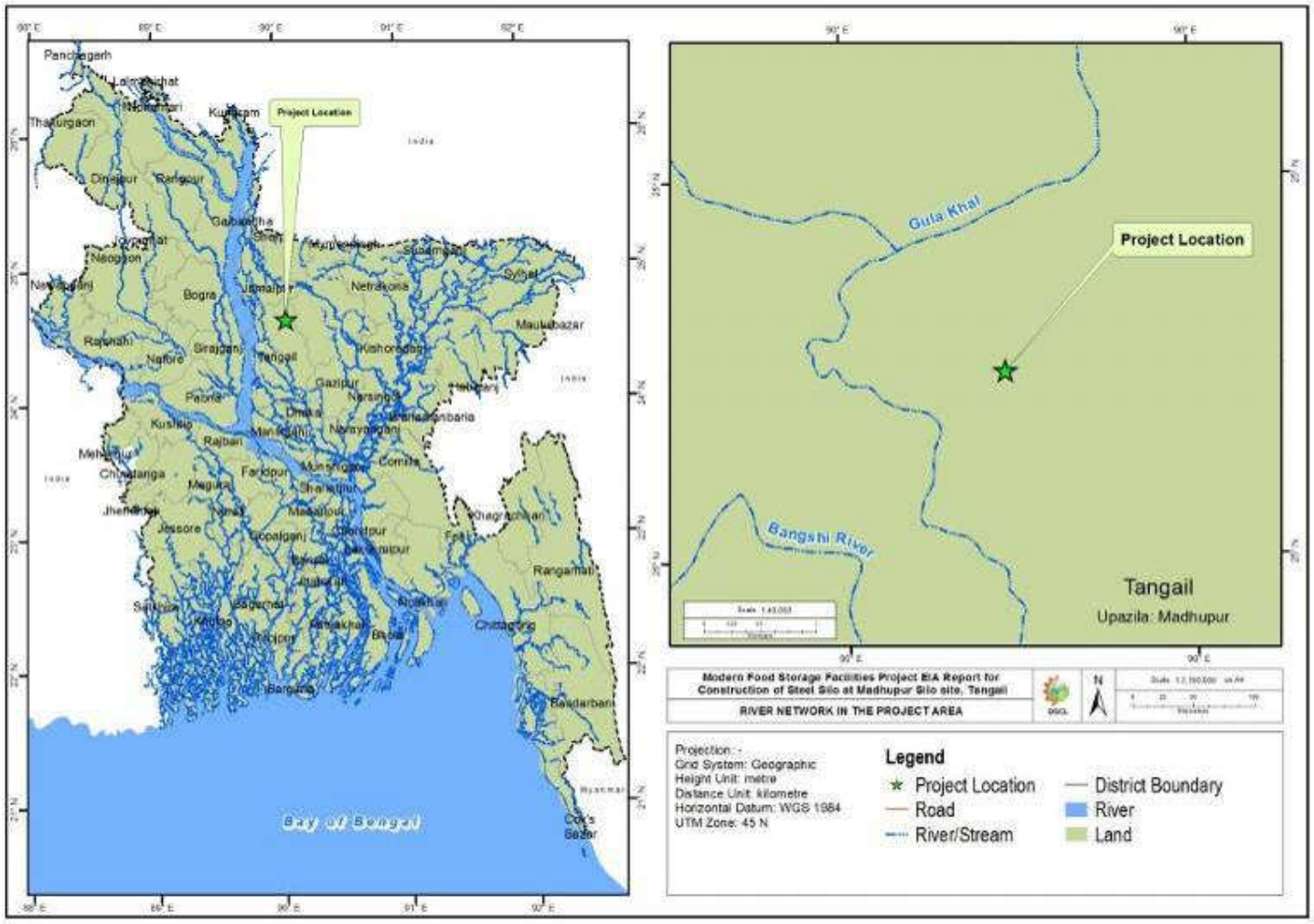


Figure 4.12: Water Bodies and River Network Map

4.1.7.1 Ground Water

Though, arsenic is a problem in large part of Bangladesh ground water. The project area has no Arsenic problem in ground water. During consultation meeting with the local people, no arsenic affected person was identified. Arsenic contained in the soil as soluble form, it may contaminant any time in the ground water. That's why the consultant addressed arsenic for this project. The acceptable quantity of arsenic in potable water is 0.05 mg per liter under the Department of Environment standard and 0.01 mg per liter under the WHO standards. Figure 4.13 shows the water sample collection of ground water from an installed deep tube well about 120 ft' in the project area. Figure 4.14 shows (the map showing the arsenic contaminated areas throughout) that the Arsenic contamination is there in the project area.

On 11thOctober 2016, groundwater sample was collected by environmental team from a tube well depth about 120 ft near the project area. The Department of Public Health Engineering (DPHE) analyzed the sample. From the result it is found that all the quality parameters were well within the Bangladesh ground water quality standard set by Department of Environment. (The ground water quality result is attached in Appendix D).No surface water was found nearby to the project site and surface water quality test was not done. The result of the groundwater sample and the GoB standards for drinking water (ECR, 1997) are shown in Table 4.3.

Figure 4.13: Water Sampling and On-site Testing in the Project Location

Table 4.3: Results for Groundwater Sample

Parameter	Unit	Test value of the sample collected dated on December, 2012	Test value of the sample collected dated on 11 October, 2016	Bangladesh Standard	Remark
Temperature	°C	21.1	28.6	20-30	Ok
Turbidity	NTU	3.5	1.2	10	Ok
Color	TCU	3.8	1.0	15	Ok
pH	--	6.8	6.7	6.5-8.5	Ok
TDS	mg/l	820	30	<1000	Ok
DO	mg/l	7.5	6.34	>6	Ok
BOD	mg/l	1.8	<LOQ	0.2	Ok
Fe	mg/l	0.1	0.12	0.3-1	Ok
Zn	mg/l	0.2	<LOQ	5	Ok
Al	mg/l	Nil	<LOQ	0.2	Ok

Source: On site test, Lab Analysis by DPHE and Environmental Screening Report, Madhupur, April 2015

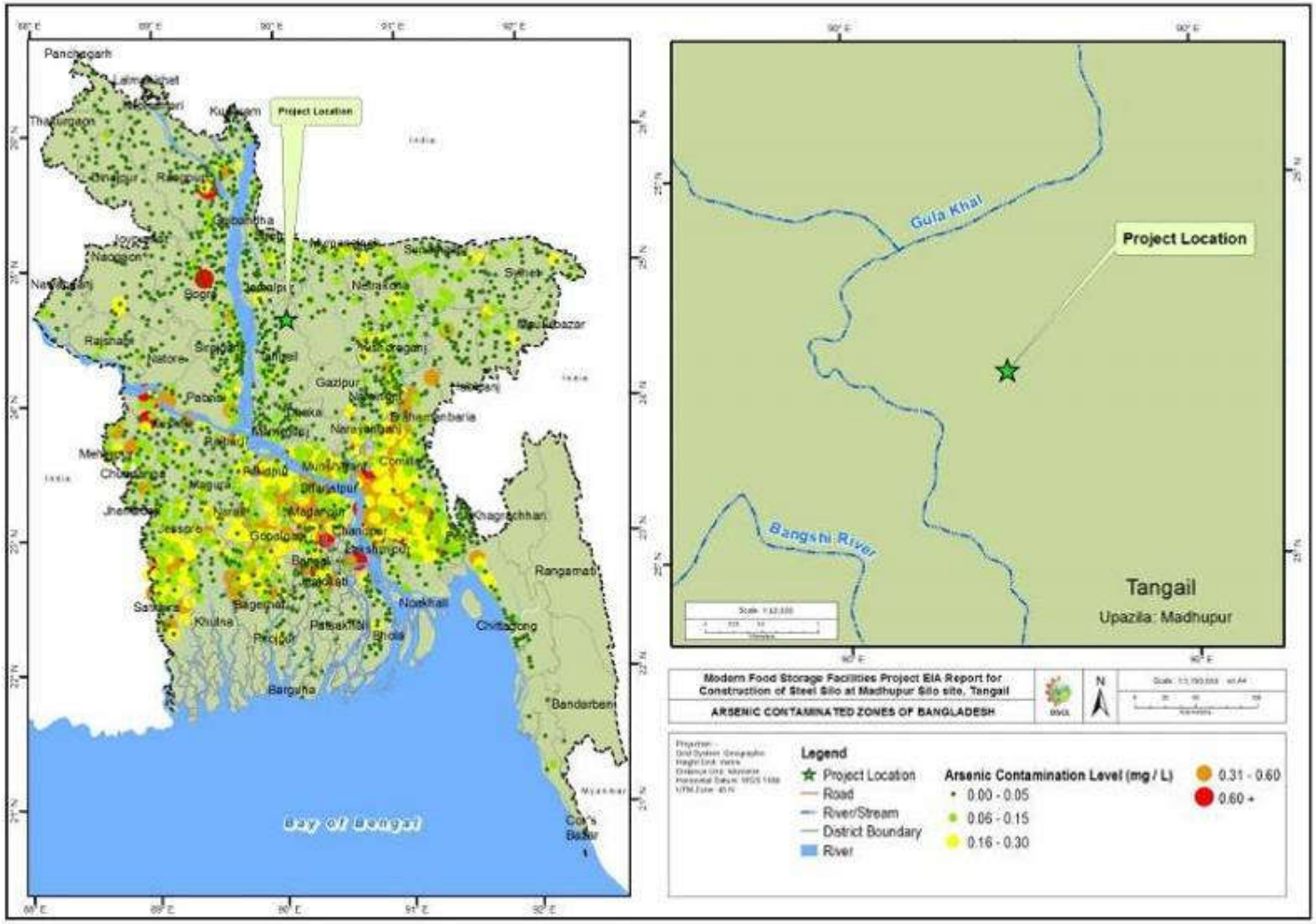


Figure 4.14: Arsenic Contaminated Zones of Bangladesh

4.1.8 Soil Quality

The soil of the project area is yet not classified and does not fall any of the category of Bangladesh soil types. However, there are two categories of soil near the project location which includes the following (Figure 4.15)

Non-calcareous Alluvium Similar to calcareous alluvium, except they are non-calcareous in soil profiles. These soils occupy extensive areas on the active Teesta and Brahmaputra-Jamuna floodplains. They are sandy or silty, grey or olive, neutral to slightly alkaline. Most of these soils have been included as EutricFluvisols.

From the field and laboratory test results of soil it can be found that the sub-soil formation encountered at the proposed site is homogeneous. The sequence of lithological composition as well as consistency of the soil at different depths has been depicted in the bore logs.

However; we enclosed the allowable bearing capacity of soil at different depth and length. Considering the magnitude of the structure, the structural designer selects the suitable type of foundation. The details of the soil investigations results are given in the sub-soil investigations report at Kakraid, Madhupur, Tangail prepared by GERICO, France.

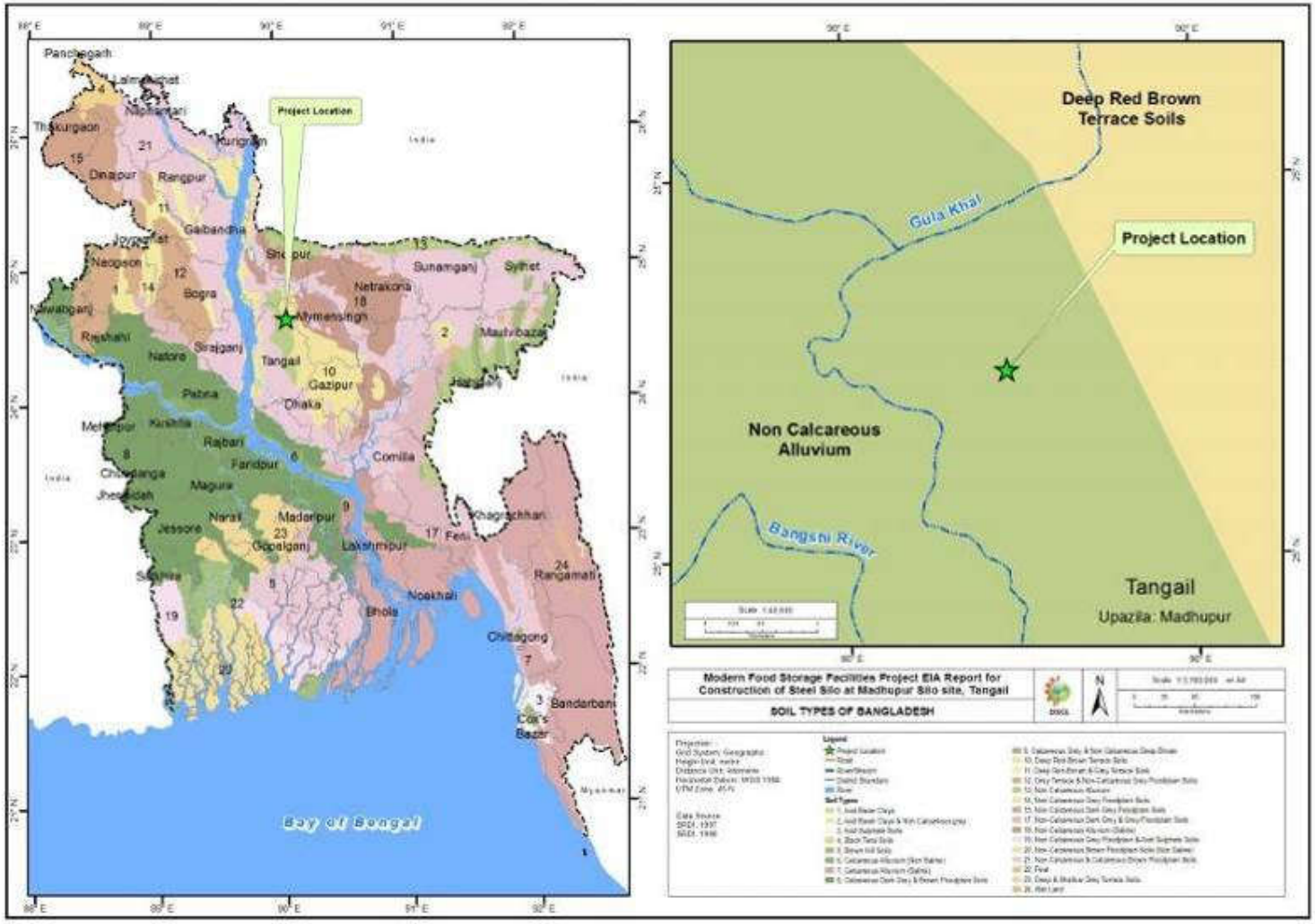


Figure 4.15: Soil Types of project area

4.1.9 Agro-Ecological Zones within the Project Area

A 1988 study carried out by the United Nations Development Program (UNDP) classified Bangladesh into a series of Agro-ecological Zones (AEZs) based on an assessment of commonalities in characteristics such as physiography, soil types, climate and drainage. In total, 34 regions were identified and characterized, however this information has been updated and further refined on numerous occasions since the original study was undertaken.

The purpose of assessing the AEZs within the project area is to establish a broad overview of expected soil conditions which can be compared against more detailed, Upazila-level data sources.

The most recent assessment was completed by the Soil Resource Development Institute (SRDI, 1998) which classified Bangladesh into 30 AEZs. The project area contains the below AEZs (refer Figure 4.16), namely:

Madhupur Tract (28) (4,244 sq km) this is a region of complex relief and soils developed over the Madhupur Clay. The landscape comprises level upland, closely or broadly dissected terraces associated with either shallow or broad, deep valleys. Eleven general soil types exist in the area of which deep red brown terrace, shallow red brown terrace soils and acid basin clays are the major ones. Soils in the valleys are dark grey heavy clays. They are strongly acidic in reaction with low status of organic matter, low moisture holding capacity and low fertility level.

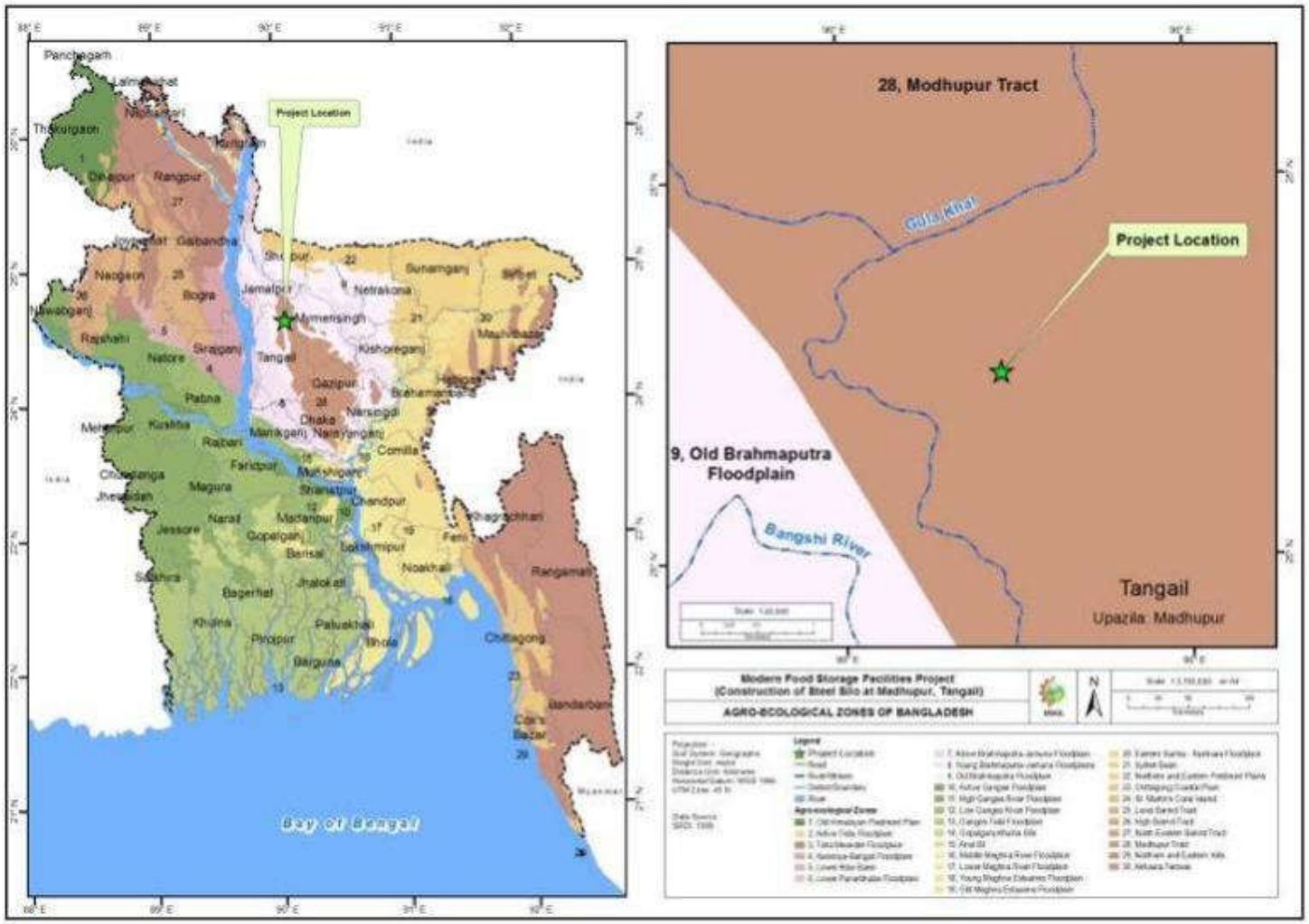


Figure 4.16: Agro-Ecological Zones of project area

4.1.10 Seismicity

Bangladesh is situated in one of the most tectonically active regions in the world, where three major plates meet (the Indian Plate, the Tibet Sub-Plate, and the Burmese Sub-Plate). The project area is located over the Indian Plate, which is moving north. However due to the location of relevant plates, fault lines and hinge zones, Bangladesh itself is divided into three seismic zones (Table 4.4), based on the ranges of the seismic coefficient (*note: the seismic coefficient is a measure of how strong an earthquake has the potential to be based on a combination of the mass of the plate and the seismic forces acting on it, as well as how frequently these quakes are likely to occur*). As per the seismic zone map (Figure 4.17), project area falls in the zone II. It means the project area is prone to medium seismic intensity. The Zone-II seismic coefficient has been considered during the design works though there is no evidence of major earthquakes in the project areas in the recent past.

Table 4.4: Seismic Zone of Bangladesh

Zoning	Area Marcella Scale	Bask Seismic Coefficient
I	North and eastern regions of Bangladesh (Seismically most active)	0.08
II	Lalmai, Barind, Madhupur Tracts, Dhaka, Comilla, Noakhali and western part of Chittagong Folded belt.	0.05
III	Khulna division S-E Bangladesh (Seismically relatively quiet)	0.04

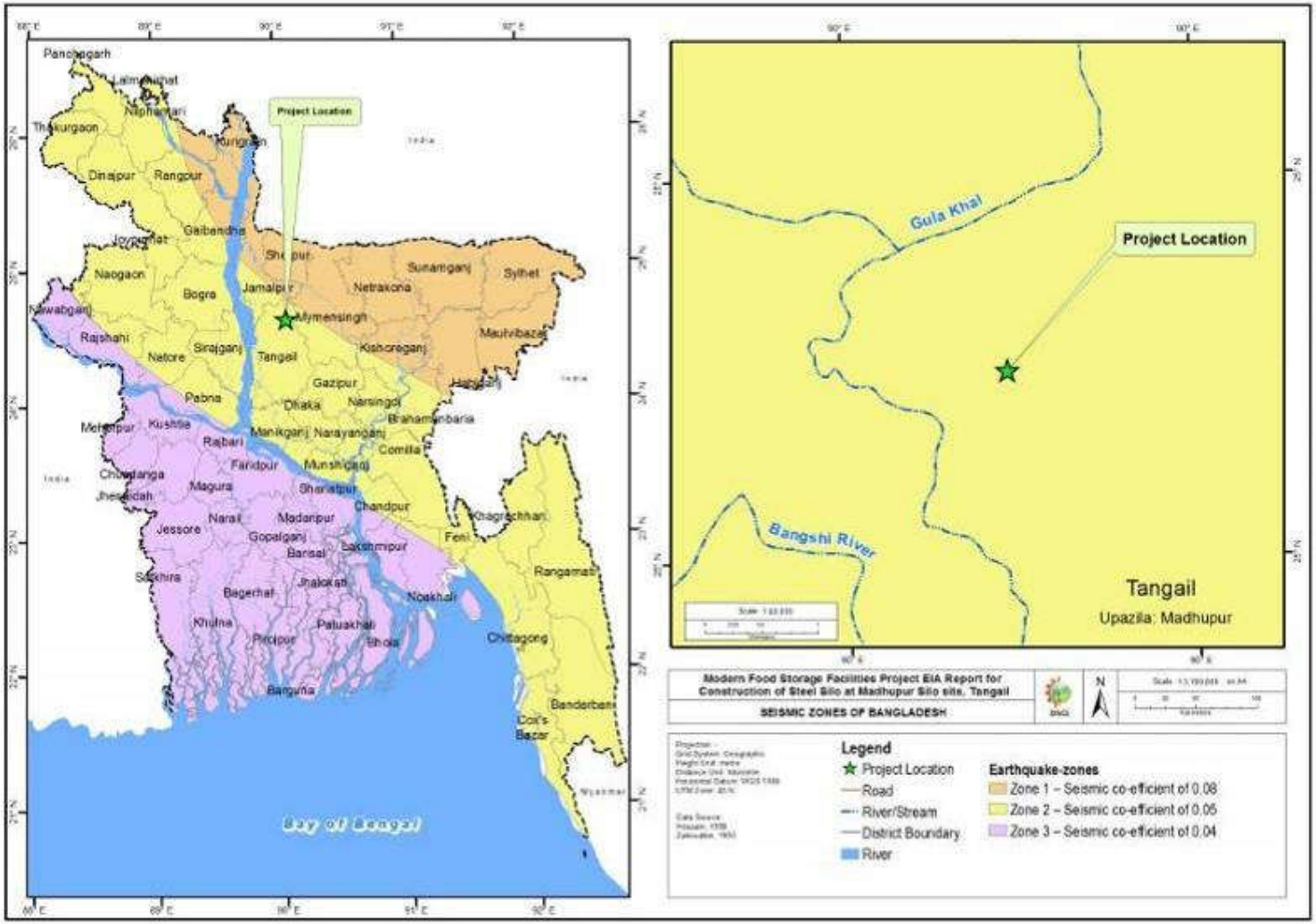


Figure 4.17: Seismic Zones of Bangladesh

4.2 Biological Environment

The Madhupur silo site is located in the zone of Manipur-Khasia, Bengal and North Burman provinces within the Indo-Malayan realm (IUCN, 2002).

The floodplains of Bangladesh is the adjacent landscape of Tangail-Madhupur areas. The lands, in the vicinity of Madhupur silo site, are either under cultivation or forest, including the native trees and wet land in some places.

4.2.1 Bio-Ecological Zones

Madhupur Sal Tractextends across the districts of Gazipur, Tangail and Mymensingh. The boundaries between this region and the adjoining regions are generally sharp and well defined. However, they are transitional in the southwest and in parts of the southeast, where floodplain sediments have buried the dissected edges of the Madhupur tract, leaving small hillocks of red soils as 'islets' surrounded by floodplain soils. This zone is enshrined with high floral diversity. However, over 70 per cent of the sal forest area iseither already degraded or encroached. Nonetheless, the important timber species include: the Sal (Shorearobusta), Banyan (Ficusbengalensis), Tamarind(Tamarindusindica), Sadakoroi (Albiziaprocera), Simul (Bombaxceiba), and Ashwath (Ficusreligiosa). The prominent fruit-bearing tree species of this zone are: Mango (Mangiferaindica), Jackfruit (Artocarpusheterophyllus), Litchi (Litchi chinensis), Guava (Psidiumguajava), Lemon (Citrus medica), Grapefruit (C. decumana), Pineapple (Ananassativus), Sharifa (Ananasquamosa), Wood apple (Limonia acidissima), ,and various kinds of palms still grow in abundance in the wild. Records show that the Bengal tiger (PantheraTigris) and One-horned rhinoceros (Rhinoceros unicornis), both of which became extinct from this zone now, had healthy populations in the past. The Bengal monitor (Varanusbengalensis) and other common lizards inhabit in scattered patches of jungle throughout this zone. Among snakes, Madhupur Sal tract is a suitable habitat for cobras. In terms of diversity of bird species, this zone is still relatively rich.

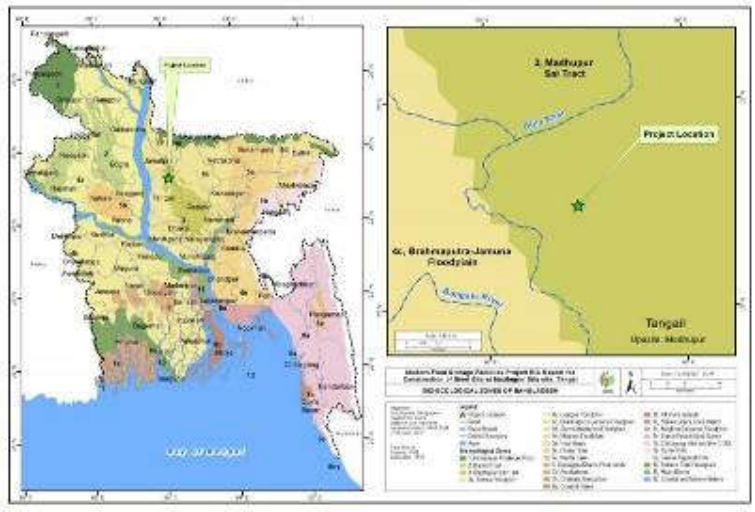


Figure 4.18: Bio-Ecological Zones of Bangladesh

4.2.2 Terrestrial Ecosystem

The status of terrestrial floras and faunas at the project site were assessed from visual observations, review of literature, and information documented by other agencies. The project area consists of several ecological subsystems e.g. open agricultural land, homesteads, and roadside vegetation. The open agriculture land ecosystem dominates the area providing widespread habitat types for various species of flora and fauna under flooded and non-flooded conditions. The vegetation covers of agricultural lands are different crop species, weeds and other herbaceous plants species. The faunal species in the agriculture land and roadside bush ecosystems include birds, amphibians, fishes, snakes rodents and few mammals. The homestead ecosystem provides the main tree covered areas within rural Bangladesh including the project site. The homesteads are covered by fruit, timber, fuel wood, medicinal plants and various multipurpose tree species. The wildlife species in homestead ecosystem include the birds, amphibians, reptiles, rodents and mammals like mongoose, jackal, cats, monkey, etc. Many of the species including mammals are vulnerable or/and endangered in Bangladesh due to habitat loss, over exploitation, natural calamities and lacking of management. The project command area is not the specific habitat for any particular species of flora and fauna hence none such species will be specifically affected due to project implementation.

Figure 4.19: Flora in the Project Area

4.2.2.1. Flora

The project influence area (PIA) is has mixed vegetation. Crops, vegetables are cultivated at the surrounding mainly include rice, wheat, rabi crops and variety of homestead vegetables. A sizeable number of fruit trees with economic value have been observed in the PIA. The fruit trees include jackfruit, mango, litchi, banana, coconut etc. and timber trees include sal, shimul, koroi etc. Considerable number of trees and bushes in the PIA site provide habitat for birds and other animals. The composition of plant community includes low growing grasses, trees, herbs and shrubs. The data collected from the field survey and suggests that the predominant species are those of cultivated vegetables and trees. A detailed list of terrestrial floral species found in the project area is shown in Appendix E.

4.2.2.2. Fauna

The diversified habitat and ecosystem in the project area support various types of animals as given in Appendix F. Primary and secondary mode was adopted for identification of fauna. Most of the birds are identified through direct observation rather than from people. Most of the Amphibians, Reptiles and Mammals were identified by using books and description of the local people during the field survey. The most common amphibians found in the project influence area are Kuno Bang. Cow, Buffalo, Goat, Rat etc. are the common mammals available in the project areas. Fairly available mammals are kathbirali, monkey etc. the most common aves available in the project area are Charui, hen, babui, duck, pecha etc.

4.2.3 Aquatic Ecosystem

Some aquatic plant species exist in the banks of the rivers and khals and in water of ponds khals and rivers. The species commonly found are Shapla (water Lily), Kalmilata, Kochuripana, DholKalmi, Khudipana, Malanchi, Shingara, Keshar dam etc.

As many as 52 species of fish are found in the area. Some indigenous fish species previously common but presently hard to be found in the area; these include Puti, Tengra, Taki, Bele, Drakina, Koi, Singh, Magur, Kakla etc. The species of cultured fish include Ruhit, Katla, Silver carp, Pungas, Mrigel, Grass carp, Telapia, Mirror carp, Big Head etc. Batashi, Rita, Pabda, Swar punti, Chital etc. previously available but hardly be found now.

There have no pond and river is situated in and around the CSD area. No anticipated impact on aquatic species as well as fish species due to the project activities.

4.2.4 Protected Areas & Red Book Species

Many wildlife species are in stress in Bangladesh, many more are endangered/ threatened and a large number already faced extinction. The status of faunal species in Bangladesh has been published by IUCN (2000). According to the IUCN findings this country has lost 10% of its mammalian fauna, 3% avifauna and 4% reptiles over the last 100 years. More than 50 species are presently critically endangered in Bangladesh of which 23 species are already declared as endangered in the Red Data Book of IUCN. In addition, 83 species are commercially threatened and are included in the appendices of Convention on International Trade in Endangered Species (CITES). Among the most endangered species are: elephant, tiger, wild Cat, Leopard or wild goat, serao, dolphin; birds: white-winged duck, comb duck, stork, carne, pheasant, partridge, and crocodile, python, monitor, lizard, tiger terrapin, roofed turtle, soft turtle, and marine turtles.

In and around the project area some wildlife species were identified as locally vulnerable. One of these vulnerable species is Bengal monitor. Some species were also identified as locally endangered. Any construction must consider impacts on the rate of deforestation, loss of habitat, habitat fragmentation, and interruption of wildlife migration patterns. Figure 4.20 shows that no environmental sensitive area is present around the project region.

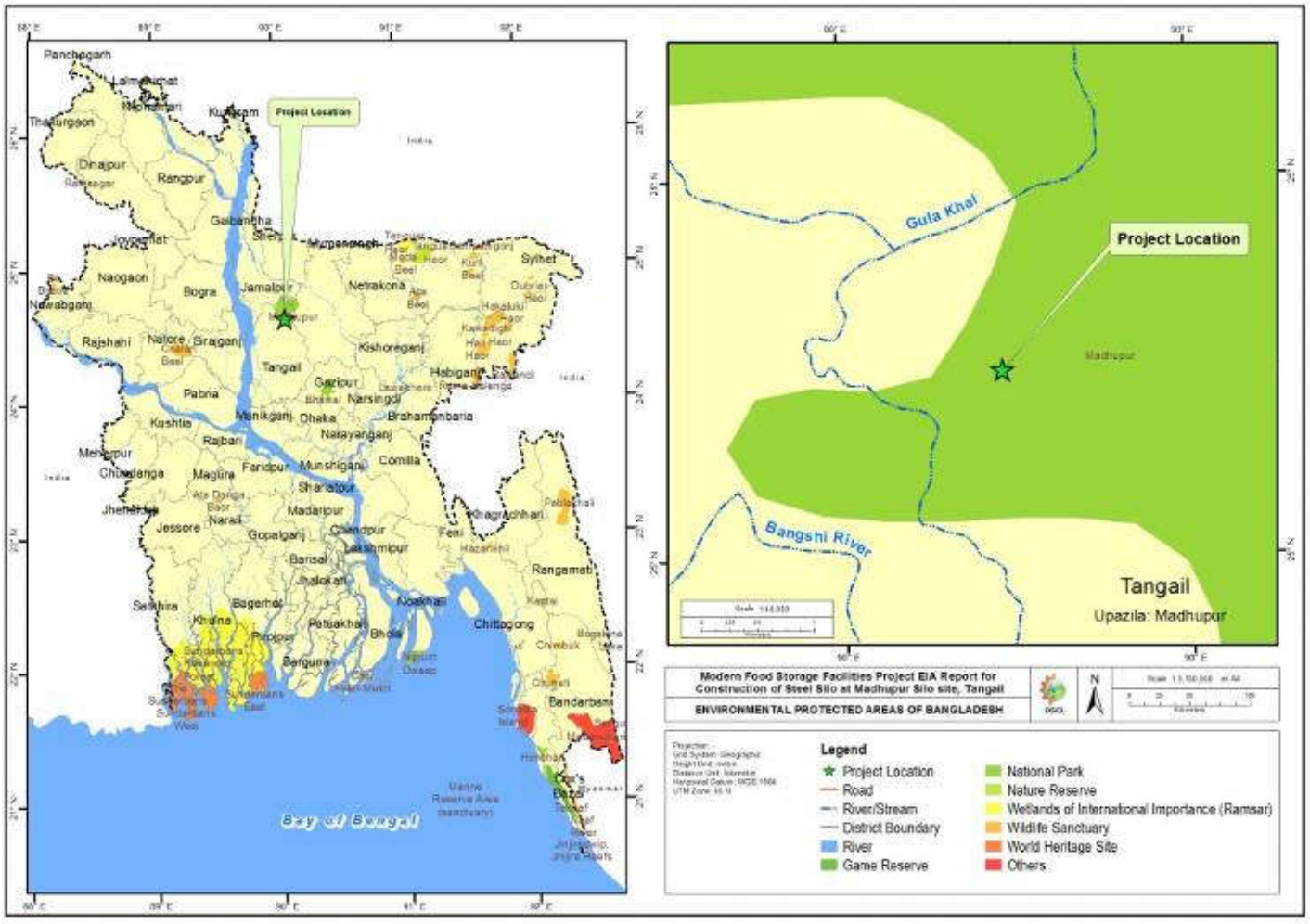


Figure 4.20: Environmental Protected Areas of Bangladesh

4.3 Social Environment

This Section presents an analysis of the socioeconomic baseline of Project area developed based on data from secondary sources, questionnaire survey and from community consultations at the local level. The analysis presents the socioeconomic profile of the Project area, population, and communities.

4.3.1 Demographic Profile

4.3.1.1 Background

Madhupur came into existence in 1898 as a Thana and was upgraded to Upazila in 1983. It is learnt that in the past this area was full of Jungles and forest and a large number of bee hives were found in this jungles. People used to collect honey (meaning Madhu in Bangla) form those bee hives and sold it to the local market. In consequence of this availability of honey means Madhu the area became known as Madhupur.

4.3.1.2 Area and Location

The Upazila occupies an area of 366.92 sq. km. including 184.39 sq. km. forest area. It is located between 24º32´and 24º47´ north latitudes and between 89º53´ and 90º09´ east longitudes. The Upazila is bounded on the north by Jamalpur Sadar Upazila of Jamalpur Zila and Muktagachha Upazila of Mymensingh Zila, east by Muktagachha Upazila and Fulbari Upazilas of Mymensingh Zila, south by Gopalpur Upazila and Ghatail Upazila and west by Dhanbari Upazila and Gopalpur Upazila.

4.3.1.3 Administrative/Geographic Unit

The Upazila consists of one Pourashava, 9 Wards, 23 mahallas, 6 Unions, 111 populated mouzas and 180 villages. The average population of each ward and mahalla are 6260 and 2450 respectively. On the other hand, the average size of population of each Union, mouza and village are 40065, 2166 and 1335 respectively.

4.3.1.4 Housing and Household Characteristics

Household Size: The average household size (General) for the Upazila is 3.9 persons, for rural area the size is slightly lower i.e. 3.8 and for urban area the size is slightly higher i.e.4.0.

Type of Housing Structure: In the Upazila, 1.4% general household live in pucca house, 6.0% in semi-pucca house, 91.6% in kutcha house and the remaining 1.0% live in jhupri.

Source of Drinking Water: In Madhupur Upazila, 95.0% generalhousehold get the facility of drinking water from tube-well, 0.4% from tap and the remaining 4.6% household get water from other sources.

Sanitation: In the Upazila, 66.7% general household use sanitary latrine, 26.5% non-sanitary latrine and the remaining 6.8% have no toilet facility.

Access to Electricity: All the 6 Unions of the Upazila have brought under the Rural Electrification Program. However, a total of 37.9% general household reported to have electricity connection in the entire Upazila in 2011 as against 20.0% in 2001.

4.3.1.5 Population Characteristics

According to Population and Housing Census 2011, the total population of the Upazila is 296729 of which 147734 are males and 148995 are females. The sex ratio of the Upazila is 99 which has remarkably decreased in 2011 as against 104 males in 2001.

Growth Rate: The decadal population growth rate for the Upazila is (-) 29.8% and the annual compound growth rate is (-) 3.43%. The decadal growth rates over the last six decades are shown in Table 4.5.

Table 4.5: Decadal Growth Rate of Population

Decades	Growth Rate (%)
1951-1961	30.0
1961-1971	59.5
1971-1981	31.9
1981-1991	31.4
1991-2001	12.7
2001-2011	(-) 29.8*

*Negative growth of population due to transfer of some areas for creating a new Upazila

4.3.1.5.1 Religion Composition

According to Bangladesh Population Census, 2011 the number of Muslims living in the area is 196134, the number of Hindu people is 5686, the number of Buddhist people is 12323 and the number of Christian and others are 19 and 137 respectively. The table 4.6 shows the percentages of religion composition in the Project Area.

Table 4.6: Religion Composition of Madhupur Upazila

Total Population	Muslim (%)	Hindu (%)	Christian (%)	Buddhist (%)	Others (%)
296729	66.1	1.92	4.15	0.0064	0.046

4.3.1.5.2 Tribal Communities

In Madhupur Upazila the indigenous communities are, Garo and Koch. According to Bangladesh Population Census, 2011, the number of tribal people is 25584. None of the tribal communities will be affected by the project activities.

4.3.1.6 Literacy and Education

Information on literacy and education is furnished below:

Literacy: In Madhupur Upazila, it is found that 41.2% population aged 7 years and over is literate. Literacy rate by sex of three consecutive censuses are shown in Table 4.7.

Table 4.7: Literacy Rate by Sex

Sex	1991	2001	2011
Both Sex	25.3	37.7	41.2
Male	30.2	40.2	42.7
Female	20.1	35.0	39.7

Education: School attendance of boys and girls between ages 3-29 years is presented in table 4.8.

Table 4.8: School Attendance Rate by Sex, 2011

Sex	3-5 years	6-10 years	11-14 years	15-19 years	20-24 years	25-29 years
Both sex	8.70	76.44	81.18	41.84	6.00	1.29
Male	9.62	74.97	77.14	45.76	9.43	1.95
Female	9.44	78.04	85.86	37.62	3.75	0.74

There exist differences in school attendance rates in different age groups which can be observed from the table. The female attendance rate in the age groups 6-10 and 11-14 years is higher than their male counterparts. On the other hand, male attendance rate in the age groups 3-5, 19-19, 20-24 and 25-29 years is higher than female. The highest school attendance rate is 85.86% which is found for female in the age group 11-14 years.

Educational Institutions: The table 4.9 shows the status of the educational institutions present in the Upazila.

Table 4.9: Educational Institutions in Madhupur Upazila

Educational Institutions	No.(s)
College	5
High School	30
Madrasa	137
Government Primary School	156
Non-Government Primary School	53
Missionary High School	3
Missionary Primary School	13
Kindergarten	13
NGO Managed Primary School	57

During public consultations local people were demanding one school and college due to the more people movement to the project area. The consultant highly recommended to the project authority to establish one social institution like school, college or madrasa for getting more social benefit from this developmental activities.

4.3.1.7 Arts and Culture

The cultural institutions present in the Upazila are listed in the below table, (4.10)

Table 4.10: Cultural Institutions of Madhupur

Cultural Institutions	No.(s)
Library	9
Rural Club	76
Cinema Hall	6
Playground	29
Dakbangloo	6

4.3.1.8 Economy and Occupation

Land use: Total land cultivable 32900 hectares, fallow land 2000 hectares; land under irrigation 65%.

The market value of the land of the first grade is Tk. 10000 per 0.01 hectare. Main crops Paddy, jute, wheat, cotton, potato, potol, ginger, betel leaf and vegetables. Extinct and nearly extinct crops are Indigo, varieties of pulses and Amon paddy. Main fruits are Mango, jackfruit, litchi, papaya, pineapple and olive.

There are 18 fisheries, 28 dairies, 103 poultries and 1 hatchery. The main sources of income of the people of Madhupur are listed below:

Table 4.11: Income Sources of Madhupur

Income Source	Percentage (%)
Agriculture	63
Non-agricultural Laborer	2.14
Industry	0.53
Commerce	13.05
Transport and Communication	1.21
Service	8.90
Construction	2.40
Religious Service	0.22
Rent and Remittance	0.70
Others	7.85

The list of manufactories is given below:

Table 4.12: Manufactories

Manufactories	No.(s)
Silk Mill	1
Rice and Flour Mill	53
Ice Factory	17
Lathe and Welding	63
Saw Mill	109
Bakery	7
Bidi Factory	1

Below is the list of cottage industries, hat bazaars and fairs.

Table 4.13: List of cottage industries, hat bazaars and fairs

Cottage Industries/Hat Bazars/Fairs	No.(s)
Weaving	27
Goldsmith	103
Blacksmith	26
Bamboo Work	320
Potteries	43
Wood Work	42
Tailoring	216
Hat Bazaars	45
Fair	3

Some noted Hat Bazars of Madhupur are, Madhupur Hat, Jolchhatro Hat, Pirojpur Hat, Gangaier Hat, Garo Bazar, Moter Bazar. And the three fairs held in Madhupur are, Gopal Angina Gostha JatraMela, Solakuri Baishakhi Mela and Jaitatul Devta Mela. The main exports from Madhupur are Pineapple, silk, cotton, jackfruit and honey. NGO activities in the Upazila include operationally important NGOs like brac, asa, proshika and caritas, World Tourist Mission, Family and Child Welfare Centre, World Vision Bangladesh.

4.3.1.9 Access to Electricity and Drinking Water

All the wards and Unions of the Upazila are under rural electrification net-work. However 20.03% of the dwelling households have access to electricity.11 KVA Electric line of palli biddyut is running along the adjacent road and there is no water and gas supply. Continuous power supply is available around the area. Adequate capacity transformer and new electric line will be installed during construction of silo.

Drinking water source is mainly tube-well. But water is drunk for taps and ponds too. The percentage of drinking water consumption from different sources is listed in below table 4.16.

Table 4.14: Drinking water Source

Drinking Water Source	Consumption Percentage (%)
Tube-well	86.87
Tap	0.60
Pond	0.41
Others	12.12

4.3.1.10 Health & Sanitation Condition

There are few family welfare centers, satellite clinics, charitable hospitals and other health institutes in Madhupur. The list of the health care centers along with the numbers is given in table 4.17.

Table 4.15: Health institution

Health Care Center	No.(s)
Upazila Health Complex	1
Union Health and Family Welfare Center	6
Satellite Clinic	6
Charitable Hospital	2
Missionary Hospital	1
Leprosy Hospital	1
Maternity Hospital	1
Clinic	4
Health Care Center	1

46.25% (rural 45.55% and urban 49.23%) of dwelling households of the Upazila use sanitary latrines and 22.28% (rural 21.76% and urban 24.47%) of dwelling households use non-sanitary latrines; 31.47% of households do not have latrine facilities.

4.3.1.11 Transportation Link

The roads of Madhupur include pucca road 150 km, semi pucca 19 km and waterways 32 nautical miles. The traditional transport of the Upazila is Palanquin (extinct).Road is the only mode of transportation. The road width of the Mymensingh-Tangail-Jamalpur highway is 5

m. There are very few bicycles and motor cycles run regularly but large vehicles like trucks, busses and cars also move. New traffic is expected, as a result of new silo construction .

Interior roads: The site is currently a vacant land with no structure or underground installation. For construction of the new silo in the vacant land, new connecting roads need to be constructed with provision of proper utility facilities.

Figure 4.21: Existing Tangail-Mymensingh Highway

4.3.2 Survey Finding of Social Impact Assessment

During socioeconomic survey of SIA study, the consultants observed that the proposed silo facilities will be constructed in a government khas land. The area has been bounded by masonry boundary wall. Since it is a khas land no new acquisition of land is required. The site is also well connected by road and placed in the central part of Bangladesh. This sub-project will not be the cause of any dislocation and will not at all harmful to any homestead, women or vulnerable groups and will not effect on income or business. The sub-project activity will not effect on physical, cultural and socio-economic resources or issues.

It will generate more employment in terms of using more laborers, more rice mills will be established, transport business will boost, poultry farming will enrich further and so on. The local people requested that local labor should be used during construction and operation.

Hence, this proposed silo project facility has neither significant nor adverse impact to its adjoining area but has positive impact on local people as well as to all over Bangladesh.

4.3.3 Environmental & Social Hotspot

The environmental and social hotspots like mosque, school and Union Parishad office are there within one kilometer radius, those are outside the silo boundary. There is a small mosque within the BFIDC office premises (eastern side of silo boundary) and a primary school at the western side of the silo boundary. There is no hospital or health clinic near the sub-project (fig. 4.22 & appendix-G). Neither of the environmental &social hotspot would be affected by the project activities.

4.3.4 Cultural, Religious and Archaeological Sites

There is no remarkable cultural centre or religious or historical monument in project area. There are also two Mosques, one Graveyard and one School near the project site. Neither of the cultural, religious and archaeological sites would be affected by the project activities.

Figure 4.22: Sensitive Locations in Madhupur

5. SOCIAL MANAGEMENT AND RESETTLEMENT POLICY FRAMEWORK

5.1 Objectives of SMRPF

The Social Management and Resettlement Policy Framework (SMRPF) is intended to provide general policies, guidelines, and procedures to DG-Food for social inclusion and integration of required mitigation measures of possible safeguard impacts into the selection, design and construction of silo facilities. The objective of the SMRPF is to help DG-Food to achieve the following:

- ✓ Enhance the social development outcomes of development of modern silos facilities at strategic locations and provide home silos to targeted families in disaster prone areas;
- ✓ Identify and mitigate adverse impacts that the selected sites might cause on people (men & women), including protection against loss of livelihood activities, with culturally, socially and economically appropriate measures;
- ✓ Develop necessary safeguard mitigation measures to adequately disclose and consult with affected people on draft action plans, to replace their lost assets and to improve (or at least restore) their incomes and livelihoods, and
- ✓ Ensure compliance with the relevant GOB policies and those of the World Bank on social safeguards and other social issues, including those with gender implications.

5.2 Basic Planning Principles

In consideration of the potential adverse impacts associated with land acquisition and displacement of authorized and unauthorized private activities from its own (and other public) lands, the strategic planning approach was followed by the DG-Food to select, design and implement all activities in accordance with the following principles:

- ✓ Prior to selection of specific site, undertaking community and stakeholder consultations about their objectives, scopes, and social safeguard implications, especially with respect to land acquisition and displacement of businesses, trading and other activities from its own lands (and other public lands, if they are also likely to be used by the project). Consultations will inter alia include,
- ✓ All formal/informal local entities, such as Municipal Committees, Union Parishads, local women's groups and others with direct and indirect stakes in the project who are deemed as key actors to influence project design and implementation.
- ✓ The persons to be discussed with, like the landowners, business owners, traders, embankment settlers etc. who would be directly affected by the project.
- ✓ The persons who would be affected in terms of loss of livelihood and/or loss of access to common property resources.
- ✓ Avoiding private land acquisition and limit its activities, to the extent feasible, within the existing land of DG-Food to minimize displacement of economic and other activities from private and public lands.

- ✓ Avoiding the activities that might be threaten the cultural way of life of tribal peoples; severely restrict their access to common property resources and livelihood activities; and affect places/objects of cultural and religious significance (places of worship, ancestral burial grounds, etc.)
- ✓ Undertaking social screening of all sites to identify potential social safeguard issues, and adopt and implement impact mitigation measures consistent with the Bank's OP 4.12.
- ✓ Special attention to female affected persons in the resettlement process and to the vulnerability of women and children in the project areas to social exclusion, trafficking, risks of HIV/AIDS infection following the policy guidelines of the World Bank on gender.
- ✓ Special attention to the vulnerable communities and destitute groups including poor, women, ethnic minorities, small and marginal farmers, and tenant contract farmers, in selection of beneficiaries and making available family silos based on needs.

5.3 Social Screening & Impact Assessment

DG-Food screened the sites to identify potential safeguard compliance issues and social impacts associated with the construction of silo facilities, in order to determine applicability of the OP 4.12 and the required Social Management Plan. Where adverse impacts cannot be avoided entirely, DG-Food selected, design and implement the project in accordance with the following guidelines:

5.3.1 Exclusion Criteria

To ensure that the project meets its overall objectives, and that the national legal as well as Bank's safeguard requirements are met, the following criterion for the exclusion of silo sites from project finance:

- ✓ Require involuntary land acquisition that affects private homesteads those cannot be relocated in available lands;
- ✓ Affect mosques, temples, graveyards, cremation grounds, and other places/objects that are of religious and cultural significance;
- ✓ May significantly restrict access to common property resources and livelihood activities of groups and communities;
- ✓ Threatens cultural/traditional way of life of tribal peoples, restrict their access to common property resources (forests, water bodies, etc) and livelihood activities, and affect their places/objects of cultural and religious significance (places of worship, ancestral burial grounds, etc.).

5.3.2 Social Impact Assessment Methodology

Social impacts and risks including land acquisition, resettlement and other social impacts were primarily identified during the initial social screening of silo sites. Once social impacts were noted, census of affected persons and assets would be conducted following the site

boundary and where applicable land acquisition plan in compliance with the SMRPF guidelines. The surrounding communities were consulted during the census survey to understand the risks and options and devising mitigation of social impacts. In the case of land acquisition, if there was any case of affected person, the process would be initiated well ahead of time so that assessment of social impacts and risks could be done for preparation and approval of RAPs before award of civil works contract and implementation of the same before displacement of people. Land acquisition proposal for respective sites would provide information on land and the census (by DG-Food) and joint verification (jointly by DC and DG-Food) would provide data on inventory of losses and risks recognized in the SMRPF.

With this SMRPF in place, when sites for construction of silo facilities are determined, detailed social impact assessment (SIA) following the initial social screening, was undertaken to identify all project beneficiaries, impacted people and other relevant stakeholders. The SIA utilized a well-planned and all-inclusive communication and consultation strategy and survey methodology to lay out a detailed socioeconomic survey covering the prevailing status of income, employment, education, age, skills and other socioeconomic aspects along with cultural and community aspects in the areas. The following methodology has been adopted.

- ✓ The SIA has been carried out in accordance with the civil works time table.
- ✓ Community/stakeholder consultations at locations with habitations and documentation of such consultation.
- ✓ Focus group discussions with beneficiaries, key affected persons and their community.
- ✓ Census and socioeconomic survey among the project affected households (if any).
- ✓ Assimilation and analysis of data and information to address key issues following SMRPF.
- ✓ The information was recorded on strip maps and computerized, and photography/ video-graph was used to document existing structures and land holding and other impacts in the corridor of impact.
- ✓ Updated the final alignment on the Mouza maps and finalized (no land acquisition required).
- ✓ All data was disintegrated by gender, age and ethnicity where necessary. A gender analysis would also be undertaken (in case).

In case of land acquisition; the Deputy Commissioner at respective districts, where a site involve land acquisition, would process land acquisition on behalf of DG-Food under the provision of the ARIPO 1982 and make payment of compensation under law to legalize land acquisition. However, DG-Food would make additional payment where needed to ensure replacement cost of land and other property acquired for any silo site following the provision of RAP prepared in compliance with this SMRPF.

5.4 Social Management and Resettlement Policy

The ARIPO 1982 is not adequate to deal with the adverse impacts associated with land acquisition and involuntary displacement in compliance with the Bank's OP 4.12 on Involuntary Resettlement. The Ordinance has no provisions for resettlement of the affected households/businesses or any assistance for restoration of livelihoods of the affected persons. Land acquisition, therefore potentially diminishes productive base of affected farm families and infringe impoverishment risks to those physically or economically displaced due to undertaking of infrastructure projects. No involuntary resettlement issues were observed. As the legal framework falls short of the provisions of the World Bank OP 4.12 on Involuntary Resettlement, the project would apply the following added mechanisms to meet the Bank's requirements:

- ✓ **Avoid or minimize resettlement:** The law only implicitly discourages unnecessary acquisition, as lands acquired for one purpose cannot be used for a different purpose. However, there are no mechanisms to monitor if this condition is actually adhered to.

- ✓ **Eligibility for compensation:** The law stipulates compensation only for the persons who appear in the land administration records as the owners. It does not recognize the rights of those, such as squatters, who do not possess legal title to the lands they live in or make a living from.

- ✓ **Compensation:** The law provides compensation for lands and other objects built and grown on them (structures, trees and orchards, crops and any other developments like ponds, built amenities, etc.). No provisions are there to assess and restore lost income stream or income sources that acquisition causes to the affected persons, be they legal titleholders or others like squatters, tenants and employees of affected businesses.

- ✓ **Compensation standards:** Although the law stipulates 'market prices' of the acquired lands as the just compensation, the legal assessment method almost always results in prices that are far below the actual market prices9. Certain pricing standards, which are regarded as unrealistic, are used to assess other losses like structures and various built amenities, trees, crops and the like.

- ✓ **Relocation of households and other establishments:** No legal obligation is there to relocate, or assist with relocation of, those whose homesteads have been acquired or whose place of residence or livelihoods has been affected. Such persons/households, be they titleholders or squatters, are left on their own.

- ✓ **Ensuring payment of compensation:** Lands are legally acquired and handed over to the project execution agency as soon as the acquisition authority identifies the owners (or 'awardees'), by examining the records, and sends a legal notice advising them to claim the compensation (or 'awards'). It is the obligation of the affected landowners to prove, by producing an array of documents that the acquired lands legally belong to them. As gathering these documents is a long, expensive and cumbersome process, many landowners may remain unable to claim their awards10.

- ✓ Socioeconomic rehabilitation: The law shows no concern whatsoever about the long-term socioeconomic changes the affected persons and households might undergo in the post-acquisition period. There is no provision in the law except compensation for ensure economic rehabilitation and social reintegration of the displaced persons.

6. IMPACTS ASSESSMENT AND MITIGATION

6.1 Assessment of Environmental Impacts and Mitigation

The Madhupur silo site is located at 3.5 km away from Upazila HQ. It is well connected by Madhupur- Mymensingh highway. The area is free from environmental hotspot, and away from any environmentally sensitive area. The sub-project will not be harmful to the settlement, vulnerable group or women, rather; it will generate a huge employment for the local people. The economy will be developed through increasing business, trades and poultry development.

Some anticipated impacts will have to be considered, especially, during construction and operation periods and those are to be well managed, to minimize environmental and social impacts and hazards, as the means of mitigation measures to the probable impacts. For the sustainable development as well as to maintain environmental friendly infrastructure, measures start from design phase. Madhupur silo site, with 5.81 acres of land, is now well protected by boundary wall. Before starting the construction works, an well planning is required to place the laborers' shed, drinking water facility, sanitary latrines, equipment and materials yards, lubricant and fuel keeping facility, temporary drainage facilities, solid waste management facilities etc. The traffic and machineries' movement routes etc. are to be established in the construction site. Essential facilities like; labor-shed with proper living, lighting and cooking arrangement, waste water drainage arrangement from the kitchen area, waste bins and solid waste management facilities, and adequate drinking water supply, sanitary latrine facilities, personal protection equipment and first aid box etc. are to be provided before starting the construction works. The construction materials' yard and place for keeping the prefabricated steel sheets will be fixed in ahead of starting the silo bins' super-structure setting. As, the area is not so large (5.81 acres only), no stone/ brick crushing will be allowed within the silo site. Only pre-fabricated steel sheet will be carried to the construction site and separate areas/ yards will have to be maintained for that. For carrying the construction materials, care should be taken on traffic management. Safety measures will be taken for the local pedestrians, school children, local Madhupur-Mymensingh bound traffic.

6.1.1 Potential Impacts considered during Pre-construction Phase

Loss of Tree Structure: Due to the implementation of the silo project, during the sub-project preparatory phase, some immature and young trees were cut down. To minimize the anticipated impacts for the loss of such trees, the project authority as well as the design consultants has already designed the landscape in the silo campus and considered more than 500 trees to plant in and around the silo campus.

Damage due to Waste Disposal: The improper solid waste management activities during construction period would damage the local environment. So, proper arrangement of solid waste management, prior starting the construction works, is essential. The contractor is solely responsible for total solid waste management activities.

Solid Waste Quantity: During the construction works, 100 workers may work at a time (during pile driving for silo bins' foundation works and for other construction works. If per capita waste generation is 300 gm per day, the quantity of solid waste will be 30 Kg in a day.

Type of works	number of workers	per capita waste	Quantity
Pile driving for silo bins	30	300 gm	9 Kg
Other ancillary work	70	300 gm	21 Kg

Mitigation:

- ✓ Within the silo campus, some waste bins are to be provided by the contractor,
- ✓ A primary transfer station for solid waste will be constructed by the contractor outside the project boundary gate open place between the highway and project boundary wall. The Conservancy unit of Madhupur Pourashava will collect this waste daily basis. A transfer station (2 m long x 1 m width x 1.5 m height) masonry walled box with provision of door and tin shed is to be constructed on the immediate north side of the entrance gate (the gate at present). The engaged laborer will collect solid wastes from different waste bins, inside, and deposit that in the transfer station. The Pourashava conservancy unit will collect that waste and dispose at the landfill site daily. In absence of services of Pourashava conservancy unit, the contractor will make suitable arrangement for safe disposal of solid waste.
- ✓ The contractor will arrange with the Conservancy unit of Madhupur Pourashava for the solid waste management and disposal activities. The Contractors' laborer will collect the solid wastes from different places within the silo areas (waste bins should be placed by the contractor) and will dump those in a suitable place from where the Pourashava conservancy unit will collect the wastes and dispose to their landfill site.
- ✓ If the contractor plans for solid waste management by themselves, they will make some suitable arrangement of safe dumping of solid waste.

Damage due to Septage Disposal: There is no sewerage system in the silo site. On-site sanitation is necessary for the septage as well as latrine waste management. The sanitary latrines, to be provided for the laborers and that should be with proper on-site sanitation system. Prior to start the construction works, sanitary latrines should be provided by the contractors.

Mitigation:

- ✓ The contractor will install sanitary latrines (may be low-cost latrines) with two-pit septic tank facilities,
- ✓ The latrines should be at a distant and safe location, preferably near the north-west boundary wall side.
- ✓ The latrines should be with proper washing facilities (water and soap).

Damage due to inadequate water supply: Prior starting the construction works, it is very essential to establish water supply in the construction site. There is no supply water in the construction site. If the supply water is inadequate both in terms of quality and quantity that will damage the entire construction works. So, water supply should be proper, quality and adequate.

Mitigation:

- ✓ The contractor will install tube well as considered in the BOQ (environmental and social safeguard component) prior starting the construction works,
- ✓ The water quality will have to be tested for its quality judgment.

Pollution from fuel and lubricants: Improper placing of fuel and lubricants is essential, to prevent damage of surrounding environment and measures are to be taken prior starting the works.

Mitigation:

- ✓ Raised platform (brick soling with neat cement finishing) shall be constructed prior to start working.
- ✓ The place should be well protected and to be prepared prior to start working. The place should be in a safe corner of the silo campus.

Transportation Planning before starting works: The contractor will set up the stock yards as shown in the attached figure 7.2, that the larger stockyard is to be set up near the silo office building and other two separate smaller size stockyards in between silo bins and store building..

Mitigation:

- ✓ Coarse sand and fine sand will be transported from Sunamganj or Sylhet areas via Mymensingh town through the bi-pass road, those will be dumped in the stock pile outside the silo campus and that will be carried to the silo campus stock pile when required.
- ✓ The reinforcement steel and cement will have to be carried via Mymensingh road and to be stored in the bulk pile stock and only fabricated steel to be carried to the stock pile at silo site.
- ✓ Steel sheets (fabricated/ non-fabricated) will have to be carried from Chittagong port to the large stock pile (outside the silo campus) and those will be carried through Chittagong-Mymensingh-Tangail route.
- ✓ In all the cases, the Mymensingh route will be used and the materials will be stored in the bulk storage facilities outside the silo campus and only required and fabricated materials will have to be carried to the silo site.
- ✓ For mass concrete works (especially for the concreting of in-situ pile casting, separate batch plant is preferable, at least from outside the silo campus, only concrete mix will be carried to the silo site.

Contingency Planning for any uneven situation: There are so many unwanted happenings may be there during construction periods. Proper contingency planning is required for overcoming any uneven situation, otherwise, that will hamper the progress of works. As a preparedness works, proper contingency planning is essential for smooth progress.

- ✓ All the emergency telephone numbers of all the departments like Police station, fire service & civil defense, truck & bus stands, hospitals, clinics, etc.
- ✓ Standby transport facilities to deal any accidental case,
- ✓ Emergency on-call physician
- ✓ Emergency arrangement of medicine
- ✓ Arrangement of Safe havens (within the Madhupur area), that may be used as emergency shelter during any disaster like Cyclone, etc.
- ✓ Proper liaison, with the local people and community leaders, is to be maintained so that the local people may always be with the silo construction engineers and workers, during any uneven situation.

Precaution for the safeguard of Hot-spots: There is a mosque at the eastern side of Silo campus (within BFIDC campus) including the BFIDC office and a primary school at the western side of the silo campus. Also, there are some green plants/ nursery etc. around the silo campus. These physical and natural resources may be affected due to creation of uneven sound during construction works, due to unplanned movement of trucks for carrying construction materials, unplanned solid waste disposal etc.

- ✓ The machineries to be used shall be checked with proper silencer and muffler,
- ✓ The materials carrying trucks shall be planned to move during night time,
- ✓ All the materials carrying trucks shall be with covered truck/lorry.
- ✓ The construction watchers shall be instructed to keep eyes to the school children and will not allow them to enter into the silo campus during construction period,
- ✓ Solid waste disposal shall be well planned to avoid any uneven dumping around,
- ✓ The construction workers and supervisors will be trained up to control dust.

6.1.2 Potential Impacts during Construction Phase

Arrangement of stockpile: Proper stock piling is essential during construction period. Improper stockpiling may hamper the construction works, especially for the silo campus of Madhupur silo.

- ✓ Large stock piles should be outside the silo campus. Large volume of construction materials should be at large stock pile. Prefabricated steel sheet and reinforcement bars should be there in the stockpile within silo campus.
- ✓ Separate batch plant should be maintained for concrete mixing.
- ✓ The stockpile in the silo campus will be used for essential items and for the fabricated steel sheets.
- ✓ Separate fencing is to be maintained for the stock pile within the silo campus.

Transportation Planning: Madhupur-Mymensingh highway is two lane road. The road is capable of carrying about 200 vehicles per hour, from the following trip model calculation:

The capacity of a two lane urban road can be calculated using formula:

$C_A = 1900\ N\ f_W\ f_{HV}\ P_{HF}\ g/C$

C_A= intersection approach capacity

N = number of lanes on the road segment

f_W= adjustment factor for lane width = 1 + (W-12)/30 (w is lane width, here 16 ft)

f_{HV} adjustment factor for heavy vehicles = 100/ {100 + HV (Er-1)}

Where: HV = percent of heavy vehicles and E_T= 2.0 passenger car equivalents,

Here for outside street of the sub project sites located outside of city traffic, it is assumed that HV =50% to simulate the congestion effect of heavy vehicles/trucks and low vehicles

$HF\ P$ = Peak Hour Factor = 0.88 is considered for sub project area

g/C= effective green time-to-cycle length ratio = 0.55 is considered for sub urban arterials.

It has been observed, during ESIA study, that the total vehicle running on the road is less than 100 out of which less than 50 trucks move at market days (Kakraid Bazar). During the silo and ancillary works' construction, on an average 15-20 more trucks will move per day, on the road. So, no problem will be raised during construction period. Moreover, most of the materials will be carried from Mymensingh side and no extra burden will be there on Madhupur town. Also, the contractor will carry the construction materials during night time (10:00pm-6:00 am).

- ✓ To avoid local traffic congestion, any materials required for construction should be transported at night time (within 10.00 pm – 6.00 am),
- ✓ Vehicle schedule should be maintained with proper consultation of the local people,
- ✓ Emergency parking arrangement should be kept in between highway road and project boundary wall approx. 30 ft open space,
- ✓ Unloading of materials should be done inside project areas,
- ✓ Traffic control manpower will be deputed during construction and operation period,
- ✓ Control sign will be provided to regulate traffic movement,
- ✓ Safety arrangement has been inserted in the safeguard cost in BOQ.

Pile Casting: In Madhupur silo site, 600 mm dia and 42m long (cast in situ)piles will be casted/ dived. The pile boring and diving/ casting will be done by diesel driving machineries. Prefabricated pile reinforcement will have to be set up within the pile whole and a huge quantity of concreting works will be done. Safety measures is very much important during the whole pile works and sound pollution will likely to be occurred also. A huge quantity of bore hole waste (mixture of sand, clay and water) will come out and its proper management is very much essential.

Mitigation:

- ✓ The pile diving machineries should be with proper silencer and muffler to minimize the sound pollution,
- ✓ The pile waste (mixture of sand, clay and water) should be managed properly. Earlier site fixing should be ensured before starting pile diving.
- ✓ Fabrication of pile case should be done carefully, in a safe corner, by the side of north and south boundary wall.
- ✓ Concrete mixing should be done in a separate batch plant.
- ✓ Ensure use of proper PPE (helmet, gloves, safety shoes etc) of all workers during pile boring and casting work.

RCC and Brick Work: This item of works consists of carrying of construction materials (cement, brick/stone chips, construction sand), reinforcement from source to the construction site, unloading from truck, steel fabrication, shuttering works, mixing of concrete using mixture machine, pouring of concrete and compacting of concrete by using vibrator machine, carrying of bricks, building of walls using scaffoldings. All these works will be done by manual labourer, so personal accident may occur during operating the work.

Mitigation:

- ✓ Steel fabrication should be done in a separate corner within the silo campus,
- ✓ Concrete mixing should be done in a separate batch plant,
- ✓ For the small concrete works, mixture machine will be used and in that case, sound control will be there through setting muffler and silencer properly to control uneven sound,
- ✓ Ensure use of proper PPE (helmet, gloves, safety shoes etc) of all workers during work.

Pollution from construction materials: Dumping of construction spoils, including accidental leakage of lubricant, fuel etc. from carrying vehicles in equipment yards, is an important hazard. Both surface and ground water might be polluted from these contaminants. Safe transport, storage and disposal provisions for construction materials, equipment. Especially lubricant, fuels etc. have to be carried out in order to avoid accidental spillage and leakage

Mitigation:

- ✓ These hazardous materials will be stored over raised platform (brick soling with neat cement finishing)
- ✓ Carrying vehicle should be checked by an experienced mechanic by every week, filled up a checklist and keep in the site office

- ✓ Carrying vehicle should be with proper license and route permit from Bangladesh Road Transport Authority (BRTA),
- ✓ Construction material should be transported by covered van/ truck,
- ✓ The playground of the educational institutions shall not be allowed to use as a stack yard.
- ✓ Location for stockyards for construction materials will be at least 30 m away from the laborers' camp and sseparate enclosures shall be put around the stock yard,
- ✓ If any private land is used as stock yard then agreement with the land owner should be submitted to the Supervision consultant.
- ✓ Storage of the material should not create obstacle for movement of vehicles and pedestrians.

Dust: Different activities like; pile diving & casting, machinery movement, handling of construction materials (stone/brick chips, sand, cement), rod fabrication, movement of trucks with construction materials etc. may generate dust and damage the air quality.

Mitigation:

- ✓ Water will be sprayed to control the dust, which is the main way to suppress dust in the working site.
- ✓ Construction material should be transported through truck covered by tarpaulin.

Noise and vibration: Movement of vehicles, concrete mixer machine, vibrator machine and crushing bricks at site generates noise. Pile diving, concrete casting, cutting of steel for reinforcement and steel sheet for silo bins etc. may cause noise hazards.

Mitigation:

- ✓ Transportation of the construction materials have to be carried with scheduled time, mainly day time
- ✓ All powered mechanical equipment and machinery shall be fitted with noise abating gear such as mufflers for effective sound reducing device.
- ✓ Crushing of bricks/ stones shall not be allowed at the project site, so broken brick or stone chips should be collected from source to the project for construction purpose.
- ✓ For concreting works, separate batch plant should be used.

Water Quality: The quality of surrounding surface water may deteriorate if construction debris, construction waste, pile waste, effluent from work camps, food wastes etc. are allowed to dump in the nearby road side borrow pits or haphazardly.

Mitigation:

- ✓ Waste material in any form should not be thrown in water body or unspecified places,

- ✓ Proper construction management including waste management, training of operators and workers will be provided to avoid pollution of water bodies or nearby habitants.
- ✓ Waste bins are to be provided at different location of working and living places.

Safety Hazards and Public Health: During construction works, specially, during installation of steel frame and sheets at large height of silo bins and other mechanical arrangement of silo bins. Occurrences may be with fall from height, burns, cuts and other body injuries.

Mitigation:

- ✓ Specific condition of contract, for maintaining health, safety and environmental conditions, should strictly be followed during construction and installation,
- ✓ Proper scaffolding should be made available during installation and setting of steel frame and sheets,
- ✓ Material safety data sheet (MSDS) will be followed during handling and installation of steel silo bins,
- ✓ PPE wearing should be ensured during framing, installation, setting and fitting of steel frame and sheets of silo bins,
- ✓ HSE trainings will be provided to the workers and supervisors of silo site.
- ✓ First aid boxes will be made available at each construction site.
- ✓ Emergency phone numbers (hospitals, Fire Service, Police station etc) will be displayed at key locations of silo area.
- ✓ Firefighting equipment will be made available at the facilities.
- ✓ Liaison with the community will be maintained.
- ✓ Traffic movement along Madhupur-Mymensingh road should be synchronized with that for using silo construction works, and contractor shall maintain the traffic movement those will be used in carrying materials.

Temporary Drainage System during Construction works: During rainfall and during construction works, temporary flooding may be occurred in the construction site. Temporary drainage arrangement has been considered and the item has been inserted in the BOQ of environmental safeguard issues.

- ✓ Earthen drains will be constructed immediately after any occurrence of water shading
- ✓ The drains should be closed after the end of the water shading occurrences,
- ✓ The outlet of the temporary drains should be in line with the outlet of the drainage system already designed for the silo campus.

Occupational Safety and Sanitation: It involves the safety problems of the construction workers and the provision for sanitation and drinking water facilities at work sites. Occupational safety is essential during handling construction materials, fabrication of reinforcement steel, handling of steel sheets for silo bins, fitting of steel sheets with bolts & nuts, mixing of concrete, welding works, placing & compacting concrete etc. may cause serious health hazards and accident. On the other hand, improper sanitary facilities may also cause health hazards and that may reduce the work efficiency.

Mitigation:

- ✓ Provision of deep tube well for water supply (both for drinking and construction works) and toilets along west-boundary wall, for male/female workers, to be ensured.
- ✓ First Aid Box with sufficient gauze, bandage, antiseptics etc. to be made available.
- ✓ Ensure availability and using proper PPE (helmet, gloves, safety glass, safety shoes etc) of all workers during work.

Social Conflict: The presence of a large workforce, establishment of construction camps, Project-related traffic and construction activities may potentially cause conflicts with the nearby communities, privacy issues for the women and other similar problems.

Mitigation:

- ✓ Orientation and training will be provided to the contractors, supervisors and workers, on health, safety and environment including sexual diseases control (as of BOQ),
- ✓ Liaison with the communities will be maintained throughout the construction phase.
- ✓ Grievance redress mechanism has been established at the sub-project site.

Safeguard of Hot-spots: To protect the physical and natural resources around, the following measures shall be taken into consideration during construction period:

- ✓ The machineries to be used shall be checked with proper silencer and muffler,
- ✓ The materials carrying trucks shall be planned to move during night time,
- ✓ All the materials carrying trucks/lorry shall be covered properly,
- ✓ The construction watchers shall keep eyes to the school going children and will not allow them to enter into the silo campus during construction period,
- ✓ Solid waste disposal shall be well planned to avoid any uneven dumping around,
- ✓ The construction dust shall be controlled every day.

Location and Facilities of Labour Camps:

- ✓ The labor-camp will be at the middle portion along west boundary wall,
- ✓ The labor shed shall be with the facilities like; mosquito nets, cooking arrangement, water supply, waste bins, lighting etc.
- ✓ Temporary drains for the kitchen waste water and rain water are to be provided and maintained around camp site,
- ✓ The camp should be with standard living condition and arrangement.

6.1.3 Potential Impacts during Operational Phase

Safety Hazards and Public Health:

The silo bins and ancillary facilities under Modern Food Storage Facilities Project (MFSP) has been designed in an automated system, from loading the food grains within the silo bins till bagging the same for distribution, where there is no chance of generating any waste and dust. The use of chiller for temperature control and use of inert gas Nitrogen (auto generated system) for disinfection and that will not impose any harm to human health.

Proper capacity building issues will be addressed carefully to handle the system efficiently and effectively. The O&M staff will be trained up to ensure maximum use of technology and to minimize any operational hazard.

Mitigation:

The following precautionary measures will be taken, in addition:

- ✓ Each facility will prepare a site specific Health, Safety and Environment (HSE) Plan.
- ✓ Awareness raising programs for health, safety and on communicable diseases,
- ✓ HSE Plan will be made an integral part of the Operational Manual of each facility.
- ✓ Material safety data sheet (MSDS) will be followed in overall O&M process.
- ✓ PPE will be provided to the O&M staff and use of musk shall be mandatory during handling food grains.
- ✓ HSE trainings will be provided to the O&M staff on a regular basis.
- ✓ Availability of safe drinking water will be ensured at each facility.
- ✓ First aid box, with sufficient gauge, bandage, medicine etc. shall be available at each silo site. Emergency phone numbers (hospitals, Fire Service, Police etc.) will be displayed at key locations within the campus.
- ✓ Firefighting equipment will be made available at the facilities.
- ✓ All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel.
- ✓ Waste management plan to be prepared and implemented in accordance with international best practice.
- ✓ Liaison with the community will be maintained.

Health and safety Issues in using Ancillary Facilities: The silo bins is associated with several ancillary facilities like grain chiller; Nitrogen gas disinfection system; mechanical handling system etc.

Grain Chiller itself will not pollute air (it is just like an air cooling system). Inert gas, Nitrogen will be extracted from natural air by Nitrogen gas generator as and when required and to be used in an automatic monitoring and controlled way in the silo bins. So, no special mitigation is required for these chiller and nitrogen gas use, as it will not create any hazard.

The mechanical handling systems are in-built with filtration and aspiration system and it will not create any dust pollution. So, there is no need of mitigation measures in case of ancillary system lying with silo bins.

Air Quality: Though there is no chance of occurring air pollution from the modern silo and ancillary system, food grains carrying transport may generate some air pollution around and the following precautionary measures will be considered:

- ✓ The food grain carrying vehicle should comply with the national standards.
- ✓ The steel silos to be constructed under has the duct at the dust collection point, which will be attached to a reverse jet bag filter and then to the fan which will vacuum the duct and extract the dust. These suction ducts will be suitably installed at the dump pit of the grain collection point, to the bucket elevator and chain conveyors also to collect dust during operation of silos.
- ✓ The O&M staff will be provided HSE trainings on regular basis; these trainings will address the air quality standard including hygiene practices.

Soil & Water Contamination: Inappropriate waste disposal from the O&M activities as well as from offices and residential facilities may potentially contaminate soil and water thus negatively affecting nearby communities and biological resources of the area.

Mitigation:

The following measures will be to minimize adverse impacts of the Project associated with soil and water contamination:

- ✓ Each facility will have waste management plan as part of its Operations Manual. No untreated waste effluents will be released to the environment.
- ✓ For the domestic sewage from the offices and residential areas, appropriate treatment and disposal system, such as septic tanks and soaking pits, will be constructed having adequate capacity.
- ✓ Waste oils will be collected in drums and sold to the recycling contractors.
- ✓ The inert recyclable waste from the site (such as hard board, drums, and broken/used parts) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste.
- ✓ Domestic solid waste from the offices and residential areas will be disposed in a manner that does not cause soil contamination.

Noise & Vibration: The O&M activities (running of motors, conveyor belts, bag filters, chilling plant and others) at the silos and vehicular traffic will generate noise and vibration which are likely to affect the O&M staff and nearby communities.

Mitigation:

The following measures will address the adverse impacts of the Project associated with noise and vibration:

- ✓ It will ensure that the noise from the facility complies with the national and WB standards.
- ✓ PPE (ear muffs or air plugs) will be provided to the O&M staff
- ✓ Vehicular traffic through the communities will be avoided as far as possible. Project routes will be authorized by the silo authority.
- ✓ Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities.
- ✓ Vehicles will have exhaust silencers to minimize noise generation.
- ✓ Nighttime traffic will be avoided near the communities.
- ✓ Movement of all project vehicles and personnel will be restricted to within work areas,
- ✓ Liaison with the community will be maintained. Grievance redressal mechanism is in place to address the community complaints.

Vehicular Traffic: Transportation of food grain to and from silos will cause additional traffic on the access routes. This increased traffic can potentially cause traffic congestions on local roads and also pose safety hazards for the nearby population and community.

Mitigation:

- ✓ To avoid local traffic congestion, transportation of food grains should be transported at night time (within 10.00 pm – 6.00 am),
- ✓ Proper vehicle schedule should be maintained with proper consultation of the local people,
- ✓ Emergency parking arrangement should be kept in between highway road and project boundary wall approx. 30 ft open space,
- ✓ Unloading and loading of food grains should be done inside project areas,
- ✓ The PMU, MFSP will prepare a traffic management plan for the silo facility. This plan will be a part of the Operational Manual of each facility.
- ✓ Liaison will be maintained with the relevant authorities (such as traffic police) regarding the food grain transportation particularly during emergencies.

Electricity Consumption: For continuous power supply on priority basis through the 33 KV power line will have to be ensured at the Silo for uninterrupted operation of a silo. If chilling system is interrupted the soil will not meet the required temperature and infestation of soil will be expedited.

Mitigation:

- ✓ Ensure electricity connection from multiple grids.
- ✓ Keep the provision for backup generator.

Aesthetic View: Presence of silos may potentially affect the aesthetic value of the area.

Mitigation:

- ✓ Landscaping and tree plantation will be carried out at each facility.
- ✓ Proper housekeeping will be regularly maintained at the facilities

Safeguard of Physical and Natural Resources: To protect the physical and natural resources around, the following measures shall be taken into consideration, during operation and maintenance:

- ✓ The silo uploading machineries shall be with proper silencer and muffler,
- ✓ The bagging and truck loading machines shall also be with proper silencer,
- ✓ Food grain carrying trucks should be with controlled speed,
- ✓ The silo guards shall check and limit public/ children entrance properly,
- ✓ Solid waste management shall be proper to avoid nuisance around,

6.2 Assessment of Social Impacts & Mitigation

6.2.1 Social Screening

To assess the potential impacts of the proposed project on environment and people around the silo facilities, social screening of the site for construction of modern public silo infrastructures was carried out during initial visit to the sites. A rapid social checklist was used for the screening shown in table 6.1 below.

Table 6.1: Social Screening

Site Name	Availability of Land	Land Acquisition process	Impact on Tribal Population
Madhupur	Government Khas Land already handed over to DG-Food	Land has been transferred through inter-ministerial transfer method. There was no occupancy and no issue of compensation as per law or as per Bank' OP 4.12.	None

6.2.2 Impacts on Indigenous People

The silo sites did not affect any people from the tribal communities. The World Bank's OP 4.10 on Indigenous Peoples therefore, does not apply to the project as a whole. None of the indigenous community would be affected by the project activities.

6.2.3 Social Exclusion

The objectives of the project are to improve food stock and supply of food grains during emergencies and at the events of disaster. The project is expected to benefit the communities in the target areas. Although the project intends to benefit communities from all strata, there is no risk of inequity with the issues like; gender, ethnicity and other social stratification of beneficiaries from the silo facility. The disadvantaged groups like the small ethnic and other minorities, women, disabled and very poor populations will be equally treated during any event of disaster. Social safeguard issues has been incorporated along with the environmental safeguard issues.

6.2.4 Impacts Due to Non-Local Work Force

Increased number of non-local peoples on site during construction may pose a risk to public health and to some extent spread of STDs including HIV/AIDS. Social and environmental management plans has been incorporated to address such impacts.

6.2.5 Impacts on Local Infrastructure

The local community, in Ramkrishna Bari Village, is at least one kilometer away from the silo campus and that is by the side of Mymensingh-Tangail highway. The construction of the silo and ancillary works will not directly affect the community. The local infrastructure/ institution will not be affected by the project activity.

6.2.6 Impacts on Conflict of Labor Influx

Conflicts may occur between local residents who may feel that they have received unfair wages. During construction and operation phases external worker from outside the project area will be deployed. Then conflict may also occur between local residents and external workers because of any changes to local customs if external workers cannot understand local customs.

A number of consultations have been conducted with local residents about local conflict of interest. Local people should be employed for the construction works to the maximum extent possible, and any workers from other countries should be taught to respect local customs in order to facilitate good relationships with local people. The lodgings of the project workers should be equipped with sufficient living facilities to keep workers at the project site as much as possible.

To minimize the adverse impacts of temporary project induced labor influx the consultants suggested to the project authority to follow the World Bank guidance note for “Managing the Risk of Adverse Impacts on Communities from Temporary Project Induced Labor Influx”

(*Managing the risks of adverse impacts on communities from temporary project induced labor influx*, *Environmental and Social Safeguards Advisory Team (ESSAT); Operations Policy and Country Services (OPCS);* 1 December 2016) during the implementation and monitoring of this subproject. The Guidance Note focuses on the assessment and management of social and environmental risks and impacts, both anticipated and unanticipated, from the influx of labor into a project area.

6.2.7 Project Benefits

Madhupur, within Ramkrisnabari Mouza, is located strategically in terms of storage of rice; it is connected by road and placed in the central part of Bangladesh. Rice will be collected, from Northern Districts, by road and will be delivered to the surrounding LSDs, and will meet up emergency during and after any disaster, in the similar transport pattern. So, Madhupur is well located in terms of food storage and distribution that the surplus food storage during harvesting period as well to meet up the emergency during any disaster like early flood. The silo facilities are more efficient than flat warehouses. The silo can be constructed within smaller horizontal areas than normal traditional flat system godowns. The rice may be stored more efficiently, where loss (in terms of quantity and quality) is minimum and the quality of rice will be sustained for longer periods. The silo facility has wonderful opportunity of blending vitamin and mineral enriched rice kernels to the stored rice to improve the health of the people, especially for child and lactating mother.

Modernizing the current food storage system in the country will result in improved storage capacity at national level to make available food stock the emergency and disaster periods. The project will help ensure food and nutritional security to the communities, particularly in the disaster periods. By enhancing the post-disaster food distribution system, the project will serve to safeguard livelihood, human capital and welfare of the poor and vulnerable populations.

6.2.8 Social Welfare Works by the Project Authority

During the environmental and social data and information collection process, type of effects, their advantage and disadvantages etc. were analysed mainly on the issues like; Agriculture, Fisheries, Livestock, Bird, Animal, Forestry, Income, Employment, Movement of local people, Tourism, Business, Industry, Archeological and Historical Side, Health, Literacy Rate etc. Different effects found are mentioned in the following table.

The Table 6.2 shows the social impact assessment of the project.

Table 6.2: Social Impact Assessment (SIA)

Sl	Issues	Advantages/ Disadvantages/ No effect
1.	Agriculture	**No Effect:** As there is no issue of land development.
2.	Fish	**No effect:** Surface water bodies, except some road side ditches, far away
3.	Livestock	**No effect**: as, the construction will be within confined area.
4.	Bird	**No effect**: as, the construction will be within confined area.
5.	Animal	**No effect**: as, the construction will be within confined area.
6.	Forestry	**No effect**: as, there is no cutting of trees, also new plantation will be done
7.	Income	**Advantage**: Construction works will create business opportunity
8.	Employment	**Advantage**: Construction works will create employment opportunity
9.	Movement of people	**Disadvantage**: Due to increased movement of goods, vehicles, people.
10.	Tourism	**Advantage**: Tourism will be developed through movement & migration.
11.	Business	**Advantage**: The food processing, rice husking etc. will be developed.
12.	Industry	**Advantage**: Industries will be developed during the silo operation.
13.	Archeological Side	**No effect**: No effect will be there on archeological infrastructure
	Historical side	**No effect**: No effect will be there on historical infrastructure
14.	Health	**Disadvantage**: Adverse effect may be due to external workers
15.	Literacy Rate	**Advantage**: Literacy rate may be increased due to the presence of more educated people and workers during and after construction operation.

7. ARRANGEMENT OF SILO BINS AND ANCILLARY FACILITIES

7.1 General

The Madhupur Silo Campus is now a confined area of 5.81 acres of land, by the side of Madhupur-Mymensingh road, within the boundary wall. Within this 5.81 acres of land, 16 nos. silo bins and a huge number of ancillary facilities are to be accommodated. The ancillary facilities are; Guard room by the gate site, Truck scale, Sampling house, Laboratory house with weight control room, Truck parking area, Bulk truck receiving area (26x16m), Control room (9x10m), Bulk elevator tower (8.9x6m size), Surges bin tower, Bulk house (12x15m size), Bagging house (30x18m size), Empty gunny bag godown (7.5x24m size), Workshop cum store (12.6x15.4m), Sub-station (17x10m), Inspection bungalow, Silo office, Car parking, Public toilet for rivers and other (4.8x7.8m area), Canteen, Four storied dormitory for support staff, three storied Officers dormitory, Fortified rice bags receiving area (6x18m size) etc. The Designers arranged all the silo bins and the ancillary facilities very effectively (pl refer to the fig. 3.3, the layout plan for the silo and ancillary works).

7.2 Safeguard facilities during Construction works

For the environmental and social safeguard compliances, the construction and installation of water supply and sanitation facilities, along with the labor-camp placement, will have to be done with precaution. The areas, along the western boundary wall, will be suitable for setting the workers' facilities like labor-shed, toilet and solid waste management. Cleaning of labor-camp site, toilets etc. will have to be done cautiously, because; the west boundary wall is just by the side of Madhupur-Mymensingh highway. Also, the toilet facilities may be accommodated at the north-west corner of the silo campus. Precaution will have to be taken on cleaning the toiletry facilities, because, the office building is with the north boundary wall. The Supervision Consultant's Engineer and the Contractor will take a careful decision for setting the workers' facilities, material stocking yard etc. within the limited area.

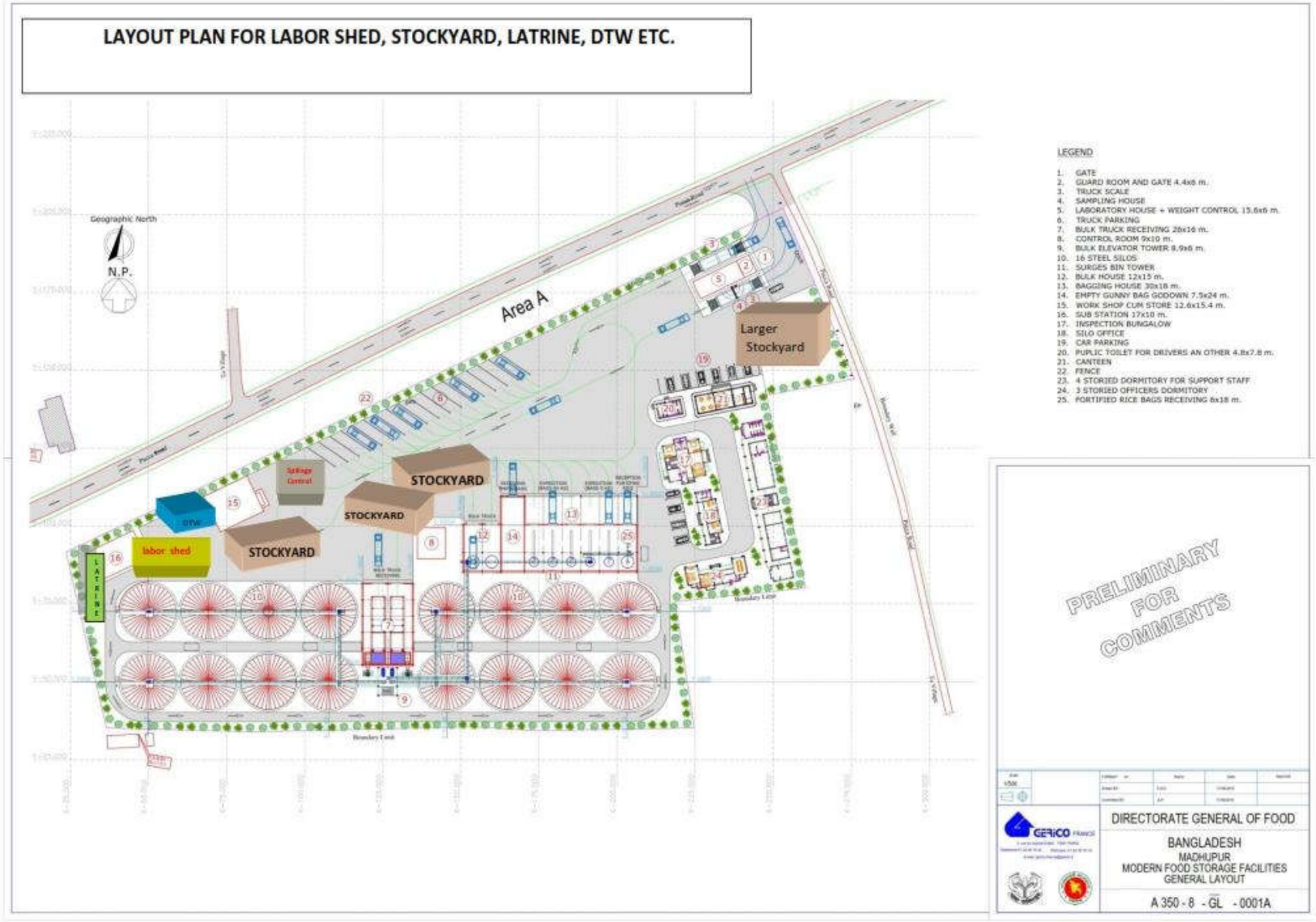


Figure 7.1: Arrangement of labor camp, stockpiles, water source, latrines etc.

7.3 Traffic Management

The Silo Campus is adjacent to the Madhupur-Mymensingh highway. There is no other alternate route through which the Contractor might use for carrying their construction materials. The materials carrying vehicles may use either Dhaka-Tangail-Madhupur route or Chittagong-Mymensingh-Tangail route. The vehicles for construction and installation will be only through this road. The use of the only road may follow the following sequences:

- ✓ The construction materials like stone/ brick chips, sand (both local and Sylhet sand) may be brought from Mymensingh/ Sylhet area, via Mymensingh,
- ✓ Steel Rod for reinforcement works may be from Chittagong via Mymensingh,
- ✓ Cement may be purchased/brought from Chittagong/ Narayanganj via Mymensingh,
- ✓ The Steel Sheet (pre-fabricated) for the silo bins may be brought from Chittagong Port to the project site via Mymensingh, or from Dhaka to project site via Tangail and Madhupur.

Proper traffic management is necessary during carrying construction materials. The environmental and social safeguard issues have been accommodated with the engagement of people for traffic management during construction and operation periods (also traffic arrangements are shown in figure 7.2)..

7.4 Residential Arrangement for the Silo Experts

The Contractor may have to arrange some residential arrangements for the International and National Experts, during construction periods. In that case, the Contractor will be able to rent houses in the Madhupur city area which is only at 3.5 km from the silo site.

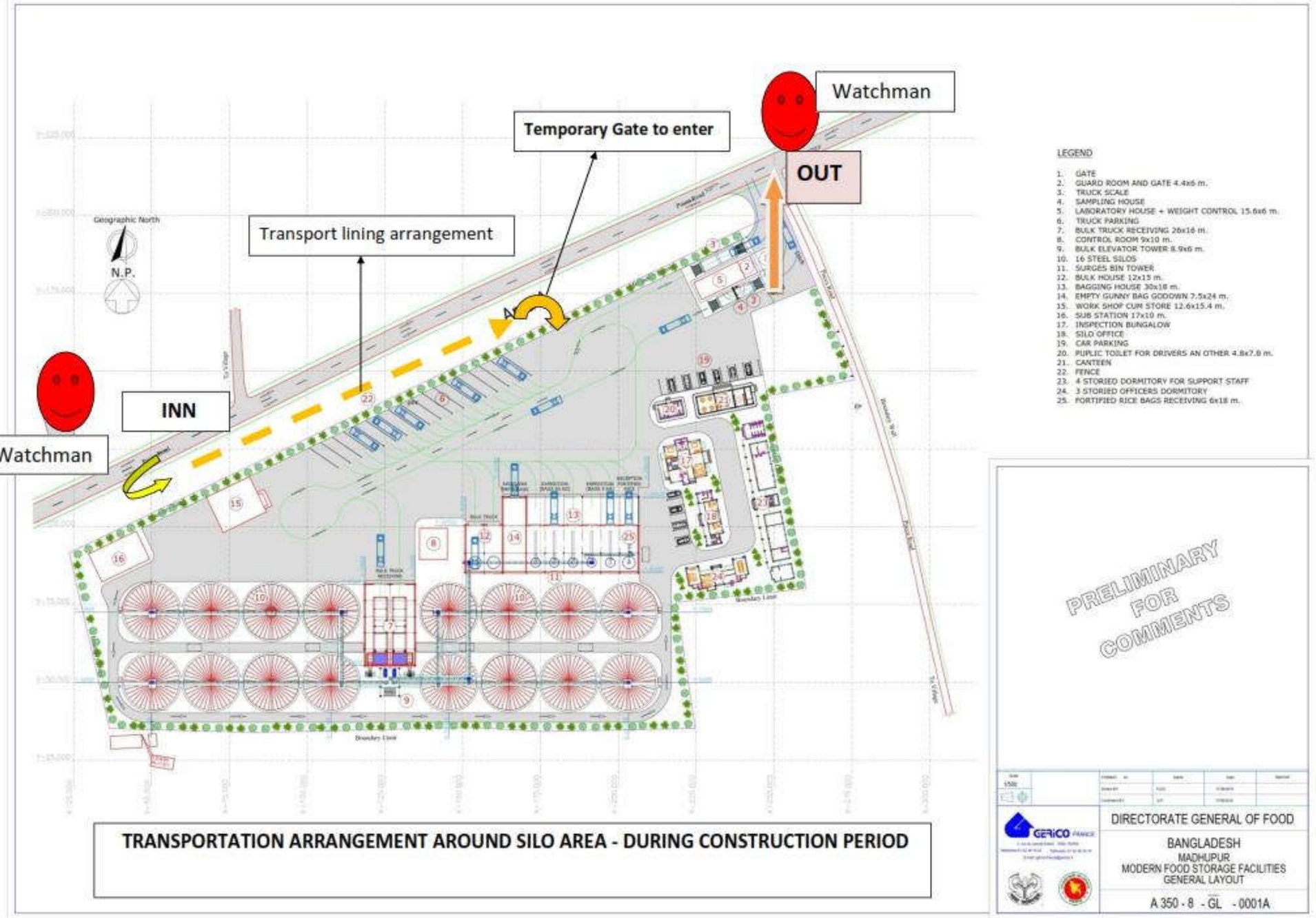


Figure 7.2: Transportation arrangement around silo area during construction period

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Plan (ESMP) aims to ensure the compliance of all activities undertaken during implementation and operation of the sub-project with the environmental and social safeguard requirements of both the World Bank and Government of Bangladesh. Furthermore, it aims to integrate the environmental and social mitigation measures needed for the sub-project. The plan consists of mitigation, monitoring and institutional arrangements to be undertaken during implementation and operation to eliminate adverse impacts, offset them, or reduce them to an acceptable levels. The plan also includes the actions needed to implement these measures.

8.1 Objectives of the ESMP

The basic objective of the ESMP is to manage, prevent and mitigate the adverse impacts due to the sub-project interventions in a way that minimizes the adverse impact on the environment and the people around Madhupur Silo areas and specifically to:

- ✓ Facilitate the implementation of the environmental and social mitigation measures identified during the present ESIA.
- ✓ Assign responsibilities of the PMU, MFSP and Contractors for the environmental and social management of the Project;
- ✓ Define a monitoring mechanism and identify monitoring parameters to ensure effective implementation of the ESMP.
- ✓ Assess environmental training required for different stakeholders at various levels.
- ✓ Describe communication and documentation requirements.

8.2 Environmental and Social Management and Mitigation Plan

Environmental and Social Management and Mitigation Plan summarizes the potential impacts, corresponding to, (i) preventive measures during pre-construction/design period, (ii) both preventive and mitigation measures during construction phase and (iii) preventive and mitigation measures during operation period. The plan is also for setting the responsibilities of different level of stakeholders with specific task and function. There will be an indication of timeframe for effective implementation of ESMP.

Potential impacts have been assessed according to magnitude (minor, moderate, major), sensitivity and impact duration (Temporary or Permanent) and are presented in a manner that shows magnitude, sensitivity and duration of a particular impact. Level of duration and magnitude assumed without mitigation measures.

Table 8.1: Environmental and Social Management /Mitigation Plan (Design & Construction Phase)

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Pre-Construction stage					
Site Preparation (already done)	Measures for environmental safeguard during preparatory works	Environmental safeguard issues were added in the BOQ of site preparatory works	Included with the BOQ of preparatory works	Contractor	PMU, MFSP
Traffic movement plan	Traffic load will be increased on Madhupur-Mymensingh highway	• Extra man-power will have to be provided to control the traffic movement. • Most of the construction materials will be carried from Chittagong-Mymensingh route. • Few item will be transported from Dhaka, along Tangail-Madhupur route	Cost has been included during cost estimation and included in the BOQ	Contractor	PMU, MFSP
Design Considerations	Foundation works for the silo bins, consideration of pile design	• Pile design for silo bins has been completed as per soil test report. • Foundation for the ancillary facilities has been designed according to sub-soil test.	Cost has been included in the estimates and BOQ	Design Consultants	PMU, MFSP

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
	Anticipated contamination of soil and water around, during construction works	• Appropriate waste collection and disposal systems has been adapted with the environmental and social safeguard compliance issues • Temporary drainage facilities has been incorporated with environmental management plan. • Proper drainage system and on-site sanitation system has been considered during design works	Cost for waste collection system and temporary drainage system has been include with the BOQ and estimated for the designed drainage and latrine sludge management.	Design Consultants during design and contractor during implementation	PMU, MFSP
Construction of labor camp	If not prepared and maintained properly, impacts will be there on surrounding environment.	• The labor camp has been considered along the west boundary wall of silo campus. • Proper sanitation and waste collection system are to be provided along with the labor-camp.	Cost has been estimated and items have been incorporated in the BOQ	Contractor	PMU, MFSP
Construction stage					
Earthwork	Slope, erosion and dust blowing, during earth work for any foundation work	• Care to be taken during any excavation works, • Dust blowing is to be controlled through providing water spray every day	Expense has been included in contract and conditions has been provided in the BOQ.	Contractor	PIU, PMU, MFSP

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Noise	Increase of noise level of the construction site. Increasing noise level during construction works may disturb to the nearby physical and social infrastructures like school, mosque etc.	• Noise level to be measured periodically, near the north-side of the entrance gate, • Proper scheduling of transportation of material and noise generating equipment/ works, • All vehicles and equipment used in construction shall be fitted by exhaust silencers, maintain regularly to minimize noise level.	According to overall Environmental Management plan in addition to Compliance included in BOQ	Contractor	PIU, PMU, MFSP
Dust	Dust is generated during vehicle movement, material carrying and construction works that may create disturb to nearby physical and social infrastructure	• Construction materials should be carried by the covered vehicle • Spraying should be done every day, during construction works • Extra care to be taken for the safety of nearby institutions.	BOQ is with the issues (environmental safeguard)	Contractor	PMU, MFSP
Surface water	Contamination of surface water (road side ditches)if waste is not managed properly	• Ensuring wastes/effluent disposal properly, • Ensuring solid waste management properly	BOQ is with the environmental safeguard issues	Contractor	PMU, MFSP
Water Logging	During construction work and in rainy season, water logging may take	• Temporary earthen drain to drain out rain water during construction • Temporary earthen drain shall be	As per BOQ of bidding document	Contractor	PMU, MFSP

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
	place	with the kitchen of labor camp			
Vehicular Traffic	Materials carrying vehicles may damage environment and may be a disturbance to nearby physical and social institutions.	• Speed limits will be enforced for the Project vehicles. • Reduced speed near/through communities. • Safety signage should be placed at the work sites	Environmental Management plan, environmental safeguard compliance cost in BOQ	Contractor	PMU, MFSP
Public Health and Safety	Due to migrated workforce, infectious diseases may be there in and around Madhupur silo site	• The contractor will engage local people as maximum, • Health checking should be done, especially for migrated people, • Workshop and training will be with the workers & supervisors.	Environmental Management plan, environmental safeguard compliance cost in BOQ	Contractors	PMU, MFSP
Social and Gender Issues	Some issues related to society and gender may be raised during construction works	• Workshops with the surrounding community people, leaders will be arranged. • Grievance redress mechanism has been established at silo site	Expense is included in the environmental and social safeguard compliance BOQ	Contractors	PMU, MFSP
Children's right	Child labor may be engaged during construction	• Contractor shall avoid the engagement of child labor force, • Patrolling periodically to check for any child labor	Clear indication is there in the tender documents.	Contractors	PMU, MFSP

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
At the end of construction works i.e. during completion	Any unwanted substances may be left behind, at the end of construction, may lead environmental pollution and damage to the aesthetic views and may cause disturbance to nearby physical and cultural resources	• At the completion of work, the contractor shall remove all unwanted material from the site, • The cleaning of construction site should be done properly. • Damaged equipment, debris, waste and unusable materials should be cleaned from the campus and those are to be disposed properly.	Expense is included in contract cost.	Contractor	PMU, MFSP
Operation and Maintenance stage					
Chiller System and use of Nitrogen	Chiller system has been adapted in the modern food storage facilities project, instead of using Fumigation (AP) system. In addition, Nitrogen gas will be used for insect and fungal control.	In the silo bins, an improved control, of insect and fungie, has been adapted and designed. Design & Supervision Consultant has designed the system. The use of Nitrogen gas will be automatically controlled and there is no chance of any hazard due to use of nitrogen gas for disinfection.	Cost has been included in the bidding document	D&S Consultant	PMU, MFSP
Public Health and Safety	The total system (from food grain loading to bagging) is automated and mechanised. Some problem may be raised during maintenance of steel of bins at outside.	• Proper care will be undertaken during maintenance of bin sheets at the operation phase, • Capacity building, including on-the-job training shall be continued during O&M phase.	Environmental Management plan, environmental safeguard compliance cost in BOQ	Contractors	PMU, MFSP

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Traffic for grain transportation	Noise levels may be increased due to movement of more vehicles during operation and may be a disturbance to the nearby physical and social institutions	Awareness building and administrative measures shall be taken	Incorporated in the safety BOQ	MFSP	DG-Food
Children's Right	Child labor engagement	• Prohibit child-labor engagement, • Patrolling periodically to check child labor engagement	Mentioned in the tender document	MFSP	DG-Food
Operation of Machinery and equipment	May cause air quality deterioration and noise level may also be increased and may be a disturbance to the nearby physical and social institutions	Controlled vehicular movement, Regular monitoring air quality, Arrangement of HSE training to workers and supervisors, Regular monitoring noise quality, Ensure PPE to the O&M staff Waste management plan as part of its operation & maintenance, On-site sanitation system should be with proper septic tank.	Mentioned in the bidding document	MFSP	DG-Food

8.3 Environmental and Social Monitoring Plan

8.3.1 General

Environmental and Social Monitoring Plan has been prepared to provide guidelines for environmental and social management plan during the construction and operation phases. The environmental and social components will be monitored during construction period and the monitoring will be continued up to certain period of silo operation. Environmental and social management and monitoring plan is an essential tool to keep the base environment undisturbed as well as to upgrade the environmental standard of the sub-project area. The major environmental impact, monitoring method, responsibility, expenses, time period etc. are illustrated in table 8.2.

8.3.2 Objectives of the ESMoP

The objective of environmental and social monitoring plan, during the construction and operation phases, is to compare the monitored data against the baseline condition collected during the study period to assess the effectiveness of the mitigation measures and the protection of the ambient environment based on national standards. The main objectives of the pre-construction, construction and operation phase monitoring plans will be to:

- ✓ Monitor the actual impact of the works on physical, biological and socioeconomic receptors in and around the sub-project area.
- ✓ Recommend mitigation measures, during construction and operation period, for preventing adverse impacts and to control impacts at its acceptable limit.
- ✓ Ensure compliance with legal and community obligations including safety on construction sites;
- ✓ Ensure the safe disposal of excess construction materials.
- ✓ Ensure measures to protect and improve physical, biological and socio-economic environmental standards for long time.

Table 8.2: Environmental and Social Monitoring Plan

Environmental Indicator	Management	Means of Monitoring	Parameters	Frequency	Responsibility	
					Implementation	Supervision
Air Quality	Measurement of air quality	Portable air quality measuring machine	CO, SOx, Nox, SPM	Once in every three month	Contractor	PMU, MFSP
Dust Control	Spraying of water	Visual	Suspended particles in air	During creation of dust	Contractor	PMU, MFSP
Noise Control	Measurement of noise level	Portable noise measuring machine	Noise level (dB)	Once in every three month	Contractor	PMU, MFSP
Waste management	Collection, transportation and disposal of solid waste.	Inspection	Different types of waste	Daily	Contractor	PMU, MFSP
Health and safety	Monitoring health and safety of workers	Inspection	PPEs	Daily	Contractor	PMU, MFSP
Water quality	Surface and ground water	Inspection and Water analysis through a government approved laboratory like DPHE, BUET etc.	Organic & inorganic	Once in every three month	Contractor through an agency	PMU, MFSP
Infectious Disease HIV/AIDS	Monitoring affected people if any	Engaging Physician	No. of affected person	Twice in a year	Contractor	PMU, MFSP
Traffic movement	Nos. of vehicle movement	Inspection& record keeping	No. of vehicle	daily	Contractor	PMU, MFSP

8.4 EMP in Bidding Document

The following items have been incorporated as ESMP in the bidding document:

Table 8.3: Cost of ESMP

Item	Description of Item	Amount (Tk.)
	Environmental and Social Mitigation and Enhancement Works	
1	Temporary Camp for the laborers with the facilities of cooking, utensils, washing, disposal of solid waste and providing waste bins etc. are to be with entire satisfaction of Engineer-in-charge (EC)	1,50,000.00
2	Prevention of spillage, leakages of polluting materials, i.e. arrangement of keeping fuel, lubricant, kerosene, mobil etc. for which a pucca platform (at least 100 sq. ft with brick soling and plastering), as per satisfaction of EC	30,000.00
3	Adequate supply of potable water for ensuring; drinking purpose, household purpose, washing, using in construction works. The water quality should be tested in the standard testing laboratory in Bangladesh, specifically but not limited with the standard test results for the parameters like; pH (6.5-8.5), Iron (0.3-1 mg/L), Arsenic (0.05 mg/L), Aluminium (0.2 mg/L), Ammonia (0.5 mg/L), Chromium total (0.05 mg/L), Manganese (0.1 mg/L), Salinity (0%) and the whole works to be done to the entire satisfaction of EC	2, 00,000.00
4	Sanitation: 4 nos. of Toilets; at two separate corners as directed by EC.	100000.00
5	Providing First Aid Box with sufficient gauge, bandage, antiseptic cream, antiseptic lotion and with sufficient medicine with the satisfaction of EC	20,000.00
6	Rehabilitation of whole areas including stockpile, brick crushing sites, borrow areas, workforce camp to the entire satisfaction of the EC	100,000.00
7	Construction of temporary earthen drain and its maintenance during rains to drain out the surface water during rains and construction	50,000.00
8	Providing personal protection equipment (PPE); 20 pairs-hand gloves, 20 pairs-gumboot, 20-approne, 20-eye protecting glass, 20-Helmets etc.	150,000.00
	Sub-total	800,000
Construction phase		
1	Air quality	10000.00Tk x 1 point x 3 quarter = 30000.00
2	Water quality	8400.00Tk x 1 point x 3 quarter = 25200.00
3	Waste management L.S	50000.00
4	Noise and vibration	10000.00Tk x 1 point x 3 quarter = 30000.00
5	Ecosystem (Flora and Fauna)	20000.00
	Fisheries ecosystem	10000.00
6	Work environment (Including Safety)	20000.00
7	Accidents	20000.00
8	Awareness building Program on HIV/AIDS	50000.00
	Sub-total	**255200**
Operation Stage		
1	Air quality	10000.00Tk x 1 point x 3 quarter = 30000.00
2	Water quality	8400.00Tk x 1 point x 3 quarter = 25200.00
3	Noise and Vibration	10000.00Tk x 1 point x 3 quarter = 30000.00
4	Work Environment (Including Safety)	50000.00
5	Accidents	50000.00
6	Tree Plantation	500000.00
	Sub-total	**685200**
	Grand total	**1740,400.00**

In Word: Tk. Seventeen Lac Forty Thousand and Four Hundred Only

8.5 Grievance Redress Mechanism

A grievance can be defined as an actual or perceived problem that might give grounds for complaint. As a general policy, DG-Food along with the MFSP will work proactively towards arising and minimizing grievances through the implementation of impact mitigation measures and community liaison activities that anticipate and address potential issues before they become grievances. The Grievance redress mechanism (GRM) sets out the information and communications strategy to ensure that PAPs and communities are fully informed about their rights to offer suggestions and make complaints, and the different mechanisms through which they can do so, including grievances through creating more sounds during construction, pollution through improper solid waste management, traffic disturbance during the movement of more vehicles during construction and operation phases etc. This will be the responsibility of the PMU, CSC, and contractors and persons designated to be responsible for stakeholder liaison. The objectives of GRM are:

- ✓ Potential impacts and effects that are most likely to give rise to grievances for this Project are related to:
- ✓ Mitigation to any disturbance during construction and operation phases,
- ✓ Distribution of employment opportunities;
- ✓ Construction noise, vibration, surface water pollution, waste management etc control,
- ✓ Presence of a construction labor force and its effects on neighboring villages, local services and infrastructure.

Any stakeholder (individual or organization) will be able to submit a grievance to the Project if they believe a practice is running with adverse impact on community, the environment, or on their quality of life. They may also submit comments and suggestions. Grievances could include:

- ✓ Adverse impacts on a person or a community (financial/physical lose, nuisance);
- ✓ Dangers to health and safety or the environment;
- ✓ Failure of PMU, MFSP, its contractors and their workers or drivers to comply with standards or legal obligations;
- ✓ Harassment of any nature;
- ✓ Criminal activity;
- ✓ Improper conduct or unethical behavior;
- ✓ Financial malpractice or impropriety or fraud; and
- ✓ Attempts to conceal any of the above.

DG-Food will establish a Grievance Redress Mechanism (GRM) to answer to queries and address complaints and grievances about any irregularities in using the guidelines adopted in

the project implementation. DG-Food will form Grievance Redress Committees (GRCs) for silo sites consisting of memberships to ensure proper presentation of complaints and grievances, as well as impartial hearings and transparent decisions. Based on consensus, the GRM will help to resolve issues/conflicts amicably and quickly, saving the aggrieved persons resorting to expensive, time-consuming legal actions. The GRM will however not preempt an aggrieved person's right to go to the courts of law.

The GRC at the silo level will have the following memberships:

1.	Project Coordinator, Silo Site, MFSP, DG-Food	Convener
2.	Technical Site Specialist, Silo Site, MFSP, DG-Food	Member Secretary
3.	Councilor / Member of the respective City Corporation / Pourashava / Union Parishad	Member
4.	Women Councilor / Member of the respective City Corporation / Pourashava / Union Parishad	Member
5.	Representative from the Project Affected Person / Beneficiaries / Stakeholder of the respective silo site	Member

8.6 Institutional Arrangement for Project Implementation

The institutional arrangements required for implementation of the EMP are discussed below. A flow chart for implementation arrangement is added in Figure 8.1

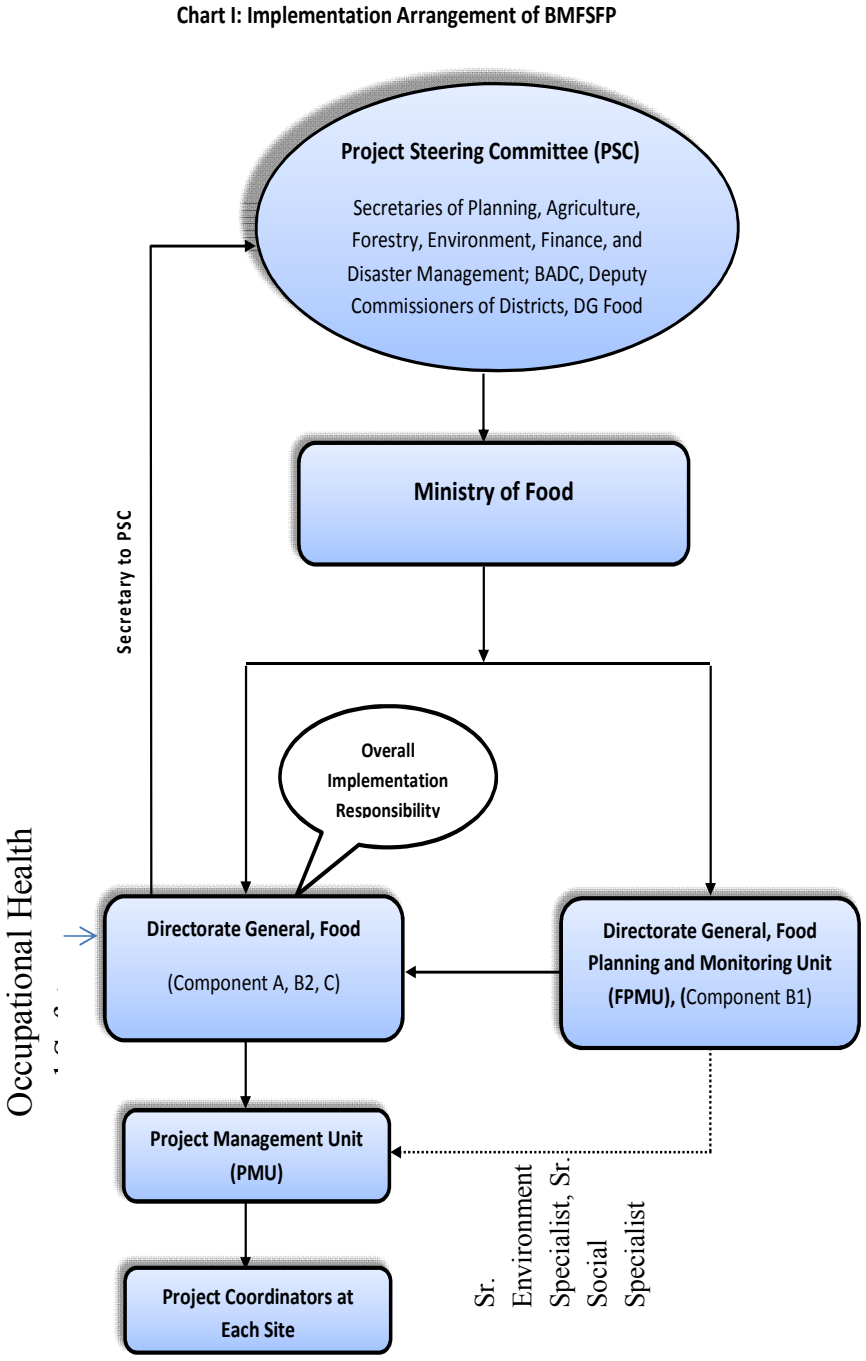


Figure 8-2 Implementation Step Up of the Project

8.6.1 Implementation Responsibility

The Project proponent (DG Food) will be overall responsible for the implementation of EMP through consultants and contractors. The staff of the proponent, consultants and contractors who are responsible for ensuring the implementation of the EMP needs to have the capability to handle the complexities and spirit of management strategies. Training and workshops will need to be arranged involving proponent, consultants and contractors to share the issues of environmental and social protection.

A **Project Management Unit (PMU)** has been established under the DG Food's office for day–to-day implementation and monitoring the project activities. The PMU is headed by a Project Director who is assisted by; (i) Deputy-Project Director and Assistant Deputy Project Director, and a number of consultants like; (i) technical specialists (Civil, Mechanical and Electrical); (ii) Senior Procurement Specialist, and Procurement Analyst; (iii) Senior Financial Management Specialist, and Accountant, (iv) Senior Environmental Specialist, (v) Senior Social Specialist, and (vi) Senior Communication Specialist. Each Silo site is headed by the Project Coordinator for coordination with the contractors, consultants and local administration, along with a Technical Supervision Specialist. The Senior Environment Specialist is responsible for ensuring the adequacy of environmental safeguard issues in the Bidding Document (BOQ) and ensure the quality of Environmental Action Plan (EAP), that will be developed and submitted by the contractor before starting the work (Sample EAP is attached in the annex-K). The field level environmental specialist (D & S Consultant) will be on board before commencement of the construction work.

8.6.2 Construction Phase

Environment Specialist in PMU. The Senior Environmental Specialist (SES) of PMU will have to ensure implementation of EMP and other environmental safeguard issues. The SES is responsible for maintaining liaison with WB safeguards team, regulatory agencies and other stakeholders during the Project implementation. The SES will also coordinate with the environmental staff of the Construction Supervision Consultants.

Supervision Consultant's Environment Monitor. The Supervision Consultants will have dedicated, properly qualified and experienced, site-based Environment Monitor (EM) at each construction site (before starting the construction works). The EMs will monitor and supervise the EMP implementation at the field level. The EMs will maintain coordination with SES at the PMU level and supervise and monitor the construction works. The EMs need to be a graduate preferably in environmental science/engineering with at least 5 years' experience in the related field.

Contractor's Environment Supervisor. The construction contractors will have dedicated, properly qualified and experienced, site-based Environment Supervisors (ESs) at each construction site. The ESs will be responsible to implement various aspects of the EMP particularly the mitigation measures to ensure that the environmental impacts of the construction works remain within acceptable limits. The ESs will maintain coordination with the EMs at the site level.

8.6.3 Operation Phase

The (Health, Safety and Environment) HSE function will be a key element of the operation and maintenance arrangements at each of the silo facility. Dedicated HSE personnel will be part of the O&M staff and will be responsible to prepare and then implement the relevant parts of the Operations Manual for ensuring health and safety during project operation.

8.7 Training Plan

A series of training programs has been proposed under the MFSP Silo project to enhance the skills of the MFSP as well as contractor staff in environmental aspects especially Environmental Management Plan (EMP) and Environmental Safeguard arrangements. The Environmental and Social consultants (PMU and D&S consultants) will be responsible for imparting training to the engineers and supervisors engaged in construction and operation works. The, following training programs are to be included for effective implementation of environmental safeguard issues during construction period and operation stages:

- ✓ Implementation of Environmental Management Plan (EMP) and auditing of Environmental Management System (EMS)
- ✓ Documentation requirements of ISO 14001 2004
- ✓ Internal and external communications
- ✓ Internal audit

A training plan is provided the following Table 8.4.

Table 8.4: Environmental and Social Training Plan

Contents	Participants	Responsibility	Schedule
✓ Environmental issues related to Silo Construction and associated facilities under MFSP ✓ Environment policy & legislation of Bangladesh, guidelines on Environment, Health and Safety (EHS) safeguards of co-financiers	DG-Food/ MFSP staff and Contractor staff	MFSP (PMU and D&S Consultant)	Prior to start the Project activities. (to be repeated as needed.)
✓ Environmental and social safeguard issues required during construction works and remedial measures for adverse impacts during construction works.. ✓ Environmental and social safeguard issues during operation and maintenance of Silo Bins. ✓ Use of Nitrogen gas in the process operation for silos.	DG-Food/ MFSP staff and Contractors' Crew	MFSP (PMU and D&S Consultant)	During and after construction works
✓ Environmental parameters' quality measurement activities required during construction works, ✓ Mitigation measures with the environmental parameters during operation phases	DG-Food/ MFSP staff and Contractor's staff	MFSP (PMU and D&S Consultant)	During and after construction works
✓ Monitoring and checking the ecological parameters around, during construction works. ✓ Reporting of environmental monitoring	DG-Food/ MFSP staff	MFSP (PMU and D&S Consultant)	During and after construction works
✓ Waste disposal; ✓ HSE	Construction crew	MFSP (PMU and D&S Consultant)	Prior to start the Project activities. (to be repeated as needed.
✓ HSE during Operation Phase	DG-Food/ MFSP staff	MFSP (PMU and D&S Consultant)	Prior to start the Project activities. (to be repeated as needed.

9. PUBLIC CONSULTATIONS

9.1General

Public Consultation was done with different level of people in and around Madhupur, Tangail areas. The people are not fully aware of the activities of modern steel silo projects. During the consultation meetings and interactions, the sub-project, its benefit etc. were elaborated by the consultation team (environmental and social). The consultations were made with different level of people like, Upazila and Union level elected persons, community leaders, mosque Imam, businessmen, rice husking factories in and around Madhupur areas. The direct and indirect beneficiaries, like workers, businessmen, people of all level etc. of the existing LSD at Madhupur were also consulted. The target of such consultation was to finalize the environmental and social safeguard compliance issues to be considered during pre-construction/design phase, construction phase and operation phase, including the options for rice storage, Use of Nitrogen gas for controlling insects/fungi, fortification, bagging and distribution of rice during disaster period. The probability of impacts on local peoples' business and employment was also judged through such consultation. Such stakeholders' engagement is an integral part of ESIA preparation and is a statutory requirement of the ESIA legal framework in Bangladesh on Environmental and Social Safeguards. The consultation program for the Project is based on informed consultation and participation in line with ESIA requirements with the people, and such consultations were made during October 2016.

9.2 Objectives

The objective of stakeholder consultation is to finalize the environmental and social safeguard compliance issues to be incorporated in the ESMP. The consultation was done for the following specific objectives:

- ✓ to find the legal obligations are involved with the silo construction works at Madhupur area,
- ✓ to find out the probable ways to avoid traffic congestion during carrying construction materials,
- ✓ to find out the best possible ways to adapt solid waste management options to be applied for Madhupur silo campus,
- ✓ to find out the water supply, sanitation etc. facilities to be involved during construction and operation,
- ✓ to find the safety options for construction of silo and ancillary facilities in Madhupur.
- ✓ to identify the stakeholders affected and/or with an interest in the Project;
- ✓ describe how the views and issues raised have informed and influenced the development of the Project; and
- ✓ outline the future plans and approach to stakeholder engagement.

9.3 Consultation with various Stakeholders

A stakeholder is defined as any individual or group who is potentially affected by the proposed Project or can they affect the proposed Project directly or indirectly. Stakeholder consultation is an inclusive process for sharing information that enables stakeholders to understand the risks, impacts, and opportunities of a development or project, allowing them to express their views and articulate their perceptions towards it.

Through the project preparation stage extensive consultations/FGDs have been arranged during the conduct of the ESIA surveys. The details of FGDs are given in the following Table 9.1. The findings of the FGDs are summarized in Table 9.2 and the details of these FGDs are given in Appendix I.

Table 9.1: Details of FGDs

FGD No.	Type of Participants	No. of Participants
1	Local People	15
2	Local People	15
3	Local People	15
4	Local People	15
Total		**60**



Figure 9.1 Photos of Focus Group Discussions

Table 9.2: Summary of the FGD

Questions for discussion	Answer, Opinion, Comments and Suggestions
Are you aware of the activities of the sub-project? If yes, what are they?	Yes. The details of the project are shared with us, earlier. Silo-bins will be constructed to store surplus food during harvesting period and distribution of food during/after a disaster.
Any air pollution in the area due to the project activities? If yes, how to mitigate?	The area is away from the community. Air quality will not decrease significantly, project authority will take necessary measures to control air pollution,
Noise- impact in the locality during construction and operation? How to mitigate?	There will be a little noise impact, due to pile driving, vehicular movement etc. but the project authority will have to minimise the noise.
Any impact on local soil due to the project activities? If yes, how to mitigate?	The construction will be within the confined area, within boundary wall, and no impact will be occurred on the local soil.
Any impact on ground/ drinking water quality due to the project? If yes, how to mitigate?	There is no problem with the groundwater quality because of the construction. However, the project proponent should confirm that no accidental spillage or washout of hazardous/waste material to surrounding water bodies during construction; particularly in the monsoon.
Any impact on the surface water body (river, pond, khal, beel, canal etc.)? If yes, how to mitigate?	There project authority will control waste water, during construction and operation. They will also control the accidental spillage or washout of hazardous/waste material to surrounding water bodies during construction; particularly in the monsoon.
Any impact on drainage system? If yes, how to mitigate?	No; the project authority will design the drainage system to drain out storm water and onsite sanitation system for septage management.
Any impact due to on site or offsite disposal of construction waste or household waste? If yes, how to mitigate?	Waste will be generated, no doubt, during construction and operation, both from silo areas and the residential areas, but the project authority will have to manage all type of wastes properly.
Is the proposed area inundated during flood? If yes, how much?	No, the area is not inundated during rainy season.
Are any Environmental Protected Area (EPA) / Environmental Sensitive Area located nearby? If yes, where & how far from the project?	No, the area is out of such EPA or ESA
Will the project lead to any agricultural land loss/crop loss?	No. The land will be used is a khas land and was not used for any agricultural purpose.
Will the project increase the disaster preparedness of the country?	Yes. The food storage will help supplying food in emergency situation right after a disaster. And thus it will increase the disaster preparedness of the country.

Will the project help in meeting food security needs caused by disaster induced food shortage?	Yes. After a disaster, the storage will meet up the emergency food supply and thus it will help in meeting food security needs caused by disaster food shortage.
Will the project stabilize the food price?	Yes. If there is enough food stored, then the price of the food will be stabilized too.
Will the project reduce storage losses?	Yes. This modern food storage facility is an improved technology, which will reduce storage losses, than that of conventional food storage systems.
Will the project be helpful for the poor and vulnerable?	Yes. the scarcity of food will be reduced and price of the food will be stabilized even after a disaster which will ultimately help the poor and vulnerable.
Does the project involve any land acquisition or involuntary resettlement?	The land was government owned khas land. Few poor people were using the land for their temporary living and for cultivating banana etc. and they were compensated during acquisition of land.
Does the project need demolishing of any structure?	No.
Will the project lead to destruction of trees and vegetations?	There were four young Mango tree and those were cut during land development. It has been designed to plant more than 500 trees in the sub-project area.
Does the project require land filling? If yes, what is the source of land filling material/soil?	Yes. The land filling has already been done. The soil was carried from far places by the engaged Contractor.
Will there be any traffic disturbance due to construction material and wastes transportation?	During carrying construction materials, traffic load will be increased than the present mode. The materials will either be carried from Mymensingh part or from Tangail part. Emphasis will be given to carry materials from Chittagong and Sylhet via Mymensingh.
Will there be any negative impact in neighborhood or community?	No, the community is far from the construction site, it is 3.5 km away from Madhupur town.
Will there be any impediments to movement of people and livestock?	The construction works will be commenced within the confined area, within the boundary wall, so, there will be no problem for the peoples' movement through Madhupur-Mymensingh road.
Will there be any direct or indirect hazards to student for walking in the school campus by construction activities	No.
Will the project impact on your social and economic sector? If yes, how?	Yes. It will create some employment generation, hence the project will be beneficial to the community people, on the point of more employment for the local people.
What types of benefits are you expecting from the project?	We are expecting increase in working facilities, food supply and improvement of trade and commerce. We also expect the improvement of local community.

Do you have any recommendation before the implementation of this project?	The local people of the project area are expecting more employment generation for them and they urged to engage more local people for construction and operation phases.
Are you in favor of this project? Why?	Yes. the people appreciated the initiatives. The project authority is expecting to initiate and generate business, employment etc. for the local people.

9.4 Findings of the consultation meetings

Four consultation meetings were held during October 2016 at the project areas. The consultation meetings were conducted with different level of local people. Total 60 (sixty) participants, different level of people like; local representatives, businessmen, day laborers, farmers, shop keepers etc, were in the meetings. In consultation meetings; environmental and social issues were examined. The main focus was to dig out the mental supports from different level of stakeholders regarding the new concept of food storage facilities, i.e. the silo construction works in lieu of the traditional food storage facilities. The issue on potential impact of construction works has also been raised.

Most of participants appreciated because of the benefit from the proposed project. They also discussed about noise, water and soil pollution issue that are evolving because of existing project and the future possibilities. They expect improved technology to minimize the problem.

The outcome of the consultation meetings were as follows.

- ✓ There should be effective mitigation measures in order to reduce noise pollution during construction period. Improved technology and proper management plan would help to mitigate the noise pollution.
- ✓ Surface water and soil pollution should be controlled by monitoring the runoff of waste materials to the surroundings.
- ✓ Air pollution from the construction materials and emission from machineries might create problem. Contractor should spray water during material transportation and use cover for air pollution sources if possible.
- ✓ It will generate more employment in terms of using more laborers, more rice mills will be established, transport business will boost, poultry farming will enrich further and so on. The local people requested that local labor should be used during construction and operation.

10. CONCLUSION & RECOMMENDATIONS

10.1 Conclusion

On the basis of the analysis, it may be concluded that the project stands environmentally sound and sustainable when the recommended mitigation measure and environmental management processes are adopted properly.

The benefits of the project will be realized primarily at the level of the national economy. Benefits in the project area will be in significant except for some short terms employment and business opportunities during the construction phase. However, the needs of the food storage facility are obvious and for that the livelihood of the area will be developed. Developed livelihood will directly influence the growth of economy of the area.

The adverse environmental impacts from the project will mostly take place during the construction stage. There are no significant cumulative adverse impacts during operation that are identifiable at this stage. The construction impacts should be very predictable and manageable, and with appropriate mitigation measures. Some funds are required for the environmental clearance certification and certificate renewal fees.

The project is expected to have a small "environmental footprint". No endangered or protected species of flora or fauna are reported at the project site. The proposed project activities have no significant adverse environmental impact so far as a time bound execution program with application of advanced construction technology is ensured. The mitigation measures are well within such codes and practices of construction and operation of the proposed project.

10.2 Recommendation

- ✓ Adequate provisions have been made for the environmental mitigation and monitoring of predicted impacts, along with their associated costs.
- ✓ Adverse impacts if noticed during implementation will be mitigated using appropriate design and management measures. The potential cumulative and residual impacts of the project classify as not a highly sensitive or complex.
- ✓ The EMP, its mitigation and monitoring programs, contained herewith shall be included within the Bidding documents for project works.
- ✓ The Bid documents state that the contractor shall be responsible for the implementation of the requirements of the EMP, as per environmental safeguard compliances costs, mentioned in the BOQ.
- ✓ The contractor will engage environmental people to implement EMP properly.
- ✓ A strong recommendation is being made to implement the proposed sub-project in the CSD campus.

APPENDICES

APPENDIX A: Site Clearance Certificate with ToR for EIA

Government of the People's Republic of Bangladesh
Department of Environment
Head Office, E-[illegible]
Dhaka-1207
www.doe.gov.bd

Memo No: paribesh/ta-j/30.93.57.03.87.3006.15/946 Date: 02/08/2015

Subject: Site Clearance for Construction of Galvanized Corrugated flat Bottom steel silo with RCC foundation and its ancillary works at Madhupur, Tangail under Modern Food Storage Facility Project.

Ref: Your Application on 29.06.2015.

With reference to the above mentioned subject, the Department of Environment (DOE) hereby accords Site Clearance for Construction of Galvanized Corrugated flat Bottom steel silo with RCC foundation and its ancillary works under Modern Food Storage Facility Project subject to fulfilling the following terms and conditions.

1. This clearance shall only be applicable for the development of the infrastructure of the said project.
2. The project authority shall submit a comprehensive Environmental Impact Assessment (EIA) report considering the overall activity of the said Project in accordance with the TOR and time schedule submitted to the Department of Environment (DOE).
3. The EIA shall incorporate the following components, inter alia:

(a) Executive summary
(b) Introduction (Background, brief description, scope of study, methodology, limitation, EIA team, references)
(c) legislative, regulation and policy consideration (covering the potential legal, administrative, planning and policy framework within which the EIA will be prepared)
(d) Project activities: A list of the main project activities to be undertaken during site clearing, construction as well as operation
(e) Project schedule: The phase and timing for development of the project
(f) Resources and utilities demand: Resources required to develop the project, such as soil and construction material and demand for utilities (water, electricity, sewerage, waste disposal and others), as well as infrastructure (road, drains, and others) to support the project
(g) Map and survey information
Location map, Cadastral map showing land plots (project and adjacent area) Topographical Map
(h) Baseline Environmental Condition should include, inter alia, following:
- Physical Environment : Geology, Topology, Geomorphology, Soils, Meteorology, and Hydrology
- Biological Environment : Habitats, Aquatic life and fisheries, Terrestrial Habitats and Flora and Fauna
- Environmental Quality : Air, Water, Soil and Sediment Quality

(i) Socio-economic environment should include, inter alia, following:
- Settlement and housing
- Traffic and transport
- Public utilities: water supply, sanitation, solid waste, drainage, dedicated industrial effluent drainage, sewerage system, green area, parking, fire hydrant, space for various utility services, etc.
- Economy and employment
- Fishing activities, fishing communities, fishing resources, commercial factors.

1/2

(j) Identification, Prediction and Evaluation of Potential Impacts (identification, prediction, magnitude, extent, quantifying, causes and effects, evaluation and assessment of positive and negative impacts likely to result from the proposed project)

(k) Management Plan/Procedures :
For each significant major impact, proposed mitigation measures both in former and external will be set out for incorporation into project design or procedures. Impacts, which are not capable of mitigation, will be identified as residual impacts. Both technical and financial plans shall be incorporated for proposed mitigation measures
An outline of the Environmental Management Plan shall be developed for the project.
In Environmental Monitoring Plan, a detail technical and financial proposal shall be provided for developing an in-house environmental monitoring system to be operated by the proponent's own resources (equipments and expertise)

(l) Explore and design the project in an environmentally sound and sustainable concept by incorporating the policies, resources and energy efficient, optimum use of water resources energy, rain water harvesting, use of low or non waste technology, etc.

(m) Consultation with Stakeholders/Public Consultation (ensures that consultation with interested parties and the general public will take place and their views taken into account in the planning and execution of the project)
Beneficial Impacts (summarize the benefits of the project to the Bangladesh nation, people and local community and the enhancement potentials)

(n) Conclusion and Recommendations.

4. Without approval of EIA report by the Department of Environment, the project authority shall not be able to open L/C in favor of importable machineries.
5. Without obtaining Environmental Clearance, the project authority shall not start the operation of the project.
6. Rehabilitation of human settlement or compensation for any sort of activity which will incur damage or loss to public or private property shall be addressed as per Government of Bangladesh rules and regulations.
7. The project authority shall submit the EIA along with a filled-in application for Environmental Clearance in prescribed form, the feasibility report, NOC from other relevant agencies and other necessary documents to the Tangail District Office of DOE at Tangail with a copy to the Head Office of DOE in Dhaka.
8. Violation of any of the above conditions shall render this clearance void.
9. This Clearance is valid for one year from the date of issuance and the project authority shall apply for renewal to the Tangail District Office of DOE at Tangail with a copy to Head Office of DoE at least 30 days ahead of expiry.
10. This Site Clearance Certificate has been issued with the approval of the appropriate authority.

02.09.2015

(Syed Nazrul Ahsan)
Director (Environmental Clearance, c.c)
Phone # 8181778

Project Director
Modern Food Storage Facility Project
Provasi Kallayn Bhaban, 17th floor
71-72, Puratan Elephant Road
Eskaton Garden, Ramna, Dhaka-1000.

Copy Forwarded to:
1) PS to Secretary, Ministry of Environment and Forest, Bangladesh Secretariat, Dhaka.
2) Director, Department of Environment, Dhaka Region, Dhaka.
3) Deputy/Office in Charge, Department of Environment, Tangail District Office, Tangail.
4) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

2/2

APPENDIX B: Noise Level Test Result

DSCL

Multidisciplinary Development Consultants

DSCL Environmental Laboratory

Name of the Project	Construction of Steel Silo including ancillary works at Madhupur Silo site
Project Location	Madhupur Silo site of Madhupur at Tangail district
Description of sample	Noise Level
Sample Collector	Collected by DSCL Team
Sampling Date	11th October, 2016

Noise Level Analysis

ID	Sampling Location	GPS Location	Zone*	Noise Level Day dB (A)	Bangladesh Standard at Day dB (A)**	Remarks
NM-01	Project Site (East)	24.62982°N 90.06440°E	Commercial Area	49.30	70	Good
NM-02	Project Site (South)	24.62925°N 90.06445°E	Commercial Area	46.22	70	Good
NM-03	Project Site (Centre)	24.62892°N 90.06396°E	Commercial Area	46.68	70	Good
NM-04	Project Site (South-West)	24.62842°N 90.06284°E	Commercial Area	48.14	70	Good
NM-05	Project Site (North)	24.62910°N 90.06312°E	Commercial Area	47.01	70	Good

Note:

** According to Environmental Quality Standard 1997 and subsequent amendment in 2006.*

*** Bangladesh Standard for Noise Level at different types of areas (as per Noise Pollution (Control) Rules, 2006). The sound level standards for residential area are 55 dBA, for silent area 50 dBA and for commercial area 70 dBA at day time. The sound level standards for residential area are 45 dBA, for silent area 40 dBA and for commercial area 60 dBA at night time.*

Abbreviation:

NM- Noise Measurement, dB- decibel

Comment:

Noise measurements were acquired during field visit. Though the site is adjacent to the Mymensingh-Tangail-Jamalpur high-way, noise level in all the five sampling areas remained below Bangladesh Standard at Day dB (A).

Test Performed By:	Approved By:
1.) **Masfiq Bashir** Jr. Environmental Specialist	**Israt Jahan Sumi** Director
2.) **Md. Atiqur Rahman** Jr. Environmental Specialist	

Development Solutions Consultant Limited * DSCL *

Development Solutions Consultant Ltd.
House-35 (A-2), Road-15, Nikunja-2 R/A,
Khilkhet, Dhaka-1229, Bangladesh. Tel: +8804478035444
Email: dscl@dsclbd.com Web: www.dsclbd.com

APPENDIX C: Test Result for Ground Water (On Site)

DSCL

Multidisciplinary Development Consultants

DSCL Environmental Laboratory

Name of the Project	Construction of Steel Silo including ancillary works at Madhupur Silo site	
Project Location	Madhupur Silo site of Madhupur at Tangail district	
GPS Coordination	Latitude- 24.62931°N	Longitude- 90.06356°E
Description of sample	On-Site Ground Water Test	
Sample Collector	Collected by DSCL Personnel	
Sampling Date	11th October, 2016	

Ground Water Test Analysis (On-Site)

Water Quality Parameters	Unit	GW-01	Drinking Water Quality Standard, DOE*	Method of Analysis
pH	---	6.7	6.5-8.5	pH Meter
TDS	mg/L	30	1000	TDS Meter

Note:
** Environmental Conservation Rule (ECR) '97*
TDS – Total Dissolved Solids

Source: Field survey, Cells in grey color shed indicate the exceedance the limit of DOE standard.
GW-01 - Madhupur Silo site

Development Solutions Consultant Limited * DSCL *

Test Performed By:	Approved By:
Masfiq Bashir Jr. Environmental Specialist	**Israt Jahan Sumi** Director

Development Solutions Consultant Ltd.
House-35 (A-2), Road-15, Nikunja-2 R/A,
Khilkhet, Dhaka-1229, Bangladesh. Tel: +8804478035444
Email: dscl@dsclbd.com Web: www.dsclbd.com

APPENDIX D: Test Result for Ground Water (DPHE Laboratory)

Government of the People's Republic of Bangladesh
Office of the Chief Chemist
Department of Public Health Engineering
Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 173/ CC, DPHE, CL, Dhaka. Date: 02/11/2016

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2016110001	Sample Receiving date: 13/10/2016
Ref. Memo No: 2016/N8 & Dated: 13/10/2016	Sample Source: Deep Tube Well
Sent by:S.M. Sanaul Kafi ,Environmental Specialist , Gulshan, Dhaka.	Dist:Tangail, Upa:Madhupur
Care Taker: Modern Food Storage Facilities Project.(GW -01)	Union:, Vill.:Madhupur Silo Site
Sample Collection date: 13/10/2016	Date of Testing: 13/10/2016 - 02/11/2016

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Aluminium (Al)	0.2	<LOQ	mg/L	AAS	0.05
2	Biochemical Oxygen Demand (BOD)	0.2	<LOQ	mg/L	5 days Incubation	0.20
3	Colour	15	1.0	Hazen	UVS	-
4	Dissolved Oxygen (DO)	6.0	6.34	mg/L	Multimeter	-
5	Iron (Fe)	0.3-1	0.12	mg/L	AAS	0.05
6	Temperature	20-30	28.6	°C	Thermometer	-
7	Turbidity	10	1.2	NTU	Turbidity Meter	-
8	Zinc (Zn)	5.0	<LOQ	mg/L	AAS	0.08

Comments: Sample was collected & Supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS- UV-Visible Spectrophotometer, LOQ - Limit of Quantitation.

Test Performed by: Signature

1.) Name: Mahabuba Sabina Motin
Designation: Sample Analyzer
02-11-16

2.) Name: Md. Saiful Alam Khosru
Designation: Sample Analyzer
02.11.16

Countersigned/Approved by: Signature

1.) Name: Md. Biplab Hossain
Designation: Chief Chemist
02/11/2016

2.) Name:
Designation:

APPENDIX E: List of Plants in the Project Area

Common Name	Scientific Name	English Name	Family
Aam	Mangiferaindica	Mango	Anacardiaceae
Aamra	Spondiaspinnata	Sour fruit	Anacardiaceae
Ajuli	Dilleniapentagyna	Dog teak	Dilleniaceae
Apang	Achyranthesaspera	Chaff-flower	Amaranthaceae
Amloki	Phyllanthusemblica	Indian gooseberry	Phyllanthaceae
Akanda	Calotropisgigantea	Crown flower	Apocynaceae
Arhar	Cajanuscajan	Pigeon pea	Fabaceae
Bahera	Tarminallabelerica	Beleric	Combretaceae
Basak	Adhatodavasica	Malabar nut	Acanthaceae
Bazna	Zanthoxylum budrunga	Prickly ash	Rhamnaceae
Banana	Musa sapientum	Banana	Musaceae
Bamboo	Bambusa vulgaris	Bamboo	Poaceae
Babla	Acacia nilotica	Babul Tree	Leguminosae
Begun	Solanum melongena	Brinjal	Solanaceae
Bhant	Clerodendrumviscosum	Hill glory bower	Verbinaceae
Chapalish	Artocarpuschaplasha	Chaplash	Moraceae
Champa	Magnolia champaca	Champak	Magnoliaceae
Dhan	Oryzasativa	Rice	Poaceae
Dhutura	Datura metel	Thorn apple	Solanaceae
Durbaghash	Cynodondactylon	Bermuda grass	Gramineae
Eucalyptus	Eucalyptus obliqua	Eucalyptus	Myrtaceae
Gandhigajari	Miliusavelutina	Sugar apple	Annonaceae
Gamari	Gmelinaarborea	Beechwood	Lamiaceae
Guava	Psidiumguajava	Guava	Myrtaceae

Golap	Rosa sp.	Rose	Rosaceae
Gondhoraj	Gardenia jasminoides	Gardenia	Rubiaceae
Hasnahena	Cestrum nocturnum	Night Blooming Jasmine	Solanaceae
Jarul	Lagerstroemia speciosa	Giant crape-myrtle	Lythraceae
Joba	Hibiscus rosa-sinensis	China Rose	Malvaceae
Jaam	Syzygiumcumini	Java Plum	Myrtaceae
Jambura	Citrus maxima	Pomelo	Rutaceae
Kaika	Adina Cordifolia	Yellow teak	Malvaceae
Koroi	Albiziaprocera	Persian silk tree	Fabaceae
Kalomegh	Andrographispaniculata	Green chiretta	Acanthaceae
Koromcha	Carissa carandas	Crane berry	Apocynaceae
Kadam	Neolamarckiacadamba	Burflower Tree	Rubiaceae
Krishnochura	Delonixregia	Royal Poinciana	Fabaceae
Kheshari	Lathyrussativus	Grass Pea	Fabaceae
Kamini	Murrayapaniculata	Lakeview Jasmin	Rutaceae
Khejur	Phoenix dactylifera	Date palm	Arecaceae
Kutushkanta	Lantana camara	Big sage	Verbinaceae
Lau	Lagenariasiceraria	Bottle Gourd	Cucurbitaceae
Litchi	Litchi chinensis	Litchi	Sapindaceae
Masoor	Lens culinaris	Lentil	Fabaceae
MishtiKumra	Cucurbita maxima	Sweet Gourd	Cucurbitaceae
Mishti Aloo	Ipomoea batatus	Sweet Potato	Convolvualceae
Mula	Raphanussativus	Raddish	Cruciferae
Morich	Capsicum annuum	Chilli	Solanaceae
Nillata			
Palash	Butea monosprema	Flame of the forest	Fabaceae

Paua	Toonaciliata	Red cedar	Meliaceae
Palong Shak	Spinaciaoleracea	Spinach	Chenopodiaceae
PataBahar	Codiaeumvariegatum	Garden Croton	Euphorbiaceae
Pepe	Carica papaya	Papaya	Caricaceae
Premkata	Chrysopogonaciculatus	Golden false beardgrass	Gramineae
Sal	Shorearobusta	Sal Tree	Dipterocarpaceae
Satti	Curcuma zedoaria	White turmeric	Zingiberaceae
Shealmotra	Vernoniapatula	Purple fleabane	Compositae
Shirish	Albizialebbeck	Lebbeck	Fabaceae
Shimul	Bombaxceiba	Cotton Tree	Malvaceae
Shonalu	Cassia fistula	Golden shower tree	Fabcaeae
Shotomul	Asparagus racemosus	Shatamuli	Asparagaceae
Shorpogondha	Rauvolfiaserpentina	Indian snakeroot	Apocynaceae

APPENDIX F: List of Fauna Identified in the Project Area

Scientific Name	English Name	Local Name
Class: Amphibia		
Bufo melanostictus	Common toad	Kuno bang
Rhacophorus leucomystax	Tree frog	Gecho bang
Rana tigrina	Indian bull frog	Kula bang
Class: Reptilia		
Calotes versicolor	Common garden lizard	Rokto-chosha
Dendrelophististris	Tree snake	Gechoshap
Gecko gecko	Wall lizard	Tokkhok
NajaNaja	Indian cobra	Gokhra
Varanusbengalensis	Bengal monitor	Guishap
Xenochrophispiscator	Checkeredkeelback	Dhorashap
Atretiumschistosum	Olive keelback	Maittashap
Class: Aves		
Gallus gallus	Wild cock	Murgi
Rhopodytestristis	Green-billed malkoha	Bon kokil
Copsychussaularis	Magpie-robin	Doel
Copsychusmalabaricus	White-rumpedshama	Shama
Pericrocotuscinnamomenus	Small minivat	Chotoshheli
Bubo bubo	Eagle owl	Pecha
Ploceusphilippinus	Baya weaver	Babui
Nectariniaasiatica	Purple sunbird	Neel tuni
Oriolusoriolus	Black-hooded oriole	Ishtikutumpakhi
Psittaculacyanocephala	Plum-headed parakeet	Phooltushi
Upupaepops	Common hoopoe	Mohonchurapakhi

Athene brama	Spotted owl	Konthikutipecha
Halcyconsmyrnensis	White throated kingfisher	Shadabukmachranga
Coracinamacei	Large cuckoo shrike	Borokabashi
Meropsorientalis	Green bee eater	Shobujshuichorapakhi
Phalacrocoraxniger	Little cormorant	Paankouri
Anasplatyrhynchos	Duck	Hash
Corvussplendens	House crow	PatiKak
Acridotherestristis	Common Myna	Shalik
Dicrurusmacrocercus	Black Drongo	Fingey
Alcedoatthis	Common Kingfisher	ChotoMaachranga
Picidae	Woodpecker	Kath Thokra
Streptopeliatranquebarica	Red turtle dove	Laal ghughu
Streptopeliachinensis	Spotted Dove	TilaGhughu
Columba livia	Domestic Pigeon	Kobutor
Passer domesticus	House sparrow	Charui
Eudynamysscolopacea	Asian cuckoo	Kokil
Cuculusmicrpoterus	Indian cuckoo	Chotekokil
Spilornischeela	Crested serpent eagle	Shorpoeagol
Orthotmussutorius	Tailor bird	Tuntuni
Turdodesstriatus	Jungle babbler	Chatarepakhi
Class: Mammalian		
Bostaurus	Cow	Goru
Bubalusarnee	Wild Water Buffalo	Mohish
Capra aegagrus	Goat	Chagol
Ovisaries	Sheep	Bhera
Feliscatus	Cat	Biral

Canisfamilaris	Dog	Kukur
Sciuruscarolinensis	Grey Squirrel	Kathbirali
Oryctolaguscuniculus	Rabbit	Khorgosh
Rattusrattus	Rat	Indur
Axis axis	Deer	Horin
Macca mulatta	Monkey	Banor

APPENDIX G: Important Sensitive Locations in the PIA

Name	Location		Description	Picture
	N	E		
Site Office (new)	24.62981°	90.06464°	A two storied building used as site office.	
Site Office (Temporary)	24.62975°	90.06453°	A one storied tin shade building used as temporary site office.	
Electric Pillar	24.62964°	90.06397°	An electric pillar in the middle of the project site.	
Site Main Gate	24.62974°	90.06361°	The site main gate is still under construction.	

Sumi Nursery	24.63011°	90.06380°	A nursery with various plant diversities which sells plants too.	
BFIDC, Rubber Department	24.63033°	90.06450°	Bangladesh Forest Industry Development Corporation.	
Mosque, BFIDC	24.63033°	90.06450°	A one storied tin shade mosque.	
Go Down, BFIDC	24.62996°	90.06497°	Go down of BFIDC.	

Kakraid Darus Salam Madrasa Signboard	24.62939°	90.06289°	A steel signboard for the Madrasa.	
Kakraid Government Primary School	24.62939°	90.06217°	A Government Primary School with two buildings. Both of them are one storied.	
Arunkhola Union Parishad	24.62879°	90.06200°	One storied building for Union Parishad	
Mosque, Arunkhola	24.62863°	90.06160°	One storied Mosque	

ASA, Kakraid Branch	24.62863°	90.06160°	Tinshed building of ASA	
Kakraid Bazar	24.62821°	90.06088°	A medium sized local bazar.	
Potato Cold Storage	24.62741°	90.05993°	A cold storage of potato of 2000 metric tonnes capacity.	
Bangladesh Krishi Bank	24.62808°	90.06006°	Krishi Bank of Bangladesh, Kakraid branch.	

BADC, Madhupur	24.62661°	90.05829°	Bangladesh Agricultural Development Corporation	
Kakraid Mosque	24.62803°	90.06526°	A tin shade Mosque	
Madhupur Range Office, Tangail Forest Department	24.63097°	90.06530°	Tin shade office of Madhupur Range office.	

APPENDIX H: Socio-Economic Survey Template

Questionnaires for Socio-Economic Survey

Location & Identification of Household:

01	District	:	
02	Upazila	:	
03	Pourashava	:	
04	Union	:	
05	Mouza	:	
06	Village	:	
07	Others	:	

General Information about Household Head:

Name of the Household Head:	
Father's/Husband's Name:	
Name of Respondent:	
Relation of Respondent with Household Head:	
Religion:	
Ethnicity:	

Household Composition:

Total Household Members:_____ Male:_____ Female:_____

Sl. No.	Relationship with Household Head	Sex	Age	Marital Status	Education	Occupation		Place of Work	
						Primary	Secondary	Primary	Secondary

Membership Involvement with any Organization:

Are you or any member of your family involved with any NGOs/Associations?	
If yes, the name of organization& how long you are involved?	
Your involvement in what capacity?	
Did you receive any loan& what is the amount?	
Repayment procedure/method	

Fixed Household Assets, Land & Facilities:

Do you have any house of your own?	
If yes, what is the total cost of your family house?	
If no, what is the arrangement?	
Total land ownership (Land in Acre)	
Do you have any pond or orchard?	
What is the cost of your owned pond land or orchard?	
Your yearly income from the pond or orchard?	
Farmer type (Farming own land/Farming own and other's land/Sharecropper)	
Cropping intensity and patterns in practice	
Crop production per acre in Kgs	
Do you have electricity?	
What type of fuel do you use?	
Who usually gives decision in the family?	

Health & Nutrition:

Common diseases in your family		
Whom do you contact first for treatment?		
Average food intake per day?	Breakfast	
	Lunch	
	Dinner	
Source of common food you intake?		

Water & Sanitation:

Sources of drinking water	
If tube well or pond, ownership of source	
Is there any arsenic problem in the area?	
Is there any salinity problem in the area?	
Sanitation type	
Source	

Livestock:

Does the household own the following livestock?

Livestock	Nos
Cattle	
Goats	
Sheep	
Buffalo	
Pigs	
Ducks	
Chicken	
Pigeon	

Trees

What types of trees does the household own?

Timber Trees	Nos	Fruit Trees	Nos	Medicinal Plants	Nos
Eucalyptus		Banana			
Mahogany		Mango			
Akashmoni		Coconut			
Neem		Jackfruit			
Shishu		Litchi			
Rain tree / Koroi		Guava			
Palash		Olive			
Babla		Lemon			
Teak		Jambura			
Bakul		Blackberry			
Palm / Tal		Mulberry			
Silk cotton / Simul		Ambra			
Sal		Papaya			
Chatim		Tamarind			
Sajna		Marmelos / Wood-apple / Bel			
Pakur		Custard apple			
Kadam		Pomegranate			
Koroi		Plum / Barai / Kol			
Tal		Carambola			
Chambol		Kotbel			
Chalta		Supari			
Manjori		Other			
Other		Other			
Other		Other			
Other		Other			

Livelihood:

What is your main income source?	
How many months of the year do you earn from this?	
What is your monthly earning?	
Where do you work?	
Do you generally receive loan from local traders?	
If yes, amount of money received last year and this year?	
Repayment method?	

All Sources of Household Income During the Last 12 Months:

No.	Income source	Income obtained from mentioned source in the last 12 months
1	Service holder	
2	Agricultural wage labour	
3	Non-agricultural Wage labour	
4	Wage labour – foreign countries	
5	Sale of household agricultural products (rice, vegetables, etc.)	
6	Boat operator	
7	Fishing	

8	Fish trading	
7	Income from local fish-culture	
8	Sale of household livestock products (milk, meat, etc.)	
9	Sale of tree and orchard products (timber, bamboo, fruit, etc.)	

What is the household's average monthly income?	
What is the household's approximate average monthly expenditure?	
Explain if expenditure higher than income?	
If the household has any loan?	
Number of new births in the household during the current year?	
Number of deaths in the household during the current year?	

Overall Remarks (If any):

APPENDIX I: Focus Group Discussion (FGD) Participants List

Modern Food Storage Facilities Project

Focus Group Discussions (FGDs)
List of Participants

Focus Group No. 01 Date 11.10.16 Time 12.00 PM

Location: Kakraid Bus stand, Madhupur, Tangail

GPS Location N-24.62819° E 90.05091°

SL. No.	Participant's Name	Age	Occupation	Telephone No.	Signature
1	Runa Laila	50	Head Master	01719673684	
2	Jahidul Islam	24	ICT Progra mmer	01753692818	
3	Abdur Rashid	50	Service	—	
4	Razzak Ali Khan	50	Business	—	
5	Monoje Mia	35		01744256970	
6	Mohammad Rinku	36	Business	—	
7	Anwarul Islam Shekhar	35	Shopkeeper	01727276351	
8	Mohammad Rokon	30	Shop Business	—	—
9	Mohammad Hanif Ali	45	Van Driver	—	-
10	Mohammad Mukul Ali	32	Van Driver	01765705840	
11	Mohammad Abdur Rahman	65	Rickshaw Driver	—	
12	Abdul Sattar	65	Agriculture	01712125849	
13	Mohammad Tajem Uddin	72	Retired Teacher	01736206251	Md. Tajem uddin
14	Mohammad Nazrul Islam	35	Employee of Shopkeeping	01931664597	
15	Abdul Majid	40	Business	01715563443	

FGDs Completed By Sarwar Kabir

Signature

Focus Group Discussions (FGDs)
List of Participants

Focus Group No.: 02 Date: 11/10/2016 Time: 03.40pm

Location: 9 no. Aurun Khola, 4 no. Ward, Kakraid Bazar, Madhupur, Tangail

GPS Location: N – 24.62229° E – 90.06073°

SL No.	Participant's Name	Age	Occupation	Telephone No.	Signature
1	Mohammad Usman Gani	69	Agriculture	—	[illegible]
2	Mohammad Tayeb Ali	67	Agriculture	01721899456	[illegible]
3	Mohammad Hasan Jaman Minto	50	Business	01712777111	[illegible]
4	Mohammad Sayeb Ali	38	Agriculture	01726876316	[illegible]
5	Sabin Uddin	49	Van Driver	01769467272	
6	Mohammad Nazrul Ali Khan	65	Agriculture	01712786118	[illegible]
7	Mohammad Sohel Rana	43	"	01869928519	[illegible]
8	Mohammad Mamun	18		01985678548	[illegible]
9	Mohammad Haider Ali	19	Tea Staller	01758424436	
0	Abdul Hamid	35	Medicine [illegible] Pharmacy	—	
1	Mohammad Hasan Ali	40	Van Driver	01737044302	[illegible]
2	Mohammad Imdul Haque	45	Agriculture	01726329877	[illegible]
3	Mohammad Harest Ali	62	Aged Person	-	—
4	Nurul Islam	46	Agriculture	01757581616	—
5	Mohammad Ali Akbar	48	Truck Driver	01732838834	[illegible]

FGDs Completed By: Sanaul Kabir

Signature: [illegible]

Modern Food Storage Facilities Project

Focus Group Discussions (FGDs)

List of Participants

Focus Group No. 03 Date 11/10/16 Time 3.00 PM

Location: Kakraid Bazar

GPS Location N 24.52786° E 90.06067

SL No.	Participant's Name	Age	Occupation	Telephone No.	Signature
1	Md. Milon	26	Business	01760409928	
2	Md. Sajib	20	Job	01963113186	
3	Md. Al Amin	19	Student	01951206924	
4	Md. Abdullal	19	Student	01850199[illegible]	
5	Md. Sagor	15	Student	01867[illegible]	
6	Md. Shafiq Jamil	26	Student	01850056568	
7	Md Jahirul Islam	30	Job	01771432223	
8	Eng. Md. Mirazul Islam	30	Job	01712-700464	
9	Md. Azahar Ali	55	Agriculture	017 56803852	
10	Azaha Ali	50	Agriculture	01725402[illegible]	
11	Lafsor Rahman	51	Business	—	
12	Md. Abul Kalam Azad	35	Business	01714747665	
13	Md. Koddus	42	Agriculture	01725759[illegible]	
14	Md. Bacchu Mia	45	Business	01724439[illegible]	
15	Md. Mortuza Ali	60	Agriculture	01956778632	

FGDs Completed By Md. Aziqur Rahman

Signature

Focus Group Discussions (FGDs)

List of Participants

Focus Group No.---------04--------------------------------- Date---11/10/2016----Time-------4:00 pm-----

Location:----------------Katrabo Bazar (Fish Market), Madhupur Tangail------------------------------------
---

GPS Location--------------N-24.62781'   E-90.06024'--

SL. No.	Participant's Name	Age	Occupation	Telephone No.	Signature
1	Abul Kalam	45	Van Driver		[illegible]
2	Abdul Hamid	63	Agriculture		[illegible]
3	Md. Sobahan Ali	39	Van Driver	01786305306	
4	Hasne Ara	35	Housewife		
5	Jobeda	48	Housewife		[illegible]
6	Khokon Mia	47	Business		
7	Md. Musa Mia	26	Pickup Driver	01883804909	[illegible]
8	Md Billal Hossain	32	Agriculture	01757179476	[illegible]
9	Abul Kalam	33	Tea stall		[illegible]
10	Ahmed	40	Agriculture		
11	Gonor Ali	50	Agriculture		[illegible]
12	Somser Ali	55	Agriculture		
13	Md. Abdur Rahim	65	Business		[illegible]
14	Samar Ali	45	Business	01776096078	[illegible]
15	Abdul Kader	60	Agriculture		

FGDs Completed By---Sajedul Islam---------------

Signature---[illegible]--

APPENDIX J: Study References

List of secondary data used for carrying out ESIA study and preparation of ESIA report is given at the following table:

Government Departments : Rules Act Policy and related data	
1.	Bangladesh Water Development Board
2.	Department of Environment
3.	Bangladesh Meteorological Department
4.	Bangladesh Forest Department
5.	Bangladesh Bureau of Statistics
6.	Soil Resources Development Institute (SRDI)
7.	Department of Food, Government of Bangladesh
Journals, Books & Existing Studies	
8.	Detailed feasibility study and environmental impact assessment study for Ashuganj 450mw combined cycle power plant (south) at Ashuganj existing power station site, June 2011
9.	Environmental and Social Review Summary Ashuganj Power Station Company Ltd. (APSCL), September,2012
10.	Environmental & Social Assessment & Management Framework (ESAMF) Bangladesh Modern Food Storage Facilities Project, Phase I (MFSP-I), March 2013
11.	Aktar, M.N. (2013). Impact of climate change on riverbank erosion, International Journal of Sciences: Basic and Applied Research, 7(1): 36-42.
12.	Garde, R.J. (2011). River morphology, Second Edition, New Age International Publishers, India.
13.	MPO (1987). The groundwater resource and its availability for development, Technical Report No. 5, Master Plan Organization, Dhaka.
14.	ECR (1997), "Environmental Conservation Rules "Ministry of Environment and Forest, Government of Bangladesh.
15.	Munn, R. E. (1979) Environmental Impact Assessment, Principal and procedures. John Wiley & Sons.
16.	DOE (1997) EIA (Environmental Impact Assessment) Guidelines for Industries.
Website	
17.	Wikipedia
18.	Google maps
19.	Google earth imageries
Others	
20.	Site visits
21.	Environmental and Social Screening report of the project
22.	Different project related EIA-Report
23.	BBS Community Series -2011, Tangail district

Annex-K: Sample Environmental Action Plan for MFSP Sub-projects

Sl. No.	Activities/ Item of works	Management Actions to be taken	Implementation	Frequency	Compliance (date)
	Pre-Construction Stage				
1	Construction of Labor camp and necessary facilities	✓ Obtaining approval of layout plan for the labor camp and related facilities, ✓ Providing accommodation facilities for the workers, ✓ Setting the cooking arrangement, ✓ Setting the washing and cleaning arrangements, ✓ Providing waste bins in and around the labor camp, ✓ Supply of safe drinking water and sanitation facilities for the laborers, ✓ Fencing and demarcation around the labor camp to prevent unwanted entrance.	Before starting the Works	Approval requires before construction of labor camp and continuous monitoring will be there to ensure quality labor camp and related facilities	
2	Development of fuel storage areas	✓ Construction of at least 100 sq ft pucca (masonry) platform for storing all type of fuel and lubricants, ✓ Demarcation around the area, ✓ Placing of Firefighting equipment.	Before starting the Works	Construction of pucca platform to be done once and with regular maintenance	
3	Water Supply	✓ Supplying potable water for the laborers through installation of tube well (as per specification & BOQ), ✓ Ensuring the location plan of tube well, that should be sufficiently away from on-site sanitation facilities, ✓ Ensure tube well location, that is at safe distance from surface water source. ✓ Development of drainage line from the water source to drain out waste water.	Before starting the Works	Monitoring the quality of water at the time of commissioning	

Sl. No.	Activities/ Item of works	Management Actions to be taken	Implementation	Frequency	Compliance (date)
4	Sanitation facilities	✓ Providing suitable sanitation facilities for the workforce (as per BOQ). ✓ Ensuring Solid Waste Bins within the Silo Campus, ✓ Installation of sanitary latrines and urinals at safe distance, as per BOQ, ✓ Provide separate latrines for the women, ✓ Installing onsite sanitation facilities (septic tank, soak pits etc.) with toilets.	Before starting the Works	Before starting the work and replacement after damage with Continuous monitoring/ cleaning	
5	Transfer point for solid waste	✓ Installation of solid waste transfer station near the main gate of silo campus (BOQ), ✓ Providing fencing around the masonry transfer station.	Before starting the Works	Installation once with regular maintenance	
6	Providing First Aid Box	✓ Providing First Aid Box with sufficient gauge, bandage, antiseptic cream and with sufficient medicine.	Before starting the Works	Continuous monitoring & input	
7	Stock pile for construction materials	✓ Development of stock pile area with clear demarcation and fencing, ✓ Rehabilitation of stockpile area.	Before starting the Works	Continuous monitoring & repair	
8	Temporary drainage arrangements (preparation)	✓ Construction of temporary earthen drain to drain out the excess water due to rains and due to construction activities, ✓ Closing the temporary drains after escaping from temporary floods.	Arrangement before starting the Works	Continuous monitoring with corrective measures	
9	Personal Protection Equipment (PPE)	✓ Providing personal protection equipment (PPE) with at least 20 pairs-hand gloves, 20 pairs-gumboot, 20-approne, 20-eye protecting glass, 20-Helmets etc. (BOQ).	Arrangement before starting the Works	Purchasing once and replacement after damage	
10	Public Health and Safety	✓ Notification of the public adjacent to the construction areas, ✓ Protection of school going children during their movement.	During starting the Works	Continuously	

Sl. No.	Activities/ Item of works	Management Actions to be taken	Implementation	Frequency	Compliance (date)
	Construction Phase				
11	Monitoring Water Quality (potable water)	✓ Monitoring the drinking water quality with the parameters like; arsenic, iron, manganese, chloride and other organic/ inorganic pollutants.	During construction	Quarterly	
12	Maintaining air quality	✓ Regular maintenance of vehicles ✓ Covering or wetting of dusty materials ✓ Dust suppression by spraying water	During wworks with regular monitoring	Continuously	
13	Maintaining and monitoring Noise quality	✓ Ensure construction activities with acceptable limit of noise level, ✓ Notify nearby population prior to occurrence of any uneven sound, ✓ Working hours should be kept within the daylight hours, ✓ Locate the noisy equipment and facilities away from sensitive receptors ✓ Monitoring of noise level (dB) at selected sensitive sites during working hours.	During the wworks	Continuously maintaining the noise quality and checking the magnitude (dB) on quarterly basis	
14	Solid Waste Management	✓ Ensuring collection & safe disposal of solid waste from construction area, ✓ Safe storage of inorganic wastes and regular disposal of organic wastes, ✓ Ensure safe waste collection, transportation and disposal systems at approved disposal sites.	During the Works	Continuously	

Sl. No.	Activities/ Item of works	Management Actions to be taken	Implementation	Frequency	Compliance (date)
15	Ecosystem (Flora and Fauna) monitoring	✓ Monitoring flora and fauna species around the construction camp, ✓ Discussion with local people regarding any effect of construction work on terrestrial floral species, ✓ Discussion with local people on the effect on local fisheries system/ species due to construction works.	During construction	Bi-annual	
15	Waste water disposal system	✓ Installation of proper filtering elements for disposing the waste water (soak pit arrangement etc.). ✓ Ensure safe disposal of liquid wastes generated in the camp.	During the Works	Continuously	
16	Occupational health and safety and minimise chance of accidents	✓ Train up the workers on health and safety issues, ✓ Educating the workers on HIV and sexually transmitted infections (STI), ✓ Ensuring use of proper PPE materials during working hours, ✓ Ensure wearing helmet by the visitors/ inspectors during working hours, ✓ Educating the people in using the first aid items during any accidents, ✓ Provide sanitation facilities where needed, ✓ Provision of safe drinking water to work force (tube- well water, bottled water etc.) during works, ✓ Proper signaling of working areas.	During Works	During starting the works and reviewing quarterly	

Sl. No.	Activities/ Item of works	Management Actions to be taken	Implementation	Frequency	Compliance (date)
17	Public Health and Safety	✓ Proper signaling of working areas, ✓ Limitation of construction vehicles at public roads during peak hours, ✓ Construction activities are to be ensured during daylight (07:00 – 17:00 hours) on weekdays.	During the Works	Continuously	
18	Tree Plantation	✓ preparatory works for tree plantation, ✓ plantation points development.	Before ending construction	Once with monitoring	
19	Monitoring of Surface Water Quality	✓ Preventing entrance of waste, soil, etc. in the water system through waste management and dust suppression process.	During the Works	Continuously	
20	Complaints and Environmental Incidents	✓ Grievance Redress Mechanism will be established at silo site, ✓ Complaints received from the public or other stakeholders will be registered and recorded and be brought to the attention of the Site Engineer, ✓ All environmental incidents occurring on the site will be recorded and be brought to the attention of the Site Engineer.	During the Works	Continuously	
	Operation and Maintenance Phase				
21	Monitoring of Air Quality	✓ Monitoring of air quality (SO_X, NO_X, particulate matter etc) at selected sensitive sites during operation phase (contract period).	During operation phase	Quarterly	
22	Monitoring of water Quality	✓ Monitoring of water quality (both metallic and non-metallic parameters of potable water) at the water source being used during operation (contract period).	During operation phase	Quarterly	

Sl. No.	Activities/ Item of works	Management Actions to be taken	Implementation	Frequency	Compliance (date)
23	Monitoring of Noise Quality	✓ Monitoring of noise level (dB) at selected sensitive sites during working hours.	During operation phase	Quarterly	
24	Use of works safety materials	✓ Monitoring the use of safety materials like; wearing safety shoes, eye glass, helmet etc (PPE) as appropriate	During operation phase	Continuous	
25	Control of accidents	✓ Monitoring the accident control activities like; deployment of watchers to control unauthorized entrance, ✓ Traffic movement control, ✓ Precaution during working in altitude.	During operation phase	Continuous	
26	Tree Plantation	✓ Landscaping and tree plantation works' preparation (cleaning the lands), ✓ Making the holes suitable for plantation, ✓ Arrangement of fencing around the tree, ✓ Arrangement of spraying water, ✓ Arrangement of cleaning the unwanted vegetation around the tree.	During operation phase (till the trees reach to specified height)	Continuous and replacement after damage	
27	Monitoring of Surface Water Quality	✓ Performance of analyses on surface water (river, khal, beel and pond) for: pH, TDS, DO, BOD, EC/Salinity and Turbidity.	During operation and maintenance	Quarterly	
28	Complaints and Environmental Incidents	✓ Grievance Redress Mechanism will be established at Silo Site, ✓ Complaints received from the public or other stakeholders will be registered and recorded and be brought to the attention of the Site Engineer. ✓ All environmental incidents occurring on the site will be recorded and be brought to the attention of the Site Engineer.	During the Works	Continuously	

Annex-L: No Objection Letter (NOL) from the World bank on ESIA report

Fwd: FW: NOL ISSUED: Request for NoL on ESIA reports for Madhupur, Ashuganj and Mymensingh silo sites.

1 message

Md Gazi Ur Rahman <gaziur60@gmail.com> 1 November 2017 at 17:13

Dear Mr. Gazi, PDMFSFP:

Based on the documents received and information provided I am pleased to inform you that IDA has no-objection to the **Madhupur** and Mymensing Sites EIA reports. You should insure that: (i) these reports are disclosed on the DG Food website, and (ii) the World Bank is informed from DG-Food of the disclosure information.

Best regards.

Manievel (Emmanuel) Sene
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Agriculture Global Practice - GFA12
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Annex-M: Environmental Clearance Certificate from the Department of Environment (DOE)

Government of the People's Republic of Bangladesh
Department of Environment
Head Office, Paribesh Bhaban
E-16 Agargaon, Dhaka-1207
www.doe.gov.bd

Memo No: DoE/Ta.Dist./30.93.573.87309615/ 115 Date: 22 /02/2017

Subject: Environmental Clearance for Construction of Galvanized Corrugated Flat Bottom Steel Silo with RCC Foundation and it's Ancillary Works at Madhupur Silo Site of Tangail District under Modern Food Storage Facility Project.

Ref: Your Application dated 20/12/2016.

With reference to the above, the Department of Environment (DOE) is pleased to award the Environmental Clearance as well as approval of Environmental Impact Assessment (EIA) report in favor of Construction of Galvanized Corrugated Flat Bottom Steel Silo with RCC Foundation and it's Ancillary works at Madhupur Silo Site of Tangail District under Modern Food Storage Facility project subject to the following terms and conditions:

1. The activity under construction of Galvanized Corrugated Flat Bottom Steel Silo with RCC Foundation and it's Ancillary works shall not result in the loss of containment of any materials that would affect health or will have damaging impact on the environment or natural resources.
2. Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed project activities.
3. No solid waste can be burnt in the project area. An environment friendly solid waste management should be in place during whole the period of the project in the field.
4. Proper and adequate on-site precautionary measures and safety measures shall be ensured so that no habitat of any flora and fauna would be demolished or destructed.
5. All the required mitigation measures suggested in the EIA report along with the emergency response plan are to be strictly implemented and kept operative/functioning on a continuous basis.
6. During the Construction phase, all the earthen material should be kept in such a way that traffic jams are not created.
7. To reduce any problem to the traffic movement, construction work should be performed preferably during night.
8. To reduce, dust, spraying of water over the earthen materials should bd carried out time to time.
9. The Environmental Management Plan prepared under the EIA study shall strictly be implemented and kept functioning on a continuous basis.
10. In case of any emergency, the following information shall immediately be reported to the Tangail District Office and Headquarters of the Department of Environment (DOE) simultaneously :
    a) Nature of incident (fire, accident, collision, etc.)
    b) Personnel affected (injured, missing, fatalities etc.)
    c) Emergency support available and its location (standby transport, medical facilities etc.)
11. All parameters of effluent, gaseous emission, noise, solid waste, hazardous waste, etc. shall be within the limits in the Environment Conservation Rules (ECR) 1997. In case of non-coverage of ECR 1997 the World Bank Environment, Health and Safety Guideline shall be adhered to.

12. Comprehensive Environmental Performance report shall be submitted on a monthly basi, o both the DOE offices.
13. There shall be specific format for Environment Monitoring. Environmental Monitoring Reports shall be made available simultaneously to DOE Head Quarter in Dhaka and Tangail District Office on a monthly basis during the construction & operation stage of the project.
14. Periodic monitoring of air quality in the plant site and quality of river water near plant site and reported to DOE.
15. The noise level of the project area shall not exceed the standard for industrial area mentioned in ECR, 1997.
16. Rehabilitation of human settlement or compensation for any sort of activity which will incur damage or loss of public or private property or any natural resources shall be addressed as per Government of Bangladesh rules and regulations;
17. No activity of cutting/racing/dressing of hill or hilly land is endorsed under this clearance without due permission/clearance of the concerned authority of the Government of Bangladesh.
18. No activity of filling wetlands is endorsed under this clearance without due permission/clearance of the concerned authority of the Government of Bangladesh.
19. Appropriate permission would be required to obtain from the forest department in favor of cutting/felling of any plant/sapling/tree by any individual or government before doing such type of activity.
20. The project authority shall extend necessary cooperation to DOE officials to facilitate their visit to the site as and when necessary.
21. Violation of any of the above conditions shall render this clearance void.
22. This clearance is valid for one year from the date of issuance and the project authority shall apply for renewal to the Tangail District Office of DOE, Tangail with a copy to the Head Office of DOE, Dhaka at least 30 days ahead of expiry.
23. This Environmental Clearance Certificate has been issued with the approval of the appropriate authority.

(Syed Nazmul Ahsan)
Director (Environmental Clearance)
Phone # 02-8181673

Project Director
Modern Food Storage Facility Project
Directorate General of Food
Protichi Kallayan Bhaban
71-72, Eskaton Dhaka-1000.

Copy Forwarded to:

1) PS to the Secretary, Ministry of Environment and Forest, Bangladesh Secretariat, Dhaka.
2) Director, Department of Environment, Dhaka Regional Office, Dhaka.
3) Deputy Director, Department of Environment, Tangail District Office, Tangail.
4) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

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