FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Feed the Future Bangladesh Aquaculture and Nutrition Activity
PIO Grant No. 72038-818IO-00002

Environmental Due Diligence (EDD)

Submitted to
Feed the Future
Bangladesh Mission, Dhaka, Bangladesh

Prepared by
MHM Mostafa Rahman
Environment Specialist
WorldFish, Bangladesh & South Asia Office

April 22, 2018

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Acronyms

AIN	Aquaculture for Income and Nutrition Activity
BMP	Best Management Practices
CC	Climate Change
CDCS	Country Development and Cooperation Strategy
CE	Categorical Exclusion
CR	Climate Risk
DO	Development Objective
DoE	Department of Environment
EDD	Environmental Due Diligence
EMMP	Environmental Mitigation and Monitoring Plan
ESMS	Environmental and Social Management System
FtF	Feed the Future
GIFT	Genetically Improved Farm Tilapia
GIP	Genetic improvement program
GMO	Genetically Modified Organism
GoB	Government of Bangladesh
GPS	Global Positioning System
ha	Hectare
IEE	Initial Environmental Examination
NDC	Negative Determination with Conditions
RF	Results Framework
SBCC	Social Behavior Change Communication
TA	Technical assistance
TBN	Tilapia Breeding Nucleus
USAID	United States agency for International Development
yr	Year
ZOI	Zone of Influence

1. Background

a) Program Description

Feed the Future Bangladesh Aquaculture and Nutrition Activity is built on the completed six-year Feed the Future Aquaculture for Income and Nutrition (AIN) Activity to sustain the positive aquaculture sector growth through an inclusive market system approach at the Feed the Future Zone of Influence (FtF ZOI). This is a five-year assistance activity (PIO Grant No.: 72038-818IO-00002) awarded to WorldFish[1] on 6 February 2018 and expected to continue until 5 February 2023. The total estimated amount of this Grant for the five-year period is US $24.5 million.

The Activity will contribute to Development Objective 2 (DO 2)[2] of USAID's Country Development and Cooperation Strategy (CDCS). The goal of this activity is to stimulate inclusive aquaculture sector growth, increase employment and incomes, and food and nutritional security for smallholder farmers through a market systems approach. Specific objectives and sub objectives are presented in the table below:

IR 1: Increased Aquaculture Productivity
- Sub-IR 1.1: Increased availability of improved fish seed
- Sub-IR 1.2: Increased availability of affordable quality fish feed
- Sub-IR 1.3: Increased adoption of improved pond management practices

IR 2: Strengthened Aquaculture Value Chains
- Sub-IR 2.1: Increased market linkages
- Sub-IR 2.2: Increased engagement of private sector in aquaculture markets
- Sub-IR 2.3: Improved enabling environment for inclusive growth in aquaculture

IR 3: Improved Nutrition Related Behavior of Rural Households
- Sub-IR 3.1: Improved nutrition awareness and practices
- Sub-IR 3.2: Improved access to diverse and nutritious food

The Activity has the following targets for the implementation period:
1. A total of 400,000 men, women and youth in the FtF ZOI have improved access to better quality aquaculture inputs, services, and/or market channels
2. A 30 percent expansion of investment by the private sector in the FtF ZOI in aquaculture production and market related to inputs and services (e.g., seed, feed, production/ market related information, technology, etc.)
3. A 30 percent increase in productivity from ponds and *ghers* in the FtF ZOI
4. A 20 percent increase in the number of households adopting improved nutritional practices (consumption of nutritious food, dietary diversity and hygiene practices)

[1] WorldFish is a member of Consultative Group for International Agricultural Research (CGIAR).
[2] "Availability, Access, and Utilization of Domestically Produced and Nutritious Foods Increased"

b) Environmental Impact Potential

The 2017 Umbrella Initial Environmental Examination (IEE) for the Activity identified the notion of the interventions as "technical assistance (TA)" in nature, and therefore, will impart no negative impact on the physical or natural environment. These TA activities thus qualify for a ***Categorical Exclusion (CE)***[3]. The IEE also recommended to check if any of the interventions of the Activity downturns as ***Negative Determination with Conditions (NDC)***[4]. Procurement of office equipment and materials fall under NDC, in general.

c) Climate Risk (CR)

The IEE illustrated a general outline for the climate stressors and the major types of risks that climate change (CC) poses to the FtF ZOI/south-west Bangladesh. Climate risk rating was also done based on characterization of CR; assigned a qualitative risk rating for each climate risk: low, moderate, or high.

2. Summary of the EDD

Table 1: Recommended IEE Threshold Decision

Activities	Negative Determination	Negative Determination with Condition	Positive Determination	Deferral
1) Studies[5]	X			
2) Policy and strategy development/modification	X			
3) Small-scale physical construction, repairing and maintenance works[6]		X		
4) Pond re-excavation & dyke repairing		X		
5) Equipment installation [7]		X		
6) Feed mill Operation		X		
7) Fish hatchery operation		X		
8) Fish nursery management		X		

[3] per 22 CFR 216.2 (c)(2)(i), 22 CFR 216.2 (c)(2)(iii), and 22 CFR 216.2 (c)(2)(v)

[4] if pursuant to 22 CFR 216.3(a)(2)(iii)

[5] The sub-IRs may require various types of studies like analysis of current status, trend, impact of a certain type of technique or approach.

[6] Small-scale physical works may include the construction and/or renovation and extension of facilities of hatcheries (i.e. water tanks, drainage system), feed mills (i.e. works relating to hygiene and quality improvement), fish nursery and growers (i.e. pond re-excavation, dyke repairing), local fish markets (i.e. raised platform, drainage system), fish processors and transporters (i.e. works relating to hygiene and quality improvement), etc.

[7] In order to improve capacity, quality, efficiency or to mitigate an environmental issue, certain equipment may require to be installed in hatcheries, feed mills, fish processors and transporters, etc.

Activities	Negative Determination	Negative Determination with Condition	Positive Determination	Deferral
9) Pond aquaculture management		X		
10) Vegetable cultivation		X		
11) Market development and improvement[8]		X		

The Leopold Matrix (also called a "Project Impact Matrix"), ER Checklist, and aforesaid "Environmental Compliance Summary Table" illustrate the following facts:

Each of IRs will focus on reviewing the current status and trend of different issues related to livelihoods, food security and nutrition, policy review and revision, development and strengthening of private sector for the sustainable improvement of homestead-pond aquaculture and fish value chain, and awareness raising. In addition, it will also focus on the capacity development of the fish growers, input suppliers, and the actors in the supply chain. The aforesaid activities are not expected to have potential for adverse environmental impacts.

The IR 1 is the most important part of the Activity, which will focus on quality fish seed and feed availability, and transforming homestead-pond aquaculture from *traditional*[9] to *semi-extensive.*[10] Since the production system of nursery and grow-out ponds will be more organic therefore aquaculture activities are not expected to have potential for adverse environmental impacts. The sub-grants to the hatcheries, feed mills, etc. will be utilized for the activities (i.e. to upgrade machinery facilities, production system) that would not have potential adverse environmental impacts. In order to minimize the potential adverse environmental impacts (if any) of the *associated activities,*[11] and hence make the hatcheries and feed mills environmentally compliant, the Activity will assist them to adopt Environmental and Social Management System (ESMS),[12] and apply for getting "Environmental Clearance" from DoE..

The IR 2 will focus on improving efficiency of aquaculture value chains specifically market linkage, and engagement of private sector in the market. Thus, the activities are expected to halt the existing level (if there is any) of environmental consequences.

[8] Activities relating to supply chain and value chain development

[9] The culture regime that uses almost no inputs

[10] The culture regime that uses some of the basic inputs

[11] The activities in which the sub-grants will not be utilized but they are the ones that are integral and/or essential to make the sub-grant assisted activities functional.

[12] According to IFC EHS Guidelines, companies are expected to adopt a technical means of integrating environmental and social concerns into company management, so that a business can become more effective in reducing its impact on the environment, its workers and its neighboring communities.

The IR 3 will emphasize on improved nutrition related behavior in rural households. Thus the activities are not expected to have potential for adverse environmental impacts.

However, the Activity will seek to incorporate environmental impact/management components as needed.

ANNEX 1

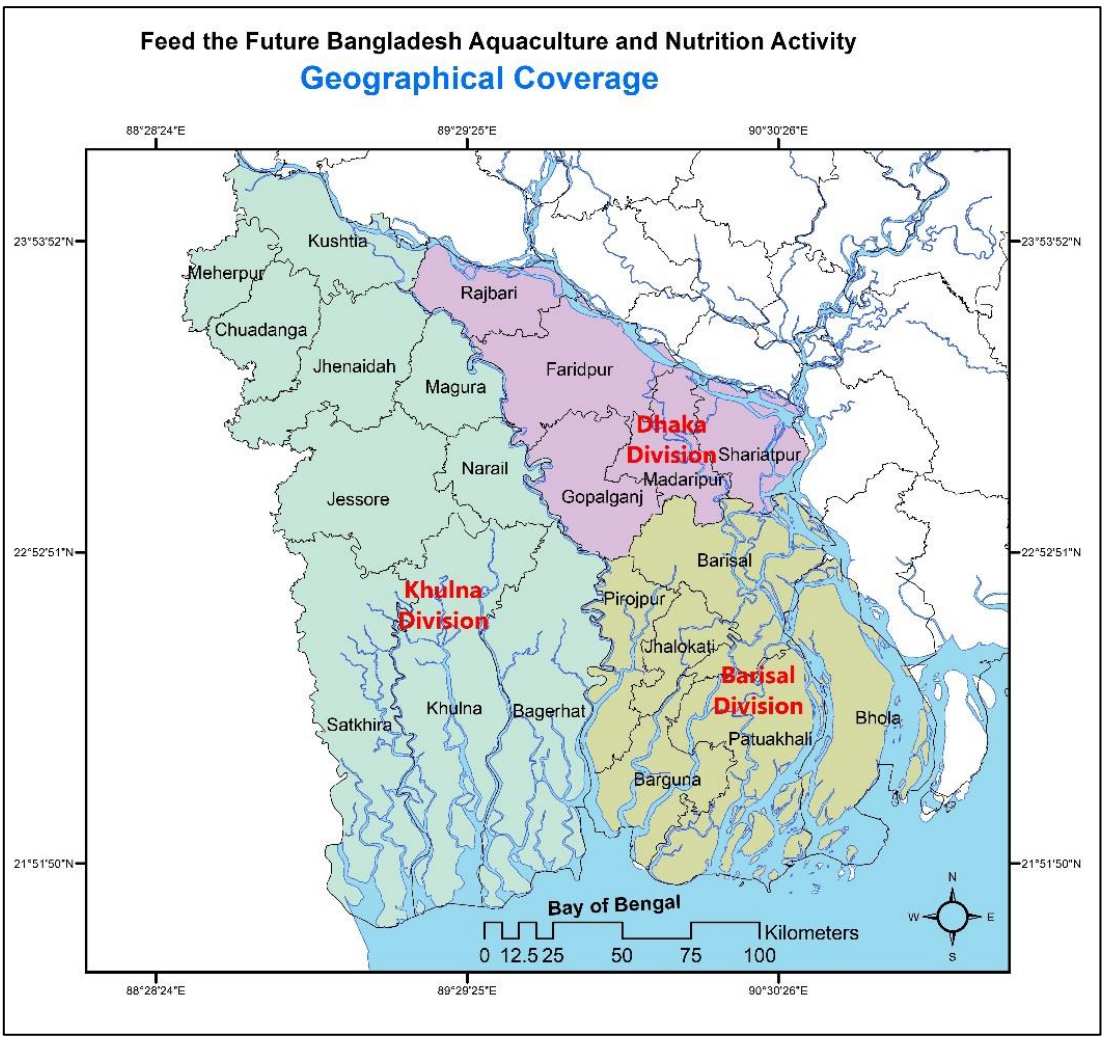
ENVIRONMENTAL REVIEW & ASSESSMENT CHECKLIST (ER Checklist)

Date of Review:	19-April-2018	**DCN of triggering IEE:**	IEE for USAID-Bangladesh DO 2: Food Security Improved
Name of reviewer:	MHM Mostafa Rahman, Environment Specialist		
Name of Project/Activity:	Feed the Future Bangladesh Aquaculture and Nutrition Activity		
Name of Grantee	WorldFish, Bangladesh & South Asia Office		
Type of Project/Activity:	Increased aquaculture productivity, strengthened aquaculture value chains, and improved nutrition related behavior		

Location:

The Activities will be implemented at the FtF ZOI, covers 21 southern districts under the following three divisions:

1) **Barishal Division:** Barishal, Bhola, Jhalokathi, Perojpur, Barguna, Patuakhali;
2) **Dhaka Division:** Faridpur, Gopalganj, Madaripur, Rajbari, Shariatpur; and
3) **Khulna Division:** Jashore, Jhenaidah, Magura, Narail, Bagerhat, Khulna, Satkhira, Chuadanga, Meherpur, Kushtia



Project/Activity Description:

In order to achieve the set goal and objectives, the Activity designed numbers of tasks under each of the sub-IRs, which are illustrated as follows:

IR 1. Increased productivity, production, and quality of aquaculture output from ponds and *ghers*

The actors involved in the aquaculture sector (i.e. input suppliers, growers, buyers) must adopt and use better seed, feed, and best management practices (BMP) in order to increase the production of farmed fish.

Sub-IR 1.1. Increased availability of improved fish seed

Aquaculture development in Bangladesh has been constrained by the poor quality of fish seed with significant problems in inbreeding and accessibility to improved strains. AIN initiated a strategic shift from quantity/price alone to quality and customer preference. Pond farmers are gradually becoming more willing to pay a premium price for quality seed-stock. The interventions that the Activity would focus on can be categorized in the following groups:

a) *Promotion of AIN supported Tilapia Breeding Nucleus (TBN) hatcheries:* As part of AIN, the TBN concept was introduced through 14 hatcheries (two GoB, and 12 private sector) in the ZOI. Among them four hatcheries were developed as brood-bank[13] where original Genetically Improved Farm Tilapia (GIFT) strains were stocked from Malaysia. The assistance will be extended further to carry on the momentum, and to further improve their efficiency. On an average, a grant of $ 20 thousand may be provided to a TBN hatchery that has a production capacity of 6 to 7 million fry a year (about 2 million in a cycle). Considering their capacity, the hatcheries are categorized as "small-scale." The hatcheries are not expected to have potential for adverse environmental impacts. However, assistance will be extended to develop and implement an ESMS. Hatcheries will also be assisted to apply for the "Environmental Clearance" from DoE.

Photo: An in-door, and an out-door activities in a TBN hatchery

Brood-stock management

Hatching

[13] A total of 56 strains were imported. The strains were spilt into eight cohorts, and the families (containing male and female broods) from all eight cohorts were stocked in each of the aforesaid hatcheries.

b) *Promotion of AIN-initiated Carp Genetic Improvement Program (Carp GIP), and capacity development of the hatcheries:*
As part of GIP, brood-stocks were collected from natural waterbodies like Padma, Jamuna, and Halda rivers in 2012, and are currently going through a genetic improvement process.[14] The stocks are expected to be ready for dissemination in or after 2021 (i.e. *rohu* in 2021, silver carp in 2023, *catla* in 2027, etc.). The AIN supported carp hatcheries will be assisted further to carry on the momentum, and to improve their efficiency even better. On an average, a grant of $ 40 thousand may be provided to a Carp GIP hatchery that has a production capacity of 1 to 6 thousand kilograms of fry a year (about 50 to 200 kilograms of fry in a cycle). Considering their capacity, the hatcheries are categorized as "small- to medium-scale," and are not expected to have potential for adverse environmental impacts. However, assistance will be extended to develop an ESMS, and implement the same appropriately. Hatcheries will also be facilitated to apply for the "Environmental Clearance" from DoE.

Photo: AIN carp GIP activities

c) *Promotion of fish nursery entrepreneurship:*
The homestead ponds will be used fry nursing. The size of the ponds may vary from 5 to 50 decimals, and where fry will be grown in a moderate density. The activity is not expected to have potential for adverse environmental impacts.

d) *Small-scale physical works:*
This may include construction, renovation, and/or extension works as part of facilities development of hatcheries (i.e. water tanks, drainage system), fish nursery and grow-outs (i.e. pond re-excavation, dyke repairing), etc.

e) *Equipment installation:*
As part of facilities development of hatcheries, installation of equipment (i.e. solar power system, (re)freezers, aerator), may become necessary.

f) *Adaptive-researches and studies:*
A few of them are listed below. The research and studies items would be selected as needed throughout the life of project.

[14] This is **NOT** a GMO process – rather, follows the way in which, sometimes, some organisms become genetically improved naturally.

- *Evaluation of performance and impacts of the AIN-innovations (i.e. oxygen towering, and water recycling system) for carp hatcheries*
- *Assessment of demand and supply of seed and brood-stock (i.e. fin fish, prawn and shrimp).*

Sub-IR 1.2. Increased availability of affordable quality fish feed

Although Bangladesh ranked fifth as aquaculture producing country but there is a huge yield-gap observed if compared with the Asia regional standards[15]. The yield-gap would have been minimized substantially if the application of supplemental feed were 'valued' in homestead pond aquaculture. Using feed at homestead-pond aquaculture was not common in the past. Perhaps this is one of the most important reasons for households (HHs) getting poor yield from their homestead-ponds. The scenario is slowly changing as HHs started to apply rice bran with/without other ingredients (i.e. oilcake, fish-meal, etc.). However, using non-pelleted feed cannot be efficient since the ingredients tend to be dispersed once applied (either dried for dough-like). Therefore, the Activity plans to make affordable pelleted/formulated feed available for homestead-pond aquaculture. The interventions that the Activity would focus on can be categorized under following groups:

a) *Facilitate fish feed mills in producing affordable feeds for homestead-pond aquaculture:*
   A few feed mills will be supported with grants to upgrade their machineries, lab facilities, feed preparation techniques, and staff capacity. On an average, a grant of some $ 50 thousand may be provided to a feed mill. Since the feed mills are not water-based industry therefore no effluents are released. However, assistance will be extended to the feed mills to develop an ESMS, and implement the same appropriately. Feed mills will also be facilitated to apply for the "Environmental Clearance" from DoE.

Photo: A feed mill

Feed preparation unit *Feed storage unit*

b) *Promote GoB feed policies and regulations in feed value chain*

[15] Average fish/shrimp yields in FtF ZOI compared to Asia region best performers (carp: 1.2 vs. 40 ton/ha/yr; tilapia: 0.9 vs. 25 ton/ha/yr; pangas: 7.8 vs. 100 ton/ha/yr; shrimp:0.4 vs. 10-15 ton/ha/yr)

c) Establish linkages among feed mills, women entrepreneurs, testing services, and specialized know how in affordable feed formulation

d) *Small-scale physical works:*
This may include construction, renovation, and/or extension works as part of facilities development of feed mills (i.e. works relating to hygiene and quality maintenance/improvement of ready feed and ingredients).

e) *Equipment installation:*
As part of facilities development of feed mills, installation of equipment (i.e. solar power system, (re)freezers), machineries (i.e. feed processor), devices (i.e. dust catcher at feed mills), etc. may become necessary.

f) *Adaptive-researches and studies:*
One of them is presented below. The research and studies items would be selected as needed throughout the life of project.
- *Assessment of current and future demand and supply scenario of fish feed*.

Sub-IR 1.3. Increased adoption of improved pond management practices

The interventions that the Activity would focus on can be categorized under following groups:

a) *Development of fish health services*:
Potential government, university and/or private sector will be facilitated through providing grants and training in order to establish fish health service centers.

b) *Document and promote best management practices (BMP) for different types of aquaculture:*
- Commercial fish farming (carp, tilapia, and *pangas*)
- High-value fish farming (i.e. catfish, perch)
- Carp-tilapia-shrimp-prawn polyculture, and
- Carp-*mola* pond polyculture

Stocking in a homestead pond

A traditional and non-efficient way of feeding fish

c) *Small-scale physical works:*
This may include pond re-excavation, dyke repairing, etc.

d) *Adaptive-researches and studies:*
A few of them are listed below. The research and studies items would be selected as needed throughout the life of project.
- *Detail study on the progress of rice-fish farming and future potential innovations*.
- *Feasibility assessment of using solar power for lighting and operating machineries (i.e. pump, aerator) at hatcheries and aquaculture farms.*
- *Development of national fish and shellfish management plan.*

IR 2. Strengthened aquaculture value chains

The existing fish supply chain, in turn, contributes to degraded fish quality and unacceptably high post-harvest losses estimated at a wastage rate of 10 percent valued at BDT 21,300 million per year.

Sub-IR 2.1. Increased market linkages

The interventions that the Activity would focus on can be categorized under following groups:

a) *Assist private sector to test innovation in supply chain to maintain quality and price.*

b) *Studies:*
A few of them are listed below. The research and studies items would be selected as needed throughout the life of project.
- *Study on current market supply and demand, and its future trend.*
- *GIS-based mapping to identify opportunities to link production to markets*
- *Study on value chain analysis to identify current constraints, and their solutions.*

Sub IR 2.2. Increased engagement of private sector in aquaculture markets

The interventions that the Activity would focus on can be categorized under following groups:

a) *Strengthening local financial institutions by providing grants to make credit available for various aquaculture value chain.*

b) *Small-scale physical works:*
This may include construction, renovation, and/or extension works as part of facilities development of local fish markets (i.e. raised platform for product display, drainage system, access road), fish processors and transporters (i.e. works relating to hygiene and quality improvement), etc.

c) *Equipment installation:*
As part of facilities development of fish processors and transporters, installation of equipment (i.e. solar power system, (re)freezers), may become necessary.

d) *Studies:*
A few of them are listed below. The research and studies items would be selected as needed throughout the life of project.
- *Study on identifying investment opportunities in aquaculture and aquaculture-related sub-sector.*
- *Study on potential new opportunities for value addition in the aquaculture supply chain.*

Sub IR 2.3. Improved enabling environment for inclusive growth in aquaculture

The interventions that the Activity would focus on can be categorized under following groups:

a) *Improving and refining existing aquaculture development policies to make them pro-poor, and foster quality (i.e. certifications/standards).*

b) *Studies:*
A few of them are listed below. The research and studies items would be selected as needed throughout the life of project.
- *Study to identify potential win-wins for aquaculture business and the poor.*
- *Study on identifying effectiveness of introducing aquaculture certification to foster the growth of the sector.*

IR 3. Improved nutrition related behavior in rural households

Stunting, combined with other nutritional deficiencies associated with poverty undermine a trend of national improvement in productivity; while malnutrition more broadly is estimated to cost Bangladesh USD 1 billion each year in economic productivity forgone. In order to improve the measures of dietary quality, food safety, dietary diversity, income, change in knowledge and practice regarding fish for unimproved nutrition especially in women and young children, the Activity will focus on the following areas:

Sub-IR 3.1. Improved nutrition awareness and practices

The interventions that the Activity would focus on can be categorized under following groups:

a) *Develop a strategy on improved nutrition awareness and practices using AIN developed SBCC materials.*

b) *Capacity building of public, private and civil society organizations and stakeholders on the role of fish for improving nutrition*

c) *Capacity building at influencing policy and program design with stakeholders including Department of Fisheries (DoF), Institute of Public Health and Nutrition (IPHN), BIRDEM, Scaling up Nutrition (SUN) movement*

d) *Partnering with the private sector to develop a mass media campaign*

e) *Facilitate women entrepreneurs to develop nutrient-rich fish-based products as a sustainable income-generating opportunity*

f) *Promote the initiatives of first 1000 days approach*

Sub-IR 3.2. Improved access to diverse and nutritious food

The interventions that the Activity would focus on can be categorized under following groups:

a) *Scaling-up of proven homestead gender and nutrition-sensitive aquatic agri-food systems (e.g mola-carp polyculture systems with vegetables) to all ponds in FTF ZOI.*

Photo: Pond-dyke vegetable cultivation

b) *Facilitate women entrepreneurs to develop nutrient-rich fish-based products as a sustainable income-generating opportunity*

c) *Studies:*

One of the topic is listed below. The research and studies items would be selected as needed throughout the life of project.

- *Study on assessment of demand of fish-based products in meeting nutritional requirements of the poor and vulnerable.*

Baseline Environmental Conditions:

Geo-morphologically, Bangladesh coastal land zone is a low-lying tract, and is divided into 4 parts: (a) South West (Ganges Tidal Floodplain – West), (b) South Central (Ganges Tidal Floodplain – East), (c) South East (Young Meghna Estaurine Floodplain), and (d) East and Hill (Chittagong Coastal Plain). However, the coastal land zone serves as the out-let of the great GBM (Ganges-Bhramaputra-Meghna) river basin system that discharges huge amount of water annually, which is too much in the wet and too little in the dry season. The water also carries about 2.7 billion mt of silt annually that has been contributing in forming new lands in the South East. The coastal land zone extends over about 32% (47,150 km^2) of the total land, which is consists of 147 upazilas under 19 districts. Among the upazilas, 48 are located at the *exposed coast*, and the remaining 99 at the *interior coast*. About 26% (38.5 million) of the total population are residing here with an average density of 817 persons/km^2 (national average-1,237/km^2). About half of them are below poverty line, which illustrates that the most disadvantageous people are dwelling here. It is expected to increase the population at the coastal zone to 60.8 million by 2050 (PDO-ICZMP, 2005). About 54% of the people of coastal area are functionally landless (who possess 50 decimal or less land) and more than 30% are absolutely landless. Present per capita agricultural land of 0.056 ha may decrease to 0.025 ha by 2050 if present trend continues.

Like other coastal area of Bangladesh, the land use at the FtF ZOI is diverse, conflicting and competitive. Agriculture, shrimp culture, forestry, ports, industry, settlements and wetlands are some of the uses. Moreover, the pattern of land uses has changed over the decades. In the early 1950s, paddy cultivation was the main land use. It should be noted that Khulna division experienced frequent major changes in land use pattern – from forest to *gher* dominated landscape through *settlement-cum-agriculture* dominated landscape. The transformation of crop lands into *ghers* not only altered the environmental perspectives but also changed the socio-economic factors particularly increased unemployment of marginalized farmers and agriculture laborers.

The living conditions are demanding due to frequent occurrence of cyclones, storm surges, droughts, floods, water-logging, salinity intrusion, etc. that cause huge damage to the people, animals, crops, fisheries, and vegetation.

However, the Activity will intent to increase aquaculture production especially in homestead ponds that serve as water reservoir for domestic uses (i.e. washing, cleaning, bathing), and to grow fish for subsistence consumption and some additional income. Since the existing cultivation method is *traditional*[16] therefore, the homestead ponds aquaculture has neither direct nor indirect impact on either the social life or the environment.

[16] which means no chemicals (other than lime), antibiotics, and any other harmful substances are not used

A. CHECKLIST FOR ENVIRONMENTAL CONSEQUENCES: Check appropriate column as Yes (Y), Maybe (M), No (N) or Beneficial (B).

Y. M. N or B

1. Earth Resources

a. grading, trenching, or excavation in cubic meters or hectare _B_
b. geologic hazards (faults, landslides, liquefaction, un-engineered fill, etc.) _N_
c. contaminated soils or ground water on the site _N_
d. offsite overburden/waste disposal or borrow pits required in cubic meters or tons _B_
e. loss of high-quality farmlands in hectares _N_

2. Agricultural and Agrochemical

a. impacts of inputs such as seeds and fertilizers _B_
b. impact of production process on human health and environment _B_
c. other adverse impacts _N_

3. Industries

a. impacts of run-off and run-on water _M_
b. impact of farming such as intensification or extensification _M_
c. impact of other factors _N_

4. Air Quality

a. substantial increase in onsite air pollutant emissions (construction/operation) _N_
b. violation of applicable air pollutant emissions or ambient concentration standards _N_
c. substantial increase in vehicle traffic during construction or operation _N_
d. Demolition or blasting for construction _N_
e. substantial increase in odor during construction or operation _M_
f. substantial alteration of microclimate _N_

5. Water Resources and Quality

a. river, stream or lake onsite or within 30 meters of construction _N_
b. withdrawals from or discharges to surface or ground water _Y_
c. excavation or placing of fill, removing gravel from, a river, stream or lake _N_
d. onsite storage of liquid fuels or hazardous materials in bulk quantities _N_

6. Cultural Resources

a. prehistoric, historic, or paleontological resources within 30 meters of construction _N_
b. site/facility with unique cultural or ethnic values _N_

7. Biological Resources

a. vegetation removal or construction in wetlands or riparian areas in hectare _N_
b. use of pesticides/rodenticides, insecticides, or herbicides in hectare _M_
c. Construction in or adjacent to a designated wildlife refuge _N_

8. Planning and Land Use

a. potential conflict with adjacent land uses _N_
b. non-compliance with existing codes, plans, permits or design factors _N_
c. construction in national park or designated recreational area _N_
d. create substantially annoying source of light or glare _N_
e. relocation of >10 individuals for +6 months _N_

f. interrupt necessary utility or municipal service > 10 individuals for +6 months _N_
g. substantial loss of inefficient use of mineral or non-renewable resources _N_
h. increase existing noise levels >5 decibels for +3 months _N_

9. Traffic, Transportation and Circulation

a. increase vehicle trips >20% or cause substantial congestion _N_
b. design features cause or contribute to safety hazards _N_
c. inadequate access or emergency access for anticipated volume of people or traffic _N_

10. Hazards

a. substantially increase risk of fire, explosion, or hazardous chemical release _N_
b. bulk quantities of hazardous materials or fuels stored on site +3 months _N_
c. create or substantially contribute to human health hazard _N_

11. Other Issues (to be used for categories not captured under1 through 10 above)

a. Substantial adverse impact _N_
b. Adverse impact _N_
c. Minimal impact _N_

B. EXPLANATION OF ENVIRONMENTAL CONSEQUENCES: explain Y, M and B responses

	Explanation
Earth Resources	a. Bio-deposition takes place on the aquaculture pond-beds, which needs to be removed after every couple of years. In order to maintain the pond-ecosystem favorable to the culture stock, the re-excavation may become important. Some ponds may also need to repair their dykes. b. To facilitate composting of the bio-degradable wastes from feed mills, hatcheries, and fish supply chain, borrowing pits may become important.
Agricultural and agrochemical	a. For aquaculture, **only** the local fish species, and the exotic ones that have already been proved to be beneficial for pond ecosystem will be considered. To ensure the process, the Activity will develop a list of approved fish species, and will document BMPs for pond-aquaculture; b. For vegetables cultivation on pond-dykes, the types and their varieties/lines that are less susceptible to pest infestation and/or can be grown by applying BMP (i.e. IPM) will **only** be considered. To ensure the process, the Activity will develop a list of approved vegetables, and will document BMPs for pond-dyke cropping; c. Aforesaid points ("a" and "b") will ensure that the production process will be beneficial for human health and environment.
Industries	a. Storm-water from feed mills may cause soil and/or water pollution if not managed well. The Activity will assist the targeted feed mills to develop and comply ESMS.

	Explanation
Air Quality	a. Feed ingredients (i.e. fish meal) of the feed mills may cause substantial increase in odor if not managed well. The Activity will assist the targeted feed mills to develop and comply their ESMS.
Water Resources and Quality	a. Some ponds may need to withdraw and discharge to surface water occasionally from adjacent canals; b. Hatcheries withdraw water from ground and/or surface, and may discharge either to their own ponds, or to adjacent canals occasionally; c. Feed mills are not water-based industry but for cleaning and washing purpose they withdraw water from ground and/or surface, and may discharge either to their own ponds, or to adjacent canals occasionally.
Biological Resources	a. Pesticides may need to be used in vegetable cultivation on pond-dykes. However, BMP will be applied in order to making the use 'judicial.' b. Hatcheries and feed mills may also need to use pesticides for some reasons occasionally. The Activity will assist the targeted hatcheries and feed mills to develop and comply their ESMS.

C. RECOMMENDED ACTION (Highlight Appropriate Action):

1. The project has no potential for substantial adverse environmental effects. No further environmental review is required.
2. The project has little potential for substantial adverse environmental effects; however the recommended mitigation measures will be developed and incorporated in the project design and/or construction, operation and maintenance phases. No further environmental review is required.
3. The project has substantial but mitigatable adverse environmental effects and required measures to mitigate environmental effects. Mitigation and Monitoring (M&M) Plan must be developed and approved by the MEO prior to implementation. M&M Plan is to be attached to the Scope of Work.
4. The project has potentially substantial adverse environmental effects, but requires more analysis to form a conclusion. *A Scoping Statement must be prepared and be submitted to the BEO for approval. Following BEO approval an Environmental Assessment (EA) will be conducted. Project may not be implemented until the BEO approves the final EA.*
5. The project has potentially substantial adverse environmental effects, and revisions to the project design or location or the development of new alternatives is required.
6. The project has substantial and unmitigatable adverse environmental effects. Mitigation is insufficient to eliminate these effects and alternatives are not feasible. The project is not recommended for funding.

D. IDENTIFIED SIGNIFICANT ENVIRONMENTAL IMPACTS (including **physical, biological and social**), if any: (Use ER tools such as **Leopold Matrix** to identify significant environmental impacts)

The Leopold Matrix has been developed, and attached herewith.

E. RECOMMENDED MITIGATION MEASURES:
The Activity will develop Environmental Mitigation and Monitoring Plan (EMMP) that will be complied accordingly.

F. RECOMMENDED MONITORING MEASURES (if any):
The EMMP will be equipped with schedule and responsible persons in order to ensure the monitoring of the recommended measures.

APPROVAL:

Implementer Project Director/COP: _____ Date: _____
Malcolm Dickson

USAID/ Project C/AOR: _____ Date: _____
Aniruddha Roy

USAID/Bangladesh Mission
Environmental Officer: _____ Date: _____
Sultana Rebekah Akhter

COPY TO:
Asia Bureau Environmental Officer: _____ Date: _____

ANNEX 2

Leopold Matrix

Name of Reviewer: MHM Mostafa Rahman **Date: 22-April-2018**

Environmental component / Project Component		PHYSICAL ENVIRONMENT										BIOLOGICAL ENVIRONMENT										SOCIAL ENVIRONMENT									
		Agricultural Land	Soil Erosion	Slope Stability	Energy/Mineral Resources	Surface Water Quantity	Surface Water Quality	Ground Water Quantity	Ground Water Quality	Air Quality	Noise	Aquatic Ecosystems	Wetland Ecosystems	Terrestrial Ecosystems	Endangered Species	Migratory Species	Beneficial Plants	Beneficial Animals	Pest Plants	Pest Animals	Disease Vectors	Public Health	Resource/Land Use	Distribution Systems	Employment	At Risk Population	Migrant Population	Community Stability	Cultural/Religious Values	Tourism/Recreation	Nutrition
Planning & Design	Studies (i.e. feasibility, status, trend, impact, etc.)	O								O		O									O	O	O	O	o						O
	Development of policies, management plans, etc.	O								O		O									O	O	O	O	o						O
Construction	Repair/maintenance of hatchery & feed mill buildings, local fish markets, & their drainage system		O				O		O	O	O	O		O						O	O	O			O						O
	Installation of equipment at hatcheries, feed mills, fish supply chain				O		O			O	O			O						O	O	O			O						O
	Pond re-excavation & dyke repairing		O	O		O	O					O					O	O			O	O	O		O						O
Operation	Feed mills									▮													O	O	O	O		O	O		O
	Fish hatcheries											O	O		O			O				O	O	O	O	O		O	O		O
	Fish nurseries											O	O		O	O		O				O	O	O	O	O		O	O		O
	Pond aquaculture						o					O	O		O	O		O				O	O	O	O	O		O	O		O
	Vegetable cultivation	O	O	O						O		o		O			O					O	O	O	O	O		O	O		O
	Supply & value chain develop																				O	O	O	O	O	O		O	O		O

KEY: **Beneficial: O - High; O – Medium; o – Low** **Adverse: ▮- High; ▮– Medium; ▮– Low**

U.S. Agency for International Development

Overseas Private Investment Corporation

U.S. Department of State

U.S. Trade Representative

U.S. Department of Agriculture

Millennium Challenge Corporation

United States Geological Survey

U.S. Department of Commerce

U.S. African Development Foundation

U.S. Department of the Treasury

Peace Corps

FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative