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The World Bank

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Report No: 61820

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT

IN THE AMOUNT OF  
US\$ 46.31 MILLION

TO THE

PEOPLE'S REPUBLIC OF BANGLADESH  
FOR THE

INTEGRATED AGRICULTURAL PRODUCTIVITY PROJECT

June 24, 2011

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## CURRENCY EQUIVALENTS

(Exchange Rate Effective {Date})

Currency Unit = Bangladesh Taka  
BDT 74 = US\$1

## FISCAL YEAR

January 1 – December 31

## ABBREVIATIONS AND ACRONYMS

AI	Artificial Insemination	DPM	Deputy Project Manager
APM	Assistant Project Manager	DPP	Development Project Proposal
ARCS	Audit Report Compliance System	DTW	Deep Tube Well
BADC	Bangladesh Agricultural Development Corporation	EIA	Environmental Impact Assessment
BARI	Bangladesh Agriculture Research Institute	EIRR	Economic Internal Rate of Return
BFRI	Bangladesh Fisheries Research Institute	EMF	Environmental Management Framework
BRAC	Bangladesh Agricultural Research Council	ERD	Economic Relations Division, Ministry of Finance
BRRRI	Bangladesh Rice Research Institute	FAO	Food & Agriculture Organization
BWDB	Bangladesh Water Development Board	FFS	Farmer Field School
C&AG	Comptroller and Auditor General	FG	Farmer Group
CF	Community Facilitator	GAFFSP	Global Agriculture and Food Security Program
CPTU	Central Procurement Technical Unit	GDP	Gross Domestic Product
CSO	Civil Society Organization	GIFT	Genetically Improved Farm Tilapia
DAE	Department of Agricultural Extension	GOB	Government of Bangladesh
DANIDA	Danish International Development Agency	HIES	Household Income and Expenditure Survey
DF	District Facilitator	IA	Implementing Agency
DLIAPEC	District Level Inter-Agency Project Evaluation Committee	IAPP	Integrated Agricultural Productivity Project
DLS	Department of Livestock Services	ICB	International Competitive Bidding
DOF	Department of Fisheries	IDA	International Development Association
DPD	Deputy Project Director	IFR	Interim Financial Report
		IMED	Implementation Monitoring and Evaluation Division
		LGED	Local Government Engineering Department

LLP	Low Lift Pump	PMC	Project Management Committee
M&E	Monitoring & Evaluation		
MDG	Millennium Development Goal	PMIS	Project Management Information System
MIS	Management Information System	PMU	Project Management Unit
MOA	Ministry of Agriculture	PRA	Participatory Rural Appraisal
MOFL	Ministry of Fisheries and Livestock	PSC	Project Steering Committee
MOWR	Ministry of Water Resources	RAP	Resettlement Action Plan
MT	Metric Tonnes	RFP	Request for Proposals
NARS	National Agricultural Research System	RPC	Regional Project Coordinator
NSAPR	National Strategy for Accelerated Poverty Reduction	RPCC	Regional Project Coordination Committee
NWMP	National Water Management Plan	RPF	Resettlement Policy Framework
O&M	Operation and Maintenance	RPIU	Regional Project Implementation Unit
ORAF	Operational Risk Assessment Framework	RPM	Regional Project Manager
PC	Planning Commission	SAAO	Sub Assistant Agriculture Officer
PD	Project Director	SBD	Standard Bidding Document
PDO	Project Development Objective	SCA	Seed Certification Agency
PFP	Procurement Focal Point	SGA	Seed Growers' Association
PM	Project Manager	SMF	Social Management Framework
		SO	Strategic Objectives
		SRR	Social Rate of Return
		SPV	Seed Producing Village
		STW	Shallow Tube Well
		UAO	Upazila Agriculture Officer
		UFO	Upazila Fishery Officer
		ULO	Upazila Livestock Officer
		UPCC	Upazila Project Coordination Committee
		WARPO	Water Resources Planning Organization
		WUG	Water User Group

Regional Vice President:	Isabel Guerrero
Country Director:	Ellen Goldstein
Sector Director:	John H. Stein
Sector Manager:	Simeon Ehui
Task Team Leader:	Animesh Shrivastava

# Bangladesh Integrated Agriculture Productivity Project

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# PAD DATA SHEET

## Bangladesh Integrated Agricultural Productivity Project

### PROJECT APPRAISAL DOCUMENT

*Region*  
*Sector Unit*

<p>Date: June 24, 2011 Country Director: Ellen Goldstein Sector Director: John Henry Stein Sector Manager: Simeon Ehui Team Leader: Animesh Shrivastava</p> <p>Project ID: P123457 Lending Instrument: Grant</p>	<p><b>Sectors:</b> Agricultural extension and research (30%); Irrigation and drainage (25%); Crops (20%); Animal production (15%); General agriculture/fisheries/forestry sector (10%)</p> <p><b>Themes:</b> Other Rural development (50%); Rural policies and institutions (15%); Rural services and infrastructure (15%); Nutrition and food security (10%); Global food crisis and response (10%) EA Category: B</p>
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#### Project Financing Data:

Proposed terms:

Loan    Credit    Grant    Guarantee    Other:

Source: GAFSP	Total Amount (US\$M)
Total Project Cost:	63.81
Co-financing:	
Recipient:	17.50
Total GAFSP Financing:	46.31
IBRD	
IDA	
New	
Recommitted	

Recipient: People's Republic of Bangladesh

Responsible Agency: Ministry of Agriculture, Bangladesh

Contact Person: Mr. CQK Mustaq Ahmed

Telephone No.: (880-2) 716-7474

Fax No.: (880-2) 716-7040

Email: [secretary@moa.gov.bd](mailto:secretary@moa.gov.bd)

Estimated Disbursements (Bank FY/US\$ m)

FY	FY1	FY2	FY3	FY4	FY5
Annual	8.13	9.31	11.09	10.97	6.81
Cumulative	8.13	17.44	28.53	39.50	46.31 <sup>[NA1]</sup>

Project Implementation Period: 5 years  
Expected effectiveness date: July 1, 2011  
Expected closing date: June 30, 2016

Does the project depart from the CAS in content or other significant respects?  Yes  No

If yes, please explain:

Does the project require any exceptions from Bank policies?  Yes  No  
Have these been approved/endorsed (as appropriate by Bank management)?  Yes  No  
Is approval for any policy exception sought from the Board?  Yes  No

If yes, please explain: OP 7.50 International Waterways has been triggered. However, notification exemption has been approved by RVP.

Does the project meet the Regional criteria for readiness for implementation?  Yes  No

If no, please explain:

**Project Development Objective:** The proposed Project Development Objective (PDO) of the Integrated Agricultural Productivity Project is to enhance the productivity of agriculture (crops, livestock and fisheries) in pilot areas. These areas lie in Rangpur, Kurigram, Nilfamari and Lalmonirhat districts in the North and Barisal, Patuakhali, Barguna and Jhalokathi districts in the South.

**Project description: Component 1: Technology Generation and Adaptation (Base cost US\$ 7.58 million)** to develop and release relevant technologies and management practices for farmers' use in the selected project areas; **Component 2: Technology Adoption (US\$ 35.35 million)** to enable project area farmers to adopt improved varieties/breed and management practices for crops, livestock and fisheries; **Component 3: Water Management (US\$ 11.82 million)** to increase the availability of irrigation water and efficiency of its use by project area farmers; and **Component 4: Project Management (US\$ 5.12 million)**: to coordinate project planning, implementation and monitoring and evaluation, in line with the relevant fiduciary and safeguards standards.

Safeguard policies triggered?	
Environmental Assessment (OP/BP 4.01)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Natural Habitats (OP/BP 4.04)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Forests (OP/BP 4.36)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Pest Management (OP 4.09)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Physical Cultural Resources (OP/BP 4.11)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Indigenous Peoples (OP/BP 4.10)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Involuntary Resettlement (OP/BP 4.12)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Safety of Dams (OP/BP 4.37)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Projects on International Waterways (OP/BP 7.50)	<input checked="" type="radio"/> Yes <input type="radio"/> No
Projects in Disputed Areas (OP/BP 7.60)	<input type="radio"/> Yes <input checked="" type="radio"/> No

**Conditions and Legal Covenants: NONE**

Financing Agreement Reference	Description of Condition/Covenant	Date Due





# I. Strategic Context

## A. Country Context

1. Bangladesh has made considerable progress in development, sustaining high rates of economic growth and reducing poverty incidence by 9% between 2000 and 2005 (from 49% to 40%). The country is on track to meet the Millennium Development Goals (MDGs) related to human development such as child mortality and combating HIV/AIDS, where it has outperformed other countries in the region. In addition between 2000 and 2007, Bangladesh was largely self-sufficient in terms of production of its staple food - rice.

2. Despite these significant overall achievements, the country faces considerable challenges: pockets of extreme poverty persist (one-sixth of the total population of almost 150 million lives in extreme poverty); the incidence of malnutrition is the highest in the world; the country is most at risk from natural shocks and is highly vulnerable to forecast climate change patterns; and there are large areas with unfavorable agricultural environments (tidal surge prone [2 million ha], flood-prone [0.75 million ha] and drought prone [1.3 million ha]). Moreover, there is a longstanding interface between unfavorable agricultural environments and chronic poverty/food insecurity; this forms the motivational background of this project.

3. Development indicators for the targeted project areas in the north-west and the south are significantly below the national average. The latest Household Income and Expenditure Survey (HIES, 2008) indicates that poverty rate in the north-west is 57% and in the south (Barisal region) is 52% against the national average of 40%. Moreover, the extreme poverty rate in the north is 43% compared to a national rate of 25%. In Barisal region in the south, the rate of extreme poverty even increased from 36% in 2000 to 37% in 2005 in rural areas. All the four northern districts targeted under the project suffer acute seasonal deprivation and famine-like conditions, a phenomenon locally known as *monga*.

## B. Sectoral and Institutional Context

4. *The Agriculture Sector.* Agriculture accounts for about 20.24% of GDP (crops 11.34%, forestry 1.74%, livestock and poultry 2.66% and fisheries 4.5%) and plays a critical role in the overall economic development of Bangladesh. The rural non-farm sector, which is driven primarily by agriculture through the backward and forward linkages, accounts for another 36% of GDP. Agriculture, which employs directly employs 43.6% of the labor force, contributes a quarter of total export earnings and is the mainstay for food security of the increasing population. Nearly three-quarters of the country's total population and 85% of the poor people live and earn their livelihood in the rural areas. In the past three decades, Bangladesh has experienced a trebling of food production (10 to 30 million tonnes), in large part due to expansion of irrigated, dry-season *Boro* rice.

5. *Key Challenges.* In order to produce both more food (for a population growing at 1.6% p.a.) and more raw materials (for the agro-industry), there is an urgent need to increase agricultural productivity (crop, livestock and fisheries), improve natural resource management (especially, ground-water and soil health) and enhance the sector's climate resilience. In

attaining these goals, the sector faces several significant constraints: (i) widespread use of traditional, low-yielding crop varieties and breeding stock, along with outdated crop and livestock management practices – as such there exists a large gap between the productivity levels of farmers and research stations; (ii) low availability of good quality seed and improved breeds of livestock/fish at the farmer level (evidence from the field suggests that the use of improved seed varieties alone can enhance productivity by 15%); (iii) insufficient development by the research system of “appropriate” – location and problem specific - technologies and management practices for use by farmers; (iv) inadequate extension and public services support to farmers in order to expose them to new technologies and management practices and to facilitate their adoption; (v) weak infrastructure with regard to agricultural water management, which increases rain-dependence (thereby enlarging exposure to crop-loss risk over the germination-to-harvest cycle, and potentially inhibiting investments in improved seeds and inputs); (vi) poorly developed market linkages and a relatively constrained role for private sector; and (vii) a lack of institutions and instruments for agricultural risk-bearing and risk-sharing.

6. Many of these constraints reflect the institutional challenges of the sector. The National Agricultural Research System (NARS) comprising the Bangladesh Agricultural Research Council (BARC) as the apex organization and 10 other research organizations, has been developing farm technologies including improved crop varieties. Also NARS has developed knowledge base for increasing farm productivity including livestock and fisheries. Scarcity of resources and human capacity is, however, restricting its delivery of services which needs to be addressed adequately. The extension systems, particularly crop extension services have wide range network at the grassroot level. However, the extension system as a whole is also constrained due to resource limitation and limited research-extension-farmer linkage. Seeds for cereal crops are typically provided by the Bangladesh Agricultural Development Corporation (BADC) after due certification by the Seed Certification Agency. However, both these organizations suffer from infrastructure and capacity/resource constraints, especially in the project area, which constricts the supply of seed to the farmers.”Extension is the mandate of the line departments (Department of Agricultural Extension (DAE), Department of Fisheries (DOF) and Department of Livestock Services (DLS)). However the link between extension and technology generation is weak, and both these activities are insufficiently focused on farmers’ needs or demands. The extension systems are also weak, partly due to real resource and capacity constraints (DAE has a total of 24000 staff, DOF 5000 staff and DLS 8420 staff and less than 15% of department budget is typically available for operational expenses relating to extension) and limited coordination on the ground. Community-based extension approaches are still in their infancy and are usually undertaken at a small scale by NGOs.

7. *Government Stance.* GOB’s National Strategy for Accelerated Poverty Reduction (NSAPR, December 2009) outlined its vision and proposed actions for poverty reduction, including the recognition of agriculture as the major contributor to pro-poor economic growth, food security and nutrition. Earlier the government had developed a National Food Policy (2006) which encompassed the three dimensions of food security (availability, access and utilization). As part of the Global Agriculture and Food Security Program (GAFSP) process, a Country Investment Plan (CIP) was prepared which set out a coherent set of investment programs. The CIP was endorsed in 2010 by GOB and the development partners as the main tool for investing in food security and nutrition. The CIP consists of 12 programs which cover food availability, access and utilization. This project, which seeks to implement the core elements of five of the

CIP programs, is fully aligned with country need, government priorities and the overall consensus within the development community.

8. *Relevant Operations.* Beyond the regular program of research and extension carried by the public agencies, GOB has been working with development partners on a number of projects to address the sector's challenges. There is a Bank-supported National Agriculture Technology Project (NATP), whose objective is to improve the effectiveness of the national agricultural technology system of the country. It aims to re-orient and reform the agricultural research and extension system so that they become more demand-driven, relevant and effective. The Bank is also supporting the Emergency Cyclone Restoration and Recovery Project, which seeks to place rehabilitation and reconstruction activities within the overall framework of livelihood development and reduction in vulnerability to disasters, also has a significant agricultural component. The Asian Development Bank has recently finished a Northwest Crop Diversification Project, whose objective was to increase production and marketing of high-value crops. Finally, DANIDA is supporting an Agriculture Sector Program Support, Phase II, which aims to strengthen the institutions of agricultural extension.

9. This project complements the existing operations – which focus on increasing service relevance and capacity of existing institutions – through a firm focus on the farm household. As mentioned, the project targets specific agro-ecological areas, where agricultural production is constrained by low-productivity, low intensity, mono-cropping and with high risk of yield loss by the inter-locking constraints described above. Consequently, household production is low and livelihood options are limited, resulting in high levels of household poverty and food insecurity. The project approach is to break out of the low-equilibrium trap in these areas through a set of necessary interventions which are complementary – in the sense that each intervention enhances the returns on other interventions – and together constitute an integrated strategy for the agricultural development of these areas.

10. *Rationale:* The rationale – the underlying development hypothesis - for the project is that there is high demand among farmers for mature/available technologies (e.g., drought/flood/cold tolerant, high yielding, shorter duration to maturity, improved breed stock) which can be feasibly adapted for farmers' use and disseminated to them. Bridging this critical gap, however, requires four critical actions which collectively provide the justification for Bank and external partners' involvement: (i) effective technology development/adaptation and dissemination processes - in this regard, the Bank has considerable experience gained from a number of agricultural technology projects in the region (including the NATP in Bangladesh) and beyond; (ii) coordinated action – made possible under project mode - across institutional boundaries that is necessary to provide meaningful support at the farmers' level, e.g., reinforcing research-extension-farmer linkages in planning and implementation; (iii) extensive community mobilization and involvement, to ensure effectiveness of adoption and sustainability of project outcomes – again, the Bank has extensive experience of community-focused projects in the agriculture and rural sector, including in Bangladesh; and (iv) project-mode financing that allows targeted operations to be funded, e.g., location-specific adaptive research for targeted project areas as opposed to research more generally.

## **B. Higher Level Objectives to which the Project Contributes**

11. The Bank's Country Assistance Strategy for 2011-2014 aims to support GOB's objectives of attaining 6% or higher growth rate through focus on four Strategic Objectives (SOs). SO 2 aims to reduce environmental degradation and vulnerability to climate change and natural disasters. An outcome expected under this objective, through Bank-assisted interventions, is improved agriculture production and food security. This project directly aims to generate this outcome in the targeted districts. Further, in line with SO 2, it does so through introduction of technologies, agronomic practices and farm-level investments designed to reduce vulnerability of (agricultural production and rural livelihoods) to natural disasters and forecast climate change impacts.

## **II. Project Development Objectives**

### **1. PDO**

13. The proposed Project Development Objective (PDO) of the Integrated Agricultural Productivity Project is to enhance the productivity of agriculture (crops, livestock and fisheries) in pilot areas. These areas lie in Rangpur, Kurigram, Nilfamari and Lalmonirhat districts in the North and Barisal, Patuakhali, Barguna and Jhalokathi districts in the South.

14. The proposed project is based on grant proposal submitted by GOB for funding under the GAFSP. The proposal was approved by the Steering Committee of the GAFSP and awarded a grant amount of US\$ 50 million to be managed by the World Bank and the FAO as Supervising Entities (SEs). The World Bank was entrusted as the SE for the investment project of US\$ 63.81 million, funded partly by GAFSP grant (US\$ 46.31 million) and partly by GOB contribution (\$17.50 million). (The remaining US \$ 3.69 million will be used for a separate TA and Capacity Building Component of the project that will be supervised by the FAO. Therefore the overall project size therefore stands at US \$ 67.50 million)

### **2. Project Beneficiaries**

15. The primary beneficiaries will be farmers, predominantly small and marginal, in the selected project districts (about 175,000 crop farmers, 60,000 livestock farmers and 60,000 fish farmers; and about 20% of beneficiaries being women farmers).

### **3. PDO Level Results Indicators**

16. The key expected outcome indicators from the project are: (i) productivity of paddy (as representative of crops sub-sector); (ii) productivity of milk (as representative of livestock sub-sector); (iii) productivity of fish; and (iv) number of farmers whose productivity has increased in crops and/or livestock and/or fisheries.

### **III. Project Description**

#### **A. Project Components**

17. The project aims to increase agricultural productivity and livelihoods in agro-ecologically constrained areas by strengthening integrating of key aspects impacting agricultural production: research-extension-farmer linkages in order to furnish relevant technologies and practices to farmers; technology promotion with enhanced availability of improved seed, to ensure sizable spread effects; introduction of improved crop and water management practices; and training and capacity building of farmers' groups along with promotion of key productive assets. Together these constitute a pilot approach to addressing the problem of low productivity growth. Success achieved in this regard can be scaled up nationally, especially in the context of the complementary, long-term National Agricultural Technology Program which is supported by the Bank.

#### **Component 1: Technology Generation and Adaptation (Base cost US\$7.58 million)**

18. This component will support the PDO by adapting and making available for project farmers' the technologies and management practices that will increase yields and production intensities of crops and fish. It will address one of the major constraints to agricultural growth in the project area which is insufficient "supply" of relevant technologies and practices. There are three sub-components: (i) technology generation/adaptation for rice; (ii) technology generation/adaptation for "other" crops (viz. wheat, maize, pulses and oilseeds); and (iii) technology generation/adaptation for fish. Activities to be financed under this component include: evaluation and release of new/improved crop varieties; brood stock improvement and development of pure breed lines in fish; development/refinement of location-specific crop husbandry practices; adaptive trials of aquaculture technologies; and training and capacity building.

#### **Component 2: Technology Adoption (US \$ 35.35 million)**

19. This component will support the PDO by enabling farmers in the project area to sustainably adopt improved agricultural (crops, livestock and fisheries) production technologies and management practices. This will enable them to increase productivity as well as intensify and diversify agricultural production. The component will do so by enhancing farmers' knowledge and skills base, improving availability of quality seed/breed at farmers' level, strengthening extension-farmer linkages and augmenting – as appropriate - their productive assets and social capital base.

20. The component has five sub-components: (i) crop production; (ii) fish production; (iii) livestock production; (iv) enhancement of seed availability; and (v) community mobilization and extension. Crop production sub-component will comprise support for community seed production and for adoption of improved agronomic practices. Fish production will comprise activities related to fish nursery, carp polyculture, intensive fish monoculture and cage culture. Livestock production will comprise activities related to poultry, goat and dairy production as well as animal health campaigns. Enhancement of seed availability will comprise activities

related to seed certification and enhancement of seed distribution capacities. Community mobilization and extension will comprise activities relating to supporting farmers' groups in adopting project disseminated technologies and practices, and enabling them to further spread them through farmer-to-farmer interactions. Therefore, activities to be financed under this component include demonstrations, provision of seeds and inputs, community productive assets, mobilization and back-stopping of farmers' groups, trainings and exposure visits, and facilities for seed testing, processing and storage.

21. The expected outputs from this component are: adoption of improved varieties and production practices for rice and other main crops; greater availability of quality seed at farmers' level through community seed production; adoption of improved fish culture practices; adoption of improved livestock husbandry practices along with improved breed where feasible; and expansion of availability of certified seeds through formal channels in the project area and beyond.

### **Component 3: Water Management (US \$11.82 million)**

22. This component will support the PDO by improving availability of irrigation water and efficiency of its use. It will thus enable farmers to increase cropping intensity, improve cropping patterns and reduce irrigation related risk/variability in crop production that can inhibit investments in other modern technologies/inputs. There are two sub-components: (a) conservation and utilization of surface water (including rain-water harvesting); and (b) enhancement of irrigation efficiency. Conservation and utilization of irrigation water will comprise: (i) rehabilitation of (existing) natural water bodies, canals and ponds for better conservation of surface water; (ii) rehabilitation of existing natural channels (in the south) to conserve tidal sweet water; (iii) harvesting rain-water in rehabilitated natural water bodies and creeks including clay lining to reduce seepage losses; and (iv) harvesting rain-water at homestead level for household consumption, livestock and kitchen garden use. Enhancement of irrigation efficiency will comprise (i) installation of buried pipe network connections to low lift pumps (LLPs) and deep tube wells (DTWs) in appropriate locations to enhance irrigation conveyance efficiency; and (ii) repair of selected DTWs in the Northern Region. In the context of these two sub-components, a variety of training activities will also be supported. The outputs of this component will be expansion in irrigated area and increase in irrigation efficiency.

### **Component 4: Project Management (US \$5.12 million)**

23. This component will support the realization of the PDO by ensuring that (i) interventions undertaken under the project are appropriately planned, coordinated and aligned with project design and development objectives; (ii) implementation arrangements and activities are in line with relevant fiduciary and safeguards policies, procedures and standards; and (iii) there is due monitoring, oversight and reporting of project implementation and the resulting outputs and outcomes. This component will finance the establishment and operation of (i) a Project Management Unit (PMU) in Dhaka and (ii) two Regional Project Implementation Units (RPIUs) - in Rangpur (North) and Barisal (South). The PMU and RPIUs will coordinate, at their respective levels, the activities of various implementing agencies, including the research institutions, the line departments for extension, BADC (seeds and inputs supply), community

level service providers and any CSO/NGO. Activities to be financed under this component include: (i) establishing and supporting project units at the overall and regional levels; (ii) specialized support services relating to key activities such as independent external M&E, external audit, financial accounting and procurement; and (iii) training of staff involved in project implementation.

## Technical Assistance and Capacity Building – FAO

24. The GAFSP-funded IAPP will contain an additional element on Technical Assistance and Capacity Building, which is being prepared and implemented under the Food and Agriculture Organization of the United Nations (FAO) as the Supervising Entity. This will be financed by \$3.69 million grant from GAFSP. This FAO supervised operation has been designed to support the proposed investment operation as well as serve the larger capacity building needs of the sector and the country in the focus areas. Although for fiduciary and accountability reasons it will be implemented as a separable operation, the task team for this project will be located within, and work in close cooperation with, the Project Management Unit of the IAPP.

### B. Project Financing

#### 1. Lending Instrument

25. The project will be financed by a grant provided under the Global Agriculture and Food Security Program.

#### 2. Project Costs and Financing

Project Components	Project cost (US\$ million)	IBRD/IDA/ Grant Financing (US\$ million)	% Financing
1. Technology Generation & Adaptation	7.58	6.60	87.07
2. Technology Adoption	35.35	26.35	74.54
3. Water Management	11.82	6.03	51.01
4. Project Management	5.12	4.76	92.97
<b>Total Baseline Costs</b>	<b>59.87</b>	<b>43.74</b>	<b>73.06</b>
Physical contingencies	0.35	0.22	62.86
Price contingencies	3.59	2.28	63.51
Total Project Costs	63.81	46.31	72.57
Interest During Implementation	00	00	00
Front-End Fees	00	00	00
<b>Total Financing Required</b>	<b>63.81</b>	<b>46.31</b>	<b>72.57</b>

### C. Lessons Learned

26. The design of this project incorporates lessons learned from on-going and previous projects in Bangladesh and in the Region more generally.

	<b>Lesson</b>	<b>Key Design Feature</b>
1.	Demonstrations, organized as one-off events; do not cause significant spread effects	<ul style="list-style-type: none"> <li>- Demonstrations in this project are part of phased, multi-year engagement at any project site</li> <li>- The design and working of FGs is intended to facilitate demonstration-cum-adoption effects</li> </ul>
2.	Lack of complementary inputs – especially seeds – restricts adoption of demonstrated crops/varieties (often, farmers have no access to the newer varieties demonstrated)	<ul style="list-style-type: none"> <li>- Enhancement of seed availability at the farmer level has been given priority in the project</li> <li>- Arrangements for community production and storage of seed have been emphasized to reduce risks/vagaries of seed supply through formal channels</li> </ul>
3.	Adaptive research (even if problem-solving in orientation) does not produce significant impact on the ground unless it links in with extension agents and farmers’ plans	<p>Strengthening research-extension-farmer linkages is a key element in design:</p> <ul style="list-style-type: none"> <li>- adaptive research involves farmers in participatory variety selection</li> <li>- research scientists will interact with and train extension agents and farmers</li> <li>- Annual Extension plans will formally take into account technologies developed for dissemination in the area.</li> </ul>
4.	Lack of staff is a severe constraint in providing effective extension support to farmers. Existing staff are few in number and loaded with multiple responsibilities	Project design allows for hiring of dedicated implementation support staff who will work at the Union level (CFs) and backed- up at the district level (DFs)
5.	Strong M&E greatly improves implementation and enhances the attainment of the PDO	A comprehensive M&E system has been put in place involving internal, external (third party) and participatory monitoring. It is backed up by a robust grievance redressal mechanism.
6.	Community mobilization and preparatory activities are crucial to secure meaningful beneficiary involvement in project design and implementation	Project will follow a structured, detailed calendar of preparatory and mobilization activities, backed up by DFs in coordination with technical specialists from the implementing agencies.

## **IV. Implementation**

### **A. Institutional and Implementation Arrangements**



27. *Project Management.* The project will be implemented over a period of five years. The project administration and implementation arrangements build on existing institutions and capacities, and reflect the technical characteristics as well geographic location of the project's activities. The Ministry of Agriculture (MoA) will be the lead ministry and will work jointly with the Ministry of Fisheries and Livestock (MOFL) to implement the project. Day-to-day project administration and management will be carried out by a central Project Management Unit (PMU) based in Dhaka. It will be supported by two project Regional Project Implementation Units (RPIUs) in the two geographical pockets in the North and South where project activities will be implemented.

28. *Implementation.* Project activities at the ground level will be technically guided and backstopped primarily by two sources: (i) staff of relevant research institutes and line departments of GOB involved in this project ("the implementing agencies"); and (ii) local community facilitators, hired by the project, and district facilitators, deputed by GOB, who will assist the implementing agencies by working with farmers' groups through the entire project activity cycle. In addition, technical specialists, service providers, CSOs and other stakeholders may be contracted by the project to serve in specific roles and contexts.

29. The following implementing agencies will be involved: Component 1- BARI, BRRI and BFRI; Component 2 – DAE, DOF, DLS, SCA and BADC; and Component 3 – BADC. The range and number of implementing agencies is determined by the nature of both the project and the institutional set-up in Bangladesh. By design, the project addresses adaptive research, extension and seed supply constraints across crop, livestock and fisheries as well as agricultural water management constraints. (This approach is dictated by the need to respond to specific agro-ecological challenges and to cater to the mixed farming needs of the vulnerable small and marginal farmers, whose agricultural production is particularly low and variable, and who experience severe forms of household food and income insecurity.) The eight agencies involved have publicly mandated roles to play in these areas. However, as explained in Annex 3, the complexity of institutional arrangements is less than suggested by the presence of the eight agencies.

30. *Role of Farmers' Groups (FGs).* FGs will be the entry point for project activities in a village/ward. Relevant groups will be organized by CFs in consultation with implementing agencies for crops, livestock, fish, and water management. Each group will have clearly defined terms of engagement including the purpose and scope of the group's activities, criteria for selection of group members/beneficiary farmers, roles and responsibilities of the specific group members who will receive any project support in kind, group management and governance arrangements (especially for handling group funds and community-owned assets) and arrangements for ensuring sustainability.

31. *Governance, Oversight and Coordination.* There will be a Project Steering Committee and a Project Management Committee in Dhaka as well as two Regional Project Coordination Committees. There will also be an Upazilla Project Coordination Committee in each Upazila where project activities are undertaken. Together, these will oversee the project's work program, monitor progress, provide oversight and policy guidance, facilitate inter-agency cooperation and resolve any outstanding issues.

32. *Procurement and Financial Management.* In view of the number of agencies involved and the assessment of their (varying) capacities, the PMU will play a central role in carrying out procurement and financial management functions. To mitigate risks, an action plan and a performance monitoring mechanism has been agreed, involving sufficient staff, systematic capacity building, monitoring and review, and a credible complaints handling mechanism.

33. *Fund Flow Arrangements.* GOB contributions would be channeled through MOA as per the Development Project Proposal (DPP). MOA will ensure that the cost of the approved programs is included in their respective ministries' budgets. For utilization of eligible project expenditure, the PMU will maintain one designated account (DA) where Grant funds will flow under agreed terms and conditions. The designated PD of PMU and, in his/her absence, the Deputy, will be the authorized persons for operating the DA. PMU will show fund transfer as Advances from Designated Account to the Operating Account, which will need to be accounted for, preferably within 30 days but in no case beyond 90 days. In case of RIUs, no separate operating accounts will be maintained. Expenditure relating to regional offices and components under its jurisdiction will be met out of the Designated Account maintained at the PMU level.

34. *Financial Reporting.* PMU would be responsible for consolidating financial information from executing agencies and PRIUs for preparing Financial Statements on a monthly basis. For preparing consolidated Interim Financial Reports (IFRs), the PMU would develop specific formats to be used by various agencies for their periodic submission to the PMU. A set of IFRs are being developed. This and will include: Financial Statements (Sources and Uses of Funds, Uses of funds by project component, Special Account Reconciliation Statement). The consolidated project financial Statements, to be prepared by the PMU, will be audited by the Comptroller and Auditor General (C&AG). The C&AG is considered an independent auditor, acceptable to the Bank. The audit report of the project would be submitted to the Bank within six months of the end of each fiscal year. The audit reports would be monitored in the Audit Report Compliance System (ARCS).

## **B. Results Monitoring and Evaluation**

35. *M&E Arrangements.* PDO level and intermediate results indicators will be monitored and evaluated through the following methods and tools: (a) M&E strategy specifying priorities, information requirements, and tools and methodologies for data collection, analysis and reporting; (b) comprehensive M&E plan with clear roles and responsibilities as they relate to indicators tracking with respect to data gathering and reporting; (c) Project Management Information System (PMIS) which will be a computerized information system that caters to the project level information needs; (d) Internal and External periodic assessment and evaluations which would include village baseline surveys, baseline studies, impact evaluations, mid-term evaluation, and end-of-project evaluation; and (e) Participatory Community Monitoring and Accountability approaches and systems using Community Score cards. The PMU will have the overall responsibility for the M&E function although the implementation of the M&E function will take place mainly at the Farmer Group & Community levels.

36. *Data.* Most of the data required for project M&E will, given its nature, arise – and hence be collectible – in the course of project implementation (e.g., adoption rate). As such, measuring project impact is not dependent upon external sources of data which may be beset by issues relating to reliability, comprehensiveness of coverage and capacities of the data collecting agencies. In conjunction with the project M&E system, the Community Facilitator (CF) will be responsible for the collection of M&E data, which will be input into the Project MIS – through a web-enabled interface or with mobile phones. Beyond this monitoring, “evaluation” will be carried out by a competent firm that will undertake the necessary baseline, mid-term and Impact Evaluation work. The PMU will also play an active role in ensuring that the project M&E is in line with the national M&E framework.

### **C. Sustainability**

37. *GOB interest and commitment.* There is strong GOB commitment to this project. GOB was the first – and so far the only – country in South Asia to successfully apply for a grant under the Global Agriculture and Food Security Program (GAFSP), which is financing the project. Moreover, GOB is co-contributing about 27% of total project costs. Agriculture is very high on the development agenda of GOB, with allocations to this sector showing increase, especially after the food price crisis of 2008. Activities by development partners, including the Bank supported NATP, and donor partners’ supported Country Investment Plan for the agricultural sector, will maintain development focus on agriculture and productivity issues, which this project addresses.

38. *Sustainability. Sustainability of project outcomes is highly likely.* Sustainability is a core project principle and has been factored into project design through the following design features and/or expected measures.

- Institutional sustainability. At the ground level, project activities will be implemented primarily through beneficiaries groups. The following steps have been planned to ensure that the key activities will continue to be performed by relevant groups in the post-implementation stage: (i) WUGs will be provided training in system operation and maintenance; (ii) farmers’ groups to be supported under the project will be selected on the basis of clear eligibility criteria, which include willingness/capacity of the community and their understanding of the economic viability of the demonstrated model (to avoid “supply-driven” formation of group aggregates); (iii) project will help in identifying and supporting innovative service providers and potential business partners who would work with productive groups formed under the project and help spur their growth; and (iv) project will facilitate linkage of eligible FGs with banks and other formal sources of credit to ensure they can continue to undertake their activities after project closure.
- Financial Sustainability: No significant issue regarding financial sustainability arises since the project interventions (demonstrations, training and capacity building) are not recurring cost items. Once the farmers have been trained, these costs need not be incurred again. The only possible exception is water management, where there may be annual or seasonal maintenance need. As mentioned above the project will sensitize WUGs to the value of maintenance, and provide appropriate training in this regard.

- Technical Sustainability: The project will undertake the following activities to enhance technical sustainability: (i) technical training provided to FGs with respect to livestock, crop and fisheries activities (e.g., vaccination training for poultry); (ii) technologies demonstrated to FGs will be relatively simple, and will not necessarily generate a post-project demand for technical back-stopping; and (iii) technology dissemination at the ground level will be done by farmer-led mechanisms rather than external service providers.
- Social and Environmental Sustainability: Socially, the project will target the marginal and poor farmers, thus avoiding elite capture and maintaining broad support for the project at the ground level. Safeguard action plans will reduce tension and help manage any potentially negative social and environmental impacts. The M&E system will track social development indicators.
- Monitoring and Evaluation: A strong monitoring system will assist in monitoring and assessing the sustainability of investments made under the project.

## **V. Key Risks and Mitigation Measures**

39. *The risks to the PDO being achieved are rated Medium – I (Low Likelihood, High Impact).* The main sources of risk assessed are (i) involvement of multiple agencies – each with limited staffing and capacities - in project implementation (this spills into fiduciary risks relating to financial management and procurement); (ii) weaknesses in training and working of FGs, which are central to project implementation; (iii) failure of farmers to adopt the disseminated technologies; (iv) elite capture of project benefits; (v) under-representation of women; and (vi) lack of sustainability of project initiatives after completion.

40. *Project design has taken into account these assessed risks.* While the number of implementing agencies cannot be reduced any further, project design minimizes any “critical path dependence” in their actions. Also, project will be funding incremental staff as well as training for existing staff for these agencies. Finally, project will be directly hiring an entire cadre of CFs and DFs to plug the capacity gap on the ground in the implementing agencies. These CFs and DFs will also help to ensure that group activities are fully and vigorously supported, throughout the project activity cycle, from mobilization/formation to demonstration and adoption to further growth in the scale and scope of group activities. The risks of farmers not being interested to adopt the disseminated technologies will be mitigated by ensuring farmers’ involvement at all stages from participatory variety selection to organization of demonstrations. This will ensure that only relevant technologies, of interest to farmers, will be disseminated. Moreover a full financial as well as economic analysis of the planned demonstrations will be carried to demonstrate conclusively to other (adopting) farmers about the benefits of the technologies being demonstrated. The possibilities of elite capture and under-representation of women among project beneficiaries will be addressed through specification of clear, third-party verifiable criteria and establishment of processes for their transparent application. This will be backed up by a solid M&E system and a robust grievance redressal system. Finally, as explained in section IV C above, sustainability has been factored into project design through a number of features.

## VI. Appraisal Summary

### A. Economic and Financial Analysis

*FRR = 20.8%, NPV = USD 34.5 Million, ERR = 21.4%*

41. *Benefits.* Cost-benefit analysis has quantified benefits from the following sources: (i) increase in the productivity of major crops (cereals, pulses, oilseeds and vegetables) by about 12 to 29% in 175,000 farms; (ii) increase in animal productivity by about 25 to 60% for milk and meat in 60,000 farms; (iii) increase in fish productivity by about 21% in 60,000 fish farms; and (iv) increase in irrigated area coverage with improved efficiency in 25,000 ha of 50,000 farms. These benefits are generated primarily through improved, tested agricultural technologies/practices and improved irrigation water management that will be intensively propagated through a network of 10,000 demonstrations, linked to adoption groups, in the project area. The project beneficiary profile includes women (20%), landless households (HHs) (7%), agricultural labor HHs (24%) and small farm holders (81%). The analysis conservatively estimates project-generated benefits in at least two respects: (i) for benefit calculation, it is assumed that only 80% of all the farmers directly impacted by the project – through demonstrations and adoption support – will sustainably increase their productivity; and (ii) benefits accruing to farmers outside project sites are not included. However, these benefits are expected to be sizable: the increase in the annual certified seed production of quality seed by 3500 MT is estimated, for instance, will help meet the need for quality seed replacement of 400,000 farmers in the project and neighboring districts.

42. *Returns.* The estimated economic rate of return (ERR) varies from 18.3% (water management investments), 24.4% (crops), 23.3% (fisheries) to 30.3% (livestock technology adoption). Overall ERR for the project is 21.4%, with a net present value (NPV) of USD 35.5 M, including all costs and benefits from all sources. Annual incremental financial benefits is projected at USD 23.7 M, contributed by technology management (80%), water management

(16%) and reduced production variability (4%). The financial rate of return (FRR) for the project as a whole is estimated at 20.8%.

43. *Poverty and Employment Impact.* Annual incremental farm financial income for the project beneficiaries is estimated to vary from USD 105 for livestock farms to USD 165 for crops and fish farms. Irrigated farmers will realize USD 208 as incremental farm financial income. Major projected farming systems, based on current evidence, are paddy-based (21%), livestock-based (5%), fish-based (18%) and mixed farming systems (56%), with a combination of crops, livestock and/or fisheries. Weighted by these shares, average annual financial income gains for the average project beneficiary HH is estimated at USD 210 at full development by end-project which is equivalent to lifting at least 20% of the project benefited HHs above *upper* poverty line of USD 195 at 2011 prices defined for the project districts. Total annual employment generated due to the project will be 7.1 million person days. On average the project will provide additional 20 man-days of farm employment annually for each of the 345,000 project HHs included in cost-benefit analysis.

44. *Sensitivity Analysis.* Sensitivity of project returns to 20% cost escalation, 20% drop in adoption levels and delay in project benefits of two years was tested. The ERR respectively came down to 17.8%, 17.1% and 15.1%.

45. *Other Benefits.* Project activities are also expected to generate significant secondary/multiplier impacts through the following routes: (i) increased agricultural production, greater diversification and higher net farm incomes realized by other farms; (ii) improved food security, nutrition and health; (iii) increased farm employment for landless and agricultural labour HHs; (iv) reduced poverty and variability of agricultural income with more system wide impacts; (v) strengthened research-extension-farmer linkages; and (vi) improved cost effectiveness of public funding of agricultural research and extension.

## **B. Technical**

46. The project is designed with the intended complexity to support several dimensions of investment in agricultural institutions and services across crops, fishery and livestock sub-sectors to enhance productivity of farmers in areas subject to specific climatic stresses. It identifies the four critical things that need to be done to overcome the inter-locking constraints to agricultural development of the targeted areas: induce the research system to adapt relevant technologies and practices for use by the areas' farmers; align extension efforts to support the dissemination of these technologies; ensure adequate supply of quality seed and improved brood stock at small farmers' level so adoption by farmers can proceed unimpeded; and support investments in on-farm water management as well as community productive assets that enhance (resource) efficiency and resilience of agricultural operations. The design of interventions is in line with approach proposed by GOB in its grant application to GAFSP in June 2010. It is noted, however, that the marketing component included in that application to deal with marketable surplus and as well as market-oriented production issues, were explicitly left out of the purview of the grant supported investment activities.

47. The project relies heavily on community involvement, through a variety of farmers' groups, for implementation, building on the growing experience with community-driven implementation in Bangladesh and in Bank projects. A salient feature of the project is the emphasis on adoption: farmer group structure, technical guidance from extension agencies as well as in-kind project support are all designed to help not just "demonstration farmers" but second and even third cohort of "adoption farmers" to take advantage of the disseminated technologies. If successful, this could pioneer a new approach to ensuring rapid, sustainable spread of new technologies. More generally, success of the project, which essentially promotes climate adaptive technologies and practices by forging close research-extension-farmer linkages could provide a relevant model for GOB to address similar challenges in other parts of the country in enhancing climate resilience, while improving productivity, of agriculture in Bangladesh.

### **C. Financial Management**

48. The financial management assessment has been conducted by the Bank and actions to strengthen financial management capacity have been agreed upon with the project executing agencies. It has been recognized that availability of staff in all the executing agencies at project start up is a critical issue for successful implementation of the project. A clear understanding among the key executing agencies with regard to staffing, fund flow arrangements including reporting and coordination mechanism will also be necessary for effective project financial management. Preparation of accurate financial reports to base disbursement of project fund, internal audit under an agreed TOR by independent auditor and timely follow up of annual audit issues require consistent monitoring by project management. The assessment has concluded that with the implementation of the agreed actions, the proposed financial management arrangements will satisfy the Bank's minimum requirements under OP/BP10.02. Taking into account the risk mitigation measures proposed, overall, the financial management risk for this financing is assessed as Medium –I. Annex 3 provides additional information on agreed project financial management arrangements including risk mitigation measures. The detailed financial management capacity assessment is available in the project files.

### **D. Procurement**

49. Considering the procurement needs for eight procuring entities under the project (three research institutes and five agencies), the PMU – comprising the Project Director and technical representative of all entities concerned - will conduct majority of the procurement activities under the proposed grant agreement. Assessment of the implementing agencies considered the impact of complexity in project design due to the high number of procuring entities, inadequate procurement capacity and need for significant capacity building in the course of the grant for improved procurement performance. A procurement risk mitigation strategy and performance monitoring mechanism, incorporating key aspects such as identification of focal point for procurement, addition of a full-time procurement consultant attached to the PMU, producing quarterly procurement performance monitoring reports, systematic capacity building of PMU and agencies' staff and a credible complaint handling mechanism has been included in procurement interventions of project design. Furthermore, conditions for use of national competitive bidding for procurement of goods and works have been established, with bidding

documents acceptable to the Bank. Details of procurement arrangements are provided as part of project implementation arrangements elaborated in Annex 3 of the PAD.

#### **E. Social (including safeguards)**

50. A comprehensive Social Assessment (SA) has been conducted by MoA, supported by stakeholder consultations. While the project is expected to benefit the communities, the implementation of specific project investments could lead to some adverse social impacts. Potential adverse social impacts during the implementation phase of investments include loss of land or structures, loss of access to areas for livelihood support, elite capture/ exclusion of vulnerable community, and public safety issues. The Social Management Framework (SMF) prepared for the project acknowledges these issues and integrates the measures for addressing them in the project implementation process. However, given the nature of interventions, the scale of adverse loss is likely to be small. The SMF includes Resettlement Policy Framework, which specifies the procedures, eligibility, grievance redress and other measures to be followed in the event that resettlement or land taking is required for any intervention; a Tribal Management Framework with the objective of improving the quality of life of tribal population, though tribal community is not likely to be adversely affected; and a Gender Development framework. The target beneficiaries of the project include the vulnerable sections namely, women, landless, small and marginal farmers, tribal and similar vulnerable community members to be identified through social mobilization exercise during implementation. The design of the project is rooted in community participation and social development goals include inclusion; equity; participation; transparency; and accountability. The project will help build and strengthen the existing local institutions in order to deliver the benefits and empower the community. The project will engage with local communities and key stakeholders to ensure their inclusion and participation in the planning, implementation and subsequent management of the investments especially the vulnerable.

51. A social accountability mechanism will be established for the project. The key approaches for ensuring social accountability would be any or a combination of participatory processes guiding social audit, community score card and report card to acquire feedback on performance of the sub projects and record citizens' recommendations for improvement. The social accountability mandate will be further strengthened through a strong grievance redress mechanism. The project will have tiered grievance redressal mechanism.

#### *Safeguard Policies*

52. Considering the distributed nature and significance of the interventions and low adverse impacts, the project is categorized as 'Category B', as per OP 4.01. Even though involuntary resettlement is not envisaged under the project, OP 4.12 has been triggered just in case any such eventuality occurs under the water management component. While the tribal population is insignificant in the districts where the current project is operating, OP 4.10 has been triggered. The SMF would contain a check list for ensuring culturally appropriate and informed consent/choice for tribal families in such cases. In any case, given the CDD nature and vulnerability focus of the project, there is already an inclusive process framework for addressing



the concerns of all vulnerable groups through participation and informed consent, so it is anticipated that any tribal groups covered would be project beneficiaries.

#### **F. Environment (including safeguards)**

53. IAPP activities with environmental implications include: promotion of increased production of select annual crops and livestock with associated pesticide use and waste management issues, water management activities and minor construction/refurbishing. Project environmental impacts may include soil and water quality changes from use of agrochemicals and production; changes to aquatic ecosystems from excavation/desiltation activities, increased usage of surface water; conversion of fallow land to agricultural usage or water storage; loss of native biodiversity; and minor construction impacts, among others. The project is classified as Category B because although it may have some impacts, its activities are not expected to cause any significant negative or irreversible changes in the environment.

54 The Project triggers Environmental Assessment 4.01, Natural Habitats 4.04 and Pest Management 4.09 Safeguard Policies. Since exact project sites have not yet been identified, an Environmental Management Framework (EMF) has been drafted in order to manage impacts, including those from the use of pesticides during Project activities. Finally, appropriate arrangements will be established for monitoring EMP implementation. Public consultations were held with stakeholders, potential beneficiaries, indigenous peoples and NGOs at local, regional and national levels in March and April 2011. A draft EMF and Bangla summary has been developed and was disclosed on May 31, 2011 in-country on the Ministry of Agriculture website and in the World Bank's InfoShop.

#### **G. Other Safeguards Policies triggered**

55 OP<sub>[NA2]</sub> 7.50 International Waterways is triggered by the project because (i) subprojects may involve waterways that may drain to the Bay of Bengal which the World Bank defines as an international waterway and (ii) subprojects may use groundwater from aquifers that may be shared with neighboring countries. The possible impacts on water quality and quantity going to neighboring riparians would be minor and insignificant and therefore notification exception 7(a) has been granted. Additionally, the water component of the Project consists of rehabilitation of existing irrigation works or rainwater harvesting alterations to water bodies already being used. Therefore, in accordance with the exemption, the project involves "minor additions or alterations to the ongoing scheme; it does not cover works and activities that would exceed the original scheme, change its nature, or so alter or expand its scope and extent so as to make it appear a new or different scheme." The Environmental Management Framework monitoring and evaluation system will identify and reject or manage interventions that could significantly negatively impact the Bay of Bengal or any aquifers known to be shared.





## **BANGLADESH: Integrated Agricultural Productivity Project (IAPP)**

### **Annex 2: Detailed Project Description**

1. The proposed Project Development Objective (PDO) of the Integrated Agricultural Productivity Project is to enhance the productivity of agriculture (crops, livestock and fisheries) in pilot areas. These areas lie in Rangpur, Kurigram, Nilfamari and Lalmonirhat districts in the North and Barisal, Patuakhali, Barguna and Jhalokathi districts in the South. These include the salt-affected tidal surge areas in the south and flash-flood prone and drought-prone areas in the north.

2. The main expected outcomes of the project are increased productivity in selected crops, fish and livestock; increased cropping/production intensity; and diversified production base for the targeted households. These outcomes are expected to be achieved through interventions that lead to release of improved varieties of crops, greater availability of quality “seed” (for crop, fisheries and livestock) at the farmer level, better agronomic and husbandry practices, improved plant and animal health regimes, and formation of productive assets and skills among the beneficiaries through group methods. A significant proportion – at least 20% - of the project beneficiaries are expected to be women farmers.

3. The project is expected to cover all the 54 Upazilas in these eight districts. Further, project activities are expected to take place in about 375 Unions. This covers a significant proportion of all the non-urban Unions in the entire project area. The project activities will be rolled out in a phased manner, with the first year focusing on beneficiary identification and mobilization as well as capacity building at the ground level, and initiation of adaptive trials by the research institutes involved.

4. The key principles underlying the project design are:

- Active farmer participation in planning, implementing, and evaluating project interventions will enhance the relevance of varieties selected for cultivation, increase adoption of new technologies and practices, and contribute to sustainability of both technical interventions and the local institutions supporting farmers.
- The selection of project sites as well as beneficiaries should adhere to transparent, third-party verifiable criteria and an open and objective selection process.
- Project interventions should meet high standards of technical quality as well as social, environmental and fiduciary considerations.
- Investment in group and community level institutions, capacities and productive assets provides a strong and sustainable basis for livelihoods enhancement by allowing beneficiaries to collectively learn more, achieve scale and better transactions terms and organize more effectively to benefit from public services.

5. The Bangladesh IAPP will have four components: (i) Technology Generation and Adaptation; (ii) Technology Adoption; (iii) Water Management and (iv) Project Management.

### **Component 1: Technology Generation and Adaptation (Base Cost US\$ 7.58 million)**

#### **Description**

6. *Relation to PDO.* This component will support the PDO by adapting and making available for project farmers' technologies and management practices that will increase yields and production intensities of crops and fish. It will address one of the major constraints to agricultural growth in the project area which is insufficient "supply" of relevant technologies and practices. This insufficiency in supply of locally relevant and applicable production technologies and practices in the project area is due to resource limitations in research and weaknesses in research-extension-farmer linkages.

7. *Rationale.* By design, the project has targeted areas with significant environmental stress (seasonal droughts, cold snaps and flash flood submergence in the North; varying levels of salinity, tidal and saline submergence in the South). Furthering agricultural development in these areas requires suitable varieties, and location and problem specific technologies and production practices. There exist a set of mature (i.e., on-the-shelf or in the final stages of development) technologies within the research system that are generically relevant to these conditions. However these need to be refined and adapted to local soil-water-climate conditions and the resource base as well as the preferences of the farmers in the project areas.

8. The component will support the four areas needed to bridge the gap in applicable technologies for the project regions: (i) support to relevant research institutes – Bangladesh Rice Research Institute (BRRI), Bangladesh Agriculture Research Institute (BARI) and Bangladesh Fisheries Research Institute (BFRI) – to undertake validation and adaptation of mature technologies for dissemination to farmers; (ii) support for greater involvement of farmers and extension agencies in the trials and demonstrations to improve relevance and effectiveness (i.e., better research-extension-farmer linkages); (iii) enhance capacity of these research institutes to produce larger quantities of breeder seed and fish breeding stock so that the released varieties and technologies can be adopted at scale; and (iv) support training and capacity building to improve the process of technology development, refinement and transfer at various levels.

9. *Results.* The outputs of this component will be: (i) release of 23 new seed varieties and improved fish species and (ii) 22 packages of new cropping and fisheries production practices by the end of the project. It is also expected that there will be an increase in breeder seed production. Beyond these effects measurable during the project's lifetime, it is expected that this components investments will enhance the capacity of the research system to maintain a pipeline of relevant technologies and of the extension system to effectively disseminate them to the farmers.

## **Sub-Components and Activities to be Financed**

10. This component has the following sub-components, reflecting three areas of focus: (i) Technology for Rice; (ii) Technology for Other Crops (wheat, maize, pulses and oilseeds); and (iii) Technology for Fish.

### **(i) *Technology for Rice (Implementing Agency BRRI)***

11. Rice is the main crop and staple of Bangladesh, the following activities will be financed under this sub-component for enhancing rice productivity: (i) evaluation and release of new varieties; (ii) development and refinement of location and problem specific rice husbandry practices; (iii) strengthening breeder seed production capacity; and (iv) training and capacity building.

12. *Evaluation and release of new varieties.* BRRI has identified several promising lines of rice which are suitable to the specific needs of the project area and which are at an advanced stage of development and evaluation. These include varieties that show tolerance to submergence (including tidal submergence), salinity, drought and cold as well as those with a shorter maturity period. These will be taken up for participatory evaluation and variety selection on the farmer fields in the project areas. If the performance in the adaptive and validation trails is found to be better than the existing varieties, then steps will be taken for releasing these varieties for general cultivation for promotion under Component 2.

13. *Development and refinement of location and problem specific rice husbandry practices.* With reference to the special agro-economic characteristics and needs of various locations in the project area, trials will be undertaken with respect to crop management, soil management, pest management, cropping patterns, and irrigation/water management. The objective will be to develop/identify cost-effective practices, especially for resource poor farmers, which can lead to gains in productivity, cropping intensity and crop diversification that can also be promoted under Component 2.

14. *Strengthening of breeder seed production capacity.* With a view to address the shortage of quality seeds, the project will support augmentation of the breeder seed production capacity of BRRI in its two regional stations in Barisal and Rangpur in the project area.

15. *Training and capacity building.* This will involve training for BRRI resource persons as well as training given by BRRI staff in technology transfer and seed production to extension agents, farmers and other relevant players in the project areas.

### **(ii) *Technology for Other Crops (BARI)***

16. In addition to rice, four other crops have been included in the project. These are wheat, maize, pulses and oilseeds. Consumption of wheat in Bangladesh is growing at 3% p.a. and annual demand currently stands at 4 million tonnes against domestic production of 1 million tonnes. Wheat also requires less water and is better suited to the cooler climate in the Northern regions than *Boro* paddy. Maize is an increasingly important crop in Bangladesh serving food,

feed (from growing poultry industry) and forage needs. Maize has a relatively higher stress tolerance capacity (with respect, drought and water-logging) and can be introduced in different cropping patterns in both winter and summer seasons. With respect to both oilseeds and pulses there is significant shortfall in domestic production in relation to demand, and currently these crops produce low yields due to poor varieties and management practices.

17. The following activities will be financed under this sub-component: (i) evaluation and release of new varieties; (ii) development and refinement of location and problem specific crop husbandry practices; (iii) strengthening breeder seed production capacity; and (iv) training.

18. *Evaluation and release of new varieties.* BARI has identified several promising lines of wheat and maize (high yield, short duration, with adaptation to drought, boron-deficiency and acid soils) which will target project districts mainly in the North. Similarly, it has identified promising lines of oilseeds and pulses (high yield, short duration, and adaptation to salinity, drought, boron-deficiency and acid soils) which will target project districts both in the North and the South. These varieties will be taken up for participatory evaluation and variety selection on the farmer fields in the project areas. If the performance in the adaptive and validation trails is found to be better than the existing varieties, then steps will be taken for the release of these varieties for general cultivation and promoted under Component 2.

19. The other three activities being financed will follow along the lines for rice above. The *development and refinement of location and problem specific crop husbandry practices* will involve agronomic management trails and demonstrations relating to salinity, drought, improved cropping patterns, inter-cropping, fertilizer management, soil health management, pest management, water harvesting and efficient water-use technology. The objective will be to develop/identify cost-effective practices, especially for resource poor farmers, which can lead to gains in productivity, cropping intensity and crop diversification. Similarly, to enhance *breeder seed production* the capacity of selected agricultural research stations will be augmented. Finally, *training and capacity building* will involve training for BARI resource persons as well as training given by BARI staff in technology transfer and seed production to extension agents, farmers and other relevant players in the rural areas.

**(iii) Technology for Fish (BFRI)**

20. Activities to be financed under this sub-component include (i) on-station pure line development; (ii) adaptive trials of aquaculture technologies at farmers' field conditions; (iii) strengthening of fish seed production capacity and (iv) training and capacity building.

21. *On-station pure line development.* The purpose of this sub-component is to improve the genetic potential of available fish seed. This will involve three activities: stock improvement of genetically improved farm *tilapia* (GIFT) through family selection program; stock improvement of climbing perch (*thai koi*) through brood stock replacement technique; and development of pure line *thai pangas* for stock improvement and mass seed production.

22. *Adaptive trials of aquaculture technologies.* Field level refinement and standardization of production technologies is essential for improved aquaculture productivity. This will involve

also three types of activities: (i) refinement of *monoculture tilapia* fry nursery technique in farmers' ponds; (ii) refinement of *thai koi* fry production in farmers' ponds; and (iii) refinement of quality fingerling production of *pangas* in farmers' ponds. Over 250 adaptive field trials per year are planned with an important objective to assess optimal stocking densities, and to undertake relevant cost-benefit analysis.

23. *Strengthening of fish seed production capacity.* This will address the shortage in the project areas of quality fish seed through the supply of quality fish breeding stock (*tilapia, koi, pangas, rohu, catla, silver carp* and *silver barb*) Seed will be distributed to selected nurseries, Fish Seed Multiplication Farms and private hatcheries.

24. *Training and capacity building.* This will involve training for BFRI resource persons as well as training given by BFRI staff to farmers on aquaculture, pond productivity and fish disease prevention and control, including to hatcheries. Field level demonstration ponds will be utilized for the purposes of site training

## **Component 2: Technology Adoption (Base Cost US\$ 35.35 Million)**

### **Description**

25. *Relation to PDO.* This component will support the PDO by enabling farmers in the project area to sustainably adopt improved agricultural (crops, livestock and fisheries) production technologies and management practices. This will allow them to increase productivity as well as intensify and diversify agricultural production. This component lies at the heart of the project since it addresses the central challenge of moving farmers out of a traditional, low-input/low-output and high-variability production system through changes in their choices and behavior/practices. It does so by enhancing farmers' knowledge and skills base, improving availability of quality seed/breed at farmers' level, strengthening extension-farmer linkages and augmenting – as appropriate - their productive assets and social capital base.

26. *Rationale.* Agricultural production in the project areas is significantly challenged due to number factors, leading to high levels of household poverty and food insecurity. A large number of farmers continue to use local (unimproved and impure) seed varieties/breeds and traditional cultivation/husbandry practices, resulting in low yields with high variability (partly from exposure to natural hazards such as droughts and submergence). In crops, availability of good quality seeds at the local level is severely constrained, and farmers' own production and storage of seed suffers from significant weaknesses. An estimated 20% of local seed (stored and) used by farmers are unviable mainly due to damage caused by moisture, rodents and insect pests. Livestock and fisheries production for which the landless, poor women and unemployed youth are more dependent on for their livelihoods, suffers from low productivity, low technical know-how, lack of improved breeding practices/services, and inadequate health care. Finally, there are significant gaps and weaknesses in provision of institutional and public service support to farmers. Coverage of extension agencies is thin: the departments of Livestock and of Fisheries have only staff each at the *Upazila* (sub-district) level. The Department of Agricultural Extension have staff at the *Union* level (Sub-Assistant Agriculture Officer or SAAO) however several factors limit their effective outreach, such as large numbers of farm families to be serviced,



significant concurrent work responsibilities, and limited ongoing training means that the knowledge and technical skills of the extension staff need to be upgraded.

27. *Results.* This component is expected to result in 175,000 crop and horticulture farmers using improved varieties and technologies, 60,000 fish farmers using improved quality “seed” and better aquaculture practices, 60,000 livestock rearers benefiting from adoption of improved breed and/or husbandry management practices, and an additional 3,500 tons of certified seed being made available to the country’s farmers through the seed distribution system.

### **Sub-Components and Activities to be Financed**

28. This component aims to address these problems and issues through the five following sub-components: (i) Crop Production; (ii) Fisheries Production; (iii) Livestock Production; (iv) Enhancement of Seed Availability; and (v) Community Mobilization and Extension.

#### *(i) Crop Production (DAE)*

29. The Department of Agriculture Extension is the lead agency extensive related activities in field crops and horticulture and has a large network of extension workers and is responsible for interventions for enhancing field and horticultural crop productivity. This sub-component involves the following activities: (i) support for production of field and horticultural crops using new/improved varieties and/or practices, (ii) community seed production and (iii) capacity building.

30. **Support for Production of Field and Horticultural Crops using new/improved varieties and/or practices.** Over 2000 agronomic productivity “interventions” are expected to be organized during the lifetime of the project in a phased manner. Under this activity, the project will aim to demonstrate and support adoption of various technology themes such as short duration “*Boro*” rice cultivation and other cereal crops (wheat and maize) cultivation, cultivation of salinity and submergence tolerance varieties, cultivation of oilseeds and pulses, cultivation of high value horticulture crops, water use efficiency, crop intensification and diversification, improved agronomic management and so on, including those developed in Component 1. These technology themes will be demonstrated on farmers’ fields as a ‘package of practices’ thus ensuring that yield potential of the technology is not limited by poor management or lack of inputs. The project will empower demo farmers to keep field records to clearly demonstrate the economic benefit of the technology, against a control plot.

31. The technology themes will be initially demonstrated to small groups of farmers who will be linked to subsequent cohort of adopting farmers using the approach described below. The project will finance demonstration costs, costs of relevant farm equipment, and other group productive assets (e.g., tillers, seeders, Urea Super Granule deep placement equipment) while providing support to adopting farmers for seeds, storage and composting (for high value crops) and training and capacity building. The expected result from this activity is significant improvement in agronomic practices, cultivation of better suited crop varieties, improved cropping patterns and increased cropping intensity.

32. **Community Seed Production.** Approximately 800 community seed “interventions” are expected to be organized during the lifetime of the project in a phased manner, mainly for rice production. The primary objective of this activity is to enhance availability of good quality seed at the farmers’ level. Availability of good quality seed is a critical constraint, especially for small and marginal farmers. Evidence suggests that use of improved variety seeds alone – with no other change in inputs/practices – increases yields by at least 15%. In the project context, however, demonstration of improved agronomic practices will be integrated into this activity. More importantly, seed production activities will target new/improved and/or locally adapted crop varieties which have been selected for widespread promotion/dissemination under the project, closely linked to Component 1. This is to ensure that adoption by farmers of project-supported crop varieties does not subsequently suffer due to lack of availability of suitable seed.

33. The activity of community seed production involves the following aspects that will be financed by the project: (i) training of farmers in seed production, drying and storage (as well as associated set of improved production practices for the crop being produced); (ii) support for storage in form of “seed cocoons” at the community level and secure, re-usable storage bags at the individual level; (iii) seed and selected inputs to support demonstrations as well as subsequent adoptions; and (iv) training and capacity building in seed production of extension staff and other stakeholders. The community seed interventions will be implemented in a similar manner to the productivity intervention in that there will be the demonstration and adoption farmers, the approach is described below.

34. *Seed Storage.* The 800 or so seed production “interventions” described above will be supported to become Seed Producing Villages (SPV). For each SPV the project will provide a seed storage cocoon (of approximately one tonne capacity) to the FG to provide the means for safe and secure community storage of seeds. At the level of individuals, it will also seek to popularize the use of seed storage bags and drums. To enable effective community management of seed-related activities, the project will empower the FG to own and regulate the use the seed storage cocoon as well as other community productive assets. The Project will encourage the FG to form a Seed Growers’ Association (SGA) who will be the natural body to liaise, over time, with the SCA and BADC to arrange, where possible, for seed certification as well as contract “seed out-grower” arrangements and linkages to the private sector.

35. Technical support for seed production and storage activities will be organized by the DAE staff. They will be supported on location by an on-site project-hired Community Facilitator (more details in Community Mobilization component below) with regard to group formation and mobilization, as well follow-up on various technical steps advised to farmers.

36. It is expected that as a result of (i) extensive training and induced adoption of seed production among farmers; (ii) physical and social investments in community seed storage and management; and (iii) closer and more effective links formed with extension staff, there will be a dramatic change in the availability of good quality seed for all the farmers. The quantities of seed produced and stored locally could easily supply the needs of significant number of villages in the “demonstration neighborhood”, thus producing an impact on output and productivity which will extend well beyond the “direct” effects being forecast for the project.

37. *Project Approach to Improved Productivity Practices for Field and Horticultural Crops and Community Seed Production.* The project approach to technology dissemination – in this case as well as in the others – is to use demonstrations as an entry point for enabling wider adoption of the technology by the community. Approximately 2800 “interventions” are expected to be organized during the lifetime on the project in a phased manner. Each intervention will target a village to be chosen according to specific criteria. Each intervention will have the following three-year structure design to widely spread the disseminated technology, using a farmer field school (FFS) approach:

- (i) In the first year, a small group (a set of three selected from a FG) of “demonstration farmers” will be targeted, on whose fields the “technology package” will be demonstrated under close technical supervision according to an agreed training/demonstration calendar. The project will provide these farmers with a demonstration support package comprised of high-quality seed and some inputs. The demonstration farmers will be chosen according to specified criteria (described in Annex 7). As part of overall arrangement, the first cohort “demonstration farmers” will be expected to intensively involve, in training/demonstrations on their fields, the other members of the FG so the majority of the group can adopt the demonstrated practices in their own fields in the next cropping season/year.
- (ii) In the second year, the second cohort (of 20-25) “adopting farmers” of the FG will be supported by the project through provision of a smaller package of inputs (mainly seed) and a lighter technical back-up than that the first cohort farmers. The rationale for providing a seed package is to start the adopting farmers with supply of certified good quality seeds (which they may not otherwise be able to procure) as well as give them more incentives on the margin to experience for themselves the favorable economics of using good quality seed. The lighter technical back-up from the project side is premised on provision of some hands-on advice and support from first cohort farmers to these second cohort farmers on FFS principles. Critically, these second cohort farmers are also expected to engage other farmers from the project area interested in adopting these practices for themselves
- (iii) In the third year, a third cohort (two FGs of 25 farmers or so) “adopting farmers” will be supported by the project in a manner similar to the second cohort farmers.

38. As a result of the phased demonstration-cum-adoption-support approach, there will be significant spread effects in any one site/village as a result of the intervention. This critical mass of adoption is expected not only to sustain the demonstrated practices in the targeted locations but will also contribute to lateral spread to other villages. Notably, following transparent and community based beneficiary identification according to strict eligibility criteria, the majority of farmers that directly receive seed/inputs support from the project are expected to be small/marginal and resource poor, with a significant proportion being women.

39. **Training and capacity building.** This activity will involve training for extension staff, the training of trainers, training of resource persons as well as training to farmers. Support will also be provided for the development of training curriculums.

(ii) ***Fisheries Production (DOF)***

40. The aim of this activity is to improve aquaculture performance in the project area. Aquaculture productivity in this area is below the national average for three main reasons: lack of quality fingerlings (juvenile fish), lack of technical know-how (especially intensive rather than extensive culture practices) and weak extension support. Accordingly, four kinds of project activities will be undertaken to support fish production: (i) fish nursery; (ii) carp polyculture; (iii) intensive fish monoculture; (iv) cage and pen culture; and (v) training and capacity building.

41. *Fish Nursery.* To improve local availability of quality seeds/fingerlings at affordable prices, the project will support demonstrations of best nursery management practices in farmers' ponds throughout the project area. Eligibility criteria will favor targeting small but stable farmers. They will be supported by supply of quality seed (from hatcheries that would have received fish breeding stock and management training from BFRI under Component 1 to produce high quality fingerlings) and technical advice/back-up. The largest number of demonstrations will be for *carp* followed by *tilapia*. Additionally, demonstration will be organized for *koi* in the north and for *pangas* in the south. Using a similar approach to adoption as the Crop Production sub component, demonstration farmers will be expected to involve a group of next cohort adopting farmers in demonstration activities at their pond sites. The next cohort adopting farmers will be supported, on a sliding basis, by the project to take up improved nursery management practices. The expected result is sufficient critical mass of nurseries in the local area to supply the fingerling needs of all categories of fish farmers.

42. *Carp Polyculture.* Carp production is the most commonly practiced form of aquaculture in Bangladesh and almost every homestead pond is stocked with some carp, but yields tend to be very low (around 1.5t/ha) due to inadequate management. Simple management procedures (stocking the correct ratios of different species, regular fertilization and feeding etc) can easily double the output of these systems, which can also be raised further by the addition of *tilapia*. The project will work to improve management practices for *carp/tilapia* polyculture, specifically targeting small farmers with less than average pond size. Where feasible, the project will also work with landless households forming them into groups that could access ponds and adopt polyculture technologies.

43. *Intensive Fish Monoculture.* This activity will aim to introduce commercial forms of aquaculture in the project area. Evidence from outside the project areas suggest that commercial forms of aquaculture - such as intensive *pangas* and *tilapia* culture - have resulted in significant local economic growth and poverty reduction as a result of upstream and downstream employment opportunities in supplying goods and services. The project will provide demonstration and subsequent adoption support for the following; (i) intensive *tilapia* monoculture; (ii) improved semi-intensive *tilapia* culture; (iii) intensive *koi* monoculture; and (iv) intensive *pangas* monoculture. Small farmers will be preferentially targeted. For some species (*koi* and *tilapia*) it is possible to undertake intensive culture even in very small ponds and ditches (between 5-10 decimals in spread).

44. *Cage and Pen Culture.* This activity will target the landless fishers living close to public water bodies. Cage and pen culture are promising technologies for areas where there is plenty of water, as in the project districts in the South. Sets of 10 cages will be located in public access water bodies close to the homes of demonstration group members. Since ownership of land is not a requirement for cage or pen culture, poor landless fishers will be selected as project participants. The project will provide demonstration inputs and technical support.

45. *Training and Capacity Building.* This will involve training for DOF resource persons as well as training given by DOF staff to a variety of stakeholders such as nursery operators, fry traders and farmers, and will include exposure visits for farmers. Further the project will support the renovation of DOF Fish Seed Multiplication Farms to improve capacity for brood management, quality seed production and rearing of hatchlings.

(iii) ***Livestock Production (DLS)***

46. The activities being financed under this sub-component are: (i) support for poultry production; (ii) support for goat/sheep production; (iii) support for dairy (cow/buffalo) production; (iv) health campaigns; and (v) training and capacity building.

47. Overall, the livestock sub-sector is closely interlinked with the integrated farming system in Bangladesh. Cattle, buffalo, goat, sheep and poultry are a source of cash income, nutrition and food security in the rural areas. Ample scope exists developing these activities further as part of a mixed farming system, which can contribute to poverty alleviation and sustainable livelihoods especially women and the rural poor. Currently the livestock sector exhibits the following constraints: (i) low productivity; (ii) lack of good husbandry practices; (iii) lack of organized farming system; (iv) shortage of fodder and forages; (v) lack of improve breeding practices; and (vii) lack of adequate animal health care and technical services.

48. *Support for Poultry Production.* Poultry is the most prominent livestock activity in the country and it is estimated that more than 80% of rural households keep some poultry, almost exclusively local unimproved breeds. There is a very significant, and rapidly growing, demand for poultry products, with indigenous birds commanding a premium price. Of the approximately 2.5 million poultry farming households (HH) in the project areas, the vast majority involves backyard production, with 2-10 birds per HH. Major limitations to productivity are the poor knowledge/practice of the traditional rearers, poor health/mortality, and inadequacies of shelter.

49. The project will support the development of backyard poultry through building the capacity of (women) rearers by imparting appropriate training on the importance of routine vaccinations and de-worming, well-ventilated night shelters, brood management and nutrition. These simple technologies can help significantly enhance production and reduce mortality within a short period of time. The project approach is to form demonstration groups (who will be linked to potential adopters that are expected to take up the demonstrated activities in the coming year, similar to the approach of the Crop Production sub component). Each demonstration will be provided the requisite training, partial inputs support for health care, nutrition and shelters. Further, in every group one rearer will be selected as “vaccinator” for taking care the routine

vaccination program in his/her group as well as provide these services to the wider community (for a fee).

50. *Support for Goat/Sheep Production.* Goats are an important source of income and nutrition, especially for the poorer households. More than 50% of households (approximately 800,000) in the project area own small ruminants. Constraints faced in goat production include: (i) lack of elite bucks to improve bloodlines; (ii) poor nutrition (especially for kids at critical times); and (iii) high mortality due to diseases (particularly *Peste des Petits Ruminants* PPR). The project will support farmers to improve goat productivity through the provision of support for AI (possibly from private sector providers such as BRAC), health and nutrition. As in the other cases, a phased approach will be followed. “Lead farmers” will be selected from a FG and will be given support for breed improvement (AI) feeding and low cost shelters where possible. The remainder of the group will be provided support for feed for either the doe or kid during the late gestation and early lactation, in order to enhance the survival rate of the kids. As part of the health campaign activities, the group will be supported, along with other members of the wider community, with vaccination and de-worming.

51. *Support for Dairy (Cow/Buffalo) Production.* Dairy production is also an important source of supplemental income, employment and nutrition. In the project area – as in the country at large – there are significant shortfalls in supply of milk, resulting in imports of large quantities of milk powder. Most cattle are kept by the landless and smallholder farmers (65%). The indigenous cows have very low productivity (200-250 litres per lactation period of 180-240 days). Problems in timely (“doorstep”) access to breeding and veterinarian services, availability of feed (especially, scarcity of land for fodder production due to poor understanding of the economic benefits) and lack of good husbandry practices are the key constraints. The project will seek to address these issues by providing “phased” demonstrations with four elements: (i) breed improvement through AI (where feasible); (ii) nutrition enhancement through fodder plots and balanced feeding rations; (iii) farmer training; and (iv) health improvement through vaccination, de-worming and fertility camp. For dairy demonstrations farmers will be formed into groups and the demonstration will be provided to Lead Farmers (selected by the group). The group will be supported through training, support for a fodder plot, and through selected feeds for the cow/calf during gestation/lactation. AI will only be provided to those farmers/groups who agree to keep a bull for the breeding purposes of the group/village.<sup>[NA4]</sup>

52. *Health Campaign.* Vaccinations, de-worming and health care will be provided with the intention of mass coverage of villages in which the project is working. The project will seek to raise the awareness of farmers to the importance of these activities, and will seek to put a mechanism in the village through local resource persons, backed by DOL, to undertake these activities on a regular basis. The project will also pilot a system of health care cards so that farmers can record and know when the critical times are for the next intervention.

53. *Training and Capacity Building.* This will involve training for DLS resource persons as well as training given by DLS staff to a variety of stakeholders and farmers. Capacity of the DLS officers would be strengthened through conducting training of trainers, study tour and through the implementation of the project.

(iv) ***Enhancement of Seed Availability (SCA and BADC)***

54. Lack of good quality at the farmer level is the single most important – and remediable-constraint to increase agriculture production and productivity in Bangladesh. In 2008 the seed requirement for the country was estimated at 310,000 tonnes while the corresponding distribution of ‘improved’ seed in the same year was in the order of 46,000 tons, accounting for a SRR of 15%. Low SRR has many ramifications: slow replacement of old by new cultivars (BIRRI average approximately 4 new paddy varieties every 3 years), slow dissemination of new varieties (less than 5% of the paddy area is planted with varieties released by BIRRI since 1995, while almost 20% of the area is planted to varieties that are more than 20 years old), and limited promotion of varieties by extension staff (limiting farmers choice). Consequently, many farmers, especially small and marginal ones, continue to use local (unimproved and impure) varieties – stored in traditional unreliable ways - on around a fifth of the planted area.

55. The project will assist in enhancing availability of good quality seeds of targeted crops to not just other farmers in the project districts (i.e., those beyond the demonstration and adoption groups) but potentially to farmers in neighboring districts as well. This will be done by supporting: (i) *expanded network of seed farmers*; (ii) *seed certification* - enhanced ability of the SCA to undertake quality control and certification of seeds produced by farmers; and (iii) *seed distribution* – augmented capacity of the BADC to process and preserve (quality) seeds produced by the farmers and then distribute it to farmers in project and other locations. Institutionally, the project will be working with SCA since it is the sole, legally mandated seed certification authority in the country and with BADC because of its wide distribution network and outreach among farmers. However, in accordance with the national seed policy, the project and its implementing agencies will also support (by encouraging the FGs to deal directly with the private sector) the expansion of private sector role in seed distribution.

56. *Expanded Network of Seed Farmers.* This will be composed of seed production groups constituted and enabled under Community Seed Production sub-component of Component 2 (described above). The activities of these groups will support and be supported by interventions under this sub-component, as explained below.

57. *Seed Certification.* SCA has the legal mandate for seed certification and performs two key roles with respect to the project operations: (i) variety testing service for varieties developed by research institutions for release to farmers; and (ii) seed quality testing service for seeds produced by institutional seed producers as well as farmers. Testing and certification by SCA is a necessary condition for seeds produced by farmers to be either traded in the market or supplied to other farmers through the BADC system. In this regard, the constraint in the project area – where a large number of seed manufacturing groups will be constituted – is that SCA presence on the ground (and hence capacity) for certification is virtually non-existent.

58. In order to fully exploit the expanded (potential for) seed production that the project will create through the seed production groups, the project will support the SCA to expand its certification network in the project area. Specifically, the project will augment existing SCA capacity in the North (at Rangpur) and establish a new variety and seed testing facility in the South (at Patuakhali). The expected result is a significant increase in certified, good quality seeds

from the project area that can be distributed to other farmers in the country through public or private distribution channels. A direct benefit to seed producing groups (established under the Seed Production sub-component of Component 2) is that, following certification, the market value of their produce would be considerably enhanced.

59. *Seed Distribution.* Certified, quality seeds produced under the project may be distributed by private or public channels (with FGs/SGAs having the flexibility to enter into contractual/distributional arrangements of their choice). A reliable seed distribution system with outreach requires, however, facilities for cleaning, grading, drying, fumigation, controlled-condition storage, as well as an extensive distribution network. In general BADC plays a key role in this regard in Bangladesh in major “notified” crops (rice, wheat, maize, potatoes, jute and sugarcane) and non-notified crops (maize). Its existing facilities are, however, stretched and, in any event, are not present in the southern project districts. BADC will conduct activities under the project with the following objectives: (i) work with project community seed production groups where feasible, to make them contract out-growers of seed; (ii) BADC will use the expanded volume of quality certified seeds generated under the project to fulfill the seed needs of farmers over much larger regions in the north and the south. Towards this objective, the project will support the construction of seed processing and preservation centres in the south and relevant augmentation of BADC capacities to enable it to provide relevant support and coverage to project farmers in the north.

60. It is expected that, following the investments under this sub-component, an additional 3500 metric tonnes (Mt) of seed of different categories will be produced, which will directly benefit about 350,000 farmers. In the process, additional employment (for women) will be generated for cleaning, winnowing, grading, processing, tagging and other activities.

(v) ***Community Mobilization and Extension***

61. The project will adopt a group-based strategy to reach out to beneficiaries. In order to build on the social capital already achieved by the on-going programs, the project will assess the feasibility of using existing producer groups. Where necessary, new groups will be mobilized. To achieve the project objectives, the groups will need two kinds of facilitation: (i) technical support and (ii) social/operational support. Technical support involves providing specific guidance on production technologies, management practices, and other technical choices relating to pre-/post-production stages (for the relevant sub-sectors/themes, ranging from crop, livestock and fish to water management). The provision of the technical inputs will be organized and back-stopped by the relevant implementing agencies. (Their roles in this regard are discussed in Annex 3 on Implementation Arrangements.) Social/operational support for different categories of activities: (a) from a group point of view, helping with group identification, formation/mobilization, helping develop group norms and functions, evolution of group governance system, group asset ownership and use, and so on; (b) from an implementation point of view, helping groups to understand the nature and objectives of the project, assisting them to play a key role in design and implementation of the project interventions at a local level; (c) from a monitoring point of view, enabling groups to have a “voice” and ensuring that they have the opportunity and capacity to provide feedback; and (d) from the governance point of view, ensuring that project specific eligibility criteria and other selection methods are transparently followed, groups governance



arrangements work appropriately, and other risks relating to resource diversion or distortion of project-financed investments is minimized.

62. The project will hire a set of dedicated Community Facilitators (CF) to help perform the social/operational functions as well as some of the back-up functions with regard to technical support (under guidance of relevant department staff). Overall, the project is expected to work in approximately 375 Unions in eight project Districts. Each Union comprises about 8-10 wards (lowest administrative unit, akin to a village), nearly half of which may be site of one project demonstration or the other. For each Union, the project will recruit a CF whose responsibility will be to support all project activities within the Union. The CFs will be backstopped and supported by a District CF Coordinator. Eight such coordinators will be deputed for the eight districts for the lifetime of the project.

63. **Gender.** Inclusion of women in the project will be ensured through a three pronged approach: (i) women constitute at least 25 % of the resource persons as well as recipients of the capacity building efforts; (ii) at least 50% of the project beneficiaries for dairying, goat rearing and poultry shall be women; and (iii) 25 % of the committee members and other decision making positions in groups/associations formed under the project will be targeted to be women.

64. **Tribes.** The project will ensure free, fair and pre-informed consultation with the tribal community in the project area. The details of the project components will be discussed and efforts will be made to include them as project beneficiaries.

### **Component 3: Water Management (Base Cost US\$ 11.82 Million; BADC)**

65. *Relation to PDO.* This component will support the PDO by improving availability of irrigation water and efficiency of its use. It will thus enable farmers to increase cropping intensity, improve cropping patterns and reduce irrigation related risk/variability in crop production that can inhibit investments in other modern technologies/inputs. The component addresses the third set of constraints to enhancing agricultural productivity and growth in the project area which are weaknesses in existing irrigation and on-farm water management systems.

66. *Rationale.* Bangladesh is significantly dependent upon irrigation for agricultural production and food security. *Boro* rice, a fully irrigation dependent crop, alone contributes to 55% the rice production in the country. However, in the last two decades, several irrigation/water related problems have been intensifying. Although the nature of water stress varies with location, the typical problems faced in the project districts include: (i) lowering of groundwater table putting stress on the operation of shallow tube wells (STWs), particularly in March-April, resulting in reduced yields and crop failures; (ii) variability/shortage in availability of surface water flow in the existing natural channels (some silted up) restricting use of low lift pumps (LLPs) for supplementary irrigation; (iii) scattered drainage problems in lowlands during pre-monsoon (April – June) due to siltation of channels connected to river systems; (iv) reduced irrigation efficiency due to poor field conveyance through earthen canal systems; (iv) scarcity of water in dry months causing shortage of water for drinking, essential household needs, and feeding of livestock; and (v) in Barisal and Jhalokati districts in the South, there are enough sweet tidal water flows in the main river system almost throughout the whole year, however most

distribution channels are in-filled with sediments making it difficult for farmers to irrigate in the dry months of January to April.

67. *Results.* The outputs of this component are expansion in irrigated area and increase in irrigation efficiency.

### **Sub-Components and Activities to be Financed**

68. There are three sub-components: (i) conservation and utilization of surface water (including rain-water harvesting); and (ii) enhancement of irrigation efficiency; and (iii) training and capacity building.

69. *Conservation and Utilization of Surface Water.* The following activities will be undertaken: (i) rehabilitation of (existing) natural water bodies, canals and ponds for better conservation of surface water; (ii) rehabilitation of existing natural channels (in the south) to conserve tidal sweet water; (iii) harvesting rain-water in rehabilitated natural water bodies and creeks including clay lining to reduce seepage losses; and (iv) harvesting rain-water at homestead level for household consumption, livestock and kitchen garden use. The first three activities will be undertaken through Water User Groups (WUGs), formed according to specified eligibility conditions. The groups will be supported with capacities and inputs (where appropriate) to make efficient use of the water collected/harvested for supplementary irrigation. The group will also be trained in operation and maintenance of the relevant rehabilitated water structures. The fourth activity, harvesting rainwater for household consumption, will be implemented through selected needy households.

70. *Enhancement of Irrigation Efficiency.* The following activities will be undertaken: (i) installation of buried pipe network connections to low LLPs and deep tube wells (DTWs) in appropriate locations to enhance irrigation conveyance efficiency; and (ii) repair of selected DTWs in the Northern Region. These activities will also be undertaken through relevant WUGs, with locations and beneficiaries being selected as per specified criteria.

71. *Training and Capacity Building.* The project will support a variety of training: (i) to WUGs in on-farm water management, (ii) to WUG on system operation and maintenance, (linked to Component 2 demonstrations where possible); (iii) to LLP pump users and pump mechanics; (iv) to farmers in rain-water harvesting; (v) to BADC resource persons and by BADC resource persons to other stakeholders to enhance their skills and capacities.

### **Component 4: Project Management (Base Cost US\$5.12 Million)**

72. *Relation to PDO.* This component will support the realization of the PDO by ensuring that (i) interventions undertaken under the project are appropriately planned, coordinated and aligned with project design and development objectives; (ii) implementation arrangements and activities are in line with relevant fiduciary and safeguards policies, procedures and standards; and (iii) there is due monitoring, oversight and reporting of project implementation and the resulting outputs and outcomes.

## Activities to be Financed

73. The project will finance the establishment and operation of (i) a *Project Management Unit* (PMU) in Dhaka and (ii) *Regional Project Implementation Units* (RPIUs) in Rangpur in the north and Barisal in the south.

74. *Project Management Unit*. The PMU will be headed by a Project Director. It will be supported by Technical Coordinators/Focal Points from each of the eight implementing agencies involved: BADC, BARI, BFRI, BRRI, DAE, DOF, DLS and SCA. It will also have expertise in Administration, Financial Management, Procurement, M&E and Communication, Database Management and Social and Environmental Safeguards as well as relevant support staff. It will also be responsible for (i) overseeing the implementation activities of the project; (ii) coordination of financial, procurement and administrative management (iii) development and implementation of a Management Information System (MIS) for the project to facilitate performance monitoring of all project activities, (iv) organization of evaluation and impact assessments of the project; (v) arranging for expert advice and input from consultants on any subject matter area related to project implementation, (vi) review and compilation of relevant reports and other materials, (vii) submitting biannual and annual progress reports to the World Bank and Project Steering Committees, within one month of the due date, (viii) submitting the audit reports within six months of the close of fiscal year, and (x) liaising with the World Bank concerning operation and management of the project, as and when required to support implementation of project activities.

75. *Regional Project Implementation Units*. The RPIUs will be headed by Regional Project Manager and supported by team of core technical and support staff. Operating under the overall guidance of the PMU, the RPIUs will be responsible for: (i) detailed planning and implementation of all project activities within their respective Regions, (ii) coordination with relevant implementing line departments and agencies, (iii) preparing annual regional plans, (iv) guiding District, Upazila and Union level staff of the project and from implementing agencies teams to work in accordance with the spirit and principles of the project, (v) monitoring and supervising the work being done in the field, (vi) maintaining appropriate records and accounts, (vii) ensuring due attention to safeguards issues, and (viii) ensuring appropriate governance and accountability, including through management of a suitable grievance redressal system.

## **BANGLADESH: Integrated Agricultural Productivity Project (IAPP)**

### **Annex 3: Implementation Arrangements**

1. The project will be implemented over a period of five years. The project administration and implementation arrangements build on existing institutions and capacities, and reflect the technical characteristics as well geographic location of the project's activities.

#### **I. Project Management and Administration**

##### ***A. Project Administration***

2. *Project Management Units* (PMU). The Ministry of Agriculture (MoA) will be the lead ministry and will work jointly with the Ministry of Fisheries and Livestock (MOFL) to implement the project. Day-to-day project administration and management will be carried out by a central Project Management Unit (PMU) based in Dhaka. The PMU will be headed by a Project Director (PD) deputed from the Government of Bangladesh. He/she would be operationally and managerially in charge of the organization structure established at the central, regional and lower levels for implementing the project. The PD will have the authority to make decisions related to the project as well as financial management decisions with the financial powers that have been delegated to the PD under the "Delegation of Financial Powers for Development Projects" issued by the GOB. The PD will be supported by a Deputy Project Director (DPD) who will also be deputed from GOB. The PMU will also comprise of technical coordinators, one deputed from each of the implementing agencies as well as a complement of fiduciary, safeguards and M&E staff.

3. *Regional Project Implementation Units* (RPIU). There would be two RPIUs: one located at Rangpur and the other at Barisal district. Each RPIU will be headed by a Regional Project Manager who will be deputed by GOB. Operating under the overall direction of the PMU, each RPIU would have the responsibility for regional planning and coordination of project activities, ensuring compliance with fiduciary and safeguards standards and processes and overall M&E of project activities in the region.

4. The project has adopted the approach of two RPIUs in view of the fact that project activities will take place in two compact, geographic locations – one in the north and one in the south. Strong regional implementing units have been designed therefore to integrate more effectively the activities of various research institutes and line departments (see implementation arrangements below), project functionaries at District, Upazila and Union levels, CSOs and other stakeholders and target beneficiary groups. An important function of staff at the RPIUs will be to prepare annual plans and to backstop the activities being undertaken from Union level upwards in their respective regions.

## ***B. Project Implementation***

5. The approach of the project is to involve the farmer and the local community centrally in planning, implementing, and evaluation of project interventions so as to improve the design and relevance of activities, enhance adoption of new technologies and practices, and increase the sustainability of project outcomes. Farmer and community activities will be technically guided and backstopped primarily by two sources: (i) relevant research institutes and line departments of GOB involved in this project (“the implementing agencies”); and (ii) local community facilitators, hired by the project, and district facilitators, deputed by GOB, who will assist the implementing agencies by working with farmers’ groups through the entire project activity cycle. In addition, technical specialists, service providers, CSOs and other stakeholders may be contracted by the project to serve in specific roles and contexts.

6. *Implementing Agencies.* The following implementing agencies will be involved: Component 1- BARI, BRRI and BFRI; Component 2 – DAE, DOF, DLS, SCA and BADC; and Component 3 – BADC. The range and number of implementing agencies is determined by the nature of both the project and the institutional set-up in Bangladesh. The rationale – the underlying development hypothesis - for the project is that there is high incipient demand among farmers for mature and available, “win-win” technologies (e.g., drought/flood/cold tolerant, high yielding and shorter duration varieties and better breeds of livestock and fish) which can be feasibly adapted for farmers’ use and disseminated to them. Also, by design, farmers in this project are being supported across the range of mixed farming – crop, livestock, and fisheries – activities. This approach is dictated by the need to target the small and marginal farmers whose agricultural production is particularly low and variable, and who are exposed to severe household food and income insecurity.

7. In responding to these challenges, eight public agencies - mentioned above - are involved partly because of the way institutional responsibilities are defined in Bangladesh. BRRI, BARI and BFRI have the national mandate for organizing and carrying out research in their respective areas. They also have a recognized role in breeder seed production and in brood stock maintenance. DAE, DOF and DLS have the main responsibility for extension support to farmers and constitute, despite presence of some service providers in different locations, the mainstay for provision of extension support and outreach at scale. SCA is the nationally mandated agency for seed certification, without which seed cannot be formally traded. BADC is the main agency involved in seed multiplication and trade for cereal crops, and also is mandated to provide minor irrigation facilities and technologies for increasing irrigation efficiency for farmers.

8. However, the complexity of institutional arrangements is less than suggested by the presence of eight agencies. First, the project is working through the agencies’ existing structures and procedures as far as feasible rather than creating new modalities for the lifetime of the project. Second, the “backward-forward” linkages between actions to be taken by different agencies is not extensive: except in the case of BRRI/BARI and DAE, and BFRI and DOF – where adaptive research has to be linked to field demonstrations – various agencies can feasibly plan and execute actions on their own. (Of course synchronization of calendars will produce

additional gains, and will be pursued under the project). Third – and partly as a consequence – overall PDO is not necessarily put at risk due to implementation difficulties that may arise in one agency or another (although the component or sub-component output(s), related to that agency may suffer).

9. Project sub-components are organized around activities being led by an implementing agency. Each implementing agency will depute a Technical Coordinator in the PMU, and a nodal officer or contact at the regional level. This Coordinator will work with the Project Director, on the one hand, and with colleagues in his/her agency, on the other, to help develop, implement and monitor the execution of annual plans. Towards this end, each agency will produce – in coordination with the PMU - an implementation “manual” which specifies clearly the set of activities to be carried out, the key steps in each activity, which beneficiary/stakeholder groups are involved at what step, and what processes are to be used (“selection criteria”, work and reporting norms, and so on). Each agency will also be involved – along with beneficiaries and the project staff - in the (annual) planning of the activities, specifying the activity calendar as well as the resources needed (both inputs and technical staff resources). Each agency will also play its specified role in collection of implementation-stage feedback/data for the project MIS.

10. A capacity assessment of the implementing agencies involved has been undertaken and the project will support the operation of these agencies in the various ways as appropriate. In nearly all cases, the project will finance incremental staffing, operational costs, training of relevant staff, transport costs, small office equipment and renovation of laboratories.

11. *Project Staff for Implementation Support.* To support implementation activities at the farm level, the project will hire two kinds of staff: Community Facilitators (CF) and District Facilitators (DF). A CF will be hired in each project Union (approximately 375). These staff will be hired only for the lifetime of the project. The rationale for hiring this cadre of staff is the lack of capacity of implementing agencies – owing to both lack of adequate staff and relevant skill mix – to adequately support and backstop project activities at the farm level. In addition, a DF in each of the 8 project districts will be deputed from the DAE/DOF/DLS/BADC. The main responsibility of the CF and the DF will be work with the relevant implementation agencies (primarily DAE, DOF, DLS and BADC), in the area individually covered by them, to help organize farmers to carry out relevant project activities. These, where the CF will do the mobilization and coordination and the line departments will provide technical support activities would principally include crop, livestock and fish demonstrations, agriculture water management and management of group/community productive assets. CFs will participate in the entire activity cycle, starting from sensitization of the project, community needs assessment, group formation/mobilization, establishing group activity plans, helping with group learning/training/exposure visits, to participatory M&E and establishing post-production links with relevant stakeholders. DFs will coordinate and backstop activities of CFs in their respective districts. They will work with district level functionaries of relevant implementing agencies to ensure smooth planning and implementation of project activities.

12. *Role of Farmers’ Groups (FGs).* FGs will be the entry point for project activities in a village. Groups will be organized by CFs in consultation with implementing agencies for crops, livestock, fish, and water management. Each group will have clearly defined terms of engagement including the purpose and scope of the group’s activities, criteria for selection of

group members/beneficiary farmers, roles and responsibilities of the specific group members who will receive any project support in kind, group management and governance arrangements (especially for handling group funds and community-owned assets) and arrangements for ensuring sustainability.

13. *Demonstration and Adoption in Groups.* A specific feature of this project is to go beyond the standard activities of demonstrations and trainings with a clear objective of widespread adoption of technologies by farmers. In view of the resource poor small and marginal farmers that are the primary target of the project, this involves providing technical and in-kind support, on a declining basis, to subsequent cohorts of farmers who are interested in adopting a technology or practice after it has been demonstrated. FGs will be internally organized in a way that enables this phased demonstration-to-adoption effect to occur. For instance, FGs for crop production will have the following internal structure: each demonstration group of approximately 25 farmers will consist of 3 (core) demonstration farmers and about 22 adoption farmers. In the first year of project intervention at that site (PY1), the demonstration farmers shall be trained in their respective fields by DAE and project staff in crop/seed production and storage. Each demonstration farmer will receive a demonstration kit from the project consisting of certified seeds plus key inputs. Each demonstration farmer will be required to assemble a group of about 8-9 farmers who will observe all the demonstration activities at his/her field throughout the cropping season, using principals of the farmer field school approach. In PY2, these 8-9 farmers associated with each of the demonstration farmer will become the “adoption farmers”. They will be provided a smaller adoption kit from the project, and will be technically backstopped by the demonstration farmer of PY1, and DAE staff (although with reduced intensity of supervision). These demonstration farmers will, in turn, be expected to interest at least two people in the newly disseminated activities they will be undertaking in their fields. It is anticipated that some of these observers will be encouraged to take up the activity in PY3 as part of the overall demonstration’s continued spread effect.

14. Community involvement through FGs in project implementation lies at the heart of this project and its target of around 295,000 farmers during the life-time of the project. Annex 7 (optional) provides more details on the Community Implementation.

### **C. *Governance and Oversight***

15. The following governance and oversight arrangements have been established to ensure due oversight as well as collaboration and shared responsibility across the various line departments, agencies and other key stakeholders involved.

16. *Project Steering Committee (PSC).* The steering committee will be chaired by the Secretary, MOA. The PSC will consist of senior representatives from the implementing agencies involved, GOB representatives from finance and planning departments, FAO representative, as well as one representative each from the civil society, the private sector and farmers. The PD of IAPP will be member secretary of the PSC. The PSC will meet quarterly and will approve the project’s annual work plan and budget, monitor IAPP progress, provide oversight and policy guidance, and resolve any outstanding issues. A primary focus of the PSC will be to facilitate inter-agency cooperation to ensure achievement of the project’s development objectives.

17. *Project Management Committee (PMC)*. The management committee will be chaired by the Additional Secretary, MOA and co-chaired with the Joint Secretary/Joint Chief, MoFL. The PMC will consist of the coordinators from DAE, DOF, DLS and BADC, representatives from the other implementing agencies involved, GOB representatives from finance and planning departments and Project Managers from the RPIUs. The PMC will be responsible for guiding project management and implementation on a regular basis; facilitating inter-agency corporation/coordination; clearing annual work plans and budget for approval by the PSC; approving overall Human Resource policies; and fine-tuning project strategy based on emerging implementation experience. The PMC will meet at least once every two months in the first year of the project, and once every quarter thereafter.

18. *Regional Project Coordination Committee (RPCC)*. Two RPCCs will be formed, one in the North and one in the South. The RPCC will be headed by the Additional Director (DAE) and will be responsible for ensuring that there is strong inter-agency cooperation, coordination and integrated implementation at the regional levels. It will consist of Regional Project Manager, regional-level representatives of the eight implementing agencies, and one representative each of farmer groups and civil society. The RPCC will meet at least once every two months in the first year of the project, and once every quarter thereafter.

19. *Upazila Project Coordination Committee (UPCC)*: One UPCC will be constituted in each Upazila where project activities are undertaken. It will be chaired by either the ExEng. (BADC), UFO, ULO, UAO in quarterly rotation. The members will consist of the CF, SAAO, SAE (BADC), Field Assistants (DLS and DOF) and will meet at least once every two months in the first year of the project, and once every quarter thereafter. The committee will be responsible for coordination of the grass root project activities.

#### **D. World Bank Implementation Support**

20. The Bank will review project implementation and provide support on a regular basis. Project Implementation would be reviewed on a semi-annual basis by Bank implementation support missions which will also be complemented by short/regular visits by individual team members to follow-up on specific issues as needed. The implementation support strategy would be based on a combination of site visits and proactive follow-ups on relevant information from multiple sources. The PMU will ensure that semi-annual progress and project performance reports are shared prior to the Bank mission's arrival into Bangladesh. The Bank will also undertake a Mid-Term Review for assessment of implementation effectiveness and the intermediate outputs of the project, in order to undertake mid-course corrections as appropriate.

21. Bank supervision missions will visit selected project villages to assess and physically verify work financed under the project. During site visits mission members will interact with concerned Farmer Group members, Community Facilitators, staff from implementing agencies and CSOs that may be involved in project implementation. Project villages/sites will be selected on the following criteria: random selection from an Upazila-wise list of project activities provided by the PMU; and a special emphasis on sites identified by the grievance redressal system or where slow implementation is being reported.



22. Information obtained from visits to specific sites by Bank missions will be supplemented, at the regional and district levels, with feedback obtained from a larger set of project beneficiaries through meetings/workshops convened with a cross-section of Farmer Groups, CSOs and other key organizations/individuals working on the project also invited to gain additional perspective. All project districts will be covered by rotation during supervision missions with priority accorded to (a) districts with relatively larger number of activities; and (b) “problem” Upazilas, as identified by the grievance monitoring system and other information sources.

23. Fiduciary reviews during supervision missions will include reviews of a random sample of contracts and spot checks of accounting records and financial reporting systems at the central, regional, district and village/site levels. Report of the projects internal auditors will be reviewed and meetings held with them to gain additional perspective. Issues identified will be recorded in the aide-memoires and following up post-mission.

## **II. Financial Management**

24. **Financial Management System (FMS) Assessment.** Overall, the project will have the following strengths in the area of financial management: (i) given strong GOB commitment for implementing agricultural development projects and the development/approval of national food, livestock and fisheries policies, the existing institutional and policy framework appears reasonable for the GOB to implement the proposed project; (ii) some of the implementing agencies have exposure to the World Bank’s financial management policies and procedures - the existing staff in these agencies would be responsible for liaison with PMU; and (iii) the World Bank has already financed several project related to agricultural research and extension that were implemented by the MOA and that related to the development of fisheries implemented by the MOFL. Both the GOB and the Bank teams have also been working very closely with the donors that are active in agriculture and they are fully supportive of the proposed project.

25. The main weakness is that the project will be implemented by agencies spread over eight districts in Bangladesh and there are two spending units at the regional levels (PRIUs). Most of the staff who will be performing project FM work at various cost centers will be contracted out. Therefore identifying finance personnel at each implementing agencies and spending units and providing them training on the financial management procedures will be a key challenge.

26. Institutionally, four of the implementing agencies involved – BADC, BFRI, BRRRI and BARI – are well established organizations in their respective fields with sound institutional framework. DAE has experience of implementing Bank funded projects and is one of the implementing agencies under the on-going NATP. Though the Department has good track record of maintaining sound FM system, follow up of audit issues remains weak. DOF and DLS have limited experience of implementing externally funded projects, including those of World Bank (although both are involved in NATP). The capacity of DLS remains weak due to staff shortages and as a result, the implementation experience under DLS has not been adequate and will require specific implementation support measures under this project.

27. **Risk Analysis and mitigation.** The FM risk for this operation is assessed as Medium-I. Given the current assessment and experience in managing Bank funded operation of various agencies, the PMU will need to be well equipped and assist other departments to address project fiduciary requirements, at least during early years of the project. In this regard, under Component 4 of the project, activities that are proposed to be financed are: (i) establishing and supporting project units at the central and regional levels; (ii) specialized support services relating to key activities such as independent external M&E, external/internal audit, financial accounting and procurement; and (iii) training of staff involved in project implementation. In order to mitigate the risks and to ensure sound FM arrangements throughout the implementation of the project, following FM arrangements have been agreed.

28. Further, the following FM arrangements have been agreed:

- Adequate financial staff will be provided from the very beginning so as to ensure that project implementation at the three tiers does not suffer. There will be a financial specialist/manager/officer and one Accounts Officer in PMU and one Accounts Officer in each of the RPIUs. In addition, an Accountant-cum-Cashier would be appointed in each of the research institutes (BRRI, BARI and BFRI) and implementing agencies (DOF, DLS, DAE, SCA and BADC). This arrangement will be maintained throughout the project period to ensure proper handling of finance functions.
- In most of the implementing agencies or spending units, the existing FM staff would be responsible for maintaining project accounts, complying with internal controls and for providing expenditure statements to PMU.
- All staff undertaking these functions on a full or part-time basis would be provided training and on-going back-up support by PMU to ensure compliance with fiduciary requirements of GOB and the project.
- Appropriate steps would be undertaken to hire FM personnel on a competitive basis with well-defined roles and responsibilities.

29. **Internal Controls**

- PMU, RPIUs and implementing agencies will follow GOB's existing financial power, authority and payment responsibility outlined in the Project Accounting Manual. The approval limit and authority will follow existing government policy and procedures.
- All the vouchers/records/files relating to IAPP expenditure will have to be kept in proper condition up to 3 years after completion of the project.
- The assets acquired with project funds will be maintained properly by making sure that these exist at the right locations and used for the intended purposes. Asset identification systems will be used and registers are to be maintained and updated with changes in assets positions and annual physical verification.

30. **Internal Audit.** The project will undergo periodic internal audit by a private audit firm. The internal audit will assess the operation of the project financial management system, compliance with agreed actions including review of internal control mechanism and overall FM performance. This will assist the PMU to identify issues and take corrective actions in a timely manner. The audit coverage and the agencies/ institutions that will come under periodic audit

will be decided by the PMU based on magnitude of expenditure and risks perceived. Two such audits will be carried out (i) The first internal audit after one year of project effectiveness and (ii) second one year prior to project closing. The internal audit report is to be submitted to the Bank within one month of receipts including management response or action on internal audit.

### **31. Accounting Policies and Systems**

- The accounting policies and procedures of the project would be governed by the existing GOB system outlined in the Project Accounting Manual of the Ministry of Finance. The PMU will have the primary responsibility to maintain a financial management system, including adequate accounting and financial reporting, to ensure that they provide to the Bank and the Government accurate and timely information regarding project resources and expenditure. All project related transactions i.e. all sources (lender and GAFSP Trust Fund) would be accounted for separately in the PMU following double-entry bookkeeping principles and on a cash basis.
- The key project accounting functions for which PMU would be responsible are as follows: (i) budget preparation and monitoring; (ii) payments for eligible project expenditure; (iii) disbursement of project funds to various agencies as per approved work plan; (iv) maintenance of books and bank accounts; (v) cash flow management; (vi) consolidation of financial Reporting from spending units and submission to GOB; World Bank and other stakeholders; (vi) preparation of Withdrawal Applications to claim funds from the World Bank and (vii) assistance to external and internal auditor and ensuring appropriate follow up of audit.

### **32. Funds Flow Arrangements**

- (i) GOB contributions would be channeled through MOA as per Development Project Proposals (DPP). MOA will ensure that the cost of the approved programs is included in their respective ministries' budgets.
- (ii) For utilization of eligible project expenditure, the PMU will maintain one designated account (DA) where Grant funds will flow under agreed terms and conditions. The designated PD of PMU and, in his/her absence, the Deputy, will be the authorized persons for operating the DA. To facilitate project implementation, 5 implementing agencies (DOF, DLS, DAE, BADC and SCA) and 3 research institutes (BRRI, BARI, BFRI) will maintain separate operating accounts (OAs) where fund will flow from the DA. PMU will be responsible for transferring project fund to the operating accounts on the basis of three-month estimated expenditure and approved work plans of these agencies. Subsequent advance will be based on actual funding requirements to implement project activities of the implementing agencies.
- (iii) PMU will show fund transfer as Advances from Designated Account to the Operating Accounts, which will need to be accounted for, preferably within 30 days but in no case beyond 90 days. The implementing agencies will send monthly Statement of Expenditure (SOE) in an agreed format to PMU. No second advance or additional fund requisition will be allowed unless the previous advance is adjusted or the SOE is

submitted. The PMU will submit a withdrawal application to the Bank for replenishment of DA on the basis of actual project expenditure.

- (iv) An amount of six months' estimated project expenditure will be deposited into the Designated Account (in BDT) to be maintained with one of the Commercial Banks. Operating accounts will be utilized only for local expenditure. Foreign currency payment will be made out of the DA, based on the payment instruction of the implementing agencies, or through direct payment which PMU will be responsible to process within five working days.
- (v) For transferring fund from DA to operating account or to make foreign currency payment, PMU will review whether the request is supported by appropriate documents, although it will not have approval or clearance authority over the project transactions to be carried out by other implementing agencies.
- (vi) In case of RPIUs, no separate operating accounts will be maintained. Expenditure relating to regional offices and components under its jurisdiction will be met out of Designated Account maintained at the PMU level. No SOE is required to be submitted to PMU unless an advance is given to meet expenditure.
- (vii) The coordination role of the PMU will include (i) submitting withdrawal applications to the Bank (ii) compiling annual work plans and transfer of funds to operating accounts (ii) collating fund utilization status on the basis of SOEs received from implementing agencies and research institutes, adjust advance and monitor fund status (iii) make direct payments in case of foreign currency payments.
- (viii) To facilitate speedy fund transfer as per agreed service standards and corresponding accounting, reporting and compiling of financial information, a detail procedures manual outlining roles and responsibility of PMU and implementing agencies will be drawn up.

### 33. **Financial Reporting and Monitoring**

- (i) PMU would be responsible for consolidating financial information from implementing agencies and RIUs for preparing Financial Statements on a monthly basis. For preparing consolidated Interim Financial Reports (IFRs), PMU would develop specific formats to be used by various agencies for their periodic submission to PMU.
- (ii) A set of IFRs are being developed and will include: Financial Statements (Sources and Uses of Funds, Uses of funds by project component, Special Account Reconciliation Statement). IFRs will be submitted to the Bank within 45 days of the end of each quarter.

34. **External Audit:** There is no outstanding audit report or ineligible expenditure under Bank projects by MOA, MOFL and its implementing agencies. The consolidated project financial Statements, which would be prepared by the PMU, would be audited by the

Comptroller and Auditor General (C&AG). The C & AG is considered as independent auditor and acceptable to the Bank. The Audit report of the project would be submitted to the Bank within six months of the end of each fiscal year. The audit reports will be monitored in the Audit Report Compliance System (ARCS).

35. **Supervision Plan:** The initial supervision focus would be on a sampling basis for the review of expenditure below prior review threshold, payment process between PMU and other implementing agencies against defined milestones and monitoring progress of agreed actions during negotiations.

### **III. Disbursements**

36. The preliminary total project cost has been estimated to be US\$63.81 million. Out of this, GAFSP will provide US\$46.31 million and the remaining US\$17.50 will be provided by the government. It is expected that the funds would be disbursed over a period of five years. Report based disbursement procedures would be applicable for withdrawal of funds from the grant. Direct payment and reimbursement shall, when required, be supported by records of such expenditure and/or evidence of payments made by implementing agencies. All documentation showing expenditure shall be retained by the implementing agencies and shall be made available to auditors for audit and to the Bank, if requested. Finally, expenditures incurred during project preparation can be reimbursed under project retroactive financing agreement as long as they are within the standard limits, i.e.: (i) not more than 20% of the amount of the grant; and (ii) not more than twelve months prior to the expected date of signing of the grant agreement. To facilitate payment for project eligible expenditures and in consideration of contributions from GOB and GAFSP respectively, disbursement of the Grant would be made as the table below, showing financing percentage and allocation for various categories to cover expenditures under specific components or sub-components of the project.

**Table 1: Allocation of Credit Proceeds**

<b>Category</b>	<b>Amount of the Grant Allocated (expressed in USD)</b>	<b>Percentage of Expenditures to be Financed (inclusive of Taxes)</b>
(1) (a) Goods and works under Parts 2(e), 3(b)(i), 3(b)(ii), and 4 of the Project, including goods for trials, demonstrations and production support[NA5]	6,080,000	100%
(b) Vehicles for Project implementation and monitoring	1,630,000	
(2) Consultants' services, Training, and Incremental Operating Costs <sup>5</sup>	35,990,000	100%

and Incremental Operating Costs <sup>5</sup>		
(3) Unallocated	2,610,000	
<b>TOTAL AMOUNT</b>	46,310,000	

#### **IV. Procurement**

37. **Findings of Procurement Assessment.** The Bank conducted preliminary capacity assessments of seven entities of Ministry of Agriculture (MoA) and Ministry of Fisheries and Livestock (MoFL). In MoA, till date there are about 65 officers who have completed the national procurement training and in MoFL, there are 82 officers trained on the same, over the last seven years. Three of these trained officers from MoA and MoFL were involved during the capacity assessment exercise for this project. The MoA agencies assessed are DAE, BADC, BRRI, BARI, BFRI and the MOFL agencies assessed are DLS and DOF for such a project with a limited funding, procurement through each individual agency may result in a complex implementation arrangement and disoriented procurement processing. Furthermore, the key areas identified for strengthening in the procuring entities under the project are as follows:

- (i) Appointment of a dedicated procurement staff within the PMU at least for first 2 years of the project;
- (ii) Capacity building in administering large contracts or handling procurement activities following Bank Guidelines, particularly for DOF, BIRI, BARI and BFRI;
- (iii) Appropriate application of a credible complaint handling mechanism;
- (iv) Information dissemination, delivery follow up, and payments system.

38. The lack of procurement capacity may result in mismanagement in procurement operations which may lead to significant delay in project implementation and increased cost for the client. Under the ongoing Bank-funded NATP and AIPRP, it is observed by IDA that the major loopholes in procurement lay with improper technical specification, faulty bidding documents, inappropriate packaging of contracts, improper evaluation and many complaints to handle, internal and external or probable political interventions all of which may have resulted in delays in the procurement operations. However, with the interventions of IDA and recurrent hands on job experience, procurement progress in NATP in particular had been satisfactory. Considering all the facts and the experience from the ongoing projects, the project is rated as “**Substantial** (ORAF rating **Medium-I**)” from procurement operation and contract administration viewpoint subject to adoption of certain risk mitigation measures, with procurement activities to be conducted by the PMU formed from representatives of all implementing agencies and research institutes under the project. Several measures to mitigate the associated risks are either in place or being put in place and are described below.

39. **Measures to be completed during project preparation:** (a) Designation of one officer of the PMU as the procurement focal point (PFP) for the project and another officer as back-up;

(b) Finalization of Procurement Plan of each entity covering first 18 months of implementation by negotiation; (c) Agree on the use of PROMIS or equivalent procurement performance monitoring and reporting and agreement on adherence to the regular submission to IDA; (d) Developed TOR for the procurement consultant to be part of the PMU.

40. **Measures to be completed before commencement of procurement of goods, works and non-consultancy services under the project:** (a) confirm the provision of technical support through individual procurement and technical consultants [NA6]to the PMU; (b) confirm that the PFP and procurement consultant to be mandatory members of bid and/or proposal evaluation committees for all procurement under the project; (c) have provisions in the project for a systematic capacity building plan of all agencies in the project through national three-week procurement training provided by CPTU and Bank resource persons; and (d) ensure that staff trained in procurement are retained in the project for at least two years after receipt of such training.

41. **Measures to be taken during project implementation:** (a) In addition to national procurement training, the PFP and his/her back-up would undergo training on international procurement (either through Bank-arranged programs or accredited training outside Bangladesh). The PFP would also be responsible for implementation of the capacity building plan; (b) the PMU will submit quarterly procurement performance monitoring reports (PPMR) based on the indicators of PROMIS starting from three months after the grant effectiveness; (c) for contracts requiring repeated procurement, the bidding documents will be standardized for each type of procurement, cleared by IDA and the same document will be used for similar types of contracts with customized technical specification for the duration of the Project and The Bank's standard format for evaluation report should be used; (d) PMU, with support from the procurement consultant, will explore framework contracts for off the shelf goods instead of launching repeated procurement process; (e) the Bank will arrange procurement orientation or training workshops as and when required to enhance the procurement capacity of the entities; (f) the procurement plan will be updated once semi-annually or more frequently if required;[NA7] (g) The PMU, during project implementation, will try to arrange budget provisions for conducting independent procurement audits annually or bi-annually and share the report with IDA[NA8]; (h) IDA will conduct reviews of about 20% of the post review contracts on an annual basis to check the compliance with the World Bank's Procurement/Consultant Guidelines and procedure in accordance with the financing agreement.

42. **Additional Procurement Risk Mitigation Measures:** In addition, the following will be included as part of procurement and implementation arrangements: (a) ensure entities' officials and staff are informed about fraud & corruption issues; (b) make bidders generally aware about fraud & corruption issues; (c) multiple dropping of bids will not be permissible for all procurement under the Bank financed project; (d) contracts to be awarded within the initial bid validity period, and closely monitor the timing; (e) action to be taken against corrupt bidders in accordance with Section I of the Bank's Procurement/Consultant Guidelines; (f) records and all documents regarding public procurement to be preserved in accordance with the Bank Guidelines; (g) publish contract award information in UNDB online, The Bank's external website and procuring entities' website within two weeks of contract award (for prior review contracts) as well as in CPTU website for all contracts above thresholds specified in the PPR;

and (h) timely payments to the suppliers/contractors/consultants to be ensured and impose liquidated damages for delayed completion. The PROMIS and its reporting format (PPMR) will cover all these steps and this report will also function as a useful monitoring tool for the PMU, representing MoA and MoFL for implementing the project.

43. Procurement financed under the Project will be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011 and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated January 2011, and the provisions stipulated in the Financing Agreement. Procurement of Goods, works and non-consultancy services having estimated value less than the ceiling stipulated in the Procurement Plan may follow National Competitive Bidding (NCB) and Shopping. Direct Contracting (Goods/Works) may be allowed under special circumstances with prior agreement of The Bank. NCB would be carried out following procedures for Open Tendering Method (OTM) of the Peoples Republic of Bangladesh (Public Procurement Act 2006 - PPA, 1<sup>st</sup> amendment to PPA (2009) and The Public Procurement Rules 2008, as amended in August 2009), with the exceptions listed in the following paragraph and using standard bidding documents satisfactory to the Bank. The "Request for Quotation" document based on PPA is acceptable to IDA for shopping. In case of any conflicts between Bank Guidelines and PPA or ambiguous/confusing interpretation in between, the Bank Guidelines shall prevail.<sup>[NA9]</sup>

44. Exceptions to PPA and associated Public Procurement Rules 2008 (PPR), for national competitive bidding (goods and works) are as follows:

- post bidding negotiations shall not be allowed with the lowest evaluated or any other bidder;
- bids should be submitted and opened in public in one location immediately after the deadline for submission;
- re-bidding shall not be carried out, except with the IDAs prior agreement;
- lottery in award of contracts shall not be allowed;
- bids shall not be invited on the basis of percentage above or below the estimated cost and contract award shall be based on the lowest evaluated bid price of compliant bid from eligible and qualified bidder; and
- single stage two envelope procurement system shall not be allowed.

45. For each contract to be financed by the IDA-administered grant, the different procurement methods or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements and time frame <sup>[NA10]</sup>are agreed between the Recipient and the Bank in the Procurement Plan. The Procurement Plan will be updated semi-annually or as required to reflect the actual project implementation needs.

46. **Particular Methods of Procurement of Goods, Works and Non-consultancy services:** Except as otherwise agreed in the procurement plan, civil works and goods may be procured on the basis of International Competitive Bidding. The following table specifies the methods of procurement to be followed in accordance with the Government's PPA for goods and works. The procurement will be done using the Bank's Standard Bidding Documents (SBD) for all ICB and National SBD agreed with (or satisfactory to) the Bank. The Procurement Plan shall specify the circumstances under which such methods may be used:



<b><u>Procurement Methods</u></b>
(a) National Competitive Bidding
(b) Shopping
(c) Direct Contracting

47. **Methods of Procurement of Consultants' Services:** Selection of Consultants will follow the Bank Consultant Guidelines. Shortlist of consultants for services estimated to cost less than US\$200,000 equivalent per contract may be composed entirely of national consultants. For the selection of these national consultants, the request for proposal (RFP) prepared on the basis of The Bank's standard RFP and acceptable to the Bank may be used. The Procurement Plan will specify the circumstances and threshold under which specific methods will be applicable.

<b><u>Selection Method</u></b>
(a) Quality-based Selection (QBS)
(b) Fixed Budget Selection (FBS)
(c) Consultants' Qualifications (CQ)
(d) Least-Cost Selection (LCS)
(e) Single-Source Selection (SSS)
(f) Individual Consultants (IC)

48. **Operating Costs:** The eligible operating costs will be defined in the financing agreement of this project.

49. **Prior review Thresholds:** The Procurement Plan shall set forth those contracts which shall be subject to the Bank's prior review. All other contracts shall be subject to Post Review by the Association. Initial Procurement plan agreed with the borrower for the first eighteen months indicates the following prior review thresholds which will be updated annually based on the review of the capacity and performance of the PMU and will be reflected in the updated procurement plan as appropriate:

Sl. no.	Description	IDA (Prior Review)
a.	Each contract for goods and works procured on the basis of International Competitive Bidding	<input type="checkbox"/>
b.	The first contract for goods by each procuring entity following the National Competitive Bidding method, regardless of value, and thereafter all contracts estimated to cost US\$600,000 equivalent or more, regardless of the procedure	US\$600,000 equivalent or more
c.	The first contract for works following the National Competitive Bidding method, regardless of value, and thereafter all contracts for works estimated to cost	US\$2,000,000 equivalent or more

Sl. no.	Description	IDA (Prior Review)
	US\$2,000,000 equivalent or more, regardless of the procurement method applied;	
d.	Each contract for consultants' services provided by a firm, estimated to cost the equivalent of US\$200,000 or more;	US\$200,000 equivalent or more
e.	Each contract for services of individual consultants, estimated to cost the equivalent of \$100,000 or more.	US\$100,000 equivalent or more
f.	All contracts for goods/works procured through Direct Contracting, individual procurement consultant/s, individual legal consultant/s (if any) and all contracts for consultants' services procured under single source selection.	<input type="checkbox"/>

50. **Post Review:** For compliance with the IDA's procurement procedures, IDA will carry out sample post review of contracts that are below the prior review threshold. Such review (ex-post and procurement audit) of contracts below the threshold will constitute a sample of about **20% (Twenty percent)** of the post-review contracts in the project. Procurement post-reviews will be done on annual or semi-annual basis depending on the number of post-review contracts.

51. **Procurement Plan:** The procurement plan for the project is being prepared by the project preparation team and will be finalized before negotiation. This plan will be the basis for selecting methods for procurement as agreed by the World Bank, updated semi-annually or as required to reflect the latest circumstances. As per the initial procurement plan indicated in the table below, the total procurement to be prior reviewed by The Bank under the project is 38% of project cost, comprising Goods of around US\$ 14 million, followed by Works US\$ 8.4 million and Consultancy Services US\$ 1.9 million.<sup>[NA11]</sup>

## V. **Environmental and Social (including safeguards)**

### **Environment**

52. Project activities with environmental implications include: promotion of increased production of selected annual crops and livestock with likely associated pesticide use and waste management issues, water management activities and construction. The most important project environmental impacts may include soil and water quality changes from agrochemicals and production. Other minor impacts are possible such as changes to aquatic ecosystems from re-excavation/desiltation activities, increased usage of surface water; conversion of land to agricultural usage; loss of native biodiversity; and minor construction impacts, among others. The project is classified as Category B because its activities are not expected to cause any significant negative or irreversible changes in the environment. The Project triggers

Environmental Assessment (EA) 4.01, Natural Habitats 4.04 and Pest Management 4.09 Operational Safeguard Policies.

53. Environmental Assessment Policy 4.01: The Environmental Assessment Policy 4.01 is triggered because the project proposes activities with potential environmental impacts including crop, livestock and fisheries production as well as water management activities such as irrigation infrastructure, de-siltation and conservation of existing canals and ponds. These impacts are not expected to be significantly negative or irreversible. The Environmental Management Framework (EMF) contains measures to manage these impacts first by prevention, second by minimization and finally by mitigation as necessary. Subprojects will not be identified during preparation and so the EA and Environmental Management Plan (EMP) are prepared as a framework identifying potential impacts and potential mitigation measures as well as mechanisms (procedures and institutional responsibilities) for ensuring sustainable environmental management of the project. A few small buildings may be constructed under the project and these will abide by the *General Environment, Health and Safety (EHS) Guidelines for Construction*. The Project has also taken into consideration the EHS Guidelines for Aquaculture, Annual Crops, Mammalian Livestock and Poultry Production in the development of its EMF.

54. Natural Habitats Policy 4.04: Although the Project is not financing any activities that would cause significant conversion or degradation of natural habitats, the Natural Habitats Policy 4.04 is triggered because the Project will finance the development and introduction of new varieties of crops and other organisms; aquaculture activities that may impact natural aquatic habitats; and water management activities which may include the re-excavation of ponds and other water bodies which will affect aquatic ecosystems. Additionally, some Project activities will promote the conversion of previously “unproductive” lands (which may or may not be natural habitats) to agricultural production. The EMF analyzes the implications of Project activities for natural habitats and identifies a management approach to minimize potential harms to natural systems while maximizing benefits including screening of subprojects for activities in or near important natural habitats. The EMF will contain measures to avoid negative impacts to biodiversity from the Project’s introduction of the selectively bred species.

55. Pest Management Policy 4.09: The project proposes activities comprised of crop (including seed storage and distribution), livestock and fisheries production which will involve the use of pesticides and therefore the Pest Management Policy is triggered. In addition to the afore-mentioned Project activities to develop Integrated Pest Management (IPM) packages for select crops and develop insect and disease resistant crop varieties, the Project EMF promotes IPM through measures to minimize the use of chemical pesticides where possible, ban restricted pesticides, minimize harm to workers applying pesticides and promote natural pest management (i.e. using natural pest predators and the like). The project will also promote training and other capacity building where necessary to promote safe use of pesticides.

56. The EMF has been prepared in order to address project environmental safeguard issues since subprojects are not known at this time. The Project will include a strong training component to ensure that farmers and other relevant project entities are aware of pertinent

environmental and safety good practices. There will be a session on relevant aspects of the EMF as part of the overall project launch training.

57. In order to ensure that the policy obligations and associated procedures in the Environmental Framework (EMF) are operationalized, the project organizational support structure for subproject planning, review and implementation will have social and environmental safeguard staff at the PMU level and two at the RPIUs. The RPIUs will have more extensive contact with the subprojects providing assistance where needed, reviewing environmental checklists, monitoring projects and conducting site visits as necessary. Community and District Facilitators will also coordinate with the implementing agencies to provide technical support to farmers including information on environmental good practice and safety (such as regarding pesticide application, storage and labeling). PMU environmental staff will oversee the implementation of the EMF and adjust it as necessary, once agreed and cleared with the Bank, to fit project needs.

58. Annual reports on subproject activities will capture the experience with implementation of the EMF procedures including a record of experience and environmental issues running from year-to-year that can be used for identifying difficulties and improving performance. Additionally, other periodic reviews of the implementation of the EMF will be carried out in order to

- To assess compliance with EMF procedures, learn lessons, and improve future EMF performance; and
- To assess the occurrence of, and potential for, cumulative impacts due to project-funded and other development activities.

59. Finally, the project MIS and triangulation surveys will also capture some information on the project's environmental performance.

60. There are no environmental issues known that go beyond the coverage of the policies at this time.

61. Public consultations were held with stakeholders, potential beneficiaries, indigenous peoples and NGOs at local, regional and national levels in March and April 2011. A draft EMF and Bangla summary has been developed and were disclosed May 30, 2011 in-country on the Ministry of Agriculture website and in the World Bank's InfoShop on June 01, 2011.

### **Other Safeguard Policies**

62. OP 7.50 International Waterways is triggered by the project due to the fact a) that subprojects may involve waterways that may drain to the Bay of Bengal which the World Bank defines as an international waterway and b) because subprojects may use groundwater from aquifers that may be shared with neighboring countries. The possible impacts on water quality and quantity going to neighboring riparian's would be minor and insignificant and therefore notification exception 7(a) has been granted. Additionally, the water component of the Project is

rehabilitation of existing irrigation works or rainwater harvesting alterations to water bodies already being used, therefore in accordance with the exemption, project activities are “minor additions or alterations to the ongoing scheme; it does not cover works and activities that would exceed the original scheme, change its nature, or so alter or expand its scope and extent so as to make it appear a new or different scheme.”

63. The Environmental Management Framework monitoring and evaluation system will identify and reject or manage interventions that could significantly negatively impact the Bay of Bengal or any aquifers known to be shared.

### **Social**

64. **Stakeholder Consultations and Participation.** A detailed social assessment (SA) conducted by Ministry of Agriculture (MoA) included specific stakeholder consultation during the design and finalization of the assessment report and preparation of social management framework (SMF). The SMF has been disclosed in country on May 26, 2011 and in Bank’s Infoshop on May 31, 2011. The executive summary of SMF has been translated in Bangla and disclosed in country. The local consultations focused on specific issues related to the interventions and potential social issues associated with the interventions.

65. The community consultations were carried out in all the sample villages and primarily focused on (i) mechanism to select beneficiaries; (ii) positive and potential adverse social impacts; (iii) role of existing community based organizations in the project; (iv) role of NGOs working in the project districts and sample villages; and (v) need of the community and their expectations from the project. The potential adverse social impacts as identified in SA include (i) encroachment of the canal land proposed for rehabilitation; (ii) elite capture of project benefits; (iii) poor consultation and lack of involvement of vulnerable groups (landless, women, marginal and small farmers, minorities, tribes) resulting in exclusion of vulnerable; (iv) conflicts on water use; and (v) loss of access to individual or common property during implementation which may result in loss of livelihood.

66. The Resettlement Action Plans (RAPs) if required will also be disclosed as per the principles and procedures as described in SMF, followed by discussion with the affected community (including any individual adversely impacted by such intervention). The executive summary of RAP translated in local language and will be placed in the office of local self-government body where the investment is located. The list of affected persons, if any, will be pasted on the conspicuous place in all the affected unions.

### **Social Management: Potential Impacts, Avoidance and Mitigation**

67. **Social Management Framework.** While the Project is expected to benefit the communities, the inadequate or inappropriate implementation might lead to adverse impacts on people and local land resources. Avoidance and minimization of each of these potential direct and indirect impacts is the basis on which the SMF had been prepared. The project objective is to achieve greater agricultural productivity through improved agriculture support services. Expected social outcomes include empowering and strengthening vulnerable sections (landless,

marginal and small farmers, women, tribes), who constitute an overwhelming proportion of the project communities, will have easy access to the opportunities under the project and benefit the most from the project. The core principles in the implementation of the project are that (i) project communities play an active role in planning and implementing project interventions; (ii) vulnerable sections among project communities have equal opportunities to participate in the process of planning and implementing project activities; and (iii) individuals, if adversely affected by the project interventions will be supported under the project. Given the distributed nature of the proposed interventions Social Management Framework (SMF), has been developed to ensure management of social issues in the project.

68. The SMF supports the three important goals of the project: (a) to ensure the social sustainability of the subprojects, (b) to comply with the national social legislation, and (c) to comply with the World Bank Social Safeguards Policies. The SMF details out the policies, procedures and institutional responsibilities for assessing and managing the potential social risks and impacts that may come up throughout the project cycle, and is intended for use and application by the agencies responsible for the execution of the interventions under each component. The SMF includes (i) Screening criteria for adverse social issues; (ii) Resettlement Policy Framework (RPF); (iii) Tribal Management Framework (TMF); (iv) Grievance Redress Mechanism; and (v) Specific procedures on public consultation and disclosure.

69. ***Involuntary resettlement and land taking.*** According to an examination of the preliminary list of potential subproject investment works, there will be need for private land acquisition in water management component, which might result in involuntary resettlement and potential loss of livelihood. Nonetheless, such land acquisition and resultant involuntary resettlement is likely be small scale, and unlikely to trigger any need for a full-scale resettlement action plan. To cope with such possibilities, the Project has prepared a Resettlement Policy Framework (RPF), included in the SMF. [NA12]

70. The screening of the social issues described in the SMF will identify the nature of analyses to be included during the implementation of the interventions. Wherever possibilities of land taking and chances of displacement of any individual or group are found, the RPF will be fully applied. The RFP specifies procedures to be followed in the event that resettlement or land taking is required for any subproject, including procedures for identification of persons entitled, their entitlement for compensation and/or resettlement assistance, and the consultation and grievance redress mechanisms. All resettlement action plans will be reviewed by the implementing agencies before it is forwarded to Bank for its clearance.

71. ***Indigenous People.*** Three out of eight IAPP districts (Patuakhali, Barguna and Rangpur) have just one percent tribal population. Another three districts have little or no tribal settlement. As part of the ESMF a Tribal Management Framework (TMF) has been prepared by the Project. Implementation of the TMF will ensure that (a) participation of the scheduled tribes will be effectively promoted in preparation and implementation; (b) inclusion of the neighboring scheduled tribe communities in the process to achieve the maximum possible positive impact of such communities; (c) that all implementing agencies engage with communities through a consultation process appropriate to the local cultural context and local decision-making processes; and (d) the activities requiring resettlement action plans, wherever relevant, establish

appropriate information, communication, and inclusion measures targeted at the tribes and other vulnerable sections of the communities.

72. **Mainstreaming gender equity and empowerment.** This is a focus area in the project. As part of Social Assessment, specific gender analysis was carried out to help analyze gender issues during the implementation. The gender analysis is based on primary data and available secondary data. During the implementation, the social screening will identify issues related to gender disparity, needs, constraints, priorities, benefits and opportunities of women. Based on the analysis of screening results, specific interventions will be designed. The social monitoring plan for the project will have relevant indicators for measuring impacts on participation of women in the project.

73. **Social accountability and grievance redress mechanism.** The social accountability mechanism for the Project will cover all interventions. The key processes for ensuring social accountability would be any or a combination of participatory processes such as social audit, citizen scorecards or community report-cards that would acquire feedback on performance of the interventions and of the agencies involved in planning and execution. To address the sub project level grievances, the project will have three tier grievance redress mechanism. As **first tier** of GRM, the community facilitator at the village level will be the first level contact for an aggrieved person/community. As **second tier** of GRM, access points will be established at the Upazila level and, as **third tier**, the aggrieved person(s) can approach the project staff at the regional level.

74. **Implementing Arrangement and Monitoring Mechanism.** Since the implementing agencies do not have adequate skill to address the social issues of the project satisfactorily. The social staffing for the project will include (i) Safeguards and Governance Officer at PMU level; (ii) Safeguards and Governance Officer at Regional level; (iii) District Facilitator; and (iv) Community Facilitator.

75. The MoFL, MoA and the implementing agencies will monitor the social issues to ensure conformity to the requirements of the SMF. Regular monitoring will be through the social compliance reports that will form a part of quarterly progress reports submitted by the implementing agencies and consolidated at the regional level and at overall level by the MoA. These reports will be based on regular site visits and investigations by district coordinators. In addition, an annual third party social and a mid- term and end term evaluation of social issues will be carried out under the project to draw lessons from the implementation. The evaluation will build on the monitoring indicators in the SA report.

## **VI. Project Monitoring and Evaluation**

76. **M&E Arrangements.** The project will have a results-based M&E system that will monitor project processes using the following methods and tools: (a) well defined Results Framework that constitutes clearly defined goals, objectives, outputs and activities with corresponding indicators, means of verification and key assumptions; (b) well-defined M&E strategy for project

processes, information requirements, tools and methodologies for data collection, analysis and reporting; (c) comprehensive M&E plan with clear roles and responsibilities as they relate to indicators tracking with respect to data gathering and reporting; (d) Project Management Information System (PMIS) which will be a computerized information system that caters to the project level information needs; (e) Internal and External periodic assessment and evaluations which would include village baseline surveys, baseline studies, gendered community score cards, mid-term evaluations, ex-post evaluations and impact evaluations; and (f) Participatory Community Monitoring and Accountability approaches and systems.

77. The project will ensure that all stakeholders are taking part in monitoring of project processes according to defined roles and responsibilities based on specific performance indicators. It will also promote participatory community monitoring tools such as community score cards to ensure that project implementation processes are executed in a satisfactory manner and those benefits are sustainable.

78. *Implementation Arrangements.* The PMU will have the overall responsibility for the M&E function although the implementation of the M&E function will take place mainly at the Farmer Group & Community levels. The Community Facilitator (CF) will be responsible for the collection of M&E data, which will be input into the Project MIS – through a web-enabled interface or with mobile phones. The frequency of updates will be determined based upon the category of M&E data being collected and is expected to be spelled out in the M&E Strategy and implementation plan that will be undertaken in the first year of the project. The District Coordinator will review a sample of the input data periodically to check its validity, oversee the functioning of the CFs as well as provide necessary technical backstopping on M&E. The M&E officer at the RPIU will be responsible for reviewing the input M&E data and signing off on it before it is considered “acceptable” to the Project MIS – for reporting. The M&E function consists of two main activities – (a) Monitoring, and (b) Evaluation. The “Evaluation” activity will be carried out by a competent firm that will undertake the necessary baseline, mid-term and Impact Evaluation work. The PMU will also play an active role in ensuring that the project M&E is in line with the national M&E framework and efforts.

79. Finally, the Development Impact Evaluation Initiative (DIME) will conduct impact evaluations of project interventions. DIME will work independently, using a separate source of funds. Beyond the project outcome indicators mentioned in Annex 1, DIME will also measure the impact of the project in terms of increase in household incomes and improvements in household’s nutritional status.

## **VII. Other Partners**

80. FAO, as co-supervising entity, is a Development Partner that has been closely involved in the development of the project and will be fully involved in the supervision of its implementation. Beyond this, project is seeking to establish synergistic links with other operations such as CGIAR system, especially with activities likely to be carried out under the Cereals Systems Initiatives in South Asia. Furthermore, it is possible that additional financing may be made available for agriculture and climate change through the Bangladesh Climate Change Resilience Fund (TF071208). This is a multi-donor trust fund established in 2010 to



support the implementation of the *Bangladesh Climate Change Strategy and Action Plan*. The management committee of the fund has already approved an allocation of approximately \$20 million to the Ministry of Agriculture. The likelihood exists that these funds can be potentially allocated as additional financing to the IAPP.

## Annex 4 Operational Risk Assessment Framework (ORAF)

### BANGLADESH Integrated Agricultural Productivity Project

<b>Project Development Objective(s)</b>			
<p>The proposed Project Development Objective (PDO) of the Integrated Agricultural Productivity Project is to enhance the productivity of agriculture (crops, livestock and fisheries) in pilot areas. These areas lie in Rangpur, Kurigram, Nilfamari and Lalmonirhat districts in the North and Barisal, Patuakhali, Barguna and Jhalokathi districts in the South.</p>			
PDO Level Results Indicators:		<ol style="list-style-type: none"> <li>1. No. of targeted farmers whose productivity has increased (crop, fisheries and livestock): Target = 235,000 farmers, of which 20% women (2016)</li> <li>2. Increase in productivity of paddy yield: Target = Baseline + 20% (2016)</li> <li>3. Increase in fish yield: Target = Baseline + 25% (2016)</li> <li>4. Increase in milk yield: Target = Baseline + 100% (2016)</li> </ol>	
Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measures
Project Stakeholder	Low	Potential beneficiaries may resist or protest against introduction of new/improved varieties of crop and livestock	In all project sites, systematic Information campaigns undertaken. Core focus of participatory M&E will be to help project management staff view the project through beneficiaries lenses (i.e., what the project means to latter, and what they regard as success)
Implementing Agency (Summary)	Medium-I	A large number of agencies with limited staff and implementation capacity; capture of project benefits by influential farmers; and susceptibility to fraud and corruption	Allow implementing agencies to hire incremental staff plus employ dedicated project staff; transparent use of third-party verifiable criteria for selection; and strong M&E and grievance redressal system.
Project Risk: - Design	Medium - I	Project design relies very heavily on Farmers Groups for implementation;	Union-level facilitators will be hired from the market to support mobilization and

		however, weaknesses/difficulties may be experienced here	functioning of farmers' groups.  Selection criteria for project beneficiaries (group formation) will include willingness to adopt new seed varieties and technologies.
Project Risk: - Social & Environmental	Medium - I	Exclusion of women can be a risk as most beneficiaries will be land-owners who tend to be male.  Adverse environmental and social impacts may occur, impeding implementation progress or eroding stakeholder support for the project	Proactive measures to include women with set-targets will be emphasized. Inclusion of women in community decision making roles will be facilitated and monitored. Livestock and fisheries activities will be particularly targeted at women.  An ESMF has been prepared. Project staff will be given appropriate training in this regard. Project M&E will especially monitor environment and social impacts
Project Risk: - Program and Donor Risk	Low	The project is part of US\$ 50 million GAFSP grant, shared between two Supervising Entities: WB (looking after Investment Component with \$ 46.31 million plus GOB funds) and FAO (TA and Capacity Building, with \$ 3.69 million plus GOB funds). Although part of the same pool, as per GAFSP determination these are in fact "separate" operations (different project documents, different institutional procedures and accountabilities). There is a risk that one institution may be affected by activities it does not supervise or control	FAO activities will be housed within the PMU of the Bank supported project. Project documents from the two operations will be routinely shared (as done with preparation so far).  When feasible, joint supervisions will also be undertaken (one joint preparation mission already done)
Project Risk: - Delivery Quality Risk	Medium - I	Sustainability of project benefits beyond the life of the project may be threatened.	Project emphasizes farmer-to-farmer extension Expansion in Community Seed Production, reduces the need to receive good quality seeds from outside Local mechanics, veterinarians and other

			service providers will be trained to serve the Farmers' Groups formed.
<b>Overall Risk Rating at Preparation</b>	<b>Overall Risk Rating During Implementation</b>		<b>Comments</b>
Low likelihood / High impact	Low likelihood / High impact		

## BANGLADESH: Integrated Agricultural Productivity Project (IAPP)

### Annex 5: Implementation Support Plan

#### Strategy and approach for Implementation Support

1. The strategy and approach for implementation support will focus on the risk factors to achievement of the PDO identified in the ORAF, and in particular on: (i) multiple agencies involved in implementation; (ii) identified institutional weaknesses of those agencies, including with respect to implementing Bank projects; (iii) the need to interact intensively with project beneficiaries at the local level to ensure the adoption of new seed varieties and technologies that will effectively address existing production constraints; and (iv) the need to ensure that project inputs are targeted effectively and transparently.
2. *Multiple agencies involved in implementation:* A relatively large share of project resources will be devoted to management and coordination of the activities of the participating implementation agencies. There will include both a central PMU as well as separate regional RPIUs for both the southern and northern areas included in the project. In addition, there will be Facilitators at the District and Union (local) level responsible for coordination of project activities.
3. *Institutional capacity weaknesses, including for Bank procedures and practices:* The project will finance additional technical staff for most participating agencies to assist with extension of project interventions to the local level, as well as the payment of honoraria to existing agency staff to compensate for the additional responsibilities that the project will impose on them. Particular attention will need to be given to the staffing and skills of the PMU. This will include: (i) strengthening the capacity of staff in Bank procurement, financial management, and safeguards procedures through training workshops and ongoing support; (ii) the development of a detailed Project Implementation Manual addressing all major policies and procedures with regards to fiduciary and social protection issues; and (iii) periodic project monitoring and supervision. In addition the independent Monitoring and Evaluation consultant will be responsible for conducting independent oversight of operations which will, inter alia, monitor social and environmental safeguards, review procurement procedures, and provide guidance and feedback to the PMU on strengthening its supervision performance.
4. The borrower has prepared an Environmental Management Framework (EMF) to manage safeguard policy issues. It contains screening mechanisms and checklists to identify and manage site-specific safeguard concerns once sub-projects are identified and selected and the project has and will continue to build sufficient capacity to plan and implement the EMF. Environmental staff in the project management unit (PMU) and in the regional project implementation units will oversee and implement the EMF. Additionally, extension teams from the implementing agencies (such as Department of Fisheries, Bangladesh Agricultural Development Corporation, etc.) will be trained and supplied with environmental good practices (in, for example, safe pesticide storage and handling) to assist farmers on-the-ground at the Upazila (similar to a county in

Western countries) level. Farmers and other project implementing entities will be trained or informed as necessary on environmental safeguards related aspects of the project. Annual reviews of safeguard performance will be conducted and changes instituted as necessary. The overall project monitoring information system (MIS) will also capture information on safeguards implementation.

5. **Ensuring adoption of effective varieties and technologies.** It will be very important to ensure effective communication between farmers and the technical agencies participating in project implementation. The information flow needs to be two way to ensure that farmers fully understand the nature, requirements, and implications of proposed changes in production methods, and that the ground realities at the local level in turn can be incorporated into the further development and evolution of these changes. The project is investing heavily in community facilitation and will aim to utilize existing producer/interest groups to the extent possible to organize project beneficiaries early in project implementation. The project is also investing in increased technical presence at the local level to improve the exchange of information.

6. **Targeting of project inputs:** Criteria for identification of project beneficiaries will be finalized at appraisal. Specific criteria will be established for demonstration farmers and primary adopters. A system of public disclosure, financial audit, community participatory monitoring and a grievance redressal system will help ensure proper targeting and use of inputs. The independent Monitoring and Evaluation consultant will be required to interact with beneficiaries and collect data on this aspect of the project. It will also promote participatory community monitoring tools such as community score cards to ensure that project implementation processes are executed in a satisfactory manner and those benefits are sustainable.

7. A project level MIS will be developed that will have the ability to track physical and financial information pertaining to project level investments which will inform the Bank team reviewing implementation progress. They will also review the results framework, the clients MIS system that will capture more detailed level data, qualitative data from community score-cards as well as the implementation of risk mitigation identified in the ORAF.

### **Implementation Support Plan**

8. The project will have a Dhaka and Washington, DC based task team to organize routine dialogue, donor coordination, and troubleshooting. The team will be ready to carry out field visits as and when necessary.

- i. **Fiduciary requirements and inputs:** The bank specialists will assist MoA to identify any capacity building needs to strengthen its financial management capacity and the procurement specialist will provide timely support on procurement issues. As both the FM and procurement specialists are based in the country office, the Bank's fiduciary team will have constant interaction with their Government counterparts and will provide regular assistance to the implementing agencies as required. Ad-hoc meetings will also be called to explain questions and to clarify any issues;

- ii. **Staffing and skill requirements:** The task team will comprise members with long-term experience in agricultural extension, research, community mobilization, water management, M&E, and others within and outside Bangladesh;
- iii. The PMU will ensure that semi-annual progress and project performance reports are shared prior to the Bank missions arrival into Bangladesh;
  - a. For the first two years intensive hand-holding support will be provided as it is crucial that the PMU and RPIUs maintain a strong emphasis on ensuring that all project staff, group members and the community as a whole understand the concept of the project and its value in improving productivity; similarly close monitoring of the time and quality of technical expertise provided by Community Facilitators, SAAOs and extension agents will be done to ensure that the needs of farmers are being met in a timely manner so that the PDO can be achieved.
- iv. **Resource Implications:** Funding for supervision of IAPP will be entirely provided by GAFSP.

#### **Implementation review support**

- a. The Bank will routinely review project implementation and provide support on a regular basis. Project Implementation would be reviewed on a semi-annual basis by Bank implementation review missions which will be complemented by short/regular visits by individual team members to follow-up on specific issues as needed. The implementation support strategy would be based on a combination of site visits and proactive follow-ups on relevant information from multiple sources.
- b. During implementation support missions the task team will thoroughly review overall implementation progress, confirm that plans for implementation and the necessary institutional mechanisms are in place and in accordance with the agreed design of the project. To assess this the team will (i) undertake a detailed review of each project component; (ii) engage in detailed dialogue at the PMU and RPIUs levels to identify key issues and agreed upon actions to achieve the outcomes envisaged for the following 6 months and/or project period; (iii) conduct a review of fiduciary aspects including disbursements and procurement and; (iv) verify compliance of project activities with the Bank's environmental and social safeguard policies.
- c. During field visits the mission will visit selected project villages to assess and physically verify work financed under the project. During site visits government and mission members will interact with concerned Farmer Group members, Community Facilitators, SAAO, extension agents etc involved in group mobilization and capacity building. Project villages/sites will be selected on the following criteria: random selection from a Upazila-wise list of project activities provided by the PMU; and a

special emphasis on sites identified as having grievances or where slow implementation is being reported;

- d. Information obtained from visits to specific sites by Bank missions will be supplemented, at the regional and district levels, with feedback obtained from a larger set of project beneficiaries through meetings/workshops convened with a cross-section of Farmer Groups, CSOs and other key organizations/individuals working on the project also invited to again additional perspective. All project districts will be covered by rotation during supervision missions with priority accorded to (a) districts with relatively larger number of activities; (b) problem Upazilas as identified by the grievance monitoring system and other information sources.
- e. Fiduciary reviews during supervision missions will include reviews of a random sample of contracts and spot checks of accounting records and financial reporting systems at the central, regional, district and village/site levels. Report of the projects internal auditors will be reviewed and meetings held with them to gain additional perspective. Issues identified will be recorded in the aide-memoires and following up post-mission.



**BANGLADESH: Integrated Agricultural Productivity Project (IAPP)**

**Annex 6: Team Composition**

<b>Name</b>	<b>Title</b>	<b>Unit</b>
Animesh Shrivastava	Sr Agriculture Economist Task Team Leader	SASDA
Ousmane Seck	Sr Rural Development Specialist	SASDA
Paul Singh Sidhu	Sr Agriculture Specialist	SASDA
Parthapriya Ghosh	Social Development Specialist	SASDS
Suraiya Zannath	Sr Financial Mgmt Specialist	SARFM
Yuka Makino	Sr Natural Resources Mgmt Specialist	SASDI
Jose Ramon R. Pascual	Legal Counsel	LEGES
Chau-Ching Shen	Sr Finance Officer	CTRLC
Nina Masako Eejima	Sr Counsel, International Waterways	LEGEN
Krishna Pidatala	Sr Operations Officer	TWICT
Mohammad Mahbubur Rahman	Financial Mgmt Specialist	SARFM
Marghoob Bin Hussein	Sr Procurement Specialist	SARPS
Toufiq Ahmed	Procurement Specialist	SARPS
Jacqueline Julian	Operations Analyst, Cost-tab	SASDA
Sugata Talukder	Operations Analyst	SASDA
Naila Ahmed	Consultant, Rural Development	SASDA
Nicole Andrea Maywah	Extended Term Consultant	SASDI
Mohinder S. Mudahar	Consultant, Advisor	SASDA
Pramod Agrawal	Consultant, Seed Specialist	SASDA
S. Selvarajan	Consultant, M&E Specialist	FAO
Mohammand Maniruzzaman	Consultant	
G.M. Akram Hossain	Consultant, Water Management	SASDA
Bill Collis	Consultant, Fisheries Specialist	World Fish
Md. Aminul Islam Khandaker	Consultant	SASDA
Noor Mohammad Sheikh	Consultant	
Benjamin O'Brien	Agriculture Extension Specialist	FAO
Mohammad S Alam	Program Assistant	SASDA
Venkatakrishnan Ramachandran	Program Assistant	SASDA
Lilac Thomas	Program Assistant	SASDA

## **BANGLADESH: Integrated Agricultural Productivity Project (IAPP)**

### **Annex 7: Community Level Implementation**

1. Involvement of the beneficiary community in project planning and implementation is the heart of project design, and the key to reaching an estimated 290,000 farmers during the lifetime of the project. This annex describes the project's implementation approach in this regard, the main design principles, the community level groups that will be formed, and the phasing of project activities.

#### **I. Implementation Approach**

2. The project will adopt a group-based approach for the implementation of agriculture development interventions. The project will be anchored at the Union and village levels by farmer groups supported by a Community Facilitator (CF). The premise behind organizing farmers is to provide them with the ability to achieve scale and aggregate in terms of access to services or farm inputs and markets. It also allows the project to benefit more farmers, enhance equity, ownership, accountability and sustainability of interventions.

3. Rather than forming new groups the project will first identify existing groups or programs that have already built social-capital amongst producer groups such as under the SIPP and NATP projects. If no such group exists or an existing group does not match the eligibility criteria (i.e. be inclusive, transparent, have adequate female representation, have participatory decision making processes in place, etc.) then IAPP will form a new group for the purpose of this project

4. A cadre of para-professionals such as community book keepers or resource persons will be identified from the community and developed by the CF to provide ongoing support services and be accountable and, over time, be paid by the farmers for their services. For example for livestock interventions a vaccinator will be identified, for taking care of the routine vaccination program in his/her group as well as provide these services to the wider community (for a fee). A similar resource person may be identified for routine maintenance of machinery or for water management.

#### **II. Key Guiding Principles**

5. The project embraces the following key principles:

- (i) *Simple design.* Given the Government and research institutes limited experience in implementing agriculture projects that have a heavy emphasis on adoption by farmers, IAPP will adopt a “phased approach”, starting with a realistic number of interventions in the eight selected districts, and gradually scaling up to cover approximately two-thirds of the unions in the eight project districts, while continuously incorporating learning into the project.

- (ii) *Site selection.* The selection of project sites as well as beneficiaries should adhere to transparent, third-party verifiable criteria and an open and objective selection process.
- (iii) *Farmer-led.* The project will perform an enabling and facilitating role, while the decision making and implementation of activities are the responsibility of farmer groups and Seed Grower's Associations. Active farmer participation in planning, implementing, and evaluating project interventions will be emphasized to enhance relevance of interventions selected for dissemination, increase adoption of new technologies and practices, and contribute to sustainability of both technical interventions and the local institutions supporting farmers.
- (iv) *Avoidance of duplication:* The project will endeavor not to duplicate existing programs, but to support and cooperate with other initiatives, so as to build a sustainable basis for agriculture development. Rather than establish new decision bodies and program delivery mechanisms in the communities, IAPP will leverage existing investments in community organizations as long as they share a common mandate and implementation approach – i.e. are built on the key pillars of inclusion, accountability and good governance;
- (v) *Gender equality:* The project will ensure women's equal access to project opportunities. It will provide equitable inputs for equal results, so that women can receive the inputs needed to improve their productivity. Women will constitute at least 20% of the recipients of capacity building efforts; and be encouraged to take up decision-making positions.
- (vi) *High Standards of Quality:* Project interventions should meet high standards of technical quality as well as social, environmental and fiduciary considerations.

### **III. Beneficiary selection**

6. The CF will facilitate the formation of groups and members will be selected following the eligibility criteria (see table below) through participatory methods. It is likely that in a number of villages some form of poverty mapping or wealth ranking (for example the WB Social Investment Program Project has conducted a Participatory Identification of the Poor (PIP) in approximately 291 villages in 5 pilot of the 8 IAPP districts), wherever possible the project will use these resources for beneficiary selection. In other villages community members (all or a focus group) will map the physical characteristics of the village and rank farmers by farm size or wealth– this process should be carried out in the open so that all interested farmers/villagers can observe and participate in the beneficiary selection process.

7. The CF will provide intensive hand-holding support and guide the group formation process. Each group will have clearly defined terms of engagement including the purpose and scope of the group's activities, criteria for selection of demonstration and adoption farmers, their roles and responsibilities, group management and governance arrangements (especially for handling group funds and community-owned assets like the storage cocoon or machinery on behalf of the village) and arrangements for ensuring sustainability (assigning book-keepers, para-professionals etc).

8. **Targeting of poor households:** The project will target the small and marginal farmers in the project area. Participatory Rural Appraisal (PRA) techniques (such as participatory mapping, wealth ranking) will be used to identify project beneficiaries at the beginning of the community mobilization process in each village by the Community Facilitator (in the presence of the SAAO and/or Union Parishad). This exercise will identify households that are eligible for project support based on the project selection criteria. The targeting exercise would aim mapping the ongoing interventions at the village, present institutions, present livelihood options, etc through Participatory Rural Appraisal (PRA) and situation analysis.

#### **IV. Community-Level Groups**

9. The project will promote strong groups taking into consideration experiences and lessons learned from other agriculture and livelihoods projects in Bangladesh and in the region. Intensive, hand-holding support will be provided to the groups in order to help them become vibrant, self managed and sustainable organizations, founded on the principles of equity, farmer-led decision making and mutual trust. Under this project three broad types of groups that adhere the same key guiding principles will be formed for different functions namely:

10. **Farmer Groups (FGs):** The basic unit of the village level model for crops, seed production, livestock, fisheries and water related interventions will be the Farmer Groups (FG) which are small groups of poor farmers, formed on the basis of common livelihoods and affinity in each village. It is expected that there will be five types of groups: crop groups, livestock groups, fishery groups, seed growers' associations, and water user groups (WUGs). These are described below:

11. **Crop Production Group:** The Seed and crop groups will have around 25 members each (consisting of 3 demonstration and 22 adoption farmers, see table below for details).

### COMPOSITION AND ROLE OF CROP PRODUCTION FARMER GROUPS

		Membership & Office Bearers	Key Functions	Supporting Functionaries	Project Inputs
<b>VILLAGE LEVEL FARMER GROUPS</b>	<b>FARMER GROUPS</b>	<ul style="list-style-type: none"> <li>• The Farmer Groups will function in the project areas i.e.in 375 unions in 54 Upazilas in the 8 project districts;</li> <li>• Unions will be selected using available data followed by a consultative process;</li> <li>• Project will work with existing groups or form new groups;</li> <li>• Support to Farmer groups will include provision of quality seed, fertilizers, small equipment, machinery and seed storage;</li> <li>• Each Crop Farmer group will have an est. 25 members (3 core demonstration farmers + 22 adoption farmers).</li> </ul>			
	<b>Demonstration Farmers</b>	3 core farmers per FG <i>Membership:</i> 3 Men and/or women selected from the village who have capacity and an interest to improve productivity and profitability through improved inputs and technical support; Those whose land is accessible by other farmers, are willing to provide technical support to adopters; Host regular field days	<ul style="list-style-type: none"> <li>• Members of <b>Demo Groups</b> will be ideally situated for logistical reasons (to receive regular training, field inspections, transport of seed, field days for adoption farmers etc):</li> <li>• Can conduct demos on total of 1 ha. land/3 core farmers</li> </ul>	<ul style="list-style-type: none"> <li>• DAE Ext. agent;</li> <li>• SAAO;</li> <li>• Union Facilitator</li> </ul>	The project will provide some inputs for 1 year: <ul style="list-style-type: none"> <li>• Inputs such as quality seed, fertilizer, technical support, storage etc;</li> <li>• Facilitator will assist formation of group, est. of norms and record or bookkeeping;</li> </ul>
	<b>Adoption Farmers</b>	22 adoption Farmers per FG  <i>Membership:</i> 22 Men and/or women selected from the village who have capacity and are willing to adopt improved seed and technologies;	<ul style="list-style-type: none"> <li>• In the same FG there will be 22 adoption farmers;</li> <li>• These are existing farmers; priority for small and marginal farmers;</li> <li>• Agree to participate in regular field days at demo-farmers land, using FFS approaches;</li> <li>• Agree to provide technical support to other adopters outside the group or village;</li> </ul>	<ul style="list-style-type: none"> <li>• DAE Ext. agent;</li> <li>• SAAO;</li> <li>• Union Facilitator</li> </ul>	Following the demonstrations the project will a smaller package of quality seeds, support for storage and technical assistance;
	<b>Other Adopters</b>	Approximately 50 farmers or 2 groups <i>Membership:</i> Self selected men and/or women from the village who are interested to adopt improved seed and technologies;	<ul style="list-style-type: none"> <li>• Groups will be supported by the CF</li> <li>• Will be linked to the groups and farmers above to facilitate in technology transfer</li> </ul>	<ul style="list-style-type: none"> <li>• CF</li> <li>• Core farmers</li> <li>• Some input from SAAO</li> </ul>	As for adopting farmers

12. **Livestock Groups:** For groups organized around livestock (poultry, goats and dairy), the project approach is to form demonstration groups where inputs will be provided to Lead Farmers (selected by the group) who will be linked to potential adopters that are expected to take up the demonstrated activities in the coming year.

13. For poultry interventions each demonstration group will be provided the requisite training, partial inputs support as well as vaccination and de-worming. For goat production the lead farmers will be given support for feeding and low cost shelters and the remainder of the group will be provided support for feed for either the doe or kid during the late gestation and early lactation, in order to enhance the survival rate of the kids. For dairy demonstrations, the group will be supported through training, support for a fodder plot, and through selected feeds for the cow/calf during gestation/lactation. AI will only be provided to those farmers/groups who agree to keep a bull for the breeding purposes of the group/village.[NA13]

14. Through the group-based approach the project will seek to raise the awareness of farmers to the importance of these activities, and will seek to put a mechanism in the village through local resource persons, backed by DLS, to undertake these activities on a regular basis. For example one resource person will be selected in every group as “vaccinator” for taking care of the routine vaccination program in his/her group as well as provide these services to the wider community (for a fee).

15. **Fisheries Groups:** Group mobilization for fisheries will be closely integrated with and will build on the outputs of Component 1 (Technology generation) implemented by BFRI. Group mobilization, demonstration and training and extension will be undertaken, and will be based wherever possible on working with suitable existing groups already formed by civil society or government organizations in the project areas.

16. Demonstration farmers will be selected based on willingness, likely aptitude and resources, and geographical location and the location of groups, and will receive regular contact from project staff, training and support, and production inputs.

17. Training and extension (including for adoption group members, hatchery and nursery operators, and fry traders will take place largely through monthly group meetings focused around demonstration farms and nurseries and key events such as pond preparation, stocking, harvesting etc, with some additional activities such as farmers rallies. Group members will receive free seed in the second year of their involvement in the project to encourage adoption. Nurseries trained under the project will benefit from using the results of adaptive research on nursing and improved germplasm generated by BFRI. Grow-out farmers will also be able to benefit from stocking the high quality seed produced by project nurseries.

18. **Water User Groups (WUGs):** The Project will support existing and/or form new Water User’s Groups who will rehabilitate and maintain the project schemes. Similar to the farmer groups the WUGs will also adhere to the key guiding principles, be supported by the CF and will consist of direct beneficiaries of the scheme. They will also adhere to participatory and transparent practices during scheme and site selection, rehabilitation works, as well as ensure

good record keeping, accounting and have<sup>[NA14]</sup> registration for legal entity (See Annex 2 for more details). WUGs will develop an Operations and Maintenance fund and will<sup>[NA15]</sup> ensure that group formation and operation is inclusive, transparent and participatory in nature.

## V. Project Phasing

19. The project will work with at least one farmer group in a village (existing or newly formed), in around 375 Unions of the 8 districts. Project implementation will begin in all 8 districts and enter into Unions as CF are contracted.

20. For this a properly sequenced graduation process will be followed and significant investments made in capacity building of Community Facilitators, SAAOs, Fisheries and Livestock extension workers and extension agents who are essential in strengthening participation, adoption and decision making processes which will enable farmers to leverage the benefits of project inputs and technical support. The implementation of the technology adoption component will take place including but not limited to:

- Site selection<sup>6</sup> and establish a staffing and office presence in the project areas at the district (8 District coordinators) and Union levels (hiring of Community Facilitators);
- Village entry, identification of existing groups or mobilization of farmer groups followed by setting up seed multiplication arrangements;
- Village level baseline data collection;
- For the first two years of the project it is crucial that the PMU and RPIUs maintain a strong emphasis on ensuring that all project staff, group members and the community as a whole understand the concept of the project and its value in improving productivity;
- Close monitoring of the time and quality of technical expertise provided by Community Facilitators, SAAOs and extension agents to ensure that the needs of farmers are being met in a timely manner;
- Establish strong systems and processes that will support demonstrations followed by wider adoption of technology by farmers through three broad steps:
  - i. In the first year a small group of “demonstration farmers” will be targeted to receive demonstration support packages and technical support and on whose fields the demonstrations will take place under close technical supervision;
  - ii. In the second year, a larger group of “adoption farmers” will be supported with provision of a smaller package of improved seed and technical support so that they can experience for themselves the favorable economics of using good quality seeds with improved farming practices;
  - iii. In the third year the next cohort of “other adopting farmers” will similarly be supported with a small package of seed so that significant spread effects within the village and later through village-to-village spread effects are noticeable.
- Carry out exposure visits for farmers & project staff to learn good practices on various facets of the project including seed multiplication, group mobilization, capacity & institution building and use of resources by similar projects both within and outside the region;

## **BANGLADESH: Integrated Agricultural Productivity Project (IAPP)**

### **Annex 8: Financial and Economic Analysis**

1. The project is designed for effective transfer, adoption and diffusion of potential/available on-farm technologies specific to the diverse production environments, complemented by investments for improving efficiency in the use of natural resources. The project is to be implemented over a period of five years. Total project cost (including contingencies) of USD 63.81 million is shared roughly between technology generation and adaptation (13%), technology adoption (59%) and water management (20%) and the rest for project management support. The proposed project will directly benefit 345,000 household units (HHs) from eight districts in North and South regions.

2. Source of Benefits: Cost-benefit analysis has quantified benefits from the following sources: (i) increase in the productivity of major crops (cereals, pulses, oilseeds and vegetables) by about 12 to 29% in 175,000 farms; (ii) increase in animal productivity by about 25 to 60% for milk and meat in 60,000 farms; (iii) increase in fish productivity by about 21% in 60,000 fish farms; and (iv) increase in irrigated area coverage with improved efficiency in 25,000 ha of 50,000 farms. These benefits are generated primarily through improved, tested agricultural technologies/practices and improved irrigation water management that will be intensively propagated through a network of 10,000 demonstrations, linked to adoption groups, in the project area. The project beneficiary profile includes women (20%), landless households (HHs) (7%), agricultural labor HHs (24%) and small farm holders (81%). The analysis conservatively estimates project-generated benefits in at least two respects: (i) for benefit calculation, it is assumed that only 80% of all the farmers directly impacted by the project – through demonstrations and adoption support – will sustainably increase their productivity; and (ii) benefits accruing to farmers outside project sites are not included. However, these benefits are expected to be sizable: the increase in the annual certified seed production of quality seed by 3500 MT is estimated, for instance, will help meet the need for quality seed replacement of 400,000 farmers in the project and neighboring districts.

3. Data and Analysis: Pre-appraisal of the proposed project interventions based on with and without project situations are based on primary and secondary data for the project districts, compiled from multiple sources such as agricultural statistics, agricultural census, agriculture sample and household income and expenditure surveys of Bangladesh Bureau of Statistics,



ongoing agriculture, livestock and fisheries schemes in respective departments and Research Institutes, and World Bank and IFAD-financed NATP documentations. These were supplemented by data gathered during the field visits under during project preparation. Project costs and benefits are estimated at 2011 prices over a period of 20 years with 12% as the opportunity cost of capital. Recurring

costs are accounted to meet the operation and maintenance expenses during the project life. Financial analysis is done at market prices and economic analysis is done after netting out the taxes and subsidies from the financial cost and benefit flows for which appropriate conversion factors based on the import/export parity prices for the internationally traded inputs and outputs and standard conversion factors

varying from 0.75 to 0.9 for others are used. Project benefits, expected from the adoption of production management technologies are quantified as follows.

### Project Benefits

4. *Crops:* The project led phased intensive demonstration-cum-adoption -support to propagate crop production technologies will result in the adoption of location specific technologies supported by quality seed in a sustainable way. About 140,000 farmers will gain by these interventions by sustaining their adoption levels during the project life. As a result of this, crop productivity realized by the technology adopters in the project area is projected to modestly improve up to 22% for cereals (paddy, maize and wheat), 17% for pulses and oilseeds (T-1). The productivity increase is moderated to represent large scale adoption of the demonstrated technologies based on the adoption and spread effects. Farmers follow a cropping pattern which is predominantly paddy based (80%), with other cereals, pulses, oilseeds and vegetables together accounting for 20%. Incremental gross margin for paddy based cropping system is estimated at USD 165 per farm.

5. *Fisheries:* Following similar process like crops, the project will have intensive dissemination of improved aquaculture and focus will be to produce quality fingerlings through better management of farmer operated fish nurseries, and increase the productivity through improved technologies for carp polyculture and intensive fish monoculture. Fingerlings, both in quantity and quality, are critical for sustaining the productivity levels increased through improved technologies. Quality of this stock would be improved/maintained through component-A for ensuring sustainable increase in productivity levels. About 48,000 fish farmers will gain by these interventions, who will eventually sustain their adoption levels through the project life. Fish productivity will increase by 21% due to the project when the demonstrated technology is adopted over a larger area. On an average, fish technology adopter will improve his/her annual gross margin by USD 165 per farm with a pond size of 0.2 ha.

6. *Livestock:* The project will support 1728 demos covering goats (25%), dairy (25%) and poultry (50%) all linked with about 60000 farmers. Again, phased demonstration-cum-adoption

T-1 IAPP: Productivity Impacts

Technology Interventions	Unit	Productivity		
		WOP	WP	Increase
Paddy	Kg/ha	2300	2800	22%
Cereals	Kg/ha	2397	2929	22%
Pulses	Kg/ha	600	700	17%
Oilseeds	Kg/ha	600	700	17%
Vegetables	Kg/ha	8500	9500	12%
Fish	Kg/ha	2800	3400	21%
Milk	l/d/animal	1.25	2.0	60%
Meat	Kg/HH	55	80	45%

support targeting 60000 livestock farmers in the project area, will result in enhanced milk productivity by 60% and meat (poultry and goat) productivity by 45% due to the project for the benefited HH. Increased productivity is due to better feeding, reduced mortality and breed improvement in the project benefited livestock HHs. Due to large scale adoption of the demonstrated technologies, productivity increase is modestly projected with 80% adopters. At least 48,000 farmers exposed to improved management practices will continue to adopt it and realize the increased productivity through the project life. On an average, livestock beneficiary farmers in the project area are projected to gain USD 105 per farm.

7. *Water Management:* The project will improve irrigation coverage and irrigation efficiency to increase crop productivity and farm income for 50,000 farmers covering 25,000 ha land are in the project districts. Major interventions are: (i) improving irrigation efficiency through buried pipe network connections to LLPs and DTWs and maintain them through WUGs and (ii) rainwater harvesting and tidal sweet water management to promote conjunctive water use for irrigation and other uses. About 80% of the targeted area will be covered for improved irrigation efficiency to benefit 40,000 farmers and remaining 20% will come under better conservation and utilization of surface water benefiting 10,000 farmers. [NA16]

8. Presently, farmers are irrigating through open earthen channels resulting in only 40% irrigation efficiency. Installing buried pipes will improve the irrigation efficiency up to 70%. Supplementary irrigation, needed for *aman* paddy during dry spells, which occurs once in three years, can be met from the saved water. Besides enhanced productivity, improved irrigation efficiency will help in saving ground water and diesel. Total cost of irrigation including labour will come down by about 50% for the project benefited farmers. [NA17]

9. Currently, farmers are not able to utilize the tidal sweet water due to silted channels. By rehabilitating existing natural channels under the project, tidal sweet water will be made available for irrigation. The benefits are; (i) dry spell in *aman* paddy can be managed with the available water which is needed at least once in three years, (ii) dependence on ground water for boro paddy will come down by 30% due to conjunctive use of ground water and tidal sweet water. Both will result in reduced cost of irrigation besides stabilizing *aman* crop productivity. Financial gain due to reduced cost of irrigation along with enhanced productivity will ensure annual gross margin of USD 207 for the project benefited farmers. This will be realized by at least 40,000 farmers who will sustain the improved water management operations through WUGs for the project life. Productivity stabilization gain is captured under reduced production variability impacts.

10. *Production Variability Impacts:* The project area suffers almost every year agriculture production losses due to floods, excess rainfall, flash foods, cyclones and tidal surges<sup>1</sup>. Averaged over five such events during 2000-09, production loss due to natural calamities is estimated at 10.5% once in three years. The project is focusing on spreading varieties with tolerance to submergence, salinity, drought, cold, and water logging as well as shorter duration varieties in cereals, pulses and oilseeds which will be matched with adequate certified seeds for the cropped lands prone to extreme natural events. Improved water management technology covering 25,000 ha will also contribute to stabilizing productivity. Project-led initiatives in the project area is projected to help in mitigating the impacts of extreme natural events to save at least 1% of the

annual production loss in the project area due to natural events, which is included in the analysis. Annual financial benefits due to reduced production variability is estimated at USD 0.8 M.

11. *Seed Impacts*: The project will put in place a system to annually produce 3500 MT of certified quality seed mainly covering rice, supported by adequate breeder seed production from technology generation and adaptation component. With this, all the project HHs demand will be fully met to achieve seed replacement rate every three years to sustain the improved productivity levels in the project area. Additionally, the certified seed produced by the project will also cover 400,000 farmers outside the project benefited HHs. Evidences suggest that certified quality seed alone will improve the productivity by about 10%. While use of certified seed by the project farmers is captured through the sustainability of increased productivity in the analysis, impact of quality seed outside the project area is not considered in the analysis and to that extent the estimated returns are conservative.

T-2: IAPP: Project Investment Analysis Summary (USD Million, 2011 prices)

Sources of project benefits	ERR (%)	NPV	FRR (%)	NPV
Technology Management				
Crops	24.4	23.8	23.3	22.2
Fisheries	23.3	5.2	24.8	6.7
Livestock	30.3	5.1	31.3	6.1
Water Management	18.3	4.8	14.2	1.7
Overall Project	21.4	35.5	20.8	34.5

## Economic and Financial Returns

12. Effective transfer, adoption and diffusion of available potential on-farm technologies specific to the diverse production and socioeconomically constrained environments have generated ERR varying from 18.3% (water management investments) to 30.3% (livestock technology adoption). ERR for other technology management interventions are; 24.4% for crops and 23.3% for fisheries (T-2). Overall ERR for the project is 21.4%, with a NPV of USD 35.5 M, including all costs and benefits from all sources. Annual incremental financial benefits is projected at USD 23.7 M, contributed by technology management (80%), water management (16%) and reduced production variability (4%). FRR for the project as a whole is estimated at 20.8%.

T-3: IAPP: Summary of Sensitivity analysis

Sensitivity Scenarios	NPV	ERR (%)
Base Level	35.5	21.4
Falling short of projected targets		
<i>Crop Productivity by 20%</i>	25.7	19.1
<i>Fish/Livestock Productivity by 20%</i>	31.2	20.3
<i>Irrigated area expansion by 20%</i>	32.2	20.6
<i>Adoption levels by 20%</i>	18.0	17.1
Escalation in project costs by 20%	24.5	17.8
Delayed adoption process by two years	13.0	15.1
Change in base level Costs and Benefits		
<i>Costs at 120% and Benefits at 80%</i>	6.3	13.6
Switching Values		
<i>Costs increased by 50%</i>	(79.4)	1.4
<i>Benefits fall by 34%</i>	(25.8)	1.4

## Sensitivity and Risk analysis

13. Sensitivity analysis underlined the significant impact of escalation in project costs by 20%, adoption levels falling by 20%, and project benefits delayed by two years due to increased time lag since the exposure of technology to the adopters. In all the cases ERR respectively came down to 17.8%, 17.1% and 15.1% (T-3). The NPVs also came down by 30 to 67% from the base level. Therefore, risk analysis considered up to 20% escalation in costs, up to 20% fall in adoption levels and up to two year delays in the realization of technology benefits and evaluated their joint impact on ERR. Simulated ERRs, based on multiple runs, ranged from 10.8 to 18.6% with a coefficient of variation of 8.7%. Expected ERR, estimated by the risk model at 14.5% is considered reasonably stable, since the probability of ERR exceeding 13% level is 88% as predicted by the risk model (T-4 and Fig.1).

T-4 IAPP Risk Analysis Summary

	NPV, USD M	ERR
Expected value	10.0	14.5%
Standard deviation	5.0	1.3%
Minimum	(5.1)	10.8%
Maximum	25.7	18.6%
Coefficient of variation	0.5	0.09
Probability of -ve outcome	2.4%	0.0%

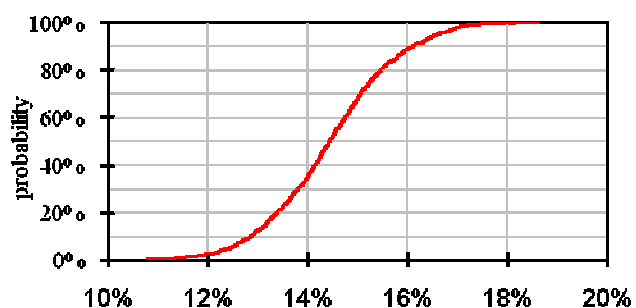


Fig.1 Cumulative Distribution of ERR

### Income, Employment and Poverty Reduction Impacts

14. Annual incremental farm financial income for the project beneficiaries will vary from USD 105 for livestock farms to USD 165 for crops and fish farms. Irrigated farmers will realize USD 208 as incremental farm financial income. Major projected farming systems, based on available evidences, are paddy based (21%), livestock based (5%), fish based (18%) and the rest are mixed farming systems (56%) with a combination of crops, livestock and/or fisheries. Weighted by these shares, average annual financial income gains for the project beneficiary HH at full development in PY-5 is estimated at USD 210 by end-project. Potentially, at full project development in PY-10, incremental farm income due to project will be able to lift at least 20% of the project benefited HHs above upper poverty line<sup>ii</sup> of USD 190 at 2011 prices defined for the project districts. Annually 7.1 million man days of on-farm employment equivalent to 23,500 additional farm jobs will be created by the adoption of demonstrated agricultural technologies by the project HHs. This will provide at least 80 man days of employment for each HH in the agricultural-labor category, which accounts for 24% of the project HHs. More importantly, such new farm employments will be sustained over the years.

### Equity Impacts

15. The projected beneficiary profile covering women (20%), landless households (HHs) (7%), agricultural labor HHs (24%) and small farm holders (81%) in the project area will

promote equity in the distribution of incremental project benefits. Crop technology management investments will impact resource poor farms-accounted by 40% marginal holdings (less than 0.2 ha) and 41% small holdings (0.2 to 1 ha). Live stock technology management investments will benefit landless and agricultural labour HHs to enhance their HH income. Fish technology investments will benefit mostly resource poor HHs. By design, women will account for at least 20% of the project beneficiaries, which will be higher if additional on farm employment opportunities for women are also considered. Besides, projected additional on-farm employment generation will enhance and sustain the wage income for the landless and agricultural labor HHs. Community efforts like seed production promoted through 800 community seed interventions by the project will also lead to employment opportunities for more HHs in the processing of produced seed. Overall, flow of incremental project benefits will be in favor of landless and resource poor HHs in the project area.

### **Other Benefits**

16. Project activities are also expected to generate significant secondary/multiplier impacts through the following routes: (i) increased agricultural production, greater diversification and higher net farm incomes realized by other farms; (ii) improved food security, nutrition and health; (iii) increased farm employment for landless and agricultural labour HHs; (iv) reduced poverty and variability of agricultural income with more system wide impacts; (v) strengthened research-extension-farmer linkages; and (vi) improved cost effectiveness of public funding of agricultural research and extension.

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<sup>i</sup> Project area experienced about 40 flood, excess rainfall, flash flood, cyclone and tidal surge events during 1960-2007, of which at least 50% of them caused significant agricultural production losses . (Ref: Statistical Year Book of Bangladesh 2009, Bangladesh Bureau of Statistics, Ministry of Planning, Government of People's Republic of Bangladesh, July 2010 and Yearbook of Agricultural Statistics of Bangladesh 2009, 21<sup>st</sup> Edition, Bangladesh Bureau of Statistics, Ministry of Planning, Government of People's Republic of Bangladesh).

<sup>ii</sup> Ref: Report of the Household Income and Expenditure Survey 2005, Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, Government of the People's Republic of Bangladesh, May 2007, Page. 160 and Preliminary Report on Household Income and Expenditure Survey-2005, Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning Government of the People's Republic of Bangladesh, September, 2006, Page. 83