



1. Project Data

Project ID P149553	Project Name BD NATP Phase 2	
Country Bangladesh	Practice Area(Lead) Agriculture and Food	
L/C/TF Number(s) COFN-C1430,IDA-56650,TF-A0720	Closing Date (Original) 30-Sep-2021	Total Project Cost (USD) 159,514,341.45
Bank Approval Date 05-Jun-2015	Closing Date (Actual) 30-Jun-2023	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	183,490,000.00	7,430,000.00
Revised Commitment	167,633,302.68	5,087,640.73
Actual	165,013,245.53	5,087,640.73

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2. Project Objectives and Components

a. Objectives

This project is the second phase of a three-phase Adaptable Program Loan (APL) aimed at long-term engagement to support institutional reforms in research and agricultural extension systems in Bangladesh.

The Project Development Objective (PDO) of this second phase of the National Agricultural Technology Program (NATP-II) as articulated in the Financing Agreement (FA, page 5) was identical to the one stated in the Project Appraisal Document (PAD, paragraph 11) and aimed to:



"Increase agricultural productivity of smallholder farms and improve smallholder farmers' access to markets in selected districts."

Parsing the PDO. The PDO will be parsed based on the following two objectives in Section 4 of this review:

1. To increase agricultural productivity of smallholder farms in selected districts.
2. To improve smallholder farmers' access to markets in selected districts.

b. Were the project objectives/key associated outcome targets revised during implementation?

No

c. Will a split evaluation be undertaken?

No

d. Components

The PDO was supported by the following five components:

1. Enhancing Agricultural Technology Generation (appraisal cost: US\$52.00 million, actual cost: US\$33.39 million). This component financed two research windows, Competitive Research Grants (CRGs) and Program-Based Research Grants (PBRGs). Those were implemented by the Bangladesh Agricultural Research Council (BARC) for a demand-driven and market-oriented approach to agricultural research. To strengthen the institutional capacity of the public research system, this component also invested in technical assistance for BARC in research management, institutional coordination, and policy formation, as well as PhD scholarships.

2. Supporting Agricultural Technology for Crops Development (appraisal cost: US\$66.00 million, actual cost: US\$77.12 million). This component supported the Department of Agricultural Extension (DAE) to mobilize farmers into common interest groups (CIGs), enhance public extension services, and promote good agricultural practices and climate-smart agriculture practices. This component also supported on- and off-farm mechanization by providing matching grants (Agriculture Innovation Funds II and III, 'AIF-2' and 'AIF-3') to CIGs and local entrepreneurs. To facilitate farmers' access to markets, this component supported formation of producer organizations (POs) and invested in development of marketing infrastructures including commodity collection market centers (CCMCs).

3. Supporting Agricultural Technology for Fisheries Development (appraisal cost: US\$37.00 million, actual cost: US\$46.91 million). This component supported the Department of Fisheries (DoF) to mobilize fisheries farmers into CIGs, enhance extension services by capacitating local extension agents for fisheries (LEAFs), promote climate-resilient and innovative aquaculture technologies, and support reliable supply of quality fish seed. AIF-2 and AIF-3 financed CIGs and local entrepreneurs. POs were formed and marketing infrastructures were developed including post-harvest service centers (PHSCs).

4. Supporting Agricultural Technology for Livestock Development (appraisal cost: US\$47.00 million, actual cost: US\$56.87 million). This component supported the Department of Livestock Services (DLS) to mobilize livestock farmers into CIGs, enhance extension services by capacitating community extension agents for livestock (CEALs) and service delivery agents, promoted climate-resilient animal husbandry



practices, and support reliable supply of inputs including promoting fodder cultivation and vaccination campaigns. AIF-2 and AIF-3 financed CIGs and local entrepreneurs. POs were formed and marketing infrastructures, with collection points (CPs), were developed.

5. Project Management (appraisal cost: US\$12.00 million, actual cost: US\$6.87 million). The Project Management Unit (PMU) established at the Ministry of Agriculture (MoA) coordinated and facilitated the overall implementation and management of the project.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost. The total project cost was estimated at US\$214.00 million. The actual cost was US\$210.41 million (ICR, Data Sheet, page 2).

Financing. The project was financed through an IDA Credit worth US\$176.06 million and a Grant from the Agency for International Development (USAID) in the amount of US\$7.43 million. These amounts were revised down to US\$162.55 million and US\$5.09, for the IDA Credit and the USAID Grant, respectively. The actual amounts disbursed were US\$159.93 million for the IDA Credit and US\$5.09 million for the USAID Grant. US\$13.44 million of IDA funds were cancelled. The project was co-financed through the International Fund for Agriculture Development with US\$23.86 million of which US\$20.32 million were disbursed.

Borrower Contribution. The Government of Bangladesh was expected to contribute US\$6.65 million and the project beneficiaries were expected to contribute US\$6.50 million. The actual amount contributed was US\$20.08 million (ICR, Data Sheet, page 2). The ICR did not provide a disaggregation of this amount.

Dates. The project was approved on June 5, 2015 and became effective 15 months later on September 5, 2016. The Mid-Term Review (MTR) was conducted on April 28, 2019 which was 9 months beyond the PAD specified date for the MTR on July, 31, 2018 and two years and seven months after effectiveness. The project closed on June 30, 2023 which was two years and nine months beyond the project original closing date on September 30, 2021.

The project was restructured twice, both Level 2, as follows:

1. On March 1, 2021, when the amount disbursed was US\$120.83 million, in order to revise the Results Framework, change components and their cost, extend the Credit closing date from September 30, 2021 to June 30, 2023, reallocate funds between disbursement categories (US\$14 million of IDA and IFAD commitment was reassigned from components 1 and 5 to components 2, 3, and 4 to support farmers in response to the COVID-19 pandemic), and change the implementation schedule. According to the Restructuring Paper (paragraph 6), the closing date required an extension to accommodate delays and allow enough time for the full achievement of the PDO. The project experienced delays in disbursements due to slow preparation of the Development Project Proposal (DPP) and Project Implementation Manual (PIM), delays in recruitment of a project director, and slow approval of IFAD co-financing (Restructuring Paper, paragraph 5).

2. On June 15, 2023, when the amount disbursed was US\$165.01 million, in order to change components and their cost, cancel undisbursed funds of US\$13.44 million from IDA, and reallocate between disbursement categories.



3. Relevance of Objectives

Rationale

Context at Appraisal. At the time of project appraisal in 2015, the agriculture sector played a key role in rural economic growth of Bangladesh as it constituted 17% of GDP. Nearly 67% of the country's population lived in rural areas, with over 43% of the labor force engaged in agriculture. However, the poverty rate in rural areas was relatively high at 26.7% in 2016. Thus, the growth of the agriculture sector continued to be a key driver of rural poverty reduction, to achieve the middle-income country status by 2021 and eliminate extreme poverty in the country by 2030. The growth of the agriculture sector relies on agricultural productivity growth, generation of improved technologies and their adoption by farmers and other actors. To achieve income increase for farmers, diversification of production, value addition, and access to markets supported by robust research and extension systems are required. NATP-II aimed to support the Government of Bangladesh (GoB) priority of increasing farm yields, diversifying agricultural production, and promoting value chain integration by improving agricultural research and extension.

Previous Bank Experience. The World Bank has broad experience in supporting agricultural projects regionally, including in Bangladesh, India and Pakistan. In addition, the World Bank has international experience in different regions of the World. This project (NATP-Phase II) would specifically benefit from the experience and lessons learnt under the Bank-funded NATP-I, which was implemented from 2007 to 2014 in 120 Upazilas across Bangladesh. Two key lessons from NATP-I were: (i) To expand the focus of the research and extension service agenda toward more agriculture commercialization, value chain, and agrobusiness areas; and (ii) To streamline implementation arrangements of complex projects to achieve greater coordination, efficiency, and accountability. The Bank with its accumulated experience and the specific lessons under NATP-I, is in a strong position to guide the implementation of NATP-II.

Consistency with Bank Strategies. At appraisal, the PDO was in line with the Bank's Country Partnership Strategy (CPS) for Bangladesh (CPS, FY2011-FY2014). Specifically, agriculture was highlighted in Pillar 3, Vulnerability, Adaptation and Inclusion, and the sector also contributes to growth (Pillar 2), and benefits from initiatives designed to improve governance (Pillar 4). The CPS was revised in 2015 and, inter alia, the revisions called for a follow-up to NATP-I for implementation starting FY2015.

At the completion of this project, the PDO continued to be in line with the Bank's Country Partnership Framework for Bangladesh (CPF, FY2023–FY2027). The CPF emphasized the critical role of the agriculture sector in creating economic opportunities in rural areas where most poor households reside. NATP-II directly contributed to the CPF's higher-level objective (b) (socioeconomic inclusion) and was relevant to the CPF Objective Indicator 5.2: Enhanced participation in higher-value agricultural activities in rural areas. The project also contributed to CPF's higher-level objective (a) (increased private sector jobs) by improving access to markets, especially promoting agri-entrepreneurship. Finally, NATP-II would contribute to CPF's higher level objective (c) (enhanced climate and environmental resilience) by promoting climate-smart agriculture practices.

Consistency with Government Strategies/Priorities. At appraisal, the PDO was in line with the Government's Sixth Five Year Plan (FY2011–FY2015) which envisaged more inclusive growth and the eradication of extreme poverty. NATP-II supported the Government's strategic priorities in agriculture,



namely, increasing production, achieving food security, supporting adaptation to climate change, and enhancing nutrition through access to safer and more diversified food.

At project completion, the PDO continued to be in line with Government's priorities for the agriculture sector as outlined in the Plan of Action of the National Agricultural Policy (2018) which emphasized policies and investments that support diversification, nutrition, and value chain development.

Summary of Relevance of Objectives Assessment. The PDO (Increase agricultural productivity of smallholder farms and improve smallholder farmers' access to markets in selected districts) statement was clear, focused, and pitched at targets for agricultural productivity and access to markets, which reflected an adequate level of ambition. At appraisal and completion, the PDO was in line with both the Bank's strategy and Government priorities for the agriculture sector. Therefore, Relevance of Objectives is rated High.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

To increase agricultural productivity of smallholder farms in selected districts.

Rationale

Theory of Change (ToC). To achieve the stated objective, the project supported the following activities:

1. Enhancing agricultural technology generation. This would be achieved through improving the performance of the national agricultural research system (NARS) and strengthening of agricultural research institutions. Improving the performance of the agricultural research system was expected to contribute to the development of innovative agricultural technologies, which represent an essential ingredient for achieving higher farm yields.
2. Crop Development. The project would support improving the outreach and quality of crop extension and advisory services by strengthening the skills of public extension workers, develop farmers' skills to scale-up the dissemination of Good Agricultural Practices (GAPs) including those developed under NATP-I, promote farm and off-farm mechanization to increase crop productivity, and strengthen institutions involved in the crop sector, through capacity development and selected investments in infrastructure. This was expected to increase farm yields and also diversify agricultural production.
3. Fisheries Development. The project was designed to promote an integrated approach to achieve productivity, quality and output increases through technology transfer. Specifically, NATP-II would provide support for the sustainable development of inland culture fisheries (small scale aquaculture ponds) and inland capture fisheries. This included scaling-up NATP-I Good Aquaculture Practices for the production systems



prevailing in the project area, promoting community-based fisheries management, supporting the participation of fisheries Community interest groups (CIGs) and producer organizations (POs) in value chains, and reinforcing research-extension-farmers linkages and strengthen the capacity of fisheries institutions. The project would also support a number of investments to support fish farming in the project area including: the promotion of specific fish production models involving improved fish varieties, the production of better quality fish seed, the introduction of appropriate fish feed, the application of relevant fisheries management tools, and the restoration of aquatic habitat. These activities would result in achieving better fish productivity and quality.

4. Livestock Development. The project was expected to support strengthening livestock support services institutions (including food and feed safety and quality, animal health), improving livestock extension services, and reinforcing the linkages between research, extension and livestock farmers; scaling up outreach programs to reach out to a larger number of farmers; and facilitating the participation of smallholder farmers in selected livestock markets. These activities were expected to result in achieving better livestock productivity and quality.

The expected outputs of the stated activities included: number of innovative agricultural technologies generated, demand driven extension developed, extension services improved, number of technologies and practices promoted, and number of grants invested in production and post-harvest processing machinery.

The intermediate outcomes as a result of the above-mentioned outputs included: strengthened institutional capacity of NARS, strengthened field institution for farmers to access technology and information, scalable technologies demonstrated in the project area, improved performance of NARS, farmers adopted improved technologies and GAPs, and improved farmers' access to machinery.

These intermediate results combined were expected to contribute to increasing agricultural productivity of smallholder farms in selected districts.

Overall, the ToC reflected relevant activities that were directly connected to the outputs, intermediate outcomes and the PDO in a plausible causal chain. However, the ToC as reported in the ICR lacked the critical assumptions that underpinned the achievement of Objective 1.

Outputs/Intermediate Results (based on Annex 1 in the ICR unless referenced otherwise)

1. Crops

- 95.26% of the targeted clients were satisfied with the agricultural and rural advisory services provided exceeding the target of 93%.
- 4,708 technology adoption and marketing sub-projects were financed through the Agricultural Innovation Fund (AIF) and were under implementation or completed significantly exceeding the target of 993.
- 788,583 clients including 263,615 females adopted an improved agricultural technology promoted by the project exceeding both the overall target of 640,000 and the female target of 224,000.
- 212 technologies were demonstrated in the project areas exceeding the target of 51.
- 241 collaborative research/extension sub-projects were under implementation/completed exceeding the target of 130.



- 4,009,360 client days of training were provided including 1,446,646 days for females exceeding both the overall target of 4,000,000 and the female target of 1,400,000.
- 695,700 crop farmers were mobilized into 27,150 crop CIGs and received 1,860,450 client days of training (no targets provided).
- 173,349 technology demonstrations were conducted, and 536,979 cumulative technology adoption were recorded (no targets provided).
- 1,803 AIF-2 grants were awarded to crop CIGs (no targets provided).

2. Fisheries

- 105,640 fisheries farmers were mobilized into 5,282 fisheries CIGs and received cumulatively 683,850 client days of training (no targets provided).
- 32,602 technology demonstrations were conducted, and 68,068 cumulative technology adoptions were recorded.
- 960 AIF-2 grants were awarded to fisheries CIGs (no targets provided).
- 7,704 beneficiaries around 40 beels (open-water wetland) were reached by the community-based beel management programs for open capture fisheries (no targets provided in the PAD).

3. Livestock

- 207,750 livestock farmers were mobilized into 8,282 livestock CIGs and received cumulative 702,450 client days of training (no targets provided).
- 45,889 technology demonstrations were conducted, and 183,556 cumulative technology adoptions were recorded (no targets provided). Major practices adopted by farmers include improved shed management, balanced feeding, and scheduled vaccination and de-worming (ICR, paragraph 39).
- 1,080 AIF-2 grants were awarded to livestock CIGs (no targets provided). 60% of the grants were towards purchasing live animals to multiply and the remaining 40% financed purchasing equipment such as chopper machines and feed crusher/mixing machines (ICR, paragraph 38).

Outcomes

- By completion, the project mobilized 1,009,090 smallholder farmers (of which 366,885 were women) exceeding the target of 1,000,000 (PDO outcome indicator 3) and organized them into 40,514 farmer groups (CIGs). The project beneficiaries were in 270 selected Upazilas of 57 districts of the country across agro-ecological zones, including 107 Upazilas, which were covered by NATP-I and 163 Upazilas were added under NATP-II. The project also continued to support over 17,000 CIGs formed by NATP-I (first-generation CIGs), with approximately 350,000 smallholder farmers in 110 old Upazilas. In addition, 1.9 million CIG and non-CIG members were supported by the COVID-19 response activities implemented by the project (PDO indicator 3b).
- The project supported three sub-sectors, crop, fisheries, and livestock and fully achieved the targets for productivity increase (PDO outcome indicator 1). Out of six targets for PDO outcome indicator 1 on productivity increase, five were exceeded, while one was significantly achieved at 98% based on data collected from a sample of farms from the 270 Upazilas selected as project beneficiaries. For crop yields, the average per hectare yield of paddy rice increased from a baseline of 4.70 tons per ha to 6.30 tons per hectare exceeding the target of 5.40 tons per hectare, and the tomato increased from a baseline of 30 tons per hectare to 38.43 tons per hectare exceeding the target of 36 tons per hectare.



For livestock productivity, milk yield (liter milk/day/cow) increased from a baseline of 3.00-liter milk/day/cow to 5.83-liter milk/day/cow exceeding the target of 3.90-liter milk/day/cow, and beef increased from a baseline of 160 kg live weight/cattle to 257.19 kg live weight/cattle exceeding the target of 225 kg live weight/cattle. For fish productivity, aquaculture pond farming increased from a baseline of 3 ton/ha to 5.28 ton/ha exceeding the target of 4.80 ton/ha, and for open capture yield increased from 0.70 ton/ha to reach 1.37 ton/ha significantly achieving the target of 1.40 ton/ha. Final targets for aquaculture were obtained through demonstration data while for crops and livestock the final numbers were from the impact assessment survey.

- The ICR (footnote #12) explained that establishing a counterfactual through a control group was not possible because the project design promoted benefit leakages to non-direct beneficiaries such as through CIG and non-CIG gathering events. This reduced the difference in benefits between control and treatment groups and therefore did not permit an assessment of the project's impact. Therefore, to estimate the net benefits generated by the project two sources of information were used. One source was a set of 251,840 project-managed demonstration plots for field crops where estimates of yield changes were based on crop cutting measurements during project implementation. The second source was a third-party impact analysis which used a sample survey of farmers in the 270 Upazilas covered by the project to determine baselines for average yields of various enterprises established based on farmers' recall of yields before the project compared with yields achieved by the time the project closed (ICR, Annex 6.2).

Summary of Efficacy Assessment. The project achieved the above-mentioned productivity increases across the three supported sub-sectors through promoting technology adoption. This was facilitated by three main project activities: strengthening field institutions for farmers to access technology, disseminating technologies through demonstrations and training, and providing access to finance through matching grants mechanism. For the two PDO outcome indicators measuring this objective (indicators 1 and 3), the project exceeded its targets for: two crops (rice and tomato), livestock (milk and beef), pond aquaculture, and significantly achieved its target for open capture. The project also exceeded its target for PDO outcome indicator 3 as mentioned above. Further, all four intermediate indicators on productivity increases achieved their targets. Despite these positive results, there were concerns in the ICR regarding the absence of project baselines, the robustness of the quality of the studies used to inform the M&E system, the significantly delayed operationalization of the Project Management Information System (PMIS), and the use of beneficiary farmers' recall as a substitute for a survey of non-beneficiaries to estimate the extent to which results such as yield increases were attributable to the project.

In light of the leakage of project benefits to non-direct beneficiaries and the evidence assembled to compensate for this challenge described in the ICR to assess the project's efficacy, this review concludes that the efficacy with which Objective 1 "to increase agricultural productivity on smallholder farms in selected districts" was almost fully achieved and is therefore rated Substantial.

Rating
Substantial



OBJECTIVE 2

Objective

To improve smallholder farmers' access to markets in selected districts.

Rationale

Theory of Change (ToC). To achieve the stated objective, the project supported the following activities:

1. The project supported establishing crop producer organizations and facilitating stronger collaboration with the private sector for agri-business development on agri-processing, market access for smallholders, as well as for the establishment of machinery hire-services. Also, the project supported promoting farm and off-farm mechanization to increase crop productivity, farm output and diversification, as well as to increase efficiency in crop handling, reduce post-harvest losses and support processing.
2. The project supported establishing fisheries producer organizations, and the creation of more suitable market linkages for better access to markets and improved realization of value for the product. The project invested in promoting climate-resilient and innovative aquaculture technologies. The project also piloted a support scheme for two fisheries POs which were supported in accessing district markets through improved marketing infrastructure (fish landing centers), comprehensive skills development through training-of-trainers, and support with further market linkages
3. The project also supported establishing livestock producer organizations and facilitating the participation of smallholder farmers in selected livestock markets. In addition, the project promoted food and feed safety issues at various levels of the commodity value chain, particularly for meat and dairy products. For goat and beef meat, the project supported community-level product aggregation, funded simple slaughter facilities, and promoted market linkages through close collaboration with the private sector for further processing and marketing.

The expected project outputs of the afore-mentioned activities included: grants invested in post-production machinery, and marketing solutions. The intermediate outcomes from the above-mentioned outputs included improved farmers' access to machinery and market access for production. All these activities and intermediate outcomes combined were expected to improve smallholder farmers' access to markets in selected districts

Overall, the ToC reflected relevant activities that were directly connected to the outputs, intermediate outcomes and the PDO in a plausible causal chain. However, the ToC as reported in the ICR lacked the critical assumptions that underpinned the achievement of Objective 2.

Outputs/Intermediate Results (based on Annex 1 in the ICR unless stated otherwise)

1. Crops

- 30 crop Producer Organizations (POs) were formed. The skills trainings for POs focused on (a) post-harvest management to mobilize large-scale high-quality products and (b) business planning so that the POs have strong business orientation and help farmers obtain bargaining power and access to market information and services. The project also helped POs identify selected domestic markets at Upazila or district level, supermarket chains, and processing companies, and facilitate contractual arrangements between POs and those actors (ICR, paragraph 41).



- 30 CCMCs were established and operated by POs. CCMCs were mini-packhouses equipped with marketing and processing appliances (such as weights and plastic crates) and logistics assets (such as rickshaw-vans and pickup trucks).
- 287 AIF-3 grants were awarded to crop POs and local entrepreneurs. The funded subprojects focused on logistics or processing proposed by selected PO members and rural entrepreneurs. The majority of sub-projects (218) invested in pickup trucks (ICR, paragraph 43).

2. Fisheries

- 22 fisheries POs including 2 special POs were formed. Those included 17,400 PO members, including 10,360 CIG member fish farmers from 518 CIGs and feed dealers, fish traders, and other input suppliers. Training and technical assistance to POs covered business planning, financial management, income generation and savings, post-harvest handling, and food safety. The project facilitated POs' linkage with upstream value chains (aqua inputs suppliers, feed dealers, and so on) as well as downstream (aqua businesses and logistics providers (ICR, paragraph 45)).
- Post harvest landing centers were established and operated by 2 specialized POs. Those were mini-processing plants with water and ice supply and cold storage.
- 228 AIF-3 grants were awarded to fisheries POs and local entrepreneurs. Funded sub-projects focused on logistics, processing, and value addition. The top five investments were aerators, feed processing machines, transportation vehicles, ice factories, and mini-fish processing centers (ICR, paragraph 47).

3. Livestock

- 120 livestock POs were formed with 3,600 members in 60 Upazilas across 39 districts in the project area. The project identified over 200 milk collectors (Goalas) in the area where 103 dairy POs operated and provided capacity building for these Goalas in hygienic transportation to reduce post-harvest loss and improve food safety (ICR, paragraph 49).
- 183 AIF-3 grants were awarded to livestock POs and local entrepreneurs. About 60% of the sub-projects were engaged in transportation and marketing such as pick-up trucks and cooling vans. The remaining 40% of grants funded machineries such as milk chillers, feed processors, and chick hatcheries (ICR, paragraph 50).

Outcomes

- By project completion, the total volume of agricultural commodities from three sub-sectors sold annually (PDO Indicator outcome 2) reached 13,071 Metric Tons (MT) exceeding the end target of 12,520 MT. Cumulative sales also reached 67,194 MT significantly exceeding the target of 33,760 MT.
- The cumulative sales from 30 crop POs reached about 37,000 MT, including 2,593 MT of commodities exported to Malaysia, the UAE, and other countries. The ICR reported that some POs developed regular sales arrangements with local, regional buyers including national agri-food brands such as PRAN Foods (paragraph 44). Also, the cumulative fish sales by 22 fish POs reached 11,971 MT including 2,927 MT through the online platform. Finally, cumulative sales of livestock products through 107 marketing arrangements identified by the project reached 11,255 MT of livestock products (ICR, paragraph 51).



Summary of Efficacy Assessment. The project improved smallholder farmers' access to markets in selected districts through supporting new infrastructure/ institutional arrangements. This included forming and training POs for the three supported sub-sectors, financing matching grants to fund sub-projects that would contribute to improved market access as noted above. In addition, the project facilitated establishing market linkages between the POs and agri-companies to increase market access for smallholders. The project exceeded its PDO outcome target as noted above for both the annual and cumulative sale volumes. However, there were M&E challenges (as discussed under Objectives 1 and 2). For example, for reasons explained in Section 4 baseline data for productivity were based on the recall of smallholders. In the absence of baseline data for market access it was reasonably assumed to be zero which meant that the assessment of increased access to markets due to the project was determined by the volume of agricultural commodities sold through arrangements funded by the project.

Therefore, the efficacy with which this objective was achieved is rated Substantial with minor shortcomings.

Rating

Substantial

OVERALL EFFICACY

Rationale

Overall Efficacy is rated Substantial. The project exceeded its outcome targets in terms of increasing agricultural productivity of smallholder farms and improving smallholder farmers' access to markets. However, there were challenges facing the assessment of net productivity increases because of the "leakage" of project benefits to untargeted beneficiaries and the consequent impossibility of defining a control group. Nevertheless, a solution which simulated a counterfactual was designed for productivity increases and for market access the baseline was logically assumed to be zero. Also, the project exceeded its target for COVID (target achieved was 1.9 million compared to the end target of 1.8 million) beneficiary coverage which supported a total of 1 million households (about 6% of farm families in Bangladesh).

Overall Efficacy Rating

Substantial

5. Efficiency

Economic and Financial Analysis (EFA)

ex-ante



- At appraisal the economic rate of return (ERR) was estimated at 31% and the corresponding net present value at US\$49.9 million using a discount rate of 12% (PAD, page 88).
- Project benefits were expected to derive from: (i) increased productivity; (ii) increased price pass-through resulting from improved market access; and (iii) reduction in production costs in some cases.
- The project's economic viability assessment was based on projecting net benefits from the project's interventions, and computing the project's internal rate of return, economic rate of return, and net present value. The yield, cost and analytical assumptions drew from NATP-I experience.
- Sensitivity Analysis. The estimated economic rate of return remained robust under hypothetical scenarios of a 10% decrease in expected net revenues and/or a 10% increase in project costs where the estimated ERR dropped to 25% in each case. In the that both scenarios materialized the estimated ERR dropped to 20%.
- Overall, the PAD EFA as presented in Annex 6 drew on the experience of NATP-I and reflected logical assumptions from the NATP-I EFA analysis. This review concluded that the analysis provided an adequate justification of this project's investments.

ex-post

- At completion, the project's overall ERR was estimated at 30.10%, with an estimated NPV of US\$89.5 million over a 20-year period and a discount rate of 12%. While this was slightly lower than the ERR at appraisal (31%), it was still comparable. The *ex-post* EFA largely followed the same methodology at appraisal to ensure consistency and comparability.
- The *ex-post* EFA was based on a standard cost-benefit analysis which considered all project costs and benefits and, to the extent possible, assessed the net impact of the project by comparing the 'with project' and 'without project' situations as explained in the assessment of the efficacy with which Objective 1 was achieved in Section 4 above.
- Sensitivity Analysis. The analysis showed that the returns to project investments remain robust even under severely adverse scenarios. For example, a two-year delay in project benefits dropped the ERR to 20.4% while a one-year delay dropped it to 24.3%. Also, a 30% reduction in net benefits (due to higher input cost/lower output prices/attrition) dropped the ERR to 21.4% while 50% and 70% reductions in net benefits (due to higher input cost/lower output prices/attrition) reduced the ERR to 14.7% and 6.5% respectively. Finally, external shocks (price or climate) every two years dropped the ERR to 22.9% and every three years dropped the ERR to 25.6%.
- Implementation Efficiency. The project closed 33 months beyond its original closing date. This delay was attributed to significant delays with the implementation of some project activities, which was exacerbated by the COVID-19 pandemic which further slowed the implementation progress. Also, delays in some key procurements undermined the quality of project implementation. At the time of project closing, US\$13.44 million from IDA commitment was canceled as those were undisbursed funds, and the total project costs were US\$214.14 million. Despite the extension of the project's closing date, a lower share of the project budget was spent on project management than estimated at appraisal (3.2% compared to 5.6%). Further, the reallocation toward components 2 and 4 allowed the project to reach a slightly larger number of project beneficiaries at no extra cost.
- Overall, the EFA at completion was detailed enough, reflected realistic assumptions, and provided a convincing justification of the project investments.

Summary of Efficiency Assessment. While the *ex-post* ERR at 30.1% was slightly lower than the 31% estimated at appraisal, it was still significantly higher than the discount rate at 12%. The sensitivity analysis at completion validated the robustness of the ERR under different scenarios as discussed above. Also, at



completion, the unit cost for the project per beneficiary (smallholder farmer) at US\$163.5 was lower than the appraisal estimate of US\$221. Overall, the project’s efficiency is rated Substantial.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	31.00	0 <input checked="" type="checkbox"/> Not Applicable
ICR Estimate	✓	30.10	0 <input checked="" type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

Relevance of Objectives was rated High. Overall Efficacy is rated Substantial. The project exceeded its outcome targets in terms of increasing agricultural productivity of smallholder farms and improving smallholder farmers’ access to markets. Also, the project exceeded its target for beneficiary coverage. Efficiency was also rated Substantial based on the estimated *ex-post* ERR of 30.1% which was still comparable to the 31% estimated at appraisal.

Based on the assigned ratings for the three outcome criteria, the overall Outcome is rated Satisfactory due to minor shortcomings pertaining to the evidence of the efficacy of the project’s agricultural achievements, and of the project’s overall efficiency.

a. **Outcome Rating**
Satisfactory

7. Risk to Development Outcome

According to the ICR the following risk could potentially impact the Development Outcome:

- **Institutional risk.** Beneficiaries were mobilized into CIGs to improve peer learning and facilitate the dissemination of inputs and services from the project. However, without the project, it is unclear whether CIGs would have sufficient incentive to operate. Also, the local extension service network



and participatory extension strategy financed by the project were a key factor in achieving technology adoption and subsequent agricultural productivity increases. The project developed an exit and sustainability plan for Farmers Information and Advice Centers/Community Extension Agents for Livestock/Local Extension Agents for Fisheries, at project closing, but it was unclear how many of these service centers will become institutionalized into the Government's regular extension and advisory network. MoA has already decided to scale up the program by adding 2,950 Farmers Information and Advice Centers across the country. However, the livestock and fisheries sub-sectors do not have a clear plan to sustain their parts of Farmers Information and Advice Centers and retain private field workers who were trained by the project. Therefore, it is expected that after project closing, some farmers will have less access to technical advisory services and possibly weakened community links to exchange and access information, inputs, and services (ICR, paragraph 94).

8. Assessment of Bank Performance

a. Quality-at-Entry

- **Strategic relevance and approach.** The project was the second phase of the NATP program in Bangladesh. The project was strategically relevant and in line with the Government priorities. The PDO was also in line with the Bank strategies (see Section 3 for details). Agriculture continues to be considered essential for economic development, and a comprehensive approach was expected to help reduce poverty and support rural development.
- **Technical, financial and economic aspects.** NATP-II was designed as a multidimensional project that integrated research, extension, supply chain, and marketing activities of crops, livestock, and fisheries. The project aimed to contribute to productivity increases, agricultural diversification, food and nutrition security, market linkages, and livelihood improvements of small and marginal farmers. The project design benefited from the lessons and experience of NATP-I (see Section 3). Overall, the project benefited from a clear design that reflected focused and logically sequenced activities. However, according to the ICR (paragraph 69), the coordination between research and extension activities needed to be more developed. Also, the compatibility of matching grants should have been assessed against the local conditions to better align with the ground-level reality (ICR, para 68). Nevertheless, the PAD included a thorough economic and financial analysis that provided a convincing justification of the project's investments.
- **Poverty, gender, and social development aspects.** The project supported activities that aimed to improve the livelihood of small and marginal farmers. This was expected to reduce poverty in the project areas. Since about 36% of the project beneficiaries were women, the project set a gender strategy to ensure women's involvement in various activities implemented by the project. This included: a gender-sensitive allocation of resources, women-targeted leadership promotions, and consideration of gender friendliness in evaluating newly developed technologies. The Results Framework (RF) included several gender disaggregated indicators to capture the participation of women in the project activities.
- **Environmental and Fiduciary aspects.** While the project had adequate environmental arrangements, financial management faced some challenges. Financial management experienced "significant delays in resolving audit observations on internal control, and there still are pending audit observations (ICR, paragraph 84)." Also, procurement had weaknesses that contributed to implementation delays (ICR, paragraph 85).



- **Implementation arrangements.** The project had a complex implementation arrangement with four Project Implementation Units (PIUs) and one Project Management Unit (PMU). It involved four line departments that covered research and the three commodity value chains. The project was implemented under the responsibility of the Ministry of Agriculture (lead implementing agency) and the Ministry of Fisheries and Livestock. The project was fully integrated in the Government's administration so as to promote the use of existing government structures at central level, and when available, at decentralized levels. A PMU was set up to oversee implementation of project activities, carry out day-to-day project management functions, facilitate coordination among components, and liaise with the World Bank on all project implementation related aspects. However, coordinating four line agencies from two different ministries proved challenging for the PMU.
- **Risk assessment.** Eight risks were identified at appraisal with an overall rating of Substantial. The risks related to political and governance, sector strategies and policies, institutional capacity for implementation and sustainability, and fiduciary were all rated substantial. While the risk assessment was realistic and identified most risks, some were underestimated. Also, the proposed mitigation measures were not as effective as expected. The risk related to fiduciary challenges proved to be more serious than initially anticipated as FM and procurement activities faced difficulties in the management of large-size procurements in a transparent manner. Also, mitigating the risk associated with coordinating four line agencies from two different ministries required a capable PMU with strong leadership complemented with qualified technical experts, and external technical assistance providers. However, it took the project two years to assign a project director and the PMU was burdened with too many experts in the PMU while experiencing shortage in field-level staff (ICR, paragraph 90). Further, the risk relating to staff hiring was also underestimated as the hiring process was hindered by the lengthy bureaucratic procedures in decision-making and processing. This was exacerbated by a mismatch between the project's financial offer to attract and retain talent and the market remuneration. These risk-related weaknesses "compromised the smooth and effective implementation of the project (ICR, paragraph 90)."
- **M&E arrangements.** M&E activities were expected to be outsourced to an external specialized firm; however, this did not materialize as planned. Aggregating all M&E-related tasks under a single agency complicated the procurement process. This arrangement undermined M&E activities, and some activities were cancelled, including collecting data for baseline, mid-term, end-line, and impact assessments. Overall, M&E arrangements were not optimal at the design stage.

Summary of QAE Assessment. The project was strategically relevant. Design featured a multidimensional approach that integrated research, extension, supply chain, and marketing activities. While environmental aspects were adequate, fiduciary aspects faced serious challenges. Implementation arrangements also faced challenges in coordinating four line agencies from two different ministries. The risk assessment was realistic and identified most risks. However, some risks were underestimated, as noted above. M&E arrangements had shortcomings as the envisioned recruitment of a specialized external M&E firm did not materialize. Overall, Quality at Entry is rated Moderately Satisfactory due to moderate shortcomings pertaining to risk mitigation measures, M&E arrangements, and, to a lesser extent, implementation arrangements.



Quality-at-Entry Rating

Moderately Satisfactory

b. Quality of supervision

- The World Bank conducted nine implementation support missions and two technical missions over the project implementation duration. According to the ICR (paragraph 91) the missions were staffed with specialists relevant to the project activities.
- The Bank team also held monthly meetings to track progress against agreed actions and to provide needed operational support. The project benefited from workshops organized by the Bank to cover with specific themes including M&E and Greenhouse Gas (GHG) emission analysis trainings. The Bank also organized study tours to India to support the PMU and PIUs staff to improve their capacity for effective project implementation. The ICR noted that the World Bank allowed the client to come up with solutions or jointly developed solutions in an inclusive manner.
- The Bank team proactively restructured the project twice, first to address the ramifications of the COVID-19 pandemic, and second, to better align the project with the Government priorities.
- A notable shortcoming was focusing on inputs/outputs instead of outcomes in the project related studies. While the project carried out a number of studies, the quality of these studies was not robust (ICR, paragraph 92). The project could have benefited from a more focused approach that included deeper analysis in a reduced number of studies. According to the ICR (paragraph 92) "the midterm review was a missed opportunity in this regard."

Summary of Quality of Supervision Assessment. The Bank team guided the project towards a successful outcome despite the complex nature of the implementation arrangements. The project team provided technical support and was proactive in restructuring the project in the face of the COVID-19 pandemic as well as to align with the shift in priorities of Government. The Bank team could have provided stronger guidance on the project studies as well as the MTR to better serve the assessment of the outcomes. Overall, however, Bank Supervision is rated Satisfactory.

Based on the assigned rating to QAE and Bank Supervision, the Overall Bank Performance is rated Moderately Satisfactory due to moderate shortcomings pertaining to QAE.

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

- The PAD did not include a Theory of Change (ToC) since it was not yet required by the Bank at the time of appraisal. Nonetheless, the ICR included a ToC that reflected the relationship between the



project activities, outputs, intermediate outcomes and PDO outcomes in plausible causal chains. This Review reconstructed a ToC narrative for each objective based on the detailed project description in the PAD (Annex 2) in combination with the ToC reported in the ICR.

- The PDO was composed of two objectives (see section 2), which were assessed based on the following three PDO outcome indicators: 1. Farm Productivity: Increase in the yield of selected agricultural commodities. This indicator monitored the annual yields of key commodities (selected from crops, fisheries and livestock) in the new NATP-II areas. It showed how the yield-gap has narrowed over the lifetime of the project with farmers' adoption of new technologies and good agricultural practices, 2. Market Access: Volume of agricultural commodities sold annually through new structures/arrangements promoted by the project. This indicator provided information about the improvement in the participation of smallholder farmers in markets. It measured the throughput marketed via commodity collection points, rural markets, contract farming and other new arrangements facilitated by the project. This indicator also helped in determining project impact on farm income, and 3. Direct project beneficiaries. This indicator measured the cumulative number of farmers who were members of Common Interest Groups (CIGs), and reported on the share of female members. Overall, the PDO outcome indicators were directly connected to the two objectives, measurable, and reflected reasonable targets. However, baseline data were reported for the first outcome indicator only and more disaggregated value chain information could have been considered for the market access indicator to measure project impact better.
- The Results Framework included seven intermediate results indicators (IRIs) to track the progress of the different project activities. The IRIs were measurable, reflected reasonable targets, and were connected to the project activities. However, strengthening the institutional capacity of the NARS was not adequately captured.
- The M&E system design also called for rigorous beneficiary analysis, namely; information and communication technology-based project monitoring and decision-making; and baseline, midline, and endline household surveys.
- Overall, M&E design reflected an adequate Results Framework (RF) that included relevant PDO outcome indicators and IRIs. While M&E activities were expected to be outsourced to an external specialized firm, this did not materialize. Also, strengthening the institutional capacity was not adequately captured as noted above in Section 7.

b. M&E Implementation

- According to the ICR (paragraph 77) "the project managed to collect reliable data based on adequate choice of method, collection procedure and verification. Progress reports were shared with the respective ministries periodically, and with the World Bank annually."
- However, M&E implementation was challenging given the project's complexity and its implementation across the four PIUs, and the lack of a third-party monitoring, since the project could not recruit an M&E firm as planned. This resulted in aggregating all M&E-related tasks to be performed under a single agency. An internal M&E team consisting of an M&E specialist at the PMU and PIUs' M&E cells were tasked with the conduct of regular project monitoring and data collection. However, M&E capacities in the implementing agencies was limited and lacked experience with IDA-funded projects in Bangladesh.
- Data from the NATP-I end-line were used as baseline for productivity indicators under the NATP-II because conducting a new baseline did not materialize - given the failure to recruit an external M&E specialized firm.



- Data at the field level were collected by the PIUs' field officers through a decentralized M&E system. Data were then aggregated at the PIUs for further analysis at the PMU. M&E activities utilized various types of remote monitoring tools including mobile tablets and Kobo Toolbox were introduced. An M&E workshop was organized to improve the capacity of in-house M&E team.
- While an ICT-based PMIS was introduced, this was several years after commencement of project implementation. As a result, most of the M&E during the project period was covered by Excel-based data collection and interpretation, which limited its timely use.
- Overall, M&E implementation was challenging and did not proceed as envisioned at appraisal.

c. M&E Utilization

- "The lack of a baseline survey proved to be a challenge for accurately evaluating the project's effect on farm productivity variables at project closing (ICR, paragraph 79)."
- As an alternative to the absence of a baseline survey, the project supported many studies; one survey sought to generate baseline data by using questionnaires which asked farmers to recall historical information. However, the quality of these reports "was not necessarily robust (ICR, paragraph 79)." Further, the results of the studies were not translated into concrete follow-on activities to provide a feedback loop for implementation improvement.
- The project could have benefited from the analysis of disaggregated data through a more targeted and succinct approach to better assess outcomes. This would have helped understand the drivers of project results, attribution, and lessons learned for future interventions.

Summary of M&E Quality Assessment. While M&E design was comprehensive, M&E implementation arrangements did not materialize as envisioned. A baseline survey could not be conducted, and this negatively impacted the accuracy of the assessment of project outcomes. Finally, M&E data could not be effectively utilized to inform changes to project implementation strategy. Therefore, M&E Quality is rated Modest. However, the ICR provided sufficient evidence to justify a substantial efficacy rating and collected information eventually based on a number of separate surveys of the project's achievements vis a vis crop productivity.

M&E Quality Rating

Modest

10. Other Issues

a. Safeguards

- **Environmental Category and Safeguards.** NATP-II was classified as a "Category B" under OP/BP 4.01 with a partial assessment as the environmental impacts were likely to be small-scale, site specific and with no irreversible impacts. Also, NATP-II was not expected to have any significant adverse social impacts; it would build on the achievements of the previous project to adequately address Gender and Social Inclusion. Two environmental and one social safeguard policies were triggered: Environmental Assessment (OP/BP 4.01), Pest Management (OP/BP 4.09), and Indigenous Peoples (OP/BP 4.10). An Environmental Management Framework (EMF), a Pest



Management Plan (PMP), a Social Assessment and a Social Management Framework (SMF) were prepared and disclosed prior to appraisal. The SMF included a Gender and Inclusion Framework (GIF).

- **Compliance with Environmental and Social Safeguards.** According to the ICR (paragraph 81) "the project met environment compliances, as it ensured completion of the safeguard activities in relation to the Environmental and Social Framework." The ICR also stated that "the project complied with related social safeguards (paragraph 82)." A Grievance Redress Mechanism (GRM) was established. The GRM received 8,341 (DAE: 3,252 grievances up to the project closing), all of which were effectively resolved, and none remains outstanding (ICR, paragraph 83).

b. Fiduciary Compliance

- **Financial Management (FM).** FM was challenging given the complex decentralized operation with multiple cost centers. That said, NATP-2 was compliant in FM requirements in submitting the interim unaudited financial reports and audited financial statements of the project throughout the project implementation period. While there were a few minor unreconciled balances of utilization of funds between the Designated Account and Client Connection, the interim unaudited financial reports were acceptable to the World Bank (ICR, paragraph 84). However, there were significant delays in resolving audit observations on internal control, and there were still pending audit observations. At closing, the project successfully submitted the final withdrawal application, closed financial books, and dispersed operational bank accounts at the field level. NATP-2 served as a pilot project in Bangladesh for the implementation of IBAS-PMAP (Project Management Accounting Portal). The IBAS-PMAP featured a real-time FM system including budgeting, accounting, and an automated payment system for project transactions. At project closing FM compliance was rated Satisfactory.
- **Procurement.** Procurement performance was challenging and experienced some shortcomings. There were delays in some key procurement activities that undermined the quality of project implementation. For example, the M&E package ended up being canceled, and procurement for the development of the PMIS was not processed until June 2020. The procurement for the IA was also delayed, which prevented the project team from investing enough time to improve the quality of the output due to the time constraints toward project closing. Further, there were a significant number of complaints relating with procurements throughout the project life. The World Bank team recommended that an Independent Procurement Panel be instituted to mitigate against ongoing procurement complaints. It was not clear whether the Bank's recommendation was acted upon. Finally, during COVID-19 pandemic some procurement activities were significantly impacted due to the inability to hold physical evaluation committee meetings and collect signatures of evaluation committee members. This emphasized the need for digitization of the procurement process (ICR, paragraph 87). At project closing procurement compliance was rated Satisfactory.

c. Unintended impacts (Positive or Negative)

None.



d. Other

The ICR (paragraph 56) reported that "the project developed and promoted several climate-smart agriculture practices. Most of the 11 technologies developed and disseminated by the project can be considered climate smart. A greenhouse gas (GHG) emissions accounting for selected crop technologies showed that adoption could achieve an annual net reduction of GHG emissions, compared to a 'without' project scenario, of between 0.15 tCO₂e per year for solar system-based irrigation pump technology, 0.47 tCO₂e for bio-organic fertilizer and improved soil health, and even up to 6.5 tCO₂e for replacing tobacco with improved maize production. In addition, about 10% of PhD research projects financed by the project focused on research topics related to climate adaptation, resilience, and mitigation."

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	
Quality of M&E	Modest	Modest	
Quality of ICR	---	Substantial	

12. Lessons

The ICR included five lessons. The following three are emphasized with some adaptation of language:

1. To ensure timely dissemination of technologies, investments in research need to be also supported with adequate financial and dissemination tools and activities. A typical research lifecycle is longer than the standard period of a project financed by the World Bank. While this project successfully generated 40 scalable technologies it required more time for these technologies to be adopted at scale and to contribute to productivity increase. This emphasizes the relevance of a support program like NATP in which technologies generated under NATP-I were disseminated under NATP-II.

2. To improve market access and value chain development for smallholders, robust technical assistance for a significant period of time is needed to ensure the achievement of sustainable outcomes. Given the commercial nature of agriculture, public sector capacity requires significant technical assistance from specialists to facilitate liaison with market actors, to develop value chains and enable a transparent, equitable and efficient business environment. NATP-II identified external technical assistance to provide such professional services for three sub-sectors, but could not maintain this support throughout the project period. After the departure of the external



technical assistance, local field-level support for POs and market actors did not emerge thus jeopardizing sustainability.

3. The public demand-driven decentralized agricultural extension system that was welcomed by beneficiaries earned support for it to be sustained. The project experience showed that the bottom-up approach for extension planning enabled the institutions to introduce demand-driven extension planning region by region. While it took a long time to set up Farmers Information and Advice Center (FIAC) facilities and popularize them amongst farmers, local extension service stations at the Upazila level were welcomed by smallholders according to a beneficiary survey at project closing. The MoA decided to expand the FIAC network, but ministries responsible for livestock and fisheries had at project closing not allocated any resources to support a decentralized extension system through FIACs or a similar approach for livestock and fisheries.

The following lesson is emphasized by IEG:

4. Projects featuring research and extension activities could benefit from a coordination mechanism to maximize benefits. According to the ICR NATP-II suffered from weak coordination between research and extension components (paragraph 69). There could have been better coordination among research and extension components and the PIUs to develop regular channels to share information from the research sector and provide feedback from the field and along the value chain.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

- **Quality of Evidence.** The ICR provided an adequate evidence base to support the achievements reported. However, the lack of a baseline study was a concern. As an alternative to the absence of a baseline survey, the project supported many studies; some surveys sought to generate baseline data by using questionnaires which asked farmers to recall historical information.
- **Quality of Analysis.** The ICR provided clear links between evidence and findings to the extent possible and used the evidence base to serve the arguments under the different sections. However, the absence of baseline survey undermined the assessment of outcomes.
- **Lessons.** Lessons reflected the project experience and were based on evidence and analysis.
- **Consistency with guidelines.** The ICR used the standard structure defined in the Guidelines and used available evidence to justify the assigned ratings.
- **Conciseness.** Overall, the ICR was well written, provided a clear and concise coverage of project activities, and candidly reported on most shortcomings. However, the section on the risk to the development outcome could have benefitted from further details.



Summary of the Quality of ICR Assessment. The ICR included a plausible assessment of outcomes despite some shortcomings. The lessons drawn by the ICR were relevant. Most sections were concise and reflected relevant evidence. Overall, the Quality of the ICR is rated Substantial with some minor shortcomings.

a. Quality of ICR Rating
Substantial