



Government of the People's Republic of Bangladesh
National Agricultural Technology Program-Phase II Project (NATP-2)
Ministry of Agriculture (MOA) &
Ministry of Fisheries & Livestock (MOFL)



ANNUAL PROGRESS REPORT 2019-2020



NATP2

Project Management Unit (PMU)
 AIC Building, 3rd Floor, BARC Complex, Farmgate, Dhaka-1215



NATP-2 PROJECT ANNUAL PROGRESS REPORT 2019-2020



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Minister

Ministry of Agriculture
Govt. of the People's Republic of Bangladesh
Bangladesh Secretariat, Dhaka.

Message

I am pleased to know that the National Agricultural Technology Program-Phase II (NATP-2) Project is going to publish its “NATP-2 Annual Progress Report 2019-2020”. NATP-2 is the largest and most diversified project of the Ministry of Agriculture which is to be implemented in three phases. NATP-2 is playing a key role in addressing food and nutrition security and livelihood improvement of the farmers. Agricultural technology generation, research & institutional capacity building of 13 National Agricultural Research System (NARS) institutes, increase farm productivity, production system diversification, bringing extension services to the farmers’ doorstep through FIAC and finally, linking farmers to markets are the major activities and focus of the project. The provision of its three innovative windows of funding for competitive research grants in agriculture, promoting farm and off-farm mechanization and supporting rural entrepreneurs to strengthen market linkage are supporting Agricultural Policy and Five Year Plans of the government.

The present agriculture friendly government under the able leadership of Honorable Prime Minister Sheikh Hasina has given high emphasis on the agricultural mechanization and its commercialization. “Not an inch of land should remain unutilized” - is our current focus in order to grow more foods and be prepared for any adverse impact of COVID-19.

The government of Bangladesh has made concerted efforts to create enabling policy, increase investments and enhance R&D capacity to address challenges associated with agriculture and climate change. I believe, NATP-2 has been utilizing its resources to improve the research and extension services of the country.

I firmly believe that this “NATP-2 Annual Progress Report 2019-2020” has reflected all the activities undertaken by the implementing agencies and their output and outcome related achievements. This annual report would be of immense help to researchers, extension providers, policy makers and academia of the country.

I thank Project Management Unit and Project Implementing Units for their valuable support and contribution to NATP-2 Project.

Joy Bangla, Joy Bangabandhu
Long Live Bangladesh.

(Dr. Muhammad Abdur Razzaque, MP)





Minister

Ministry of Fisheries & Livestock
Govt. of the People's Republic of Bangladesh
Bangladesh Secretariat, Dhaka.

Message

I am pleased to know that the Project Management Unit of the National Agricultural Technology Program-Phase II (NATP-2) Project is publishing its third Annual Progress Report for FY2019-2020. It is the most strategic project of the Government of Bangladesh, being implemented jointly by the Ministry of Agriculture and the Ministry of Fisheries and Livestock. The report focuses on the implementation progress of all Project Implementation Units including the activities being performed by the Department of Fisheries and the Department of Livestock Services.

Fisheries and Livestock are the two important sub-sectors which are the main sources of protein and prominent contributors to our national economy. Bangladesh now stands at 2nd position in freshwater fish production, 3rd position for the inland open water fisheries and 5th in pond aquaculture in the world, though all our potentials are yet to be exploited. The Ministry of Fisheries and Livestock is working tirelessly to achieve the present government's 'Vision 2021' and 'Vision 2041' under the dynamic leadership of honorable Prime Minister Sheikh Hasina. The ministry has taken manifold programs and initiatives in development of fisheries and livestock sectors. Among them, some of the mentionable activities are: quality fingerlings production and supply, beel management, pureline brood development, sanctuary development, cage culture, community based fisheries management, vaccination and deworming program of cattle and poultry, vaccine production for disease control and management, supply of day old chick and ducklings at reduced price, strengthening the artificial insemination program and farmers training.

NATP-2 promotes innovation, both in research and extension, and looks for technological solutions aiming at increasing farm productivity and reducing post-harvest losses through improved market access. The project uses holistic approach in generating and transferring technologies of crops, fisheries and livestock that would help in agricultural diversification & commercialization, increased farm income and livelihood improvements of the farmers and rural agro-entrepreneurs.

I believe, NATP-2 Annual Progress Report of 2019-2020 will serve as a knowledge reference to related stakeholders and would be of immense help to researchers, extension providers, policy makers, traders, students and academia.

I would like to congratulate the Project Team for publishing this important and informative document and wish their success.

Joy Bangla, Joy Bangabandhu
Long Live Bangladesh

(S M Rezaul Karim, MP)



Senior Secretary

Ministry of Agriculture

Govt. of the People's Republic of Bangladesh
Bangladesh Secretariat, Dhaka.

Message

I am delighted to know that the Project Management Unit (PMU) of the National Agricultural Technology Program-Phase II (NATP-2) project is publishing the “NATP-2 Annual Progress Report 2019-2020”. It is the third report PMU is publishing that documented implementation progress of all the project activities performed by the four Project Implementation Units (PIUs) and the Project Management Unit (PMU) during 2019-20, and their cumulative achievements against end targets. NATP-2 is the continuation of NATP-1, being implemented in 270 Upazilas of 57 districts. Research, extension and value chain are the three interrelated programmatic intervention areas the project is addressing in order to improve agricultural productivity, promote diversification, link farmers with the markets and increase farm income. This project has some unique activities like FIAC, three Agricultural Innovation Funds (AIF-1, AIF-2 and AIF-3) for promoting agricultural research and supporting farm mechanization and market access by the farmers and rural agro- entrepreneurs. The extension service delivery system of FIAC was applauded by our Honorable Prime Minister Sheikh Hasina in her speech during the unveiling ceremony of 100 agricultural technology ATLAS prepared by BARC. She had also emphasized on agricultural research and innovation.

For the NATP-2 a critical lesson from the first phase of COVID-19 response is that we have to be very fast and decisive in bringing massive support to our beneficiary farmers in order to quickly recover their losses incurred during the initial country-wide lockdown. In this regard I appreciate the project initiative to reallocate the entire remaining international travel budget for inputs support to the farmers.

The achievements of NATP-2 are now visible, both for research and extension activities. The project has already up scaled 11 of the project's generated new technologies at farm levels and there are also many in the pipeline to be released/registered soon. The 140 project funded PhD scholars who have been pursuing their degrees locally and abroad, will add on to the existing capacity of our 13 NARS Institutes for agricultural research.

The remarkable achievements of the project are the outcome of the concerted efforts of researchers, frontline extension providers and farmers. I believe and hope that this report will be a useful source of information for the policymakers, extension providers, researchers and development actors.

(Md. Mesbahul Islam)





Secretary

Ministry of Fisheries & Livestock
Govt. of the People's Republic of Bangladesh
Bangladesh Secretariat, Dhaka.

Message

It is my pleasure to know that the National Agricultural Technology Program-Phase II (NATP-2) Project is going to publish its Annual Progress Report for FY2019-2020. I appreciate PMU for publishing the progress reports regularly by documenting the various activities of the project.

NATP-2 is a multi-dimensional and multi-stakeholder project addressing productivity improvement and facilitating access to markets for the small and marginal farmers of crop, livestock and fisheries. The program uses holistic approach in generating and transferring technologies of crops, fisheries and livestock that would help in agricultural diversification and livelihood improvements of the farmers and rural agro-entrepreneurs.

NATP-2 project is being implemented in 270 upazilas of 57 districts. The fisheries and livestock components of NATP-2 have some unique activities like FIAC, Agricultural Innovation Funds (AIF-1, AIF-2 and AIF-3) for promoting agricultural researches and supporting farm mechanization and market access by the farmers and rural agro- entrepreneurs, quality Brood Development, Beel Management, generation and dissemination of improved technologies to the farmers. The extension service delivery system of FIAC is really unique through which community frontline extension providers, namely LEAF and CEAL are bringing the extension services at the farmers' doorsteps. The project is playing a vital role in addressing food and nutrition security and livelihood improvement of the farmers, particularly small, marginal and female farmers.

In spite of COVID-19 pandemic situations, there are many remarkable and visible achievements been made by NATP-2. PIU-DoF has developed online fish marketing website with mobile apps version and introduced mobile van for selling fish during COVID-19. PIU-DLS arranged mobile milk sale in their locality.

The Sheikh Hasina Government is well known as the agriculture friendly government. The present government under the able leadership of the Honorable Prime Minister Sheikh Hasina has given high emphasis on the agricultural mechanization, its commercialization and wellbeing of the farm community. She also emphasizes on agricultural research and innovation.

The NATP-2 outputs and outcomes are the results of concerted efforts of project personnel and the resilient and hardworking farmers. I thank all the actors for their valuable support and contribution to NATP-2 Project.

(Rawnak Mahmud)

Foreword



National Agricultural Technology Program-Phase II Project (NATP-2) is the second phase of an initially IDA-IFAD aided 15 yearlong 3-phased National Agricultural Technology Program (NATP) designed to support the GOB strategy on agriculture - to improve national agricultural productivity, market linkage and farm income, with a particular focus on small, marginal and female farmers.

NATP-2 was developed drawing learning from NATP-1; and it was designed aiming at increasing agricultural productivity of smallholder farms and improve smallholder farmers' access to markets in selected districts. It has been implementing in 270 upazillas of 57 districts. The NATP-2 Project is financed jointly by the World Bank (through IDA credit), the International Fund for Agricultural Development (IFAD), the United States Agency for International Development (USAID) and the Government of

Bangladesh (GoB).

The implementation of NATP-2 was planned during October 2015 to September 2021. However, the actual implementation of project activities delayed by more than one year and a half from the planned date due to the late release of funds and late appointment of the Project Director and experts in PMU.

NATP-2 started its activities in full sewing during the second half of FY2017-2018, gained vibrant momentum during the FY2018-2019, and continued to perform with the same momentum during the first half of 2019-2020. But due to COVID-19 pandemic implementation of some of the project activities were hampered. Particularly from March 2020 onward when physical mobility was restricted, keeping all project activities running was very difficult, specifically trainings and workshops. However, the project team regained its momentum during the FY2020-21 through digital and other available alternative approaches and techniques adopted by PMU and PIUs. In spite of COVID-19 pandemic situations, the project team achieved visible progress under all components. PIU-BARC has been implementing 51 PBRG sub-projects and 140 PhD study programs. PIU-BARC has successfully identified 11 technologies for scaling-up through Extension Departments (DAE, DoF & DLS). Besides, other institutional capacity building programs initiated by PIU-BARC (e.g. local trainings/ workshops, ICT & other facility development for NARS) have been under full swing implementation.

In spite of coronavirus pandemic, three extension PIUs also implemented appreciable volume of activities during the year 2019-20, particularly on CIG mobilization & management, technology demonstration, capacity development training, value chain & marketing, use of AIF-2 & AIF-3, fish fry production, application of ICT, social- environmental & gender issues, etc. With the restriction of physical mobility, communication using ICT facilities was boost up. During coronavirus pandemic project activities were facilitated, monitored and supervised through frequent virtual meeting/conferencing/mobile phone talk among the components, between the PIU & upazilas, field officers/staff & farmers/input dealers/traders, etc. Farm machineries especially reaper, combined harvester and power tiller procured under AIF-2 and AIF-3 were mobilized for boro harvesting and for timely tillage operation for T. aus rice during Covid-19 lockdown situation.

CIG farmers training events were organized at their door-steps in suitable venues, even in open space under trees, maintaining distances and health safety measures. PIU-DoF developed on-line fish marketing website (www.pofishmarket.com) with mobile apps version and introduced mobile van for selling fish during COVID-19. PIU-DLS arranged mobile milk sale in the locality/community. Hortex Foundation organized mobile and on-line marketing of vegetables and fruits (www.hortexbazarbd.com). There have been many localized such marketing-cum-service providing arrangements.

PMU played overall management & coordination role and extended all necessary supports for smooth



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and successful implementation of the project. PMU provided need-based capacity enhancing training on “financial and procurement management”; strategic road map and implementation guidelines; monitoring & evaluation assistance; and management & logistic supports. PMU also organized workshops on regional progress review, strengthening research-extension linkage, and other related support that provided forum for the project personnel to sit together to discuss issues and get solution/take decision.

The key project accounting responsibilities/functions lie with PMU and it receives Statement of Expenditure (SOE) from PIUs/PMU and claims reimbursement to IDA through withdrawal application and disburses the received fund to PIUs/PMU. PMU conducted procurement and procurement related activities of PMU and pooled procurement of goods and services of PMU and PIUs.

NATP is a multifaceted program in Bangladesh agriculture that attempts to transform a low-tech & low-yielding agriculture to a high input, high-tech and high-yielding commercial agriculture. The program/project uses holistic approach for the development of crops, fisheries and livestock sub-sectors which is fulfilling improved agricultural need of the farmers. NATP-2 has strong emphasis for creating market access network through value and supply chain activities for the smallholder farmers’ community and also provides assistance through AIF-2 & AIF-3 grant facilities.

NATP-2 Project strongly supports and encourages the use of ICT in agriculture. As a result, all components started using ICT in all possible areas of the project. Particularly, COVID-19 pandemic situation accelerated the use of ICT as the major tool of communication - organizing meeting, workshop, training, monitoring, e-commerce, etc. PMU designed online forms in Kobo Toolbox for a) CIG Performance Evaluation using Balance Score Card (BSC), b) Client Satisfaction Survey of NATP-2 to generate Client Satisfaction Survey Report, and c) Grievance Redress Information of NATP-2 to generate Grievance Redress Information Report through online reporting system. A modern online File Transfer Protocol (FTP) server has been setup at NATP-2 for storing and sharing field level data. The users of NATP-2 (PMU and PIUs) are storing and sharing the reports, documents, pictures, video clips etc. Reports are being sent and received without emailing with any boundary of big size file attaching. Use of digital technologies will improve project service delivery with unprecedented speed and scale.

NATP-2 project introduced some unique and innovative activities and ideas in agriculture like, CIG, FIAC, PO, CCMC/CP, etc. which help transform subsistence agriculture to commercial agriculture. It is fact that implementation of some of the project activities suffered due to the prevailing COVID-19 pandemic situation. In spite of that the overall progress that NATP-2 during the year 2019-20 was commendable. NATP-2 project activities and achievements are highly appreciated by the project development partner,, JPSC members, and all other concerned. This applauded performance will help to launch the third phase (NATP-3).

Finally, I compliment and thank all personnel involved in NATP-2 activities from the farming community, PIUs, PMU, ministries and donors for their committed and sincere efforts for successfully implementing the project activities, even during the COVID-19 period. I also sincerely endorse the valuable inputs from the PIUs in preparing this report. We would continue the momentum of our works to make NATP-2 a “Flagship Project” with great success and serve the nation better by offering a very productive and modern agriculture.



(Md. Motiur Rahman)
Project Director (Additional Secretary)
NATP-2 Project

Executive Summary

National Agricultural Technology Program- Phase II (NATP-2) Project is an umbrella project in Agriculture Sector that supports research, extension, supply chain and marketing activities of crops, livestock and fisheries. The Government of Bangladesh (GoB) has been implementing the NATP-2 Project with the joint financial support from the World Bank (through IDA credit), the International Fund for Agricultural Development (IFAD), the United States Agency for International Development (USAID) and the Government of Bangladesh (GoB). NATP-2 project is the second phase of a 3-phased 15 year long program designed to support the strategy of GoB - to improve national agricultural productivity, market linkage and farm income. The Project Development Objective (PDO) of NATP-2 is to increase agricultural productivity of smallholder farms and improve smallholder farmers' access to markets in selected districts.

NATP-2 comprised 5 inter-related components. Component-1 is the research component being implemented by PIU-BARC, Component II, III and IV are the crop, fisheries and livestock development components being implemented by PIU-DAE, PIU-DOF and PIU-DLS, respectively. The management component of the project (PMU), i.e., Component V is responsible for coordination and overall implementation of the project activities and supports the realization of the project's development objective. NATP-2 Project has a grants program (Agricultural Innovation Fund- AIF) with three windows (AIF-1, AIF-2, AIF-3), each addressing complementary strategic objectives pursued under NATP-2 with the implementation of a more holistic approach to agricultural technology.

This report presents summary results achieved during the FY2019-20 along with cumulative results and information since inception where necessary. Progress of the project activities is very briefly summarized below.

I. Research Component

The Project Implementation Unit of the Bangladesh Agricultural Research Council (PIU-BARC) has been implementing the Research Component (Component-I: Enhancing Agricultural Technology Generation) in association with the NARS institutes and non-NARS organizations. Specific objectives of this component are to: i) undertake at least 100 Competitive Research Grant (CRG) and 33 Program Based Research Grant (PBRG) research sub-projects; ii) implement 80 local and 60 foreign PhDs; iii) offer need-based short-term technical training for scientists of NARS institutes and officers of extension components; iv) improve the research and training facilities; and v. establish effective functional linkage among the NARIs.

CRG Sub-projects: The first window of NATP-2 research investment was Competitive Research Grant (CRG) program. PIU-BARC had implemented 190 CRG sub-projects. After evaluation of PCRs, 69 transferable technologies (51 in crop sub-sector, 8 in fisheries sub-sector and 10 in livestock sub-sector) were identified for dissemination. Of these 69 technologies, 11 technologies (Crops-6, Fisheries-2 and Livestock-3) have been selected by extension departments for validation/ demonstration in the farmers' fields of the project areas. PIU- BARC already handed over the factsheets of these 11 technologies to PIUs- DAE, DoF and DLS as part of technical support.

PBRG Sub-projects: The second window of NATP-2 research investment is Program Based Research Grant (PBRG) program. Executive Council (EC) of BARC initially approved 40 sub-projects which were awarded with BDT 103.54 crore. Later on, another 11 new PBRG sub-projects were awarded with the approval of EC, BARC with an amount of BDT 23.82 crore. In total PIU-BARC awarded 51





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PBRG sub-projects which are being implemented by 34 NARS Institutes, Public Universities and other organizations. Due to Covid-19 pandemic situation some PBRG sub-projects would need some extra time (about six months) to complete the activities.

PhD Program: PIU-BARC awarded 140 PhDs (60 foreign and 80 local) to the selected candidates. Distribution was scientists of NARS institutes -118, DAE -10, DLS - 05, DoF -05 and Ministry of Agriculture -02. Ten scholars are admitted in developed countries (USA, Germany, UK, Australia, and Japan) while 50 scholars are admitted in developing countries (Malaysia, Philippines, Thailand, China and India). Due to the long selection process and time adjustment of admission by semester, numbers of PhD scholars (both foreign and local) would need extension of their completion time of PhD program beyond the present project duration.

Strengthening NARS Institutional Capacity: During FY2019-20, 462 scientists received skill development training and 2,385 scientists and officials attended different national workshops/seminars arranged by PIU-BARC. The major courses of local training were: a) Research Methodology, b) Administrative and Financial Management, c) ICT in Agriculture, e) Monitoring, Evaluation and Impact Assessment, etc. The duration of local training programs ranged from 2-14 days. Two participants attended foreign training in two countries (one in USA and another in Japan) for advanced knowledge. As part of the program during 2019-20, the project funded 8 scientists to participate in workshops/seminars in the foreign countries (Europe, Asia and USA) on important scientific issues. Four events were funded where 15 senior officials participated in different countries. The duration of the programs ranged from 9 to 11 days.

II. Extension Components

Components II, III and IV are being implemented by PIU-DAE, PIU-DOF and PIU-DLS, respectively. During 2017-18, the three PIUs together completed formation of 40514 CIGs in 270 upazilas and had mobilized over one million smallholder farmers under these groups, of them around 35% are female farmers. By end June 2020 around 80% CIGs are registered from the Department of Cooperatives. During 2019-20 the CIGs had prepared their own demand-led CIG Micro Plans (CMPs) for 2019-20 extension activities. At union level, CMPs for Crop, Livestock and Fisheries were consolidated into Union Micro Plans (UMPs), then UMPs were consolidated into Upazila Extension Plan (UzEP) at upazila level.

Local Training: The three PIUs cumulatively imparted over 2.82 million client-days training till June 2020 and the trainings include CIG and non-CIG farmer training; and DAE, DoF and DLS officers and staff training. About 35% trainees were female.

Demonstration: Demonstration is one of the most effective extension tools for dissemination of improved/modern technology to the farmer. All the three extension components had extensive demo-programs and they successfully conducted them.

Demonstration under PIU-DAE: PIU-DAE so far conducted 1,25,572 demonstrations and thus completed 93% of its technology demonstration targets. During FY2019-20, 22,988 demonstrations were conducted and the major areas of technology demonstrations of PIU-DAE include yield gap minimization of rice, wheat, lentil, maize and mustard, climate smart and eco-friendly agricultural technologies of different crops, namely rice, wheat, summer tomato, spices, vegetables and fruits. Improving soil health through production and promotion of FYM & quick compost, vermi-compost and tricho-compost, community seed production and sex pheromone trap also got priorities in the technology demonstrations. A total of 270 exposure visits were also organized in related station,

Horticulture Centre and also showcasing AIF-2 equipment. The results of demonstrations exhibited that 0.33 t/ha yield gap was minimized for boro rice, 0.2 t/ha for wheat, 0.51 t/ha for lentil, and 0.51 t/ha for mustard. During the reporting year 3418 MT aus rice, 295 MT T. aman and 411 MT wheat seeds of modern varieties were distributed.

Demonstration under PIU-DOF: In FY2019-20, PIU-DoF had established 5,074 CIG farmers technology demonstrations on carp poly culture, mono sex Tilapia culture, pangas mono culture, carp galda mixed culture, carp nursery, pabda, gulsa and others. Management practices of respective demonstrations include species composition, stocking density, size of fingerlings and feeding technique. For the improvement of captured fisheries PIU-DOF had selected 23 (of the total targeted 40) beels of 20 upazilas of nine districts; identified the beneficiaries; had established their Community Based Fishery Management System; and had stocked 759 kg of Ruhu, Katla and Mrigal fingerlings in the 23 beel nurseries, habitat improvement work completed for 2 beels, completed establishment of sanctuaries for 14 beels. PIU-DOF with support from Bangladesh Fisheries Research Institute (BFRI) had developed pure line brood from germplasm of GIF Tilapia, Vietnamese Koi and Vietnamese Pangas which are now rearing in the four farms namely Raipur of Laxmipur, Nimgachi of Sirajganj, Shantinagar of Sunamganj and Kotiadi of Kishoreganj for brood development and seed multiplication. Out of 5,48,000 fingerlings produced during the year, 37% was sold, 62% was ready for sale and 1% was rearing for second generation brood production.

Demonstration under PIU-DLS: In total 29,203 demonstrations were conducted on cow, goat, sheep, poultry, duck, buffalo and pig rearing, beef fattening and fodder cultivation technologies and thus completed 72% of its total target. Of them 10,763 technology demonstrations were established in FY2019-20. The results showed that average milk production of demonstrations farmers was 8.25 liter per day per cow as against 5.40 liter per day per cow in non-demonstration farmer for improved breed. PIU-DLS put emphasis on livestock health management and had been arranging large number of vaccinations, deworming and infertility campaigns for both the CIG and non-CIG farmers. During FY2019-20, 16,164 vaccination campaigns were organized for cattle, goat, poultry bird and in total over 0.9 million animals/doses were vaccinated. Data on beef fattening demonstrations showed that recommended practices have the potentials to increase the meat production at 355 gm per day per cattle. As a result of slat system housing demonstration along with supplementary feeding, regular vaccination and deworming, average body weight increased to 51 gm per day per goat while 35 gm weight was increased for other than demonstrations. During the year 3,555 infertility campaigns were also organized.

Farmer's Information and Advice Center (FIAC): FIACs are one-stop extension service centers established and housed in two rooms (one room for crop and the other room for fisheries and livestock) in the 1,621 newly built two-storied Union Parishad (UP) office buildings. FIAC is displayed with different posters and extension messages. Insect-pest museum and seeds of different crop varieties, feed for livestock and fisheries are also displayed while FIAC to orient visiting farmers with more materials. FIACs remained open during the office hours, and SAAOs, CEALs & LEAFs provide services to all both CIG and non-CIG farmers following a systematic office routine/roaster. Farmers can also borrow equipment from the FIACs for their use. Number of visiting/contacting farmers at the FIACs varies season to season. Maximum farmers are found to visit/contact the FIAC (crop) during the intensive cropping season - November to March.

Strengthening Institutional Capacity of DAE, DOF and DLS: PIUs arrange local trainings on technologies, financial and procurement management, micro planning, use of ICT, etc. for their officers and project staff. During FY2018-19, the three PIUs had also arranged 4 batches of international training and 19 batches of study visits in Thailand, Indonesia and Malaysia. Total 46 participants



availed international training while 157 participated in the study visit.

Agricultural Innovation Fund (AIF-2): AIF-2 is the non-refundable matching grants targeted to the best performing CIGs, officially registered and maintaining bank accounts with a good amount of savings. It provides resources to the CIGs for innovative ventures to develop value added products with new business models and access to advanced markets. As of June 2020 the three components (DAE, DOF and DLS) together so far awarded 1,745 sub-projects under AIF-2, of which 1,143 were awarded in this financial year. The equipment procured by the crop CIGs are power tiller 1,592, reaper 163, power thresher 942, LLP 346, pick-up van 150, weighing machines, packaging machine, etc. With the AIF-2 fund the fisheries CIGs mostly procured auto feeder, feed pellet machine, irrigation pump, nursery equipment and other minor items. The livestock CIGs had used AIF-2 matching grants for purchasing chopper machine, feed mixing machine, pasteurization machine; cool van, incubator, freezer, etc.

AIF-2 matching grants helped to increase farm mechanization of the CIG and non-CIG farmers. As a result labor crisis and cost of production have been significantly reduced. Post-harvest losses of rice, wheat and maize are significantly minimized due to the increased facilities of threshing. Incomes from machineries are good sources of CIG savings. The water pump and aerator users covered an average area of 35.13 and 16.29 decimal land for fish culture.

III. Supply Chain and Marketing Development

The specific objectives of the project related to supply chain and market development are: i) establishing 30 CCMCs and 30 collection points (CPs) in 30 upazilas in clusters production areas for crops, 20 POs in 20 upazilas and 02 special POs in Mymensingh and Natore districts for fisheries, and establishing 120 POs in 60 upazilas for livestock; ii) selling of 21,400 metric tons (MT) of agricultural-commodities (15,000 MT for crops, 3,000 MT for fisheries, and 3,400 MT for livestock) by the end of the project through project arranged marketing facilities. All the producer organizations (172 POs) have been formed and mobilized. A total of 13,960 metric tons of agricultural commodities, 319 metric tons of fish, and 527 metric tons of livestock products were sold up to June 2020 through the mobilizations of the POs.

Agricultural Innovation Fund (AIF-3): NATP-2 project has a total of 500 sub-projects funding provisions under AIF-3 of which 240 for crops, 133 for fisheries and 127 for livestock components. Equipment and machineries procured with AIF-3 fund are: i) DAE- vermin-compost and tricho-compost preparation facilities and equipment, drying, grading table, packaging machine, pick-up van, mini-cold storage, etc.; ii) DOF- aerator, auto-feeder, pellet machine, floating feed making machine, irrigation pump, ice plant etc.; and iii) DLS- incubator, generator, pick-up, chopper machine, packing machine, feed mixing machine, cool van, etc.

Vermi-compost and tricho-compost commercial facilities helped in increased production, availability, sales and uses of the composts contributing to increased soil fertility and improve productivity and reducing degradation of soil, post-harvest losses and minimized due to use of plastic within 6 months operating time the first pellet feed making machine owners generated net income of taka 89,500 within 6 months operating time. Chopping machine helped to cut grasses that saved time.

IV. Gender and Environmental & Social Safeguard

Gender: Women have active participation in research, extension, technology adoption market access and value chain development activities in the project.. They are also playing leadership role in operation of project activities. The active participation and leadership role of women across the

project contributed to gender equality and women's empowerment in the NATP-2 project.

Environmental and Social Safeguard: The activities of NATP-2 are being implemented in compliance with the environmental and social perspective of the project. The program and activities of the project exhibited positive change in use of chemical fertilizer and pesticides; utilization of household and farm wastage; protection of soil, air and water pollution having significant impact on biodiversity, ecosystems, management and practices of agricultural and agro-forestry system; and climate co-benefit. Project activities have been facilitated to generation and dissemination of improved environment and farmer-friendly agricultural technologies that contributed to increase production of safe and quality products, and household income which ultimately led to improved livelihood and nutritional status.

V. Research-Extension Linkage

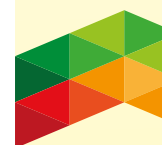
NATP-2 strongly supports the strengthening of Research-Extension Linkage considering it as a prerequisite for the generation of need-based technologies and their successful dissemination to the end users. The activities of research and extension are complimentary. Strengthening of Research-Extension Linkage is done through: i. Regional Research-Extension Linkage Workshops organized by PMU for close interactions among the researchers and field level extension officials to identify the regional scalable technologies and their dissemination. During FY2019-20 PMU had organized three regional Research-Extension Linkage Workshops covering five regions (Sylhet, Rajshahi, Bogura, Jashore & Khulna regions) and had published a booklet with the list of scalable technologies selected from the workshops. ii. NECC, DECC and UECC meetings that facilitate Research-Extension Linkage. From inception to end June 2020, three NECC meetings, 1,026 DECC meetings and 4,860 UECC meetings were held bringing researchers, extension officials and others on one table for interactions. iii. Validation trials of new varieties where both extension and research personnel work together. iv. Extension-organized training programs where researchers also participate as resource person. v. Exposure visits to research institutes organized by extension; etc.

VI. The Project Management Unit (PMU)

Coordination: PMU of NATP-2, established under the Ministry of Agriculture and headed by an Additional Secretary of the Government of Bangladesh as the Project Director, facilitates project implementation being carried out by the four PIUs, consolidates annual budget and work plans of the components for approval by the Joint Project Steering Committee (JPSC), and also coordinates with the development partners to secure technical backstopping and smooth fund flow.

Meetings, Training & Workshop: In FY2019-20, PMU had arranged 1 JPSC, 2 Project Implementation Committee, 11 Monthly Coordination meetings with the PIUs and also 11 PMU internal coordination meetings; trained 180 persons from DAE, DOF, BARC, PMU and NARS Institutes on "Financial and Procurement Management"; held 3 regional progress review and 4 Regional Research-Extension Linkage workshops and two workshops on gender & social inclusion and value chain & marketing. PMU had also produced and published the "NATP-2 Annual Progress Report for FY2018-19.

Monitoring and Evaluation: M & E are integral parts of project management. As per DPP, PMU is overall responsible for project's results monitoring, while the day-to-day implementation monitoring and evaluation of CIG performances have been integrated within the decentralized project management arrangements. The PIUs have their own M&E Cells to make regular field visits to observe the implementation progress at the field levels, to review and analyse the available information for producing various progress reports. During COVID-19 lockdown, PMU and PIUs





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convened frequent virtual meetings initially through Skype, and then using Zoom Apps to be on track, and had extensively utilized the e-nothi system to secure approval of the Project Director.

During the last three consecutive years the PIU local offices conducted performance assessments of all of their CIGs by using a 16-indicator based tool named “Balance Score Card”. Results of the assessment reveal that by end June 2020, 76% of the CIGs have graduated to category A and B. To monitor the overall implementation progress, PMU had conducted three (3) regional progress review workshops in this financial year. The World Bank and IFAD conducted two technical Missions from 14 to 18 July 2019 and from 3 to 13 February 2020 and the third Implementation Support Mission from 24 November to 1 December 2019. The 3rd Implementation Support Mission report noted that the project’s productivity targets appear on track to be achieved by project-end. As of June 2020 the project promoted scalable technologies adopted by a total of 592,705 CIG and non-CIG farmers (crop- 409,072, fisheries- 54,520 and livestock- 129,113) and thus achieved 93% of its total target. As a result farm productivity gains for 12 different crops have reached 60% to 70% of their project end targets. The livestock sector also has achieved over 69% of its growth targets for dairy and 65% for beef fattening. DoF overachieved the target for culture fish and remains on track with the targets of captured fish in beels.

ICT Use during Covid-19: NATP-2 Project strongly supports and encourages the use of ICT in agriculture. As a result, all components started using ICT in all possible areas of the project. Particularly, COVID-19 pandemic situation accelerated the use of ICT as the major tool of communication - organizing meetings, workshops, trainings, monitoring, e-commerce, etc. PMU designed online forms in Kobo Toolbox for a) CIG Performance Evaluation using Balance Score Card (BSC), b) Client Satisfaction Survey of NATP-2 to generate Client Satisfaction Survey Report, and c) Grievance Redress Information of NATP-2 to generate Grievance Redress Information Report through online reporting system. A modern online File Transfer Protocol (FTP) server has been set up at NATP-2 for storing and sharing field level data. The users of NATP-2 (PMU and PIUs) are storing and sharing the reports, documents, pictures, video clips, etc. Reports are being sent and received without emailing with any boundary of big size file attaching. Use of digital technologies is improving project service delivery with unprecedented speed and scale.

VII. Procurements, Financial Management and Audit

Procurements: In total NATP-2 had 82 packages during FY2019-2020, out of which 62 packages were completed. The remaining packages, specially the service packages (pooled and non-pooled of PMU) could not be completed due to COVID-19. Further, considering COVID-19, the World Bank suggested PIU-BARC to drop 10 packages - 3 packages of goods, 5 packages of works, and 2 packages of services.

Financial Management and Audit: During the FY2019-20, NATP-2 claimed reimbursement against IDA fund amounting to BDT 2328.31 Million through 4 (four) Withdrawal Applications (WA-16 to 19) to the World Bank and BDT 398.24 Million through 3 Withdrawal Applications to IFAD. During FY2019-20, NATP-2 project incurred expenditure BDT 26,113.64 Lakh and from inception to 30 June 2020 expenditure incurred BDT 101,889.78 Lakh. Four IUFRs are submitted in the financial year 2019-20.

From August to November 2019, representatives of C&AG (FAPAD) conducted the project audit for FY2018-19. PMU also appointed an internal audit firm who conducted their audit for the FY2018-19 and had submitted the audit report to the project authority.

Abbreviations and Acronyms

ADP	Annual Development Program
AFO	Assistant Fisheries Officer
AIC	Agricultural Information Center
AIF	Agricultural Innovation Fund
AO	Appellate Officer
AWD	Alternate Wetting and Drying
AWP	Annual Work Plan
BARC	Bangladesh Agricultural Research Council
BARD	Bangladesh Academy for Rural Development
BARI	Bangladesh Agricultural Research Institute
BAU	Bangladesh Agricultural University
BB	Bacterial Blight
BCR	Benefit Cost Ratio
BCRDV	Baby Chicks Ranikhet Disease Vaccine
BDT	Bangladesh Taka
BFRI	Bangladesh Fisheries Research Institute
BIM	Bangladesh Institute of Management
BINA	Bangladesh Institute of Nuclear Agriculture
BJRI	Bangladesh Jute Research Institute
BLB	Bacterial Leaf Blight
BLRI	Bangladesh Livestock Research Institute
BRRRI	Bangladesh Rice Research Institute
BSC	Balance Score Card
BSRI	Bangladesh Sugarcrop Research Institute
BSRTI	Bangladesh Sericulture Research & Training Institute
BTRI	Bangladesh Tea Research Institute
C&AG	Comptroller and Auditor General
CCMC	Commodity Collection and Marketing Center
CDB	Cotton Development Board
CEAL	Community Extension Agent for Livestock
CG	Carp Galda
CHT	Chattogram Hill Tract
CIG	Common Interest Group
CN	Carp Nursery
CONTASA	Convertible Taka Special Account
CP	Collection Point
CPC	Carp Poly Culture
CRG	Competitive Research Grants



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DAE	Department of Agricultural Extension
DAO	District Agriculture Officer
DD	Deputy Director
DECC	District Extension Coordination Committee
DFO	District Fisheries Officer
DLO	District Livestock Officer
DLS	Department of Livestock Services
DOF/DoF	Department of Fisheries
DOSA	Dollar Special Account
DPD	Deputy Project Director
DPP	Development Project Proposal
ECNEC	Executive Committee of the National Economic Council
e-GP	e-Government Procurement
EMF	Environmental Management Framework
EMP	Extension Micro Plan
EO	Extension Officer
EOI	Expression of Interest
ERD	Economic Relations Division
FA	Field Assistant
FAPAD	Foreign Aided Projects Audit Directorate
FCR	Feed Conversion Ratio
FD	Field Day
FGD	Focus Group Discussion
FIAC	Farmer's Information and Advice Center
FMD	Foot and Mouth Disease
FY	Fiscal Year
FYM	Farm Yard Manure
GAP	Good Agricultural Practices
GAAP	Governance and Accountability Action Plan
GLEAM	Global Livestock Environmental Assessment Model
GOB/GoB	Government of Bangladesh
GRC	Grievance Redress Cell
GRM	Grievance Redress Mechanism
GRO	Grievance Redress Officer
GTI	Graduate Training Institute
HRD	Human Resource Development
HS & BQ	Haemorrhagic Septocaemia and Black Quarter
HYV	High Yielding Variety
ICT	Information and Communication Technology
IDA	International Development Association
IEC	Information Education and Communication

IFAD	International Fund for Agricultural Development
IGA	Income Generating Activities
IMED	Implementation Monitoring and Evaluation Division
IP	Indigenous People
IPM	Integrated Pest Management
IRC	International Rice Congress
ISM	Implementation Support Mission
IUFR	Interim Un-audited Financial Report
JPSC	Joint Project Steering Committee
LBF	Local Business Facilitator
LEA	Limited Environmental Assessment
LEAF	Local Extension Agent for Fisheries
LOA	Letter of Agreement
M&E	Monitoring and Evaluation
M&IE	Monitoring and Impact Evaluation
MIS	Management Information System
MLGD&C	Ministry of Local Government Development and Cooperatives
MMC	Market Management Committee
MOA	Ministry of Agriculture
MOFL	Ministry of Fisheries and Livestock
MST	Mono Sex Tilapia
MT	Metric Ton
MTR	Mid Term Review
NARI	National Agricultural Research Institute
NARS	National Agricultural Research System
NATA	National Agriculture Training Academy
NATP	National Agricultural Technology Program
NCB	National Competitive Bidding
NECC	National Extension Coordination Committee
OTI	Officers Training Institute
PAD	Project Appraisal Document
PBRG	Program Based Research Grants
PC	Planning Commission
PCR	Project Completion Report
PD	Project Director
PDO	Project Development Objective
PhD	Doctor of Philosophy
PHI	Pre-Harvest Interval /Post-Harvest Interval
PHM	Post-Harvest Management
PHSCs	Post-Harvest Service Centers
PI	Principal Investigator





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PIC	Project Implementation Committee
PIU	Project Implementing Unit
PMC	Pangus Mono Culture
PMIS	Project Management Information System
PMP	Pest Management Plan
PMU	Project Management Unit
PO	Producer Organization
PPA	Public Procurement Act
PPR	Public Procurement Rules
PRA	Participatory Rural Appraisal
RARS	Regional Agricultural Research Station
RDV	Ranikhet Disease Vaccine
RFQ	Request for Quotation
RPA	Reimbursable Project Aid
SAAO	Sub-Assistant Agriculture Officer
SAFE	Special Account for Foreign Exchange
SAU	Sylhet Agricultural University
SCA	Seed Certification Agency
SDGs	Sustainable Development Goals
SDMIS	Service Delivery Management Information System
SME	Small and Medium Enterprises
SOE	Statement of Expenditure
SRDI	Soil Resource Development Institute
SUFO	Senior Upazila Fisheries Officer
TF	Trust Fund
TOR	Terms of References
TOT	Training of Trainer
TTMU	Technology Transfer and Monitoring Unit
TVC	Television Commercial
UAO	Upazila Agricultural Officer
UECC	Upazila Extension Coordination Committee
UEFT	Union Extension Facilitation Team
UEMP	Union Extension Micro Plan
UFO	Upazila Fisheries Officer
ULO	Upazila Livestock Officer
UMS	Urea Molasses Straw
UP	Union Parishad
USAID	United States Agency for International Development
VTI	Veterinary Training Institute
WB	The World Bank

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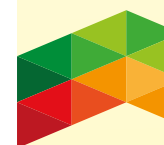


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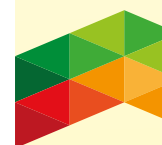
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SECTION 1: INTRODUCTION

1.1 Project Background

The Government of Bangladesh (GoB) has been implementing the **National Agricultural Technology Program- Phase II (NATP-2) Project** with the joint financial support from the World Bank (through IDA credit), the International Fund for Agricultural Development (IFAD), the United States Agency for International Development (USAID) and the Government of Bangladesh (GOB) itself. NATP-2 project is the second phase of a 3-phased 15-year long program designed to support the strategy of GOB - to improve national agricultural productivity, market linkage and farm income. NATP-2 is an umbrella project in Agriculture Sector that supports research, extension, supply chain and marketing activities of crops, livestock and fisheries.

1.1.1 NATP-2 Project Development Objective

The Project Development Objective (PDO) of NATP-2 is to increase agricultural productivity of smallholder farms and improve smallholder farmers' access to markets in selected districts.

1.1.2 NATP-2 Project Supports

The NATP-2 Project broadly supports the following activities/themes:

- Agricultural research that will produce demand-led highly productive climate smart technology;
- Decentralized and knowledge-based agricultural extension with farmers' capacity building;
- Crop diversification to meet the human nutritional requirements and maintain soil health;
- Mechanization for timely operation, increasing productivity and cropping intensity, and reducing production cost and product losses;
- Improved post-harvest management, improved supply chain & value addition and better farmer-market linkages;
- Use of ICT for effective and speedy communication/information flow and farmer's training;
- Promote public-private partnership in research, extension and supply chain development;
- Human resource and institutional development through higher study, training, study/exposure visit, improvement of physical facilities, etc.

Besides, NATP-2 has an inbuilt comprehensive grants program, i.e., the **Agricultural Innovation Fund (AIF) having three windows (AIF-1, AIF-2 and AIF-3)**, each addressing complementary strategic objectives pursued under NATP-2 and implementing in a more holistic approach to agricultural technology introduction/adoption.

1.2 Basic Information of NATP-2 Project

The project related basic information is briefly furnished below.



1.2.1 Project Sponsoring Ministry/Division

- i) Ministry of Agriculture (MOA), Lead Ministry
- ii) Ministry of Fisheries and Livestock (MOFL)

1.2.2 Geographical Coverage of the Project

The extension activities of the project have been implemented in 270 upazilas of 57 districts (Fig. 1.1). NATP-2 drew learning from NATP-1¹ (implemented in 120 upazilas during 2007 -2014) and other projects and aims at deepening its interventions in NATP-1 areas (107 old upazilas) and also expanding its scope to the new districts and upazilas (163 new upazilas) selected under NATP-2.

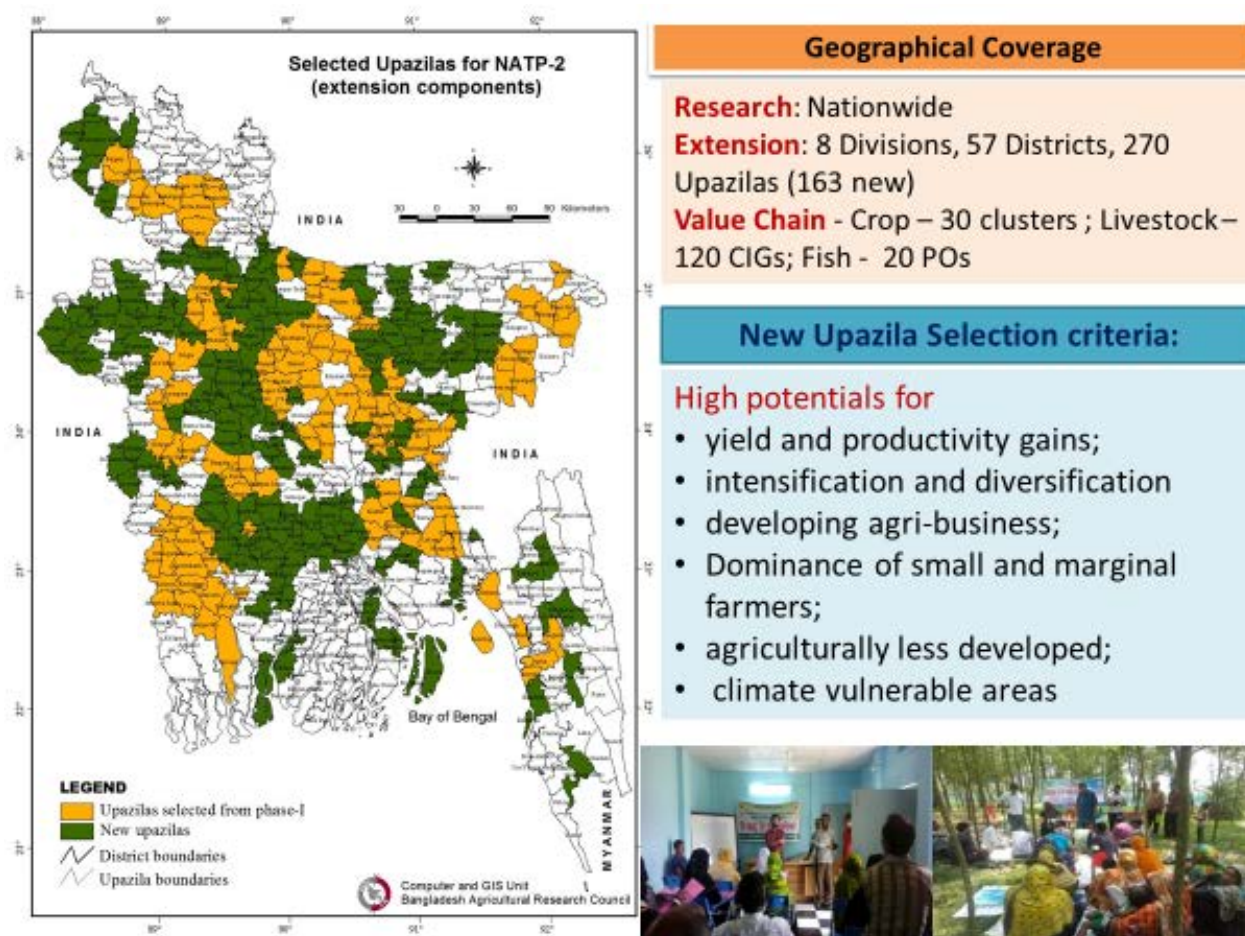


Fig. 1.1: NATP-2 Geographical coverage and upazila selection criteria

1.2.3 Project Implementation Period

As per the first DPP, the project implementation period is from 01 October 2015 to 30 September 2021.

¹NATP-1 was designed “to revitalize the national agricultural technology system, and carry out policy and institutional reforms and carry out institutional development and investments”. NATP-1 was co-financed by the World Bank, IFAD and Government of Bangladesh and implemented in 120 upazilas of 25 districts during 2007-2014.

1.2.4 Components and Executing Units/Agencies of NATP-2 Project

NATP-2 comprised 5 inter-related components. Component-I is the research component and Component- II, III and IV are the extension components. Component-V is the Project Management Component (PMU), which is responsible for overall implementation & management of the project activities and supporting the realization of the project development objective (PDO). The five components of NATP-2 project are:

- i. **Component-1: Enhancing Agricultural Technology Generation-** being implemented by the Project Implementing Unit of Bangladesh Agricultural Research Council (PIU-BARC), MOA (Popularly known as BARC Component or Research Component);
- ii. **Component-2: Supporting Crop Development-** being implemented by the Project Implementing Unit of Department of Agricultural Extension (PIU-DAE), MOA (Popularly known as DAE Component or Crops Extension Component);
- iii. **Component-3: Supporting Fisheries Development-** being implemented by the Project Implementing Unit of Department of Fisheries (PIU-DOF), MOFL (Popularly known as DOF Component or Fisheries Extension Component);
- iii. **Component-4: Supporting Livestock Development-** being implemented by the Project Implementing Unit of Department of Livestock Services (PIU-DLS), MOFL (Popularly known as DLS Component or Livestock Extension Component);
- v. **Component-5: Project Management-** being implemented by the Project Management Unit (PMU), MOA (Popularly known as PMU Component)

1.2.5 Component- wise Break-up of Estimated Cost (In Lakh Taka)

Name of Component	GOB	RPA	Total
PIU-BARC	1245	39028	40273
PIU-DAE	3085	49570	52655
PIU-DOF	11037	27791	38828
PIU-DLS	10766	35292	46058
PMU	971	9015	9986
Total NATP-2	27104	160696	187800

1.3 Approval and Launching of NATP-2 Project

NATP-2 was approved by the Executive Committee of the National Economic Council (ECNEC) on 12 April 2016 and the administrative order was issued by the Ministry of Agriculture (MOA) on 02 August 2016. The Financial Agreement between GOB and World Bank was signed on 24 May 2016 and with IFAD on 06 August 2016. The World Bank declared 05 September 2016 as the loan effectiveness date of the project. So the actual launching of project activity was delayed by more than 1.5 years and has practically started with the date of joining of its first full time Project Director on 15 January 2017. However, from April 2016 to January 2017, the implementing departments had established the PIUs and placed all the deputed officers including PIU-Directors. The Project Implementing Units (PIUs) then recruited their contractual core staff, selected consultants, prepared their annual work and procurement plans and formed different management committees.



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The initial advance was received from IDA in March 2017, from USAID in May 2017 and from IFAD in October 2017. Also, the first disbursement of fund from PMU to PIUs took time as it required authorization from the Ministry of Finance and the Bangladesh Bank. All these caused delayed starting of the project activities. However, partial implementation of project activities started in May 2017 with the receipt of first IDA initial advance by PIUs.

1.4 Structure of the “NATP-2 Project Annual Progress Report 2019-2020”

“NATP-2 Project Annual Progress Report” presents compiled summary outputs of the project activities of the components of a year. This present report covers the progress of implementation of the project activities for the FY2019-2020. The activity-wise progress and output are described in nine sections, each containing several sub-sections on different issues.

Section 1 briefly describes the key information and contexts of the project, its PDO, geographical coverage, implementation mechanism, approval & launching, etc. to enable the readers to understand the nature, objectives and activities of the project. **Section 2** contains the report on the activities and progresses of Research Component (Component-I). This component is being implemented by PIU-BARC. Status of research sub-projects awarded under CRG and PBRG and updates of the HRD (PhD & trainings) and institutional development programs of NARIs are presented in this section. Project activities of three extension components (PIU-DAE/DoF/DLS) and their progress with implementation related issues are discussed in **Section 3**.

Sections 4–9 provide the activities and progress of the cross-cutting issues of the project. **Section 4** is on market access and supply & value chain development related activities and progress for crops, fisheries and livestock. **Section 5** gives updates on gender, environmental and social safeguard, and grievance redress mechanism (GRM). **Section 6** is on the project activities on research-extension linkage building. **Section 7** provides the activities and achievements of the Project Management Unit (PMU), which is overall responsible for NATP-2 implementation, coordination and management. Updates on two major support services –procurement and financial management & audit are given in **Section 8**. Major challenges faced and the lessons learned are documented in **Section 9**; while the composition of Joint Project Steering Committee (JPSC) & Project Implementation Committee (PIC), Project Management Team (PD, DPD & PIU-Directors) and the list of contributors to this annual report are attached at the end of the report (**Annex-4**).

SECTION 2: PROGRESS OF RESEARCH COMPONENT (COMPONENT- I)

The Research Component (Component-I: Enhancing Agricultural Technology Generation) is being Implemented by the Project Implementation Unit of the Bangladesh Agricultural Research Council (PIU-BARC) in association with the NARS institutes and non-NARS organizations. The major objectives of this component are: i) generation of agricultural technologies/new information on crops, fisheries and livestock; and ii) enhancing the efficiency of NARS through human resource development (higher studies & capacity building training) and improvement of research & training facilities of National Agricultural Research Institutes (NARIs).

Specific objectives of this component are to: i) undertake at least 100 Competitive Research Grant (CRG) and 33 Program Based Research Grant (PBRG) research sub-projects; ii) implement 80 local and 60 foreign PhDs; iii) offer need-based short-term technical training for scientists of NARS institutes and officers of extension components; iv) improve the research and training facilities; and v. establish effective functional linkage among the NARIs.

2.1 The Competitive Research Grant (CRG) Sub-projects

The first window of NATP-2 research investment was Competitive Research Grant (CRG) program. PIU-BARC had awarded 190 CRG sub-projects. The implementation of 190 CRG sub-projects had been completed and 190 Project Completion Reports (PCRs) were received from the Principal Investigators (PIs). The PCRs were reviewed by the independent reviewers and accordingly were corrected by the Consultants of PIU-BARC. After evaluation of PCRs, 69 transferable technologies (51 in crop sub-sector, 8 in fisheries sub-sector and 10 in livestock sub-sector) were identified for dissemination to the farmers through extension departments (DAE, DOF and DLS) of which 11 technologies (Crops-6, Fisheries-2 and Livestock-3) have been selected by extension departments for validation/demonstration in the farmers' fields of the project areas (Annex-2.I). PIU- BARC already handed over the factsheets of these 11 technologies to PIUs- DAE, DOF and DLS as part of technical support. Factsheets of 69 technologies from CRG sub-projects are available in the website of PIU-BARC, NATP-2 (www.natpbarc.gov.bd).

2.2 The Program Based Research Grant (PBRG) Sub-projects

The second window of NATP-2 research investment is Program Based Research Grant (PBRG) programs. PBRGs are the coordinated programs involving at least two research providers: coordination is either inter-institutional or it is interdisciplinary within the institute. After rigorous review, Executive Council (EC) of BARC initially approved 42 sub-projects of which 40 sub-projects were awarded with BDT 103.54 crore. Later on, another 11 new PBRG sub-projects were awarded with the approval of EC, BARC with an amount of BDT 23.82 crore. In total PIU-BARC awarded 51 PBRG sub-projects which are being implemented by 34 NARS Institutes, Public Universities and other organizations.

2.2.1 Distribution of PBRG Sub-projects

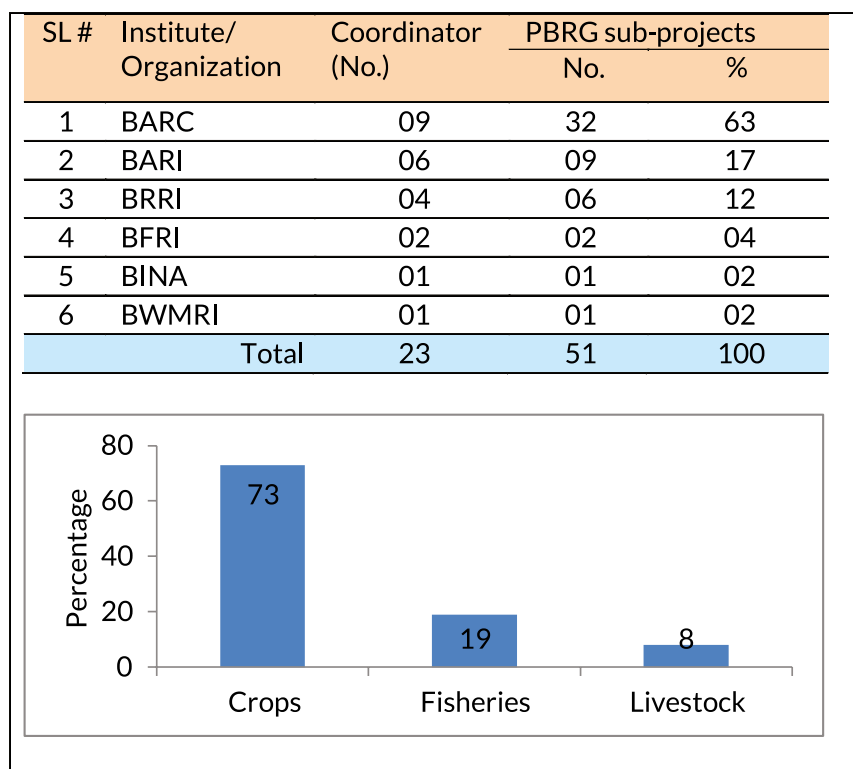
Fifty-one coordinated PBRG sub-projects with 190 components are being implemented by different



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NARS and non-NARS institutes. The Coordinators are mostly from different technical divisions of BARC. BARC together with BARI and BIRRI have been coordinating 92% of the total 51 sub-projects (Box. 2.1)

The PBRG sub-projects are being executed under different technical divisions/units of BARC: Crops Division -31%, Fisheries Division - 19%, Livestock Division - 08%, Planning & Evaluation Division - 08%, Forest - 08%, Nutrition - 08%, AERS -06%, Soil (06%) and Agricultural Engineering (06%). The numbers of PBRG sub-projects are being executed under crops sub-sector (73%) followed by fisheries (19%) and livestock (08%) sub-sectors (Box 2.1).



Box 2.1: Distribution of PBRG sub-projects

2.2.2 Updated Progress of PBRG Sub-projects

PIU-BARC started releasing fund for the PBRG sub-projects from February 2018. By June 2020, all Coordinators and Principal Investigators of the first call 40 PBRG sub-projects submitted their half-yearly and annual reports as due. Coordinators and Principal Investigators of 11 new PBRG sub-projects (second call) which are being implemented since October 2019 have already submitted the inception reports and some of them have submitted the 1st half yearly reports. Implementation progress of the PBRG sub-projects is being monitored by the field monitoring teams formed by the PIU-BARC. However, on-line survey report as well as virtual meeting with the Coordinators and Principal Investigators indicated that COVID-19 pandemic situation affected the field activities of the PBRG sub-projects to some extent. Although most of the PBRG sub-projects (1st call) completed more than two years, none of the sub-projects has reached at a stage of technology generation completely, some more time would be needed to draw any conclusion. Majority sub-projects have been able to make noticeable progress in the field and/or in the laboratory activities. The updated

progress and results achieved in some PBRG sub-projects are given below as samples:

Title of PBRG Sub-project: DNA Marker-assisted Breeding for Producing Highly Stress Tolerant Elite Rice Varieties for Coastal Bangladesh by Introgression of Multiple Salt Tolerance Loci (QTLs) into Commercial Cultivars (ID # 010)

Progress with major findings

Recombinant Inbred Lines (RILs) were developed with salt tolerance QTLs for root length, potassium and filled grained number with spikelet fertility. Another established QTL 'Saltol' is also available in the RILs. Hybridization between salt tolerant donor RILs, I-14 and I-71 and recipient high yielding cultivars was done. F1s were derived from crosses among donor and recipient parents. Using three recurrent parents, 38 double crossed F1 plants were selected against seven foreground (QTL specific) markers. The selected 38 double crossed F1s were backcrossed with recipient parents BRRi dhan63, BRRi dhan67 and BRRi dhan74. Nine hundred six, 505 and 363 BC1F1 seeds were produced using recurrent parents BRRi dhan63, BRRi dhan67 and BRRi dhan74, respectively. The selected BC1F1 plants had 13.7 to 31.7% of background recovery over 48 background markers. From these selected plants, total 2341, 1648 and 528 BC2F1 seeds were produced using recurrent parents BRRi dhan63, BRRi dhan67 and BRRi dhan74, respectively.



Photo: Hybridized plants of back crossing during Boro 2019-20

Title of PBRG Sub-project: Integration of Postharvest Technologies and Best Practices in the Value Chains of Fruits and Vegetables (ID # 016)

Progress with major findings

Washed carrot showed more brightness and more yellow packed in CFB (Corrugated Fibre Board) carton and plastic crate with polyethylene sheet having 0.05 mm thickness compared to unwashed packed in jute sack. CCA (sanitizer) mixing water-washed carrots showed better performance in respect of colour and microbial load than NaOCl (sanitizer) mixing water-washed carrots. The best package was observed in NaOCl washed carrot packed in plastic crate but NaOCl is Cl rich component that is harmful to human health. So, CCA washed carrot packed in plastic crate



Photo: Washing carrot by BARI root crop washing machine in March 2020



or CFB carton is suitable for markets (local, super and export). The treatment combinations (water temperature 50, 55 and 57 °C and exposure time 3, 5, 7 and 9 minutes) increased the shelf-life of BARI Aam-3 by 33% compared to untreated fruits. Disease severity of treated mango was reduced by 79% over untreated fruits.

Temperature at 55°C for 5 minutes is the best treatment combination of BARI Aam-3 to increase shelf-life. Temperature inside the crate and bunches of bananas increased with the traveling period whereas relative humidity decreased. Speed of ripening process of banana was accelerated due to increasing temperature during the traveling period.

Title of PBRG Sub-project: Development of Integrated Crop Management Technologies for Higher Production of Coconut in Bangladesh (ID # 026)

Progress with major findings

The management package for higher production of coconut comprising of Sanitation + four sprays of miticide Chlorphenapyr 10SC (Intrepid) @ 1.0 ml/liter of water showed the highest reduction (86.66%) of mite infestation over control which was followed by Sanitation + four sprays of Abamectin 1.8 EC (Vertimec) at 1.2 ml/liter of water. The highest nut infestation (77.87%) was recorded in control trees.



Photo: On-going field experiment at BARI, Gazipur on management package of coconut eriophyid mite

Rugose spiraling whitefly infestation was effectively reduced by Tundra 50 SP (73.79%) followed by Admire 200 SL (69.85%) and Bio-clean (60.00%). Fungicides (Autostin and Secure) treated plants had the severity of leaf spot and bud rot disease of coconut only 0.44% compared to no treatment (farmers practice) 4.44% indicating that chemical fungicides are effective for the leaf spot and bud rot disease control of coconut.

Title of PBRG Sub-project: Investigation and Characterization of Viral and Bacterial Diseases in Highly Consumed Fin Fishes and Shrimp in Bangladesh and Development of their Vaccines and Validation (ID # 030)

Progress with major findings

Five high valued species of fin fishes, namely Koi (*Anabas testudineus*), Tilapia (*Oreochromis niloticus*), Shing (*Heteropneustes fossilis*), Gulsha (*Mystus vittatus*) and Pangas (*Pangasius hypophthalmus*) were affected by deadly bacterial and viral agents, causing high rate of their morbidity and mortality. A new disease of Vietnamese (V) Koi and Tilapia known as popped eye disease (caused by *Streptococcus agalactiae*) outbreak had been reported from cultured ponds of four different districts, namely Mymensingh, Gazipur, Netrokona and Kishoreganj. A total of 330 diseased fishes of which V. Koi (n=150) and Tilapia (n=180) were collected from four infected fish farms at Trishal and Bhaluka

upazillas under Mymensingh and Kaliakair upazilla under Gazipur districts.

An inactivated whole cell bacterial vaccine was developed experimentally and the healthy adult V. Koi fish was vaccinated through I/M route of inoculation with different doses (0.2, 0.3, 0.4 and 0.5 ml/ fish) of the newly developed Koi fish vaccine in the aquarium at BFRI. The immunized V. Koi fishes were challenged (rate



Photo: Popped eye disease of tilapia

of protection) after two weeks of booster vaccination with the virulent *Streptococcus agalactiae* isolate from the laboratory repository at a dose rate of 10³ cfu (colony forming unit) /fish. Result of the challenge experiment in V. Koi fish indicated that the minimum dose (0.2 ml/fish) of the newly developed vaccine was able to protect (100%) fish mortality from virulent challenge until 15 days of observation.

The bacteria *Aeromonass* spp. had been isolated and characterized successfully from the dead shing fishes having ulcer on their body from different upazilas, such as Tarakanda, Muktagacha and Gouripur under the district of Mymensingh.

Title of PBRG Sub-project: Validation of Crop Intensification Technologies for Improving System Productivity, Soil Health and Farm Income in South Central Coastal Region (ID # 051)

Progress with major findings

Research was conducted on validation of three major cropping patterns of which two cropping patterns were executed in Gopalganj (Gopalganj Sadar & Kasheani upazila), Madaripur (Madaripur Sadar & Kalkini upazila), Pirojpur (Pirojpur Sadar & Vandaria upazila), and another one pattern was executed in Barishal (Babugonj & Gouronodi upazila), Bagerhat (Bagerhat Sadar & Mollarhat upazila) and Jhalakati (Jhalakati Sadar & Rajapur upazila) aiming to improve system productivity, soil health and farm income. Three



Photo: Mungbean in Gopalganj Sadar in Mustard-Mungbean-T.aman cropping pattern

crop based cropping patterns were introduced, like Mustard-Mungbean - T. Aman and Grasspea-Gimakolmi-T. Aman in Gopalganj, Madaripur and Pirojpur region against the existing two or single crop based cropping pattern like Rabi- Jute-Fallow or Rabi-Fallow-T. Aman or Rabi-Boro-Fallow or

Boro-Fallow-Fallow. In Barishal, Bagerhat and Jhalakati locations, the cropping pattern was Sweet gourd - Sesame - T. Aman. Integrated Plant Nutrient System (IPNS) based fertilizer application performed better than farmers practice with BARI Gimakolmi-1 yielding 15% higher than local varieties. Of the mungbean varieties, BARI Mung-6 yielded better than Binamoog-8 and BARI Mung-8. Among the three T. Aman rice varieties, BRRI dhan 71 showed better performance than BRRI dhan 57 and BRRI dhan 75.

Title of PBRG Sub-project: Introduction of Profitable and Agro-Ecologically Suitable Crop Varieties and Development of Marketing Systems for the Charlands of Northern Bangladesh (ID # 054)

Progress with major findings

Ten different crops were selected from survey findings and trials on those crops were conducted to assess the suitability of BARI released high yielding crop varieties/technologies for the char lands (Char Begumganj & Ullipur of Kurigram district; Char Jagatber of Lalmonirhat district and Char Chandanpat and Nelsia of Saghata of Gaibandha district).

All improved varieties were compared with locally grown cultivars/varieties. During 2019-20, these selected crops were piloted in the farmers' field of Charland with the coverage of more than 2 hectares of each crop. The percent increase yield of groundnut, sweet gourd, bitter gourd, onion, chilli, sweet potato, black gram and foxtail millet in research plot over farmers' plot was 44, 29, 31, 45, 18, 26, 37 and 32, respectively.



Photo: Pilot production program of foxtail millet in Kurigram

Title of PBRG Sub-project: Integrated Farming Research and Development for Livelihood Improvement in the Plainland Eco-system (ID # 061)

Progress with major findings

Across different FSRD sites, the average vegetable production was maximum (310 kg homestead-1) in Rabi season followed by Kharif-2 (202 kg homestead-1) and Kharif-1 (175 kg homestead-1) seasons. Round the year total vegetable production was maximum in Pabna (845 kg homestead-1) followed by Faridpur (831 kg

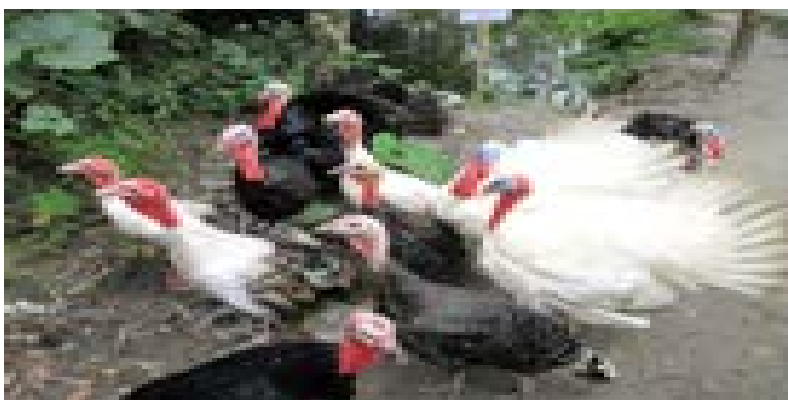


Photo: Turkey rearing in Rangpur

homestead-1) and minimum at Sherpur (408 kg homestead-1). Maximum fruits were produced during Kharif-1 season (294 kg/homestead) followed by Kharif-2 season (183 kg/homestead) and Rabi season (98 kg homestead-1). Yield of new varieties, such as Mustard (BARI Sarisha-14 and 17), Tomato (BARI Tomato-15), Lentil (BARI Masur-8), Wheat (BARI Gom-28), Mungbean (BARI Mung-6), Sesame (BARI Til-4), Barley (BARI Barley-6 & 7), Okra (Shakti- Hybrid) and Potato (BARI Alu-25, 35, 36, 37, 40 & 41) was around 20-25% higher than farmers' used variety.

Maximum body weight gain (175 g/day/animal), milk production (2.55 L/day) and lactation period (215 days) were obtained from deworming and vitamin ADE injection treated cattle/cow followed by only dewormed cattle at FSRD sites, Tangail, Rangpur and Pabna. Dewormed and vaccinated cattle responded positively under cattle fattening program at FSRD sites, Rangpur and Pabna. In polyculture of carp fishes, the survival rate of various fishes ranged from 64% to 91%. Maximum production was observed in Sherpur (296 kg/pond) with the gross margin (GM) Tk. 20, 886/pond and minimum yield (105kg/pond) in Rangpur (pond size 0.04 - 0.06 ha with 1.2 -2.0 m depth). Consumption, distribution and selling of vegetables increased about 10%, 43% and 134%, respectively

Title of PBRG Sub-project: Preparedness for the Control of PPR in Bangladesh (ID # 139)

Progress with major findings

Vaccination of goats using locally produced PPR vaccine was found to improve herd immunity level to an average of 83.33% (range: 81.89% -85.72%) showing that the PPR vaccine produced locally is quite good to protect goats from PPR. The detection rate of RT-PCR for PPR virus was around 60% (out of 287 nasal swabs collected from the suspected PPR outbreak areas 172 swabs were positive for PPR). The isolated virus has 95-98% homology with viruses circulating in India and China. However, the recently isolated PPRV has been found to make a separate sub-cluster indicating evolution at small extent.

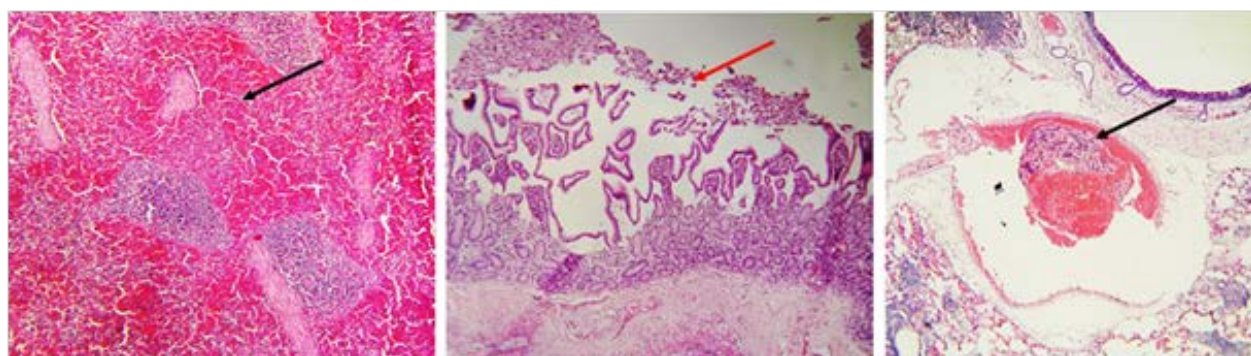


Photo: Histopathological investigation of spleen (left), intestine (middle) and lungs (right)

Title of PBRG Sub-project: Formulation of Bio-pesticides to Control Bakanae Disease of Rice in Field Condition (ID # 159)

Progress with major findings

One formulation for Trichoderma biopesticides has been done using suitable carrier material. Nano particle from neem leaf, dodder plant and mehogoni plant was produced and it is necessary to optimize for absorption intensities of the produced nano particles. DNA of six biocontrol agents

has been isolated and species identification process is in progress. Green house study with the use of biocontrol agents is going on and field trials will be evaluated as soon as possible. Moreover, nano particle of the identified plant products will be used to manage the disease (bakanae) of rice caused by the fungus, *Fusarium fujikuroi* at farmer's field condition.

2.3 Coping Mechanisms Practiced During COVID-19 Pandemic Situation

GoB closed all offices from 26 March 2020 considering the worldwide pandemic situation of COVID - 19, and it continued till 30 May 2020 to contain the virus. Most of the field research activities, laboratory analysis and data collection were postponed/closed due to the closure of universities and research institutes. During locked down PIU-BARC made a short assessment on the progress of PBRG sub-projects and implementation status of PhD programs, training, workshop/seminar, etc. over mobile phone. The output of quick assessment indicated that executing foreign training was suffered most, while implementation of PBRG sub-projects might need time extension for numbers of sub-projects especially survey-dependent research, farming systems, agro-forestry, soil improvement and fisheries related research.

2.4 Higher Studies (PhD Programs)

2.4.1 Status of Higher Studies (Local and Foreign PhD)

PIU-BARC, NATP-2 awarded 140 PhDs (60 foreign and 80 local) to the selected candidates. Among them scientists of NARS institutes 118, DAE 10, DLS 05, DoF 05 and Ministry of Agriculture 02. All scholars both at home and abroad completed their admission in different universities. Ten scholars admitted in developed countries (USA, Germany, UK, Australia, and Japan) while 50 scholars admitted in developing countries (Malaysia, Philippines, Thailand, China and India). Due to selection process and time variation in admission of different universities, impact of COVID-19, PhD scholars (both foreign and local) would need their completion time of PhD program beyond the present project duration (September 2021).

2.4.2 Contribution of PhD Programs to Achieve NATP Objectives

Topics of PhD programs under NATP -2 were selected basically based on the need assessed by NARS institutes for increased agricultural productivity, nutrition, safe food, viable marketing system and benefit of marginal and small farmers. Considering this national and institutional need, majority of PhD scholarship was offered on varietal improvement (20%); stress physiology (13%) in the context of different stresses like salinity, drought, water logging tolerant, shorter duration rice to address crop damages, crop protection and natural resource management (more than 10%); post-harvest loss, vaccine development, etc. (Fig. 2.1). The PhD researches would also facilitate the implementation of core research programs of NARS institutes, and HRD of extension agencies.

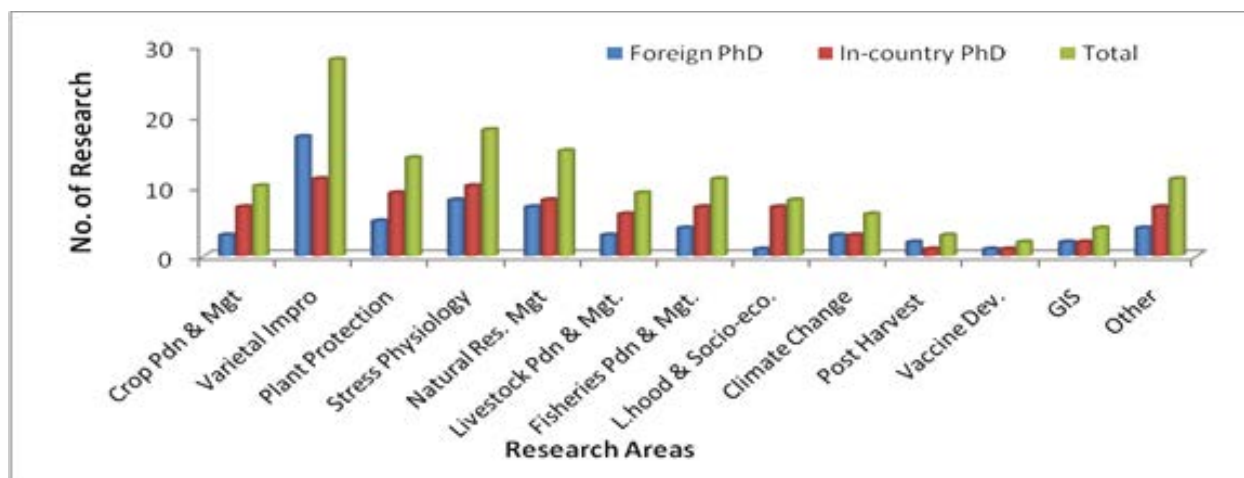


Fig. 2.1: PhD research areas with different disciplines.

2.4.3 Organization Wise Distribution of Local and Foreign PhD Programs

The distribution of foreign and local PhD programs among the NARS and other institutions/ organizations is shown in Table 2.1. BARI being the largest national research institute shared the highest numbers of local (21 of 80 i.e., 26%) and foreign PhDs (19 of 60 i.e., 32%). The next highest share of local (06) and foreign (10) PhD programs was received by BRRI.

Table 2.1: Organization wise list of awarded local and foreign PhD programs

SL#	Organizations	Awarded PhD (No.)		
		Local	Foreign	Total
1.	Bangladesh Agricultural Research Institute (BARI)	21	19	40
2.	Bangladesh Rice Research Institute (BRRI)	06	10	16
3.	Bangladesh Institute of Nuclear Agriculture (BINA)	04	05	09
4.	Bangladesh Jute Research Institute (BJRI)	05	04	09
5.	Bangladesh Sugar Crop Research Institute (BSRI)	05	04	09
6.	Bangladesh Tea Research Institute (BTRI)	01	01	02
7.	Soil Resources Development Institute (SRDI)	04	03	07
8.	Bangladesh Sericulture Research & Training Institute (BSRTI)	03	-	03
9.	Bangladesh Fisheries Research Institute (BFRI)	06	05	11
10.	Bangladesh Livestock Research Institute (BLRI)	02	04	06
11.	Bangladesh Forest Research Institute (BFRI)	02	02	04
12.	Cotton Development Board (CDB)	01	01	02
13.	Ministry of Agriculture (MoA)	-	02	02
14.	Department of Agricultural Extension (DAE)	10	-	10
15.	Department of Livestock (DLS)	05	-	05
16.	Department of Fisheries (DoF)	05	-	05
	Total	80	60	140

2.4.4 Progress of Course and Research Work of Overseas and In-country PhD Programs

a) Overseas PhD

More than 89% (80.61% in developed country and 91.30% in developing country) of course work has been completed by 56 scholars. The overall progress of research work is more than 35% (38.34% in developed country and 34.00% in developing country). Another 57% PhD scholars have course work and 100% scholars have their research work. Due to COVID-19 pandemic situation, the research as well as course work of all the scholars was affected. Particularly, 30 scholars informed that their research work was damaged and they need to repeat during May 2020. The rest of the scholars could not perform their research during the pandemic. Timely completion of PhD programs became uncertain due to COVID-19 pandemic situation.

b) In-country PhD

More than 71% of course work has been completed by 43 scholars. The overall research progress was about 46%. During the COVID-19 outbreak, 19 scholars had course work and 72 scholars have research work. All scholars were affected in their research and/or course work. Ten scholars informed that they lost their research work and need to repeat during May 2020. The rest of the scholars could not perform their research work during the pandemic period. All universities have been closed since 25 March 2020 to date. Completion of PhD program within stipulated time became uncertain due to COVID-19 pandemic situation.

2.4.5 Assessing the Progress of PhD Program in COVID-19 Pandemic Situation

Director of PIU-BARC arranged two virtual meetings using Zoom platform, one for in-country PhD on 29 June 2020 and another for overseas PhD on 14 June 2020 to assess the progress of PhD programs in a COVID-19 pandemic situation. Two issues, among other things, came during zoom meetings from both overseas and local PhD scholars. These are: (1) extension of duration with scholarship (both overseas and local) for at least six months, and (2) increase of scholarship money (both overseas and local).

2.5 Status of Local and Foreign Training and Workshop

2.5.1 Local Training/Workshop/Seminar

During FY 2019-20, 462 scientists received skill development training and 2,385 scientists and officials attended different national workshop/seminar arranged by PIU-BARC. The major courses of local training were: a) Research Methodology b) Administrative and Financial Management c) ICT in Agriculture e) Monitoring, Evaluation and Impact Assessment, etc. The duration of local training programs ranged from 2 to 14 days.

The local training improved the skill and attitude of NARS scientists in respect of designing research programs, better financial management, improved monitoring skill, leadership & administrative development and use of ICT in agriculture. The execution of training/workshop also improved the capacity of 13 NARS institutes including BARC. Training has changed the institutional efficiency in planning, designing and implementation of research programs.

The participants learned financial planning, budgeting, reporting process; financial rules and regulations; interpreting financial statements; received and payment statements; income and

expenditure statement, etc. The scientists also learned different uses of ICT in agriculture like: mobile ICT, GIS in agriculture, e-filing, use of essential software apps, national portal content management, etc.

The number of local training courses organized by NARS institutes is shown in Table 2.2. BARC as coordinating body organized 48% of total (91 events) followed by 11% by BIM, 9% by BARI, 8% by GTI, and less than 5% each by other institutions. In total 462 participants attended different training courses held in different venues. Topics of training courses included Administrative and Financial Management; Haor Adapted Livestock Technology; Global Plan of Action Reporting and Collection, Documentation of Plant Genetic Resources, etc. (Annex- 2.2). In total 2,385 participants attended the national workshops arranged by different organizations (Annex-2.3).

Table 2.2: Sharing of NARS institutes in organizing local training program

SL#	Institute	As of June 2019 # Event Organized	FY2019-20 # Event Organized	Total As of June 2020 # Event Organized
1	BARC	35	9	44 (48%)
2	BARI	8	0	8 (9%)
3	BIM	10	0	10 (11%)
4	GTI	5	2	7 (8%)
5	BARD	3	1	4
6	SRDI	2	0	2
7	PIU	5	2	7
8	BAU	1	0	1
9	BLRI	2	1	3
10	NATA	1	0	1
11	BFRI	3	0	3
12	STU Sylhet	1	0	1
Total		76	15	91

2.5.2 International Training

Two participants attended foreign training in two countries (Table 2.3). The foreign training improved the skill and attitude of NARS scientists in respect of designing & executing research programs and learning advance technology & knowledge.

Table 2.3: Foreign training programs during FY2019-20

SL#	Name of Training	Participant (No.)	Country (venue)	Duration (days)
1	Vegetables Breeding Program with Special Emphasis on Solanaceous spp.	1 (from BARI)	USA	14
2	Knowledge Sharing on Challenges for Agro-environmental Research	1 (from BARI)	Japan	12
Total		2		



2.5.3 International Workshop/Seminar

As part of the program during FY 2019-20, the project funded 8 scientists to participate workshop/ seminar in the foreign countries (Europe, Asia and USA) on important scientific issues (Table 2.4).

Table 2.4: Self-initiative conference/workshop/seminar

SL#	Name of Conference/Workshop/Seminar	Participant (No.)	Country	Duration (days)
1	Conference on Performance of Onion Advanced Lines Tolerant to Thrips and Iris Yellow Spot Virus	1	USA	4
2	Asian Pacific Weed Science Society Conference (APWSS 2019)	1	Malaysia	4
3	Seminar: Risk Management in Cotton Industry	1	USA	11
4	Multi Stakeholder Partnership Meeting of Global Agenda for Sustainable Livestock	1	USA	4
5	Conference on Agriculture 2019	1	Thailand	2
6	Conference on Veterinary and Animal Science	1	Malaysia	2
7	IRRDB International Rubber Conference and Annual Meeting	1	Myanmar	5
8	Conference on Natural Science, Engineering and Technology	1	Japan	3
Total		8		

2.5.4 International Study Visit

Four events were funded where 15 senior officials participated in different countries. The duration of the programs ranged from 9 to 11 days (Table 2.5).

Table 2.5: International study visit in 2019-20

SI #	Title	Participant (No.)	Country	Duration (days)
1	Food Safety and Quality Assurance	6	USA	9
2	Meeting on Global Institute for Food Security at Canada	2	Canada	9
3	Agro-Product Processing and Value Addition, Marketing and Mechanization in Agriculture	3	Thailand, Vietnam	11
4	Agricultural Research Management	4	USA	9
Total		15		

SECTION 3: PROGRESS OF THREE EXTENSION COMPONENTS (COMPONENTS- II, III & IV)

Components II, III and IV of NATP-2 are to support crops, fisheries and livestock sub-sector development and are being implemented by the Project Implementing Units of Department of Agricultural Extension (PIU-DAE), Department of Fisheries (PIU-DoF) and Department of Livestock Services (PIU-DLS), respectively. The aims of the components are to contribute in increasing farm yields, diversifying production, and improving market linkages for smallholder farmers by promoting an integrated approach and through transfer of improved technologies as well as better access to market opportunities.

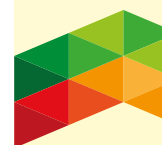
These three extension components have interventions in 270 upazilas of 57 districts (include 107 upazilas covered under NATP-1, plus 163 new upazilas) covering all major agro-ecological zones including the drought-prone areas in the North-West (dry Barind Tract), salt-affected tidal surge areas in the South, flash-flood prone areas in the North and North-East. The project is financing activities related to

- a) Mobilization of Common Interest Groups (CIGs) of farmers,
- b) Decentralized extension service by government frontline extension agents i.e., SAAOs for crops and Community Extension Agents for Livestock (CEAL) and Local Extension Agents for Fisheries (LEAF) and through FIAC,
- c) Technology dissemination through establishing of field demonstrations, field days and exposure visits,
- d) Training to extension agents and farmers, and e) enhancing institutional efficiency of the national agencies involved in agricultural extension.

Focuses of the Components

Component II: Crop Sector Development

1. Improving the outreach and quality of extension and advisory services by strengthening the skills of public extension workers from DAE, promoting ICT in agricultural extension services, and supporting farmer-to-farmer extension;
2. Developing farmers' skills to scale-up the dissemination of Good Agricultural Practices (GAP) including those developed under NATP-1, as well as in identifying technologies for a sustainable production of safer food;
3. Promoting farm and off-farm mechanization to increase efficiency in crop handling, reduce post-harvest losses and support processing;
4. Facilitating stronger collaboration with the private sector for agri-business development on agro-processing, market access for smallholders, as well as for the establishment of machinery hire-services; and
5. Strengthening institutions involved in the crop sub-sector through capacity development and selected investments in infrastructure and capacity development of CIGs and rural



entrepreneurs through AIF2 & AIF-3 matching grants respectively.

Component III: Fishery Sector Development

1. Promoting specific fish production models involving improved fish varieties,
2. Producing better quality fish seeds;
3. Introducing appropriate fish feed;
4. Applying relevant fisheries management tools;
5. Restoration of aquatic habitat; and
6. Creating more suitable market linkages for better access to markets and improved realization of value for the product.

Component IV: Livestock Sector Development

1. Strengthening livestock institutions (including food and feed safety and quality, animal health);
2. Improving livestock extension services, and reinforcing the linkages between research, extension and livestock farmers;
3. Scaling up outreach programs to reach out to a larger number of farmers; and
4. Facilitating the participation of smallholder farmers in selected livestock markets.

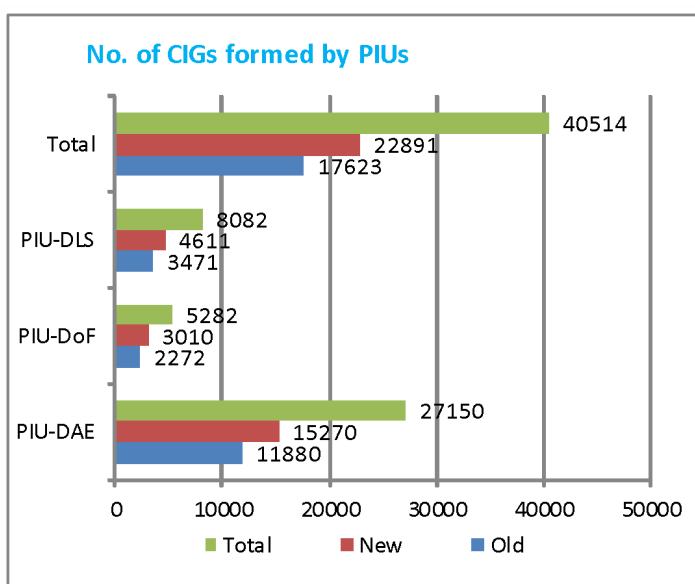
3.1 Mobilization and Functioning of CIGs

The activities of three extension components started with the mobilization of farmers through formation of Common Interest Groups (CIGs) in the targeted upazilas of selected districts. A Common Interest Group (CIG) is an association of 20 or 30 farmers (crop and livestock -30, fishery - 20) having common interests in one major agricultural activity; coming from the same socio-economic status; and living preferably in one village or sub-village (para). In one union a total of 15 CIGs are formed - 10 for crops, 3 for livestock and 2 for fisheries. CIGs for crops are usually established in all unions of the targeted upazilas, while the fishery and livestock group formation was dependent upon the availability of ponds, and/or potentiality and willingness of farmers to grow cattle, goat and or poultry. The other important considerations for farmers identification and their mobilization were: (i) their interest in adoption of new/improved technologies, (ii) willingness to make available suitable plots, ponds, etc., for demonstrations setup, (iii) their commitment to assist in spill over technologies to the non-CIG farmers, (iv) interest to produce market oriented high value commodities, and (v) agreement to include at least 35% women farmers, especially in the new CIGs and also focusing on small and marginal farmers.

At the very start of NATP-2, PIUs had completed reformation of CIGs in old 107 NATP-1 upazilas and formation of new CIGs in 163 extended upazilas for NATP-2. In total, PIUs had mobilized over one million farmers of which over 35% farmers are women (Fig. 3.1).

After formation of CIGs, efforts were made to increase the functionality of CIGs i.e., holding regular monthly meetings, raising group funds through accumulating savings, depositing the savings amount to CIG bank accounts, investing group savings in income generating activities, preparing annual extension plans and implement planned activities, etc.

- CIG monthly meetings are the platforms of open discussion, mutual interaction & building of strong bonding among the group members and are conducted as one of the important tools of mobilization. Overall status of CIG monthly meetings was raised to 97% during 2018-19 but because of the countrywide lockdown due to COVID-19 outbreak, the meetings were very irregular during March-June 2020.
- All the CIGs have completed opening of their bank accounts during 2017-18. Training allowances of the CIG farmers are paid using the CIG bank A/C; the A/C are also used for any other CIG payments, like AIF-2 matching grants. The monthly group savings are also deposited in their respective CIG bank accounts.
- Amounts of CIG group savings have been increasing over time. The raised group savings have been used for borrowing and lending within the group members to support mostly in farming; procurement of group assets (agricultural equipment, rickshaw van), production & distribution of quality seeds, fish culture, commercial farming in the leased agricultural land, etc. Service charges collected from lending and from renting out the group assets contribute to income generation of the groups.



No. of beneficiary farmers in CIGs

	PIU-DAE	PIU-DOF	PIU-DLS	Total
Old	237,600	45,580	69,420	352,900
New	458,100	59,940	138,330	656,370
Total	695,700	105,520	207,750	1,009,270

Fig. 3.1: Details of CIGs formed by the PIUs- DAE, DoF and DLS

CIG Member Characteristics

PIU-DAE

- 80% vulnerable community members
- 8906 ethnic households in 503 CIGs; female - 35%.

PIU-DOF

- 1127 members are from ethnic communities
- Female - 35.4%

PIU-DLS

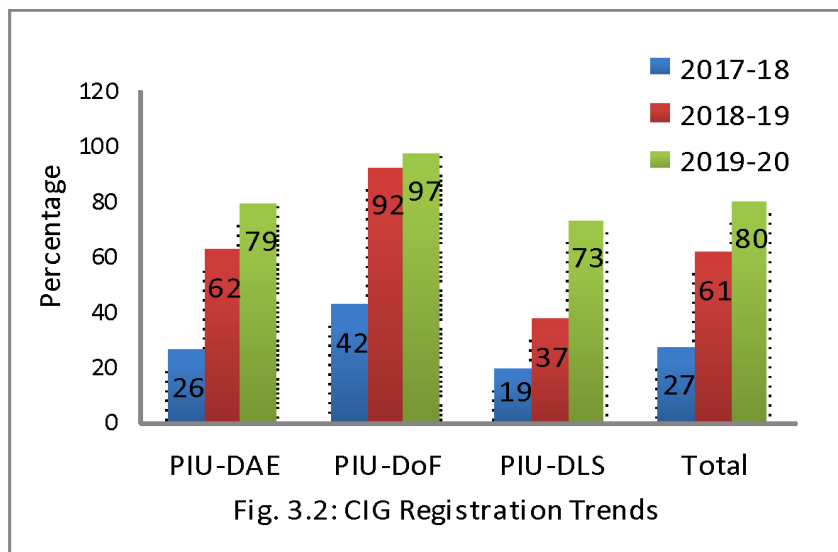
- Eight categories of CIGs (cow rearing - 44%, beef fattening - 24%. goat rearing -15% poultry rearing - 15%, duck, sheep, pig and buffalo rearing - 2%)
- Female - 44.5%.

Micro/Extension Plans Preparation: Like previous years, the CIGs themselves had prepared their bottom up demand-led CIG Micro Plans (CMP) for FY2019-20 extension activities which were then aggregated into Union Extension Micro Plans and Upazila Extension Plans for Crop, Livestock and Fisheries. The Upazila Extension Plans are reviewed by the District Extension Coordination Committees and commented on. The Upazila Extension Coordination Committee (UECC) approves the Upazila Extension Plans incorporating comments and suggestions made by District Extension Coordination Committee (DECC) and submit to respective PIUs for fund allocation.



CIG-Registration:

Registration of CIGs with the Department of Cooperatives, as an important milestone, has been undertaken since NATP-1 with a view to authenticate their formation and functioning, as well as making them officially legal. It has also been set as one of the major eligibility criteria to apply for AIF-2& AIF-3 matching grants of the project. By end of June 2020, 80% of the total CIGs got registered with the Department of Cooperatives wherein the



Upazila Extension Offices of DAE, DOF and DLS provided necessary supports and assistance for preparation of application and related documents (Fig. 3.2).

3.2 Trainings

3.2.1 Training to CIG Farmers, CIG-Leaders and Non-CIG Farmers

Farmers’ knowledge and skill gaps are considered to be the major reasons for the yield gap between the research farm and the farmers’ field; and yield gap is always a big concern to all. To overcome this problem and also to make the CIGs more operational and effective, NATP-2 supports a comprehensive training program for CIG farmers and CIG leaders. These trainings are organized at the upazila level. Besides the CIG training, NATP-2 also supports “CIG & non-CIG farmers’ technology sharing training/rally” to diffuse technologies from CIG farmers to the non-CIG farmers. The technology sharing training were conducted at the union level for the convenience of participants.

During FY2019-20 the three extension components imparted about 0.70 million client-days and cumulatively imparted over 3.45 million client days training till June 2020 (Table-3.1) to the CIG farmers, CIG leaders and non-CIG farmers (through technology sharing training/rally of CIG & non-CIG farmers). Besides, the four PIUs also imparted training to their officers and staff. Major areas of these one-day trainings were production technologies, climate smart agricultural technologies, eco-friendly & safe food production technologies, CIG mobilization, CIG sustainability, CIG savings & savings management, income generation activities, financial management, post-harvest loss reducing technologies, record-keeping, CIG registration, CIG up-gradation, good agricultural practices (GAPs), AIF use, environmental & social safeguard, gender issues, market access & collective marketing, CIG leadership development, etc.



Table-3.1: CIG farmers, CIG leaders and CIG & non-CIG farmers' technology sharing trainings by PIUs (client-days)

PIU	FY202019-20		Project Cumulative Till June 2020		
	Target	Progress	Target	Progress	Remarks
PIU-DAE	477480	477480 (100%)	2299710	2116680	achieved-92.04%; female-35%
PIU-DOF	86105	86105 (100 %)	685395	619675	achieved-90.4%; female-35%
PIU-DLS	140090	140090 (100%)	905570	719540	achieved-79.46%; female-44%
Total	703675	703675 (100%)	3890675	3455895	achieved-88.83%

Outputs/Outcomes of CIG farmers, CIG leaders and CIG & non-CIG farmers' technology sharing trainings:

- CIGs are now better mobilized & structured, savings management is more transparent, CIG registration accelerated & number of registered CIGs increased, records of CIGs are well-maintained.
- After training *CIG leaders* (the Chairmen, Vice-chairmen, Secretaries, and Cashiers of the CIG executive committees) are more efficient with the basic qualities of leadership.
- Improved skill and efficiency of the trained CIG leaders helped in accelerated dissemination of technologies, easy management and coordination in availability of agricultural inputs, easy access to markets, establishing the rights farming communities.
- *CIG & non-CIG farmers' technology sharing trainings* helped and accelerated technology diffusion from CIG to non-CIG farmers (at 1:3 ratio).



Photo: Health protection measures



Photo: CIG leaders training



Photo: Technology sharing training

3.2.2 Local Trainings for Officer and Staff by PIUs

The three extension PIUs, as part of strengthening their institutional and professional capacity, provided need based short-trainings to their officers and staff (Table-3.2). It is evident that these trainings enhanced the efficiency and skills of trained officers and staff and ultimately the capability of PIUs/organizations in project implementation and technology dissemination.

Table- 3.2: Officer and staff trainings by PIUs

Trainee	Progress (Client -days)		Training Subjects
	FY2019-20	Cumulative up to June 2020	
Officer	500 (100%)	8160 (89% of target, 9140)	Implementation strategy, TOT, production technology, financial & procurement management, CIG management, GAAP, GAP, ICT, etc.
SAAO & Staff	18290 (100%)	51180 (97% of target, 52980)	NATP-2 implementation, production technology, accounts, finance, CIG management, GAP, ICT, etc.
PO & Agro-input Dealer-Trader	-	26100 (100%)	PO: Responsibilities of PO -EC members, fund raising, PO mobilization & registration, conducting meetings, maintaining records, role of POs in marketing & market planning for the farmers' produced commodities, preparation of AIF -2 & AIF-3 sub-projects, etc. Dealer-Trader: Testing of adulterated fertilizers & pesticides, safe application of pesticides, Identification of pests & diseases, fertilizer application method, testing of quality seeds, fertilizer & pesticide Acts/Rules, etc.
PIU-DAE			
Officer & Staff (UFO, SUFO, AFO, FA)	370 persons *(100%)	1095 Persons (6045 client-days)-52.85% of target	NATP-2 implementation, aquaculture technology, financial & procurement management, CIG management, ICT, etc. *According to revised and approved training plan.
PIU-DOF			
Officer	15 batches (58% of target 26 batches)	67 batches (61% of target 110 batches)	NATP-2 implementation, production technology, financial & procurement management, TOT, PRA techniques, data collection analysis & reporting, CIG management, ICT, etc.
Staff & CEAL	29 batches (66% of target 44 batches)	138 batches (54.56% of target 253 batches)	NATP-2 implementation, livestock technology, accounts, finance, procurement, CIG management, ICT, etc.
PIU-DLS			

Output/Outcome of Agro-input Dealers & Traders Training:

1. Awareness developed among the trained dealers & traders in trading quality inputs and testing methods are practiced to identify adulterated seeds, pesticides and fertilizers.
2. Quality of advices given to the farmers by the trained dealers & traders are found to be better & more useful; farmers are seen to be better benefited from the advices of the trained dealers & traders; and sale of inputs of the trained dealers & traders are increased.
3. Training impacts are communicated among the neighboring dealers & traders, and a sense of competition has seen to be developed among the dealers & traders in trading of quality inputs.
4. Messages in regard to producing safe food, health hazards & environmental safeguard are seen to be extensively communicated to farming communities.

3.2.3 International Training and Study Visit/Tour

Besides in-country training, PIUs arranged study visit/tour, training, conference attendance abroad to acquire advance & specific knowledge and share knowledge & learning on specific subject/issue. As per the provision in DPP and the approved work plan of PIUs the following international training and study tours were undertaken up to June 2020.

Table 3.3: International training and study tour conducted by PIUs up to June 2020

	# of batches	# of participants	Who attended	Visiting Country	Areas of learning
PIU-DAE	21	149	MOA, PC, ERD, PMU, DAE, SAAO, CIGs	Malaysia, China, Thailand, Indonesia	Training: Advanced technology training on Horticultural & Field crop production & post-harvest management; Study tour: Advanced agricultural & extension services
PIU-DOF	9	88+3* = 91	DoF, MOFL, PC, ERD, IMED	Malaysia, Thailand	Training on aquaculture, fish marketing and value chain management; Study Tour on good aquaculture practice, advance aquaculture and fish marketing & value chain management *India tour: organized by WB and PMU and funded by PIU, D OF.
PIU-DLS		78	DLS, MOFL, PC, ERD, IMED, MOF	Malaysia, Thailand	Project management and procurement; Advanced livestock technology and extension services

3.3 Dissemination & Diffusion of Technologies

Demonstration in farmers' field is the most useful & effective method of disseminating technologies. As such various types of demand-led improved technologies generated by NARS institutes and universities are demonstrated in project areas for adoption by the farmers.

3.3.1 Technology Demonstrations of PIU-DAE

Technology demonstration is recognized as the best method for effective dissemination of newly released improved technologies. Demonstration helps hands-on learning and creates opportunity for subsequent adoption of technologies. So the demonstrations have been given the highest priority in technology transfer activities. In the DAE component of the project, 1,35,024 technology demonstrations provision has been made for the project tenure. Progress of conducting demonstrations so far made is given below (Table 3.4).

Table 3.4: Progress of technology demonstrations

	#	Demonstration type	Cumulative progress of established demonstration (no.)			
			2016-17	2017-18	2018-19	2019-20
Productivity Enhancing Technologies	1	Yield gap minimization of rice, wheat, lentil, maize & mustard	462	8295	16255	20032
	2	Short duration varieties of rice	-	411	411	411
	3	New varietal technology of rice, wheat & lentil	-	959	1405	1818
	4	Production and preservation of quality seeds of rice, wheat & lentil	-	3217	3217	3217
	5	Production technologies of summer tomato	87	1719	3242	3429
	6	Production technologies of high value crops (HVCs)	-	-	2917	4975
	7	Production technologies of spices crops	-	703	1649	2587
	8	Production technologies of offseasonal crops	-	336	378	492
	9	Production technologies of Colcasia	-	576	576	576
	10	Production technologies of vegetables in floating bed	155	633	747	789
	11	Production technologies of mushroom	-	65	65	65
	12	Homestead gardening	403	2287	2287	2287
	13	Establishment and management of fruit orchards	1176	5307	8092	9365
	14	Community seed production (quality seeds)	-	11791	28340	34681
Climate Smart Agri. Technologies	15	Flood & Saline tolerant varieties of T. aman rice	-	705	1303	1498
	16	Blast & Heat tolerant varieties of wheat	-	475	1261	2021
	17	Drought tolerant varieties of rice	-	-	99	99
	18	Zero Tillage cultivation of garlic & mustard	-	373	1118	1471
	19	Technology of raising boro rice seedlings in dry seed bed	-	18	18	18
	20	Climate change adaptation: production of vegetables in gher ail	-	102	102	102
Eco-friendly Agri. Technologies	21	Pest management using sex pheromone trap	1262	6031	9397	11579
	22	IPM in brinjal & bean	-	432	432	432
	23	Bagging technology in production of fruits	-	494	582	582
	24	Irrigation water-saving using AWD	-	446	722	722
	25	Good agricultural practices (GAP)	-	338	338	338
	26	Production technologies of FYM and quick compost	2077	4432	4432	4432
	27	Production technologies of vermicompost & tricho-compost	1335	7283	13232	17554
Total			6957	57428	102617	125572
			Progress:93%			

The above table reveals that 93% demonstrations were conducted up to FY2019-20. The basic principle of farmers' needs, as reflected in the CIG Micro Plans, was rigidly followed in establishing the demonstrations. Like the previous two years, during FY2019-20 the highest numbers of demonstration (34,681) was demanded by the CIG farmers on community seed production; yield gap minimization being the second highest (20,032) and the third one being the production of vermi-compost & tricho-compost (17,554).

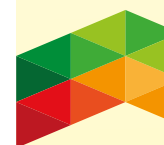
3.3.1.1 Productivity Enhancing Technologies

3.3.1.1.1 Yield Gap Minimization

Yield gap exists between research station and farmers practice due to controlled and time bound optimum management practices in the research station and uncontrolled farming environment in the farmers field due to land types, agro-ecological situation, socio-economic conditions and partial or non- practice of recommended technology by the farmers. As a result, yield of different crops in research stations is always higher than the farmers' fields. Experiences from field observations showed that yield gap of crops can be reasonably minimized by transferring recommended package of technology practices to farmers. During micro-planning preparation by CIG farmers they showed interest for improved technology package for crop production. This interest showed that there was knowledge gap of farmers in application and management of technologies. With a view to minimizing technology gap and knowledge gap of the farmers, 20,032 demonstrations on yield gap minimization on rice and wheat were established up to FY 2019-20. Year wise progress of establishing demonstrations and yield are given in Table 3.5 below.

Table 3.5: Cumulative progress and results of yield gap minimization demonstrations

Crop	Cumulative progress of demos established				Demonstrated crop Varieties	Average Yield (ton/ha)		Yield difference (ton/ha)
	2016-17	2017-18	2018-19	2019-20		Demonstration	Farmers' practice	
Rice (Boro)	0	1236	3777	4986	Boro (BRRI dhan 58, 67, 74, 81, 89, etc.)	6.38	6.05	0.33
Rice (Aus)	100	1817	3688	4839	T-Aus (BRRI dhan 48, 82, Nerica-10, Nerica Mutant, etc.)	4.54	4.12	0.42
Rice (T.aman)	362	1479	2743	3340	T-Aman (BRRI dhan 49, 51, 52, 70, 71, 72, 73, etc.)	5.1	4.274	0.826
Wheat	0	447	871	1284	BARI Wheat- 28, 30, 31, 33, etc.	3.82	3.538	0.282
Lentil	0	1365	2119	2239	Lentil (BARI Masur-6 & 8)	1.8	1.29	0.51
Maize	0	896	1271	1405	Don111, Mirakkal, Kohinur, Pacific 139 & 984; Supersign 2740, 2760, Hybrid 339, NH-7720	6.2	4.8	1.40
Mustard	0	1055	1786	1939	BARI Sharisha- 9,14,15 & 17; Binasharisha- 9	1.95	1.2	0.75

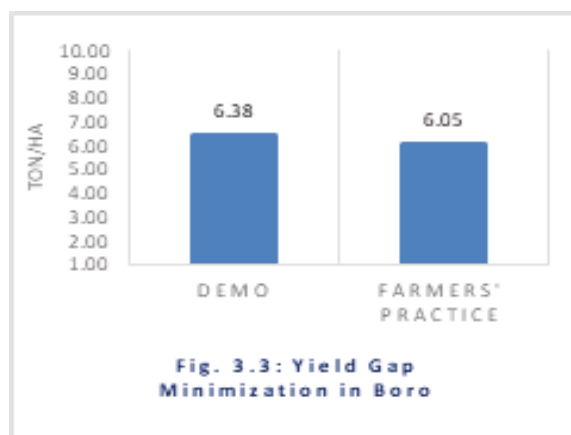


Yield Gap Minimization in Rice

A-1. Yield Gap Minimization in Boro



Photo: Yield gap minimization in Boro rice



Boro is an irrigation intensive rice crop growing in Rabi season, and favored by clear sunshine and good weather conditions. Up to the FY2019-20, a total of 4,986 demonstrations were established in Boro season using modern rice varieties BRRI dhan 58, 67, 74, 81, 89, etc. as well as following other recommended management technologies. An average yield of 6.38 MT/ha (paddy HYV) was obtained over the farmers' practice of 6.05 MT/ha making a difference of 0.33 MT/ha (Fig.3.3) The technology package applied to Boro included; Use of quality seeds & seedlings of optimum age, proper spacing, balanced fertilizer application with proper management, optimum irrigation at regular intervals, management of insect-pests & diseases and harvesting at optimum time.

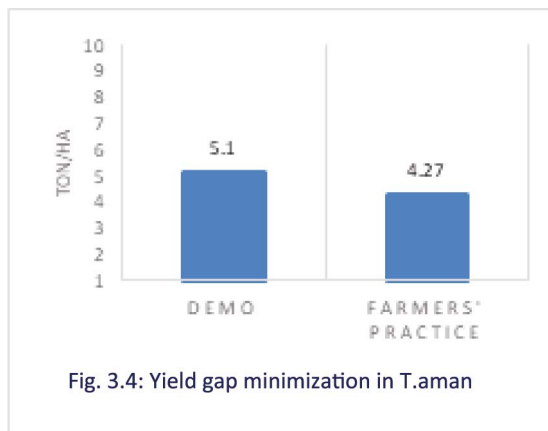
These results demonstrate that there is ample scope to reduce the yield gap at farm level.

A-2. Yield Gap Minimization in T. aman

T. aman is cultivated in Kharif II season mostly under rainfed conditions. Due to flooding risk and climatic abnormalities during Kharif II, very often application of recommended technologies by the farmers becomes difficult. Nonetheless, application of improved technology package would be of great potential for yield gap minimization.



Photo: RYGM in Aman



With a view to harnessing the benefit of rain water for T. aman production, demonstrations with package of production technology that encompasses HYV BRRRI dhan 49, 51, 52, 70, 71, 72 & 73 and quality seeds & seedlings of optimum age, proper spacing, and balanced fertilizer application with judicious management, supplementary irrigation, management of insect-pests & diseases and harvesting at optimum time were conducted.

During the FY2019-20, a total of 3,340 demonstrations on T. aman rice were conducted in farmers field that gave an average yield of 5.1 MT/ha (paddy) and the farmers' practice 4.27 MT/ha showing a yield advantage of 0.83 MT/ha (Fig.3.4).

A-3. Yield Gap Minimization in Aus



Photo: RYGM in Aus

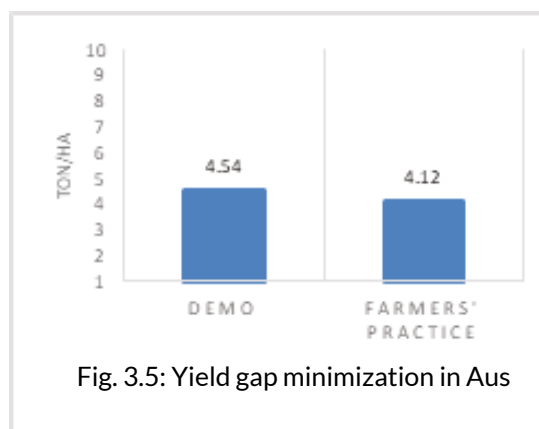


Fig. 3.5: Yield gap minimization in Aus

Aus rice is grown in Kharif I season and its cultivation area is increasing gradually. About 11.5 million ha is under aus cultivation. Following the farmers' interest during CIG Micro Planning, a total of 4839 demonstrations were conducted with the participation of farmers during the FY2019-20. The technology package used was HYV (BRRRI dhan 48, 82, Nerica-10, Nerica Mutant, etc.), use of quality seeds & seedlings of optimum age, proper spacing, balanced fertilizer application with proper management practices. Average demonstrations and farmers yield were 4.54 MT/ha and 4.12 MT/ha respectively demonstrate yield advantage of 0.42 MT/ha (Fig. 3.5)

Yield Gap Minimization in Wheat



Photo: Yield Gap minimization in wheat

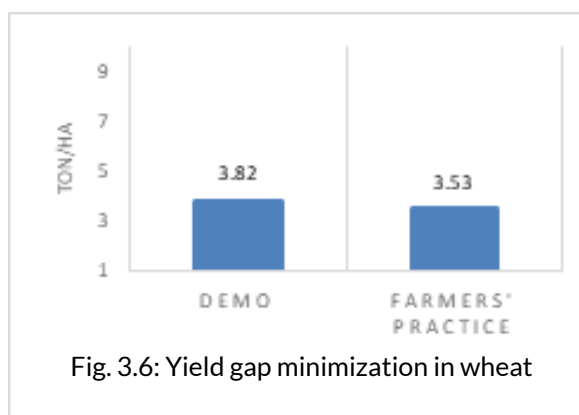


Fig. 3.6: Yield gap minimization in wheat

A decreasing trend of wheat acreage is observed due to short winter and rise of winter temperature during critical stages of wheat growth. As a result, production and productivity is affected in some years. To combat the situation and to reduce the yield gap modern varieties along with improved management practices were conducted at farmers' field during the period of FY2017-18 and FY2019-20. A total of 1,284 demonstrations using new varieties along with improved production practices on Wheat were conducted. An average yield of 3.82 MT/ha was obtained over the farmers' practice yield of 3.53 MT/ha showing yield difference of 0.28 MT/ha (Fig.3.6).

3.3.1.1.2 Production Technology of Summer Tomato

Cultivation of summer tomato is gaining popularity among the farmers due to its profitability. Demand in the market is also increasing due to its off-season availability to the consumers. Its cultivation requires suitable varieties, extra care and Poly



Photo: Tomato field

Tunnel to protect the crop both from scorching heat & excess rainfall during the months of April to October. Due to high demand & premium market price and overall profitability, it is increasingly being popularized all over the country particularly in the south-western districts.

Table 3.6: Cumulative progress of production technology of summer tomato

Crop	Cumulative progress of demos established				Demo. Varieties	Average Yield (ton/ha)		Yield dif. (ton/ha)
	2016-17	2017-18	2018-19	2019-20		Demo plot	Farmers practice	
Tomato	87	1719	3242	3429	BARI Hybrid Tomato- 4 & 8	35.81	33.6	2.21

A total of 3429 summer tomato demonstrations were conducted during the period from 2016-17 to 2019-20 of which 187 demonstrations were conducted during 2019-20. Summer tomato varieties used in the demonstrations were BARI hybrid 4 & BARI hybrid 8, and the management practices applied was; timely planting, proper spacing, balanced fertilizer, timely irrigation & management practices, management of pests & diseases, poly tunnel, etc.

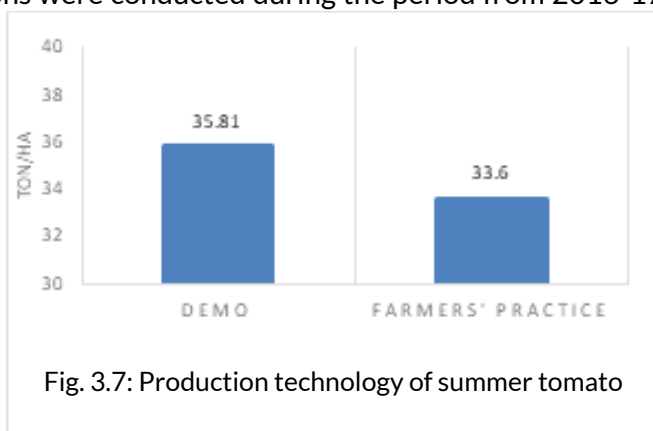


Fig. 3.7: Production technology of summer tomato

Performances of the demonstrations are shown in Table 3.6 and Fig.3.7. The demonstration results showed that 35.81 MT/ha yield was obtained from demonstration plot as against 33.6 MT/ha in farmers practice plot during the FY2019-20.

3.3.1.1.3 Technology Demonstration on High Value Crops (HVCs)

Farmers' demands for establishing demonstrations on of high value crops were reflected in CIG Micro Plans during the FY 2018-19 and FY 2019-20. Crop names are shown in Table 3.7. In total 4975 demonstrations were conducted using new variety seeds/seedlings and applied all improved management practices. Crop wise performances of the demonstrations are presented in Table 3.7. The yield result showed that per ha yield for all the 13 high value crops were higher demonstration plot than farmers practice plots.



Photo: High value crops (HVCs)

3.3.1.1.4 Production Technologies of Spices Crops

/Yields of spice-crops are less than their potential yield. Considering the farmers' demands, demonstrations on spices crops like Garlic, Onion, Chilli, and Kalojira were established to motivate and to improve technological knowledge and skills of farmers. As of FY2019-20, 2587 demonstrations were conducted. Technologies practiced in the demonstrations of these crops were: Use of improved variety seeds, timely seeding/planting, proper spacing, use of balanced organic/inorganic fertilizers, optimum irrigation, proper intercultural practices, insect-pest & disease management, etc. Crop wise progress & performances of the demonstrations are given in Table 3.8. It was found that in all the demonstrations with improved technology packages gave higher yield than farmers' practices.

Table 3.7: Yield performances of demonstrations on high value crops (HVCs)

Crops	Varieties used	Yield (ton/ha)	
		Demonstration	Farmers practice
Sweet guard	Hybrid	22.8	20
Country bean	BARI Sheem-2 Hybrid-2	18.2	14.2
Cauliflower	BARI Badhacopy-1 & 2; Atlas 70	30	21
Potato	Diamond, Asterix	24.21	22.23
Dhundol	Hybrid	8	7.3
Brinjal	BARI Begun-1,4,6,7,10	35.6	24.6
Bangi	Hybrid	12.5	10.4
Water melon	Dragon, Ganga, Pakija	53	34.8
Bottle gourd	BARI Lau-1, hybrid(Diana)	25	18
White gourd	BARI Chalkumra-1	26	19
Carrot	Hybrid	20.4	16
Aroids	BARI Mukhikochu-2, Lotiraj	25	18
Broccoli	Greenjoint	11.3	6.9

Table 3.8: Progress and performances of demonstrations on spices crops

Crop	Cumulative progress of demos established				Demonstrated Varieties	Average Yield (ton/ha)		Yield dif. (ton/ha)
	2016-17	2017-18	2018-19	2019-20		Demonstration	Farmers practice	
Garlic	0	236	478	725	BARI Rashun-3 & 4	7.5	6.1	1.40
Onion	0	82	185	371	BARI Piaz-1 & 4; Taherpuri	13.51	12.49	1.02
Chili	0	294	605	999	Bindu, Balujhuri,	10.98	8.72	2.26
Kalojira	0	16	26	35	BARI Kalozira-1	1.49	1.14	0.35
Zinjer	0	43	192	250	BARI Ada-1 & 3	25.8	19.3	6.50
Termaric	0	32	163	207	BARI Halud-1(Dimla), 2 & 3	6.35	5.92	0.43

3.3.1.1.5 Production Technologies of Off-season Crops

Recently farmers are showing interest in growing off-season crops because of fair market price and consumers demand. Giving priority to the farmers' interest, during the FY2019-20, in total 492 demonstrations were conducted on the off-season crops- eggplant, cabbage, water melon and tomato. Technology packages employed in demonstrations were: use of improved variety seeds, proper spacing, use of balanced organic/inorganic fertilizers, optimum irrigation & drainage, proper intercultural practices, shading, insect-pest & disease management, etc. Crop wise progress & performances of the demonstrations are given in Table 3.9. Demonstration results showed that in all the 5 off-season crops per ha yield was higher than that of farmers practice. The difference in yield ranges from 4.02 ton/ha to 18.20 ton/ha.

Table 3.9: Results of demonstrations on off-season crops

Crop	Cumulative progress of demos established				Demonstrated Varieties	Average Yield (ton/ha)		Yield dif. (ton/ha)
	2016-17	2017-18	2018-19	2019-20		Demonstration	Farmers practice	
Eggplant	0	105	127	161	Eggplant (BARI Begun-5 & 9, BARI Bt Begun-4)	39.82	28.13	11.69
Cabbage	0	95	106	127	Cabbage (Provati)	36.1	32.08	4.02
Water melon	0	52	54	82	Dragon, Ganga, Pakija	53	34.8	18.20
Cauliflower	0	37	39	53	BARI Badhacopy-1 & 2; Atlas-70	30	21	9.00
Tomato	0	47	52	69	BARI Tomato-10	37.2	31	6.20

3.3.1.1.6 Technology Demonstration on Floating Bed Vegetable Cultivation

/Floating bed vegetables cultivation is being practiced in low lying areas especially in Sothern districts of Bangladesh. To improve the productivity of the vegetables cultivation systems and to make vegetable available year round and to popularize the systems further 789 demonstrations were conducted with the participation of farmers during the FY 2019-20. Improved crops & varieties used in demonstrations were; Lalshak (BARI Lalshak-1), hybrid, local; Puishak (BARI Puishak-2), hybrid (local); Kankog (BARI Gimakolmi-1); Tomato (hybrid); Ladies finger (hybrid); Bottle gourd (BARI Lau-1), hybrid, etc. This cultivation requires special attention from its planting to harvest particularly in preparing floating beds with water hyacinth, selection of crops/varieties, seeding/planting of seedlings, cultural management, control of insect-pests & diseases, etc. Yield obtained from demonstrations are given in Table 3.10. Yield obtained per bed measuring 5m x 1m ranges from 55-85 kg.

Table 3.10: Progress & yield of demonstrations on floating bed vegetable production

Crop	Cumulative progress of demos established				Average achievement (per bed of 5m x 1 m)
	2016-17	2017-18	2018-19	2019-20	
Floating bed vegetables	155	633	747	789	55-85 kg

3.3.1.1.7 Establishment and Management of Fruit Orchards Demonstration

With a view to disseminating the improved/newly released fruit varieties as well as motivating improved production practices among the farmers' fruit garden demonstrations were established. Since inception of the project activities, in total 9365 demonstrations were established of which 1282 demonstrations were conducted during FY 2019-20. The technology packages of demonstrations conducted were: Use of improved/new varieties, recommended planting time fertilizer & irrigation management, pest & disease management, Pruning training, etc. Year wise progress of establishing demonstrations is given in Table 3.11. Bearing of fruits has not been started in the established garden under demonstrations.

Table 3.11: Progress of demonstrations on establishment & management of fruit orchards

Crop	Variety	Cumulative progress of demonstration establishment (No.)			
		2016-17	2017-18	2018-19	2019-20
Malta	BARI Malta-1	406	1537	2413	2721
Mango	BARI Aam-4 & 11	351	1433	2110	2396
Guava	BARI Peyara-2, Thaipeyara-5 & 7	312	888	1445	1696
Litchi	BARI Litchu-3, China-3	0	113	854	1030
Lotkon	Local Hybrid	0	0	0	6
Dragon	Local Hybrid	0	0	0	28
Coconut	Vietnami	9	9	9	9
Banana	BARI Kola- 4 & 5, Sabri,	98	1261	1261	1479

3.3.1.1.8 Community Seed Production (Quality Seeds)

/Community seed production is an innovative activity in the project. In this activity, a group of farmers of the same CIG established seedling raising demonstrations in their land and the remaining members of the CIG were involved in nursing and caring of seedbed. After raising the seedlings they shared the seedlings for seed production of the new rice varieties. After producing seeds all the CIG farmers preserved those seeds. During the seasons farmers sold or distributed the seeds of new varieties to other farmers. This has facilitated the process of disseminating newly released rice varieties to the farmers. So far 3418 tons of Aus rice and 2954 tons of Aman rice were distributed and or sold to the neighboring and other farmers (Table 3.12).

Table 3.12: Seeds of different crop varieties produced through community seed production program and their distribution

Name of crop	Cumulative progress of demonstrations established				Varieties used	Yield (ton/ha)	Total seeds produced (ton)	Quantity distributed (ton)
	2016-17	2017-18	2018-19	2019-20				
Rice (Aus)	0	2656	2775	7032	BRRRI dhan 48,51,75 & 82, Nerica-10	4.39	4219	3418
Rice (T.aman)	0	3758	3995	6079	BRRRI dhan 49, 51, 52, 70, 71 & 72	4.91	3647	2954
Wheat	0	0	5115	5273	BARI Gom-28, 30, 31 & 33	3.7	527	411

3.3.1.2 Climate Smart Agricultural Technologies

3.3.1.2.1 Demonstrations on Flood, Saline & Drought Tolerant Varieties of Rice

Frequent floods and salinity are the two major hazards during T. aman growing season. The situation is increasingly being worsened due to the impacts of climate change. With a view to overcoming the risk of the hazards as well as improving the production of T. aman, several flood & saline tolerant varieties are released from the research institutes.

Considering the farmers' demand and ecological locations 900 demonstrations with salt tolerant varieties were conducted in salinity areas of which 195 demonstrations were conducted during 2019-20. The average yield of demonstrated varieties was 4.84 ton/ha while the farmers practice yield was 4.29 ton/ha (Table 3.13).

Table 3.13: Progress and yield of saline tolerant rice variety demonstrations

Varietal character	Demonstration				Varieties	Av. Yield (ton/ha)	Farmers' practice	
	Cumulative progress of demo. Established (No.)						Varieties	Av. Yield (ton/ha)
	2016-17	2017-18	2018-19	2019-20				
Saline tolerant	0	109	705	900	BRRRI dhan 47 Binadhan- 8 & 10	4.84	BRRRI dhan 49	4.29

3.3.1.2.2 Heat Tolerant Varieties of Wheat

Sudden rise of temperature during winter season becomes a great constraint in wheat cultivation. Research institute developed heat tolerant wheat varieties. These wheat varieties were demonstrated at farm level to motivate farmers to adopt these varieties. In total 1919 demonstrations were conducted of which 760 demonstrations were conducted during 2019-20 with BARI Gom 28, 30, 33. The average yield of these varieties was 3.81 ton/ha. Farmers practice yield was 3.24 ton/ha. The result demonstrated that there is high opportunity to extend these varieties for the wheat growing farmers. Progress and performances of the blast and heat tolerant varietal demonstrations are shown in Table 3.14.

Table 3.14: Progress & performances of demonstrations on heat tolerant wheat varieties

Varietal character	Demonstration				Wheat Variety	Av. Yield (ton/ha)	Farmers' practice	
	Cumulative progress of demo. established (No.)						Varieties	Av. Yield (ton/ha)
	2016-17	2017-18	2018-19	2019-20				
Heat tolerant	0	475	115	191	BARI Gom- 28, 30 & 33	3.81	BARI Gom- 25 & 26	3.24

3.3.1.2.3 Zero Tillage Cultivation of Garlic & Mustard

Crops can be optimally grown in zero tillage conditions in many parts of the country. Usually it does not require irrigation and protects the soil from erosion as well as degradation. Zero tillage minimizes cost of production without significant loss of yield.

To disseminate zero tillage cultivation practices, up to FY2019-20, a total of 1471 demonstrations were conducted on garlic and mustard of which 353 demonstrations were conducted during FY2019-2020. In establishing garlic, healthy cloves were dibbled in no tillage condition in muddy conditions followed by mulching and in case of mustard; seeds were sown in wet land condition. In both the crops, no tillage cultivation practices gave higher yield than farmer's practices. Yield performance of garlic and mustard varieties is shown in Table 3.15.

Table 3.15: Progress & performances of demonstrations on zero tillage cultivation

Technology	Demonstration				Varieties	Av. Yield (ton/ha)	Farmers' practice Av. Yield (ton/ha)
	Cumulative progress (No.)						
	2016-17	2017-18	2018-19	2019-20			
Zero tillage	-	373	1118	1471	Garlic (BARI Rasun- 2 & 3/hybrid/kutubpuri)	7.39	7.1
					Mustard (BARI Sharisha- 9, 14, 15 & 17 Binasharisha- 9)	1.71	1.33



3.3.1.3 Eco-friendly Agricultural Technologies

3.3.1.3.1 Pest Management Using Sex Pheromone Trap

Sex Pheromone traps are very effective for management of pests like fruit flies and shoot & fruit borers in brinjal and cucumber. This helps in the production of safe vegetables & fruits, and reducing the indiscriminate use of pesticides. Considering the farmers' demands and with a view to demonstrating effectiveness of the traps for wide scale dissemination among the farmers, 11579 demonstrations were conducted during the FY2019-20. In all the crops under demonstrations, use of sex pheromone trap was found effective against farmers practice of indiscriminate pesticide use.

Crop wise progress & performances of the established demonstrations using pheromone traps on various vegetable and fruit crops are shown in Table 3.16.

Table 3.16: Progress & performances of demonstrations using sex pheromone traps

Name of crop	Varieties	Cumulative progress of demons established (No.)				Average yield (ton/ha)	
		2016-17	2017-18	2018-19	2019-20	Demonstration	Farmers' practice
Bottle gourd	BARI Lau- 2, 3 & 4	1262	278	479	704	40.1	29.53
Bitter gourd	BARI Corolla- 1, 2 & 3		314	399	646	19.62	11.54
Brinjal	BARI Bt Begun- 4		1506	1811	2175	38.9	29.52
Sweet gourd	Sweety		860	927	1046	38.87	26.04
Country bean	BARI Sheem- 2, Hybrid 2		512	764	1122	16.81	12.16
White gourd	BARI Chalkumra-1, Hybrid		48	76	157	16.5	12.82
Cucumber	Hybrid		62	76	132	13.2	10.83
Pointed gourd	Hybrid		681	770	1166	35.5	25.14
Dhundol	Hybrid		21	41	83	12.4	10.81
Water melon	Dragon, Ganga, Pakija		173	2412	2706	59.6	35.01
Leafy veg.+fruits	Leafy veg.+fruits		1576	1624	1642	-	-

3.3.1.3.2 Production Technologies of Vermi-compost & Tricho-compost

Training on vermi-compost and tricho-compost preparation and their use to maintain soil fertility enhanced farmers' awareness to protect soil from degradation. This has developed farmers' interest and demand for production and use of vermi-compost and tricho-compost. In comparison to any other promotional technologies, production technologies of vermi-compost and tricho-compost have quickly and widely been popularized. As a result, demands for demonstration of vermi-compost and tricho-compost have significantly been increased at CIGs. vermi-compost & tricho-compost production is less time consuming and their use is effective for maintaining soil fertility and crop production. In addition to adding nutrition to the soil, vermi & tricho-compost act as good soil conditioners.

As of FY2019-20, 17554 demonstrations on vermi-compost and tricho-compost were established. Progress of establishing demonstrations is given in Table 3.17. On an average about 310 kg of vermi-compost was produced from each of the demonstrations only in one-month and in case of tricho-compost average production per demonstration was about 130 kg in two months.

Table 3.17: Progress of demonstrations on vermi-compost & tricho-compost

Name of demonstration	Cumulative progress of demonstrations established (No.)				Average production
	2016-17	2017-18	2018-19	2019-20	
Vermi-compost	1335	6974	11295	13523	310 kg from each demonstration
Tricho-compost	0	309	1937	4031	130 kg from each demonstration

Outputs of Demonstrations:

Yield gap of demo crops like rice, wheat, maize and mustard are noticeably minimized in project area due to timely application of technologies.

1. Area coverage of newly released varieties of rice, wheat, mustard and tomato has been significantly increased.
2. Area coverage under T. aman submergence tolerant varieties & saline tolerant varieties and heat tolerant wheat varieties has been significantly increased.
3. Seeds of demonstrations with new varieties of rice preserved as seeds by farmers helped in meeting the demand of new varieties to some extent.
4. Wide spread dissemination of demonstrated technologies helped in increased productivity of crops, specifically for rice and for summer tomato over the base line value in 2014.
5. Vegetables of improved varieties are produced at the homestead gardens and the produces are used as source of nutrition and income of the small & marginal women farmers.
6. Demonstrated technologies of HVCs, off-seasonal crops, spices, etc. have been widely practiced enhancing intensive production of these crops.
7. Use of sex pheromone traps, Vermi-compost and Tricho-compost in high value crops reduced the pesticide use and chemical fertilizer in high value crop production.

3.3.1.4 Validation Trials

Validation trials were conducted to observe and demonstrate adaptation of newly released technologies at the local environmental conditions. During the FY 2017-18 to FY 2019-20 as many as 408 validation trials were established on newly released varieties of T. aman, wheat, mustard, lentil, maize and tomato. The trial results showed good adaptation and yield performances. Progress & performances of validation trials are shown in Table 3.18.



Table 3.18: Progress & performances of validation trials

Crops	Cumulative progress of established validation trials (No.)				Trial plot		Farmers practice (ton/ha)
	2016-17	2017-18	2018-19	2019-20	Variety	Yield (paddy) (ton/ha)	
Rice-T.aman	0	69	69	272	BRRi dhan-72,73 & 90	4.7-4.9	4.27
Wheat	0	0	36	72	BARI Gom-30,32 & 33	3.73-3.8	3.15
Lentil	0	0	0	4	BARI Masur-6 & 8	1.6-1.81	1.39
Maize	0	0	0	6	Kabery-63, Super Shine 2760	10-11.2	9.74
Mustard	0	0	33	48	BARI Sharisha-17,10,14 & 9	1.7-2.01	1.32
Tomato	0	0	0	6	Mintu Super, VL-642	50-60 20-30	46.8 18.13

From the above table it is seen that yield performances of all the validation trials are better than the yield performances of the farmers' own or practicing varieties. Neighbor farmers were invited to visit the trials at different crop stages, and SAAOs explained the advantages of trial varieties in comparison to the existing/farmers' practicing varieties. Total quantity of seeds of trial plots were preserved & distributed among the farmers. This helped in adoption of newly released varieties, and areas under the varieties used in trials are gradually being increased.

Outputs of validation trials:

1. It is seen that varieties used in validation trials are better suited than the farmers' varieties producing more yield
2. Gradual increase in adoption of trial varieties was observed.
3. Farmers' varieties are being increasingly replaced by the varieties used in validation trials e.g. in Boro, BRRi dhan 74 & 81 are occupying the coverage of BRRi dhan 29 and in T. aman, BRRi dhan 72 & 73 occupying the coverage of BRRi dhan 49.
4. In wheat, BARI Gom- 31, 32 & 33 are now widely cultivated varieties due to their high yield potential and stress tolerant characteristics.

3.3.1.5 Field Days

Field days were organized at the sites of demonstrations as well as at the sites of validation trials to show the demonstrated technology to other farmers for motivation. Around 100 farmers attended the field days among which 10 were CIG farmers. Public representatives, local elites, officials from DAE & other institutions were invited at the field days. The farmers establishing the demonstrations and validation trials were the main actors in the activities of field days and they explained the main technological features and cost-benefit of the crops. This helped in easy motivation and adoption of the demonstrated technologies. Overall discussions were facilitated by the participating SAAOs and Upazila/District officers. At the field days, many of the participating farmers were seen to collect seeds of the demonstrated varieties and many placed booking requests. Progress of organizing the field days is shown in Table 3.19. So far 1154800 farmers attended the field days.

Table 3.19: Progress of field days

Field day type	Project target (No.)	Progress in (No.)				Cum. Progress (%)	Cum. No. of participants		
		2016-17	2017-18	2018-19	2019-20		Male	Female	Total
Demonstration technology	14916	540	4758	10441	13424	90%	698048	375872	1073920
Validation trial	1080	0	270	741	1011	94%	52572	28308	80880

Outputs of field days:

1. The field days helped in easy motivation and adoption of the demonstrated technologies due to direct interaction with the experienced farmers and in-field observation of the demo/trial results.
2. Field days strengthened motivation of the CIG & non-CIG farmers accelerating adoption and increased area coverage.
3. Many of the participating farmers in field days were seen to be instantly motivated and collected seeds of the demonstrated varieties.

3.3.1.6 Exposure Visits

Exposure visits were organized at the Research Stations, Horticultures Centers, showcasing equipment procured and or established under AIF-2 matching grant sub-projects. At the visit events, the technological facts and advantages as well as stories of successes were explained by the host resource speakers of the visiting organization. Progress of exposure visits is shown in the Table 3.20.

Table 3.20: Cumulative progress of exposure visits

Field day type	Project target (No.)	Progress of exposure visits (No.)				Cumulative progress (%)	Numbers of participants		
		2016-17	2017-18	2018-19	2019-20		Male	Female	Total
Exposure visits	1080	0	540	810	1080	100%	17550	9450	27000

There were good interactions among the participants and resource speakers. Seeds/saplings were collected by the interested participants and that was indicative to effectiveness and instant adoption of technologies. In the exposure visits the participating farmers learnt the practices of successes & technological aspects, etc. and the learnt practices are increasingly being used to CIG and non-CIG farmers.

Outputs of exposure visits:

1. Visiting farmers enriched their knowledge and experiences about practicing the new technologies from direct in-field observation and performances. This resulted in enhanced adoption of new technologies.
2. Visit at showcasing of AIF-2 matching grant equipment inspired the visiting CIG farmers for



sub-project submission and learning the lessons of successes.

3. Instant collection of seeds/seedlings/saplings during exposure visits helped in accelerated dissemination of new technologies.

3.3.1.7 Production of Improved/New Varieties of Seedlings/Saplings of Fruit Crops at Horticulture Centers

With a view to disseminating the improved/newly released varieties of fruit crops and improving productivity of fruit crops, a total of 677260 quality seedlings/saplings were raised at the 20 DAE Horticulture Centers.

The raised improved qualities of seedlings/saplings were sold among the farmers by keeping records. SAAOs helped the farmers in collecting the genetically pure seedlings/saplings. The seedlings/saplings were also used for establishment of demonstrations fruit garden. Planted seedlings/saplings will take around 3- 5 years to show results. This effort helps in replacing the old fruit varieties and the impact of replacing old varieties by the new ones would be reflected in near future.

Outputs of producing new variety seedlings/saplings:

1. Around 677260 seedlings/saplings of new/improved varieties of fruit crops were planted by the farmers.
2. In due course of time, the planted seedlings/saplings would be available to use as good sources of propagation materials.

3.3.2 Demonstrations & Diffusion of Technologies of PIU-DoF

Inadequate knowledge on improved aquaculture was identified as one of the most important problems while preparing micro plans. Demonstration is the best method for dissemination of new technology. Therefore, demonstrations were established on various technologies to disseminate modern aquaculture related information to the fish farmers.

3.3.2.1 Number of Demonstrations Established

As per DPP there is a provision of establishing 23535 demonstrations over the project period. As per annual work plan a total of 5074 demonstrations were established in 2019-20. The major demonstration technologies were carp poly culture, mono sex Tilapia, carp galda mixed culture, pangas mono culture, carp nursery and others (Table 3.21).

Table 3.21: Number of demonstrations established by technology during 2019-20

Technology Name	# of demos	Brief Technology Description
1. Carp Ploy Culture (CPC)	4195	Culture of Rui, Catla, Mrigal, Silver carp, Mirror carp, Common carp, Grass carp, Thai sarpunti etc. together. Fish fry of 250-400 gram weight, stocking density of 16-21/decimal is followed. Regular feeding practice is followed on the basis of body weight of fish,
2. Mono Sex Tilapia (MST)	412	Stocking of fish fry of 10-15 gram, stocking density of 200-250/decimal. Regular feeding practice is followed on the basis of gain in body weight of fish,
3. Carp Galda mixed culture (CG)	108	Culture of Rui, Catla, Mrigal, Silver carp, Mirror carp, Common carp, Grass carp along with Galda. Regular feeding practice is followed on the basis of body weight of fish
4. Pangas mono culture (PMC)	60	Stocking of fish fry of 100 gram weight having density of 250-300/decimal. Feeding rate varied on the basis of body weight gain of fish
5. Carp nursery (CN)	63	Collection of hatchlings from Stocking of fish fry of 100 gram weight having density of 250-300/decimal. Feeding rate varied on the basis of gain in body weight of fish the government farm/private farm and rearing in the nursing pond and supply fingerlings to the pond owners
Others	236	
All	5074	

3.3.2.2 Performance of Demonstrated Technologies

Performance of the demonstrated technologies was measured in terms of yield and profitability and compared with the same farmers previous years productivity of the same technology. Findings of demonstrations conducted during 2018-19 are presented in the following sections. Results of demonstrations established during 2019-20 will be available in 2020-21.

3.3.2.2.1 Performance of Demonstrated Technologies Established in 2018-19

In 2018-19 major technologies demonstrated were carp poly culture, mono sex tilapia, pangas mono culture, shing mono culture, koi and shing culture. Average water areas of carp poly culture, mono sex tilapia and pangas mono culture were 43.43, 41.66 and 34.53 decimals, respectively. In all cases recommended stocking density, species composition, stocking period, size of fingerlings and feeding techniques were followed. Benefit Cost Ratios (BCR) are 1.61, 1.48 and 1.23 in case of carp poly culture mono sex tilapia and pangas mono culture, respectively. Yields of demonstration ponds were 6.04%, 4.89% and 1.22 % higher compared to previous year's yield of carp poly culture, mono sex tilapia and pangas mono culture respectively (Table 3.22).

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Table 3.22: Performance of the demonstrations established in 2018-19

Parameters	Results (Average)		
1. Demonstrated technology	Carp poly culture	Mono sex tilapia	Pangas mono culture
2. Water area in decimals	43.43	41.66	34.53
3. Yield (Kg/ha)	5522	12279	18620
4. Production cost (Tk/ha)	525093	861737	1143103
5. Gross return (Tk/ha)	847012	1273953	1400582
6. Net return (Tk/ha)	321919	412216	257479
7. Benefit cost ratio (Tk/Tk)	1.61	1.48	1.23
8. Fish price (Tk/kg)	153	104	75
Previous year's technology	Carp poly culture	Mono sex tilapia	Pangas mono culture
10. Previous year's yield (Kg/ha)	3702	9196	13262
11. Change of yield (Kg/ha)	1820	3083	5358
12. Increased (%) of yield	67.04	74.89	71.22



Photo 5: Fish harvesting in demonstration pond



Photo 6: Fish harvesting in demonstration pond



Photo 7: Fish harvesting in demonstration pond



Photo 8: Field days in demonstration site

Average water areas of shing mono culture, koi and shing mono culture were 38.24, 4.80 and 41.31 decimals, respectively. In all cases recommended stocking density, species composition, stocking period, size of fingerlings and feeding techniques were followed. Results of demonstrations on

shing mono culture, koi and shing were compared with carp poly culture, koi and shing mono culture respectively. Benefit Cost Ratios (BCR) are 1.78, 1.38 and 1.8 in case of shing mono culture, koi mono culture and shing mono culture, respectively. Yields of demonstration ponds were 6.88%, 61.83% and 6.88% higher compared to previous years' yield of carp poly culture, koi mono culture and shing mono culture respectively (Table 3.23).

Table 3.23: Performance of the demonstrations established in 2018-19 Contd

Parameters		Results		
1. Demonstrated technology	Shing mono culture	Koi	Shing	
2. Water area in decimals	38.24	47.80	41.31	
3. Yield (Kg/ha)	6194	11859	7163	
4. Production cost (Tk/ha)	1044292	1221358	1026524	
5. Gross return (Tk/ha)	1769428	1691134	1830431	
6. Net return (Tk/ha)	725136	469776	803907	
7. Benefit cost ratio (Tk/Tk)	1.78	1.38	1.78	
8. Fish price (Tk/Kg)	256	143	256	
9. Previous year's technology	Carp poly culture	Koi	Shing	
10. Previous year's yield (Kg/ha)	5507	7332	5507	
11. Change of yield (Kg/ha)	1656	4527	1656	
12. Increased (%) of yield	76.88	61.83	76.88	

3.3.2.3 Organization of Field Days

During the reporting year a total of 5282 (22.44% of DPP provision) field days were organized against 5282 demonstrations. Field days were organized during fish harvesting to communicate the results of the demonstration. CIG and local non-CIG farmers attended the field days. Demonstration farmer briefed the results to the attending farmers. Participants observed the results of the demonstration which helped them in decision making process of technology adoption.

3.3.2.4 Organization of Exposure Visits

In the DPP there is a provision of organizing 270 exposure visits to expedite technology transfer and diffusion process. During 2019-20, 200 Upazilas have organized exposure visits. Exposure visits were organized in Government/private farms, hatcheries, nurseries, pond sites of innovative and commercial farmers to see improved technologies and gain/share knowledge.

3.3.2.5 Organization of District Level Half Yearly Workshop

Every year each project district plans to organize two half-yearly workshops to evaluate the project activities completed and discussed the activities to be completed in the remaining six months. Division, district, upazila level personnel of DoF and LEAFs are the participants. Other persons from PIU also attend the workshops. During this financial year (2019-20) all 57 districts organized a total of 114 district level half-yearly workshops. In these workshops, DFO along with other resource persons of the department discussed various aspects like objectives and targets of NATP-2, project

activities to be performed, modality of project implementation, activities planned for the year and present status of implementation, monitoring of project implementation and constraints faced during project implementation. Recommendations were made after review of activities performed.

3.3.2.6 Organization of Mid –Term Evaluation Workshop

During the reporting year two mid-term evaluation workshops were organized. The first one was organized on 18/01/2020 at fish seed production farm, Gollamari, Khulna, covering Khulna and Barisal divisions. The 2nd one was organized on 15/01/2020 at Rifles Club, Nanking Convention Hall, Rajshahi, covering Rajshahi and Rangpur divisions. The mid-term workshops were organized to evaluate the project activities completed, problems faced and plan future work. Recommendations were made after review of activities performed. At each workshop a total of 90 participants attended. The participants were concerned Deputy Directors, District Fisheries Officers, Senior Assistant Directors, Assistant Directors, Senior Upazila Fisheries officers and Upazila Fisheries Officers. Director, PIU-DoF and other senior officers from the PIU also attended.

3.3.2.7 Adoption Linkage with Technology Dissemination

In the DPP it is postulated that at the end of the project, 60% of the CIG members will adopt aquaculture technology. For the diffusion of aquaculture technology the PIU, DoF, formed CIGs, identified location specific aquaculture problems, imparted technology training, established demonstrations, organized field days, distributed leaflets and provided pond water testing services. In addition to these, Upazila Level personnel and LEAFs are providing need based advice to the fish farmers. For effective implementation of all these activities, monitoring and supervision is performed by the personnel of PIUs, division and districts level officers of DoF. All technologies popularized through this project have relative advantage over the farmer's existing technology and compatibility with the farmers' practice.

3.3.2.8 Technology Adoption and Diffusion

Up to June 2020 out of 105,640 CIG members, 54520 CIG members (51.61%) adopted improved aquaculture technologies. Of the 54520 adopters, 54.53% adopted improved management practices of carp poly culture, 30.50% adopted improved management practices of mono sex tilapia and 14.97% adopted improved management practices of pangas mono culture technology (Table 3.24). Due to influence of result demonstration, field days and exposure visits, number of CIG and non- CIG farmers may adopt modern aquaculture technologies in coming years.

Table 3.24: Extent of technology adoption (up to June 2020)

Technology adopted	Number of farmers adopted	Percent of adoption
Carp poly culture (CPC)	29730	54.53
Mono sex tilapia (MST)	16629	30.50
Pangas mono culture (PMC)	8162	14.9
Total	54520	100.00

3.3.2.9 Yield and Production Increase

Impact of various extension efforts on aquaculture technology adoption and increase of fish yield and total production were quantified. It was found that due to various extension efforts, farmers

adopted improved management practices of carp poly culture, improved management practices of mono sex tilapia and improved management practices of pangas mono culture technology. For quantification of impact of technology adoption on fish production, adopter farmer's area, yield and total production was compared with the previous years' area, yield and total production of the same farmer and the results are presented in Table 3.25. In the previous year farmers followed traditional management practices of the same fish species used in the demonstration (carp poly culture, mono sex tilapia and pangas mono culture). Due to adoption of improved management practices the yield of fish increased and total fish production increased by 44.29%, 12.50% and 14.00% in case of carp poly culture, mono sex tilapia and Pangas mono culture, respectively.

Table 3.25: Impact of technology adoption on fish production

Parameter	Results		
	Carp poly culture	Mono sex tilapia	Pangas mono culture
1. Technology adopted			
2. Number of adopters	29730	16628	8162
3. Average water area (hectares)	0.1378	0.1568	0.1931
4. Total water area of adopters (hectares)	4097	2607	1576
5. Previous year's yield (Kg/ha)	3163	5701	12507
6. Yield after adopting improved technology (Kg/ha)	4564	6418	14258
7. Previous year's total production (MT)	3163	5701	12507
8. Total production after technology adoption (MT)	18699	16732	22471
9. Incremental production (MT)	5740	1889	2760
10. Extent of production increase (%)	44.29	12.5	14.00

3.3.2.10 Improvements of Capture Fisheries

During Project Preparation 40 beels were selected and listed in the DPP for habitat improvement, establishment of Beel nurseries, stocking of indigenous fish species, establishment of fish sanctuaries and initiation of Community Based Fishery Management systems. It is expected that at the end of project implementation productivity of capture fisheries will be increased by 100% (1.14 mt/ha) from the baseline production (0.70 mt/ha). At the beginning of project implementation all the 40 selected beels were physically verified and it was found that 17 selected Beels are not suitable for intervention because in the meantime some of them are leased out, some are silted and some are not suitable for intervention due to development of infrastructure like road, drainage channel, etc. Excluding these 17 beels interventions are in progress in 23 beels of 20 Upazilas of nine districts.

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Photo 9: Beel nursery activity



Photo 10: Fingerling stocking in beel

District	Upazila	Name of the Beel
1. Tangail	1. Kalihati	1. Charan beel
2. Kishorganj	2. Itna	2. Beel haria
	3. Tarail	3. Sadia kunai beel
	4. Mithamoin	4. Chotodigha beel
	5. Pakundia	5. Nobodoia beel
3. Madaripur	6. Madaripur Sadar	6. Zazira beel
	7. Kalkini	7. Shashikor beel 8. Khilgram beel
4. Gopalganj	8. Kashiani	9. Orakandi beel
	9. Kotalipara	10. Baghiar beel 11. Hiron beel
	10. Tungipara	12. Nasukhali beel 13. Sailobala beel
	5. Netrokona	11. Kandua
5. Netrokona	12. Madan	15. Nakdhora beel
	13. Kalmakanda	16. Bisorpasha baor
	14. Barhatta	17. Daram beel
	6. Habiganj	15. Baniachang
7. Sunamganj	16. Dheari	19. Baromedhi beel
8. Brahmanbaria	17. Nasirnagar	20. Hurol beel
9. Pabna	18. Faridpur	21. Beel Ruhul
	19. Atgharia	22. Beel Chatra
	20. Chatmohor	23. Saowaldaha beel

A summary of the activities performed during 2019-20 under improvement of capture fisheries are presented in Table 3.26.

Table 3.26: Activities performed during 2019-20 under improved capture fisheries

Activity wise project target	Progress up to June 2020
1. Habitat improvement (23 beels)	Work order issued for 14 beels and works completed for 2 beels. Due to COVID-19 works for habitat improvement was not performed in 12 beels and completion time of the works has been extended up to December 2020 for 11 beels.
2. Establishment of beel nurseries (23 beels)	Beel nurseries were established in 23 beels during 2019-20, 35.60lakh fingerlings were released in 23 beels produced from 23 beel nurseries.
3. Stocking of fingerlings (23 beels)	A total of 17591 kgs of fish fingerlings were stocked in 23 beels in 2019-20.
4. Establishment of fish sanctuaries (23 beels)	Completed establishment of fish sanctuaries in 14 beels during 2019-20.
5. Initiation of Community Based Fishery Management systems (23 beels)	Beneficiaries were selected in all 23 beels and community based fishery management system is established.
6. Rest of the 17 beels	New 17 beels have been selected and preparation of intervention plan is in progress. Budget provision has kept in the proposed revised DPP for implementation.
Fish yield from open water fisheries increased to 1.25 mt/ha during 2019-20 from baseline yield of 0.70 mt/ha.	

3.3.2.11 Supply of Quality Fish Seed

The Bangladesh Fisheries Research Institute (BFRI) in their Fisheries Research Station in Mymensingh has completed pure-line brood development activity of GIF Tilapia, Vietnamese Koi and Vietnamese Pangas. Four farms namely Raipur of Laximpur, Nimgachi of Sirajganj, Shantinagar of Sunamganj and Kotiadi of Kishorganj have collected pure seeds of the above mentioned species and rearing is in progress for pure line brood development (Table 3.27).

Table 3.27: Number of fish fry received from BFRI as of 30th June 2020

Name of hatchery	Fish species	Number received from BFRI
1. Nimgachi Aquaculture project, Raiganj, Sirajganj	Vietnamese Koi	200
	Vietnamese Pangas	447
	GIFT (Tilapia)	2000
2. Carp hatchery complex, Katiardi, Kishorganj	Vietnamese Koi	200
	Vietnamese Pangas	650
	GIFT (Tilapia)	2000
3. Carp hatchery complex, Shantiganj, Sunamganj	Vietnamese Koi	2250
	Vietnamese Pangas	3800
	GIFT (Tilapia)	2450
4. Fish Hatchery and Training Center, Raipur, Laxmipur	Vietnamese Pangas	5000
	Vietnamese Koi	2000
	GIFT (Tilapia)	8000

3.3.2.11.1 Extent of Fingerlings Production and Utilization Pattern

Fingerlings were produced in all four farms of Vietnamese Koi and GIFT (Tilapia). Out of 548,000 number of fingerling produced so far, 36.93%, 61.97% and 1.09% were sold, ready for sale and rearing as 2nd generation brood respectively (Table 3.28). In 2021 fingerlings will be produced from Vietnamese Pangas due to rearing space constraints in those fish hatchery farms. In this regard, the farm managers were instructed to keep 500-1000 (in case of Nimgachi 450) broods of Pangas and 200-400 broods in case of Koi in the respective farms and the excess number of broods to be sold to government/private hatcheries following government rules.

Table 3.28: Production of fish seed from pure line brood development program as of 30th June 2020

Name of hatchery	Fish species	Number of fingerlings			
		Produced	Sold	Ready for sale	Rearing 2 nd generation brood
1. Nimgachi Aquaculture project, Raiganj, Sirajganj	Vietnamese Koi	80,000	48,000	31,500	500
	Vietnamese Pangas	Fingerlings will be produced in 2021			
	GIFT (Tilapia)	40,000	18,000	21,000	1,000
2. Carp hatchery complex, Katiardi, Kishorganj	Vietnamese Koi	100,000	-	99,500	500
	Vietnamese Pangas	Fingerlings will be produced in 2021			
	GIFT (Tilapia)	75,000	30,000	44,000	1,000
3. Carp hatchery complex, Shantiganj, Sunamganj	Vietnamese Koi	80,000	-	80,000	-
	Vietnamese Pangas	Fingerlings will be produced in 2021			
	GIFT (Tilapia)	70,000	16,200	53,800	-
4. Fish Hatchery and Training Center, Raipur, Laxmipur	Vietnamese Koi	51,000	50,000	-	1,000
	Vietnamese Pangas	Fingerlings will be produced in 2021			
	GIFT (Tilapia)	52,000	40,200	9,800	2,000
Total		548,000	202,400	339,600	6,000
% of total		100	36.93	61.97	1.09

3.3.3 Implementation of Livestock Technology Demonstration

Demonstration is one of the most effective extension approaches for dissemination of improved/modern technology to the farmers. Through demonstration, farmers can learn and acquaint with the new technology and gain practical knowledge that build confidence of the farmers about new technology. Since inception of the project to 30 June 2020, a total of 29203 demonstrations were conducted by CIG farmers, of which 9495 demonstrations on cow rearing technology, 4740 demonstrations on beef fattening technology, 3062 demonstrations on goat rearing technology, 2954 demonstrations on poultry rearing technology and 503 demonstrations on duck, sheep, buffalo, pig etc. rearing technologies. Besides these, 8386 demonstrations were established on improved management of high yielding fodder cultivation to expand fodder cultivation in project area. The technologies used in the demonstration were selected on the basis of problems identified through CIG micro planning activity. The progress of technology-wise demonstrations establishment is shown in Table 3.29.

Table 3.29: Information of establishment of livestock technology demonstrations

SL #	Title of Demonstration	Major Technology of Demonstration	Target (No.)		Progress (No.)	
			2019-20	Project	2019-20	Cumulative
1	Cow rearing	Improved housing balanced feeding and health management	3552	13800	3552	9495
2	Beef fattening	Beef fattening using UMS	1907	6441	1907	4740
3	Goat rearing	Goat rearing using slat system housing	1213	4210	1213	3062
4	Poultry rearing	Balanced feeding of sonali/local poultry	1187	4120	1187	2954
5	Duck rearing	Balanced feeding of duck	157	605	157	400
6	Sheep rearing	Sheep rearing using slat system housing	46	170	46	119
7	Pig rearing	Pig rearing using balanced feeding and health management	14	44	14	33
8	Buffalo rearing	Balanced feeding and health management of buffalo	6	25	6	14
9	Fodder Cultivation	HYV and Modern Cultivation Practices	2681	11100	2681	8386
Total			10763	40515	10763 (100%)	29203 (72.08%)

3.3.3.1 Demonstration on Cow Rearing Technology

The major source of milk is dairy cow in Bangladesh. The milk yield of cow is low compared to many countries of the world. It was identified during micro plan preparation that low productive native cow and acute scarcity of feeds and fodder as well as poor knowledge and skills on improved management of cow i.e. improved housing, balanced feeding, health management, maintaining bio-security of farm etc. are the basic problems for low productivity. To improve the knowledge and skills of the farmers, 9495 demonstrations were established since inception to June 2020, of which 3552 demonstration were established in the reporting year 2019-20. Cow rearing demonstration mainly focuses on improved management practices i.e. improved housing, balanced feeding, scheduled vaccination, scheduled de-worming, bio-security etc. Most of the demonstrations were mainly conducted with cross-breed cows. In case of crossbreed cow, the analysis of upazila sample data of cow rearing demonstrations showed an increase of average milk production by 2.85 liter per day per cow with the demonstrated farmers over the non-demonstration farmers. The average milk production of demonstration farmers' was 8.25 liter per day per cow as against 5.40 liter in non-demonstration farmers. In case of local cow, an average milk production increased 0.88 liter per day per cow. The average milk production per day per cow is 2.18 liter in case of demonstrated farmers where 1.30 liter in other than demonstrated farmers. The data indicate that improved cow rearing practices have the potentiality to increase milk production in the country.

To disseminate cow rearing technology to other CIG farmers as well as non-CIG farmers, various extension methods and techniques i.e. training, field day, CIG-non-CIG gathering etc. were implemented. As a result since inception to till date in total 126871 farmers adopted these technologies of which 57542 are CIG farmers and 76644 are non-CIG farmers.

3.3.3.2 Demonstration on Beef Fattening Technology

Due to increasing demand of meat and increased income of consumers, beef fattening has become a profitable income generating enterprise for smallholder farmers in many areas of Bangladesh. As per findings of Bangladesh Livestock Research Institute (BLRI), the body weight of fattening cattle by practicing modern technology can be increased 700-900 gram per day per cattle instead of normal growth rate 200 to 350 gram per day per cattle. To maximize the productivity at farmer's level by practicing the recommended technology, 4740 demonstrations were established since inception to 30 June 2020, of which 1907 demonstrations were established during the FY 2019-20. Mainly Urea Molasses Straw (UMS) or Urea Treated Straw (UTS), concentrate feed, de-worming, vaccination, etc. technologies were applied in beef fattening demonstration and fattening cattle were reared for 3 to 6 months.

The results of demonstration showed that the daily growth rate of cross-bred cattle on the average was 742gm in demonstrated cattle where 387gm in other than demonstration cattle. Average 355gm daily growth rate increase was observed in demonstrated cattle over other than demonstration cattle. In case of local cattle, an average 627gm weight increase was observed in demonstrated cattle where 318g in other than demonstration cattle. About 309gm daily growth rate increase was observed in demonstrated cattle over other than demonstration cattle.

The data indicate that beef fattening with recommended practices have the potentiality to increase the meat production at farm level. A total of 77472 farmers adopted this technology of which 28854 are CIG farmers and 48618 are non-CIG members.

3.3.3.3. Demonstration on Goat Rearing Technology

Bangladesh has ample scope for rearing Black Bengal Goat for its prolific breeding habit, quality hides and popularity of meat. To increase the production of goat meat, PIU-DLS established 1213 demonstrations on goat rearing in the reporting year 2019-20. On the other hand 3062 demonstrations were established on goat rearing technology from the beginning of the project to 30 June 2020. Most of the demonstrations were established using Black Bengal Goat. Slat System Housing was used in the demonstration along with supplementary feeding, regular vaccination, de-worming as a package of technologies.

The demonstrated farmers reported that no goat was affected by diseases particularly PPR during demonstration. The physical growth of goat was good, they observed. As a result, most of the she-goats were conceived on regular basis i.e. mostly after every six months. Besides these, average body weight increased 51gm per day per goat where 35gm weight was increased other than demonstration farmers.

The result indicates that improved goat rearing practices at small and marginal level farmers has the scope to maximize their production and productivity. Up to June 2020, 52345 farmers adopted the demonstrated technologies of which 20277 are CIG farmers and 32068 are non-CIG members.

3.3.3.4 Demonstration on Poultry Rearing Technology

Poultry produces both meat and egg. Many of the consumers in our country like to eat local poultry meat and egg. The availability of local poultry is decreasing day by day due to low growth and

productivity against the high demand. The market price is also high for local poultry meat and egg compare to commercial poultry. Keeping this in view the demand for local egg and meat, NATP-2 DLS has taken initiatives to increase the knowledge and skills of farmers on improved management practices of local poultry birds. NATP-2: Livestock Component established 2954 demonstrations since inception of the project to 30 June 2020 including 1187 demonstration during 2019-20. Improved local breed, ideal housing, balanced feeding, vaccination, bio-security etc. technologies were practiced by the farmers in implementing the demonstration activities.

The results of demonstrations conducted in 2019-2020 revealed that the number of egg production was 73 per local bird per year in the demonstrated farms where 58 in other than demonstrated farms. The analysis of Upazila sample data showed that about 25% production increase observed in the demonstration farms over other farmers' practice. In case of Sonali bird, the number of egg production was 188 per bird per year in the demonstrated farms where 153 in other than demonstration farms, which was about 23% higher than traditional farmers practice.

The result indicates that the poultry rearing has the opportunity to maximize the production by practicing recommended technologies at farm level. A total of 53001 farmers adopted the technology of which 18863 are CIG farmers and 34138 are non-CIG farmers.

3.3.3.5 Demonstration on Duck Rearing Technology

Meat and egg of duck is one the important sources of animal protein in our country. Many small and poor farmers are involved in duck rearing with both local and exotic breed. Though rivers, haors (Water bodies), canals, pond etc. in the rural areas are most suitable for duck rearing but duck farmers don't get optimum production from duck due to limited use on improved rearing practices of duck as well as consistently reduction of natural feeds. To motivate farmers on the adoption of improved management and rearing practices of duck, 400 demonstrations were conducted by the CIG farmers since inception of the project to 30 June 2020 including 157 demonstrations in the FY 2019-20. Improved breed, housing management, balanced feeding practices, vaccination; bio-security as package of technologies was practiced by the farmers in the demonstration activities.

The field data on result of demonstration of duck rearing revealed that the number of egg production per duck per year was 189 in the demonstrated farms where 152 in other than demonstration farms. The result indicates that the duck rearing has the opportunity to maximize the production by practicing demonstrated technologies in their farms. A total of 7809 farmers adopted this technology of which 2524 are CIG farmers and 5285 are non-CIG members.

3.3.3.6 Demonstration on Sheep, Pig & Buffalo Rearing Technology

Sheep is being reared in limited areas of Bangladesh but it is playing an important role in producing meat and wool. Sheep is comparatively more disease resistant than goat. So sheep rearing may be more suitable than goat in the low lying areas.

To expand the sheep rearing and to disseminate improved sheep rearing technology practices, PIU-DLS established 119 demonstrations since inception to 30 June 2020. The result of demonstration showed that the disease infection has been reduced and body weight increased.

Besides the above technology demonstrations, PIU-DLS also established 14 demonstrations on buffalo rearing and 33 demonstrations on pig rearing technology.



3.3.3.7 Demonstration on Fodder Cultivation Technology

Scarcity of fodder is one of the major constraints for sustainable dairy farming as well as other livestock rearing in Bangladesh. Due to in-sufficient production of fodder, cattle farmers in Bangladesh face different problems such as low growth, low re-productive performance, susceptible to various diseases and finally low productivity. To overcome the acute scarcity of green grass, special emphasis was given to expand fodder cultivation in the project area through organizing fodder cultivation demonstration. As part of different initiatives for expanding fodder cultivation, since inception of the project to 30 June 2020, 8386 fodder cultivation demonstrations were established, of which, 2681 demonstration plots were established during 2019-20. Mainly 2 types of HYV of fodder were practiced in demonstration plots.

The data from upazilas showed that the average fodder production in the demonstrated plot of Hybrid Napier is 144 kg per decimal per cutting where average production of fodder is 115 kg of farmer's practice. In few upazilas of southern region, Pakchong variety was used in the demonstration plots and the average production was obtained 182 kg per decimal per cutting whereas 133 kg was obtained from farmers practice. DLS field level staff and CEALs provided necessary supports to the farmers on improved cultivation practices of fodder production. The interested farmers collected fodder cutting from Upazila office Campus Nursery as well as from existing fodder cultivating farmers.

The main objective of fodder cultivation demonstration is to increase the number of fodder cultivating farmers as well as increase the area of fodder cultivation in the project upazilas. Due to these initiatives, the number of farmers engaged in fodder cultivation has been increased to 53248 numbers which was 17327 numbers before starting of project activities. On the other hand, the fodder cultivation area has also been increased from 1301.47 acre to 4269.64 acre. Now the fodder is being cultivated commercially in many places of the project area specially Jhinaidah, Jashore, Magura, Bogura, Natore because of the project activities.

3.3.3.8 Implementation of Field Day

Field Day (FD) is an extension tool generally conducted at the site of technology demonstration. It is an effective "farmer to farmer" technology dissemination process. Field Day provides opportunity to surrounding farmers to visit demonstration site, learn about the activities and results of demonstrated technology, ask questions and encourage themselves to grasp the technology and subsequently try to implement the new idea(s) at his/her own farm. Since inception of the project to 30 June 2020, 27739 Field Days were implemented and 10763 Field Days were implemented at demonstrations sites during the reporting year 2019-20. On average, the neighboring 27 CIG and non-CIG farmers attended each field days activities and a total of 748953 farmers participated in these field days. The detail information of Field Day is given in Table 3.30.

Table 3.30: Information of implementation of field days

Sl. #	Activity/Output	Target		Progress	
		2019-20	Project	2019-20	Cumulative
1	No. of field days	10763	40515	10763 (100%)	27739 (68%)
2	No. of farmers attended	269075	1010375	290601	748953
3	N. of female farmers attended	94176	353631	119146	307070

3.3.3.9 Implementation of Exposure Visit

Exposure Visit is an effective way of learning and disseminating technologies from one area to others area. It involves taking a group of farmers, staff, officers or other stakeholders from their own villages or areas to other villages or areas to expose them in new technologies which are being practiced by farmers of other areas or are being developed at research stations or activities being implemented by other organizations. Since inception of the project to 30 June 2020, 809 exposure visits were organized at the upazila level, of which 269 exposure visits organized in the financial year 2019-20. In each exposure visit, on average 34 participants attended each exposure visit which includes 25 CIG farmers including minimum one third female farmers, 3-4 CEALs, 1-2 staff and officers from DLS were attended as participants. The participated farmers expressed high satisfaction on visiting new or improved management practices observed in other areas or locations. The detail information of Exposure Visit is given in Table 3.31.

Table 3.31: Implementation of exposure visit

Sl. #	Activity/Output	Target		Progress	
		2019-20	Project	2019-20	Cumulative
1	Number of Exposure Visits	270	1110	269 (99.63%)	809 (73%)
2	Number of participants attended	9180	37740	9146	27506
3	Number of female participants attended	3213	13209	3172	9076

3.3.3.10 Implementation of CIG and Non-CIG Gathering

CIG & non-CIG Farmers Gathering is an experience sharing extension method for technology diffusion from farmers to farmers. The main objective of the activity is to increase the technology adoption beyond CIG. The implementation of CIG and non-CIG gathering was started in the fiscal year 2019-20. Since inception to June, 2020, a total of 3112 CIG & non-CIG farmers gathering were implemented and 1336 CIG & non-CIG farmers gathering were implemented during year 2019-20. Each rally includes 50 farmers, 5 from CIG and 45 from neighboring non-CIG farmers. A total of 1, 55,600 farmers participated in these activities. The duration of the gathering is normally half day. Local public representatives, senior government officials, head of educational institutions and innovative farmers were present and delivered motivational speech in these occasion. The improved technology adopting CIG farmers presented their experiences before the non-CIG farmers, how they are using technology as well as how they are being benefitted through using technology and motivated the non-CIG farmers to adopt the technology. The detail information of CIG & non-CIG farmers gathering is given in Table 3.32.

Table 3.32: Implementation on CIG and non-CIG gathering

Sl. #	Activity/Output	Target		Progress	
		2019-20	Project	2019-20	Cumulative
1	No of CIG and non-CIG gathering	1341	5362	1336 (99.63%)	3112 (58%)
2	No of farmers attended	67050	268100	66800	155600
3	Number of female farmers attended	23468	93835	23880	54760

3.3.3.11 Implementation of Vaccination Campaign

Vaccination is one of the most important activities of health management for livestock. Scheduled vaccination can reduce mortality and increase productivity of livestock. The vaccination coverage for small holder livestock farmers who possess cattle, goat, sheep, poultry is very low which causes various diseases, increases mortality and decreases productivity of livestock. Since the beginning of the project to 30 June 2020, 38570 vaccination campaigns were organized at the field level, of which 16164 vaccination campaign were implemented in the reporting year. Mainly FMD, Anthrax, HS & BQ vaccine for cattle; BCRDV, RDV, Gumboro, Fowl Pox & Fowl Cholera vaccine for poultry and PPR & Goat Pox vaccine for goat were given through these campaigns. On average 97 cattle, 35 goats and 144 poultry birds were vaccinated in these campaigns. The main purpose of vaccination campaign was to motivate farmers to vaccinate their livestock on regular basis. Due to vaccination campaign, awareness on importance of vaccination has been created among the farmers. As a result, a large number of farmers have already been motivated and many farmers vaccinated their livestock regularly. The information detail of vaccination campaign is given in Table 3.33.

Table 3.33: Implementation progress of vaccination campaign

Sl. #	Activity/Output	Target		Progress	
		2019-20	Project	2019-20	Cumulative
1	No. of vaccination campaign implemented	16164	58338	16164 (100%)	38570 (38%)
2	No. of cattle vaccinated	-	-	1529304	3741290
3	No. of goat vaccinated	-	-	514766	1349950
4	No. of poultry bird vaccinated	-	-	1893792	5554080
5	No. of farmers benefitted	-	-	686366	2044210
6	No of female farmers benefitted	-	-	248708	756357

3.3.3.12 Implementation of De-worming Campaign

The Parasitic Infestation is a common problem in health management of livestock in Bangladesh. The objective of de-worming campaign is to control parasite of livestock through creating awareness and motivating farmers. The livestock farmers of Bangladesh are not fully aware of the effect of parasite on livestock health. To create awareness and control the parasite, 21047 de-worming campaigns were organized since the inception of the project to 30 June 2020, of which 6728 campaign were organized during the fiscal year 2019-20. On average 81 cattle and 46 goats were given de-worming tablet in each campaign. As a result, awareness among farmers on de-worming of livestock is increasing, which might contribute to increase production of livestock. The purpose of de-worming campaign is to encourage farmers to provide de-worming tablet to their cattle and goat as per recommended dose. The CIG and non-CIG farmers have been benefitted from these campaigns. The detail information of de-worming campaign is presented in Table 3.34.

Table 3.34: Information of implementation progress of de-worming campaign

Sl. #	Particulars	Target		Progress	
		2018-19	Project	2018-19	Cumulative
1	No. of de-worming campaigns	6728	29169	6728 (100%)	21047 (72%)
2	No. of cattle given de-wormed	-	-	493235	1704807
3	No. of goat de-wormed	-	-	306607	968162
4	No. of farmers benefitted	-	-	158154	456028
5	No. of female farmers benefitted	-	-	72145	247805

3.3.3.13 Implementation of Infertility Campaign

Infertility is the inability to become pregnant or carry a pregnancy to full-term. It has an adverse effect on reproductive performance of a cow/heifer. Common causes for infertility are: non-detective estrus, anestrus, ovulatory defects (delayed ovulation, anovulation), persistent corpus lutein, cystic ovaries, luteal deficiency, repeat breeding, nutrition deficiency, stress condition, genetic factor etc. Ultimately it effects on productivity and production of milk and meat. Keeping this in view, PIU, NATP-2, DLS has been implementing Infertility Campaign from the fiscal year 2018-19. Since inception to 30 June 2020, a total of 7088 infertility campaigns have been organized at CIG level, of which 3548 campaigns were organized in the reporting year 2019-20. Generally, Veterinary Surgeon attends these campaigns and highlights the causes of infertility, reasons of the problem, as well as how farmers can overcome the problem of infertility. Then they physically examine/diagnose the animal. On average, 18 animals were examined and prescribed treatment in each campaign. The detail information of infertility campaign is given in Table 3.35.

Table 3.35: Information of implementation progress of infertility campaign

Sl. #	Particulars	Target		Progress	
		2019-20	Project	2019-20	Cumulative
1	No. of infertility campaign	3555	22925	3548 (99.80%)	7088 (30.92%)
2	No. of animals examined and prescribed for treatment	-	-	67408	131128
3	No. of farmers benefitted	-	-	61527	126948
4	No. of female farmers benefitted	-	-	23836	48751

3.3.3.14 Technology Adoption by CIG and non-CIG Farmers

Technology adoption means a change of practice or change in use of a technology that was introduced and/or promoted by the project. The project has a specific target for technology adoption by the CIG and non-CIG farmers. At least 60% CIG farmers would adopt technology and 3 non-CIG farmers would adopt technology against one CIG adopter. Technology means a behavior or a practice which brings change at production level in a certain period of time. Technology adoption is not an effect of a single extension activity but adoption is the combined effect of a wide range of technology diffusion activities which were carried at CIG level. The major extension activities are: CIG farmers training, technology demonstration, fodder cultivation demonstration, field days, exposure visit, non-CIG farmers rally, vaccination, de-worming campaign, infertility camping etc. As a result of implementation of various technology diffusion activities, CIG farmers have started



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to adopt improved livestock technology in their farming activities. The following combined effects were observed at the field level as a result of various technology diffusion activities:

- Created awareness and enhanced knowledge and skills of farmers on use of improved livestock technology
- The coverage of vaccination, de-worming, balanced feeding, improvement of shed/house, maintaining bio-security etc. are increasing both at CIG and non-CIG level.
- Diseases infestation has been reduced.
- The adoption of technology by the farmers is increasing over the time
- The productivity of livestock farms specially yield of meat, milk and eggs are increasing due to adoption of improved technology either in package or partially.
- The awareness of farmers on environmental and social safeguard practices improved
- The farmers are gradually considering the livestock farming as business.

The major technologies adopted by the CIG farmers are: Improved house/shed management, balanced feeding, schedule vaccination, scheduled de-worming, bio-security etc. Since inception to 30 June 2020, 129133 CIG farmers adopted different livestock technology. It may be mentioned here that the adoption rate of vaccination and de-worming technology is comparatively high because farmers are very interested to vaccinate their animals for prevention of diseases as well as de-worming for improvement of herd health and increase productivity of animals. The detail information of technology adoption is given in Table 3.36.

Table 3.36: Information of technology adoption by CIG farmers

Sl. #	Title of activities	Technology adoption	Target (No.)		Progress (No.)	
			2019-20	Project	2019-20	Cumulative
1	Cow rearing	Improved housing, balanced feeding, vaccination, de-worming etc.	15000	58286	14696	57542
2	Beef fattening	Beef fattening using UMS, vaccination, de-worming etc.	7000	29926	5320	28854
3	Goat rearing	Goat rearing using slat system housing, vaccination, de-worming etc.	2400	21278	2258	20277
4	Poultry rearing	Balanced feeding of Sonali/local poultry, improved shed, vaccination etc.	2000	16708	1825	18863
5	Duck rearing	Balanced feeding of duck, improved shed, vaccination etc.	800	2784	769	2524
6	Sheep rearing	Sheep rearing using slat system housing, vaccination, de-worming etc.	250	884	212	822
7	Pig rearing	Balanced feeding and health management	50	208	33	179
8	Buffalo rearing	Balanced feeding and health management	30	78	40	72
Total Adopter			27530	133152	25113	129113
Female Adopter			11900	46604	10639	54127



3.3.3.15 Increase of Livestock Production/ Productivity Due to Adoption of Improved Technology

Extension services have been provided to farmers for dissemination of improved livestock technology. The major extension services were: training to CIG farmers, technology demonstrations, fodder cultivation demonstration, field days, exposure visit, CIG & non-CIG farmers rally, vaccination campaign, de-worming campaign, infertility campaign etc. As a result, a large number of CIG farmers adopted improved livestock technology in their farm. The adoption of improved technology is contributing to increase the productivity and production of farm. According to the data obtained from the field level, the livestock productivity of dairy milk, body weight of cattle & goat, and egg of sonali poultry and duck were increased 21%, 26%, 15%, 11% and 14%, respectively over baseline or before project. The information of productivity of dairy cow, beef cattle, goat, poultry and duck is given in Table 3.37.

Table 3.37: Information of productivity of dairy cow, beef cattle, goat, poultry and duck

Products	Measuring unit	Baseline value	Project target	Progress up to till date	Increase (%)
Dairy cow	Liter milk/Day/Cow	3.00	3.90 (30%)	3.62	21%
Beef cattle	Live body weight (Kg)	160	225 (40%)	202.15	26%
Goat (Body weight gain)	Live body weight (Kg)	14	16.8 (20%)	16.2	16%
Poultry (Sonali)	No. of egg/ Year./Hen	156	180 (15%)	169	11%
Duck	No. of egg/ Year./Duck	122	145 (15%)	139	14%

3.4 Strengthening Institutional Capacity to Improve the Outreach and Quality Extension Service Delivery

3.4.1 Establishment and Functioning of FIAC

The Farmer's Information and Advice Centers (FIAC) are one-stop extension service centers developed and housed in two rooms (one room for crop and the other room for fisheries and livestock) in the newly built two-storied Union Parishad (UP) office buildings of the project upazilas. As yet 1621 FIACs have been established, of them 654 were established under NATP-1. NATP-2 provided required furniture and other logistics for SAAO, CEAL and LEAF to sit and run the centers. FIACs have been equipped with signboard, necessary furniture, pest & seed museum, seed moisture meters, foot pumps, water testing kit, and other small scale agricultural equipment, IEC materials e.g. booklets, technology leaflets etc. FIACs remain open during the office hours, and SAAOs, CEALs & LEAFs provide services to all both CIG and non-CIG farmers following a systematic office routine/roaster. Farmers can also borrow equipment from the FIACs for their use.





FIAC Services at a Glance

- Extension service providing office and meeting place for SAAOs, CEAL and LEAF
- Technology information display center
- Pests, seeds, inputs and disease museums
- Borrowing of seed moisture meters, foot pumps, water testing kit, and other small scale agricultural equipment by farmers
- Insects, pest and disease diagnosis, prescriptions and extension advisory services to the farmers
- Information service to farmers related to availability source of quality seeds, saplings, animal breed, fingerlings etc.

are also equipped with mobile tablets and Pico projectors being used in demonstrating captured images, apps, etc. to the visiting farmers in the FIACs. SAAOs/CEAL/LEAF working in FIACs also uses the tablets in video conferencing with the farmers. Displaying arrangements of improved crop variety seeds, major pests & diseases, beneficial insects, sex pheromone traps, etc. have been displayed at the FIACs and are used to motivate the visiting farmers. These techniques add significant value in technology dissemination and adoption.

The services from FIAC are being broadened to provide technical supports through field visits, primary treatment and diagnostic services, promotion and expansion of scalable new technologies through motivation, linking producers to the markets, etc. along with the advice.

Number of visiting/contacting farmers at the FIACs varies season to

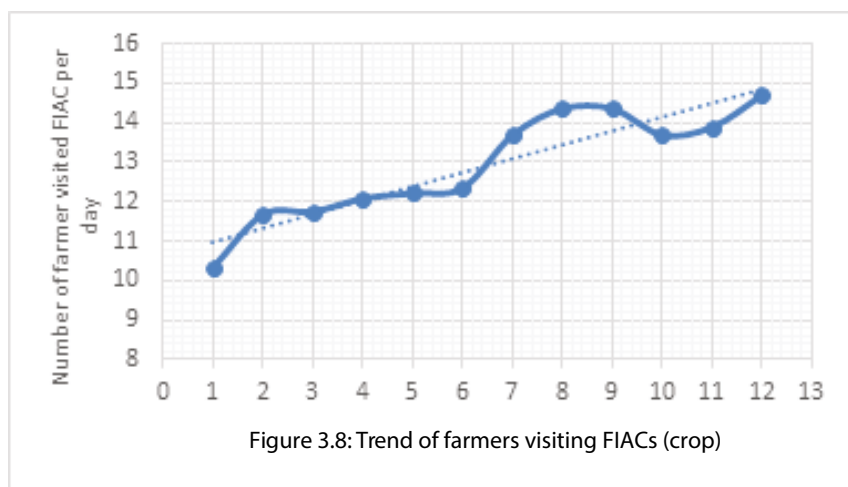


Figure 3.8: Trend of farmers visiting FIACs (crop)

season (Fig.3.8). Maximum farmers are found to visit/contact the FIAC (crop) during the intensive cropping season - November to March. Number of visiting farmers at the FIACs is increasing over time and it is estimated that during the months from November to February 2020 on an average each day around 15 farmers directly visited and made contacts in each of the FIACs (Figure: 3.8). Due to the crisis of COVID-19 number of visiting farmers from the month of March to June 2020 has significantly been declined.

The PIU-DoF data reveal that on an average, 13 fish and 24 livestock farmers visiting each FIAC per month. The most important advise/problems/issued raised by the FIAC visiting fish farmers are (i) sources of quality fish seed and feed, (ii) control of fish disease, (iii) water quality management, (iv) stocking density, species composition, (v) fertilization, (vi) fish feeding, (viii) information of fish price prevailing in other areas. Farmers are getting pond water quality testing services along with a prescription for taking corrective measures if needed. Leaflets were given to the visitors in case of



need. All these activities are contributing in production of fish. During the COVID-19 farmers are getting extension services through mobile phone and tablet.

In the FIAC separate registers are being maintained by the SAAOs, CEAL and LEAF. The farmers' visit registers records date-wise contact details of the farmers visiting FIAC, details of the problems faced and the prescriptions given by the SAAOs, CEAL and or LEAF. Complaint registers and complaint boxes are kept in the FIAC for the farmers to drop their complaints and/ or write those in the registers, which have been reviewed time to time by the Upazila Officers and take necessary measures to address them.

Several initiatives have been undertaken to popularize FIAC: Publicity of FIAC services are continued using posters, leaflets and conducting campaigns. Messages of FIAC services are being intensively communicated to CIG and non-CIG farmers making personal contacts. Elite persons and public representatives are invited at the FIACs. Instant and quality services are ensured keeping the FIACs full-time opened.

3.4.2 Development and Deployment of CEAL and LEAF

As PIU-DLS and PIU-DOF do not have any staff working at union level, the project has selected from the host community one Community Extension Agent for Livestock (CEAL) for PIU-DLS and one Local Extension Agents for Fisheries (LEAF) for PIU-DOF in each union. Total 2681 CEALs (241 female) and 2638 (218 female) LEAFs are appointed to provide livestock and fisheries related extension services to their host communities and to facilitate implementation of project activities at the village/community level. One CEAL received 14-day basic and 3-day refresher training, one bi-cycle, one starter kit box from the project. The LEAF also received 8-day of basic and 4-days of refresher trainings, one water testing kit, a bicycle from PIU-DoF for their mobility. Every CEAL and LEAF also received from the project a mobile tablet with internet connection for their easy communication of information.

CEALs and LEAFs attend FIACs at least twice a week as per their duty roaster and deliver advices and services for solutions of farmer's problems. Besides, they also assist Upazila Livestock and Fisheries Officers to organize CIG farmers training, vaccination and de-worming campaigns, conduction of demonstrations, field days, etc., with the CIG members and other community people. CEALs have now the capacity on vaccination, primary treatment, AI service, etc. and they are being paid for these services by the service recipients. CEALs receive fees from farmers for rendering the services. It is revealed from the field data that one CEAL can earn on average Tk. 9900.00 per month.

3.4.3 Equipment and Material Support by PIUs

The PIUs completed most of their goods procurement and supplied those to their district and upazila offices and the FIACs most of their required equipment and material in order to their smooth and speedy implementation of project activities and also to facilitate monitoring and supervision. Among the important items procured are Double cabin pickup, Motor cycle, Mobile tablet, Furniture for FIACs and District & Upazila Training Centers, Laptop, Multimedia projectors, Pico-projectors, Moisture meters and Foot Pumps for FIAC, IRRI Cocoon for seed preservation, Fita Pipe (Portable) & Flexy canvas hose pipe for irrigation for CIGs, Equipment for DAE Central Pesticide Laboratory, Kits and equipment for use in the 36 Upazila Veterinary Hospitals.



3.4.4 ICT Initiatives for Technology Dissemination

The introduction of ICT can play an important role in speedily reaching the technology to the farmers. The importance of use of ICT in disseminating technology to the farmers has been described in the project document and necessary financial allocation was kept in DPP. The major ICT initiatives are: establishment of ICT based project management information system (PMIS), accounting information system (AIS), design & development of website for information management & communication, development of mobile apps, service delivery management information system (SDMIS) development, digitization of FIAC, video clip based extension, etc. In pursuant to the above provision, PIU-DAE, PIU-DOF and PIU-DLS completed procurement of ICT related equipment and materials, distributed and installed those during 2018-19. The capacity building activities for field level officer and staff on use of ICT and ICT equipment is continuing. The three extension PIUs had also developed their separate websites and Facebook pages and are being enriched with various technological information, project guidelines, reporting forms and compiled reports, project databases, reading materials, apps, etc. Notices are also regularly being uploaded in the websites for easy and quick accessing by the field offices. The websites are regularly updated and enabled many users to enhance their knowledge in regard to project perspective and agricultural technologies.

In the Facebook pages, project activities focusing successes along with photographs are regularly uploaded mostly by the departmental Upazila Officers of the project area.

The project provided Mobile tablets to 2,715 LEAFs, 2,681 CEAsL and 4,336 SAAOs serving in 2,715 unions of 270 project upazilas and for use in 1,621 FIACs. The mobile tablets are being used by the SAAOs, CEALs and LEAFs for record keeping, capturing images, video recording, etc. as well as demonstrating the captured images, apps & videos in FIACs & farmers motivational events for effective sharing of technologies. PIUs also supplied all the available mobile apps with agricultural technology knowledge and information and instructed to install those in the tablets, so that SAAOs, CEALs and LEAFs can further improve their technical knowledge through browsing those and take assistance while providing advisory service to the farmers.

The project also had procured 300 PICO Projectors (100 each for PIU-DAE, PIU-DoF and PIU-DLS) and supplied those to their selected Upazila Offices. PICO Projectors can be operated in remote areas without power connection. They are being used at the FIACs, CIG training events, CIG meetings, field days, etc. and performances of advanced technologies, success stories, documentary, captured images, videos, apps, etc. are demonstrated facilitating motivation more effective.

3.4.5 Development of Training and Communication Materials

This year **PIU-DAE** published its 2018-19 Annual Progress Report and Success Stories on NATP2-DAE performances in addition to the 18 previously printing materials. The publications are distributed among the upazilas, districts & regional offices of DAE, project units and others. This year PIU-DAE had produced two documentaries on Agricultural Innovation Funds (AIF-2 & AIF-3) related activities and shared through YouTube. Previously the component had produced four such videos on (i) Production technology of Vermi-compost, (ii) Production technology on Trico-compost, (iii) Safe vegetable production using Vermi-compost & sex pheromone trap, and (iv) FIAC services which are now available at <https://www.youtube.com/watch?v=7YoLqaPB-Ss>, <https://youtu.be/aW-btB7h2iM>, <https://youtu.be/cS-LK7C42NU>, <https://youtu.be/BolKbe8IDpM>, <https://youtu.be/L6DXca25iqQ>, <https://youtu.be/BBN-L9-LK54>, <https://youtu.be/IHUwaybYMNA>.

PIU-DAE has now a page named <http://info.natp2dae.gov.bd/dae/dae-blog-developed-for-the-farmers-and-the-community-people-to-share-their-experiences-storytelling-making-queries-comments-and-reacts-and-so-on>. Efforts are now being undertaken to make the blog page familiar with the farmers and their community people.

PIU-DOF this year had developed two videos on Aquaculture Technology, an online fish marketing webpage <https://pofishmarket.com/>, two training modules on the use of ICT for SUFO/UFO and LEAF on ICT and Video Clipped based extension method; printed 7000 note books, 50,000 posters on GAP, ethnic community and women in aquaculture, 1250 copies of the guideline for Producer Organization operation and 47500 leaflets on environmental and social safeguard issues.

PIU-DLS this year had developed two training module on a) ICT and use of ICT for Technology Dissemination, Monitoring and Reporting for DLS officer and staff and b) Community Mobilization, Group Development, Savings and Credit Management for DLS officer; printed lakh leaflets and 40,000 posters for vaccination and de-worming campaigns, 2 lakh leaflets for infertility campaigns, 43,000 cards for technology demonstration, milk and cattle weight records, and 37,000 copies of FAIC advice and Grievance Redress Mechanism registers.

3.5 Agricultural Innovation Fund-2 (AIF-2)

The Agricultural Innovation Fund (AIF) is the one of the cores of NATP-2's scale-up strategy. AIF has three windows- AIF-1, AIF-2 and AIF-3. AIF-1 is for funding research sub-projects; AIF-2 for supporting well performing CIGs to help increase their productive assets, potential income and sustainability of the groups; and AIF-3 for registered rural entrepreneurs whose sub-projects will benefit smallholder's farmers in the project areas.



Photo: Equipment procured under AIF-2 Matching Grants

AIF-2 provides non-refundable competitive matching grants to CIGs with a view to (1) strengthen the capacity and sustainability of the CIGs, (2) facilitate easy adoption of technologies for increased productivity by the CIG and non-CIG farmers, and (3) promote participation and strong linkage of the CIGs with market facilities. The selected sub-project proposals submitted by the CIGs are funded where the matching grant not to exceed 70 percent of the total sub-project costs (max. BDT 3.87 lakh) and the recipient CIGs are expected to contribute at least 30% in cash.

As of June 30, 2020 the three components together so far awarded 1745 sub-projects to their crop, fisheries and livestock CIGs (Table 3.38). Most of the crop CIGs demanded farm machineries & tools

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for mechanization and transportation for marketing. The equipment procured by the crop CIGs so far using the awarded AIF-2 matching grants are: *Power tillers- 1592, Reapers-163, Power threshers-942, LLPs-346, Oil expellers, Pick-up vans-150; weighing machine, Packaging machines, etc.*

Table 3.38: Progress of AIF-2 matching grant sub-project awards in FY2019-20

	Target (No.)	2017-18 & 2018-19 (No.)	2019-20 (No.)	Total (No.)	% Achievement
PIU-DAE	1,320	509	664	1173	89%
PIU-DOF	740	59	329	388	52%
PIU-DLS	940	34	150	184	20%
Total	3,000	602	1143	1745	58%

Outcomes of AIF-2 matching grant awards: AIF-2 matching grants helped to increased farm mechanization of the CIG and neighbor non-CIG farmers. As a result labor crisis and cost of production have been significantly reduced. Area coverage under timely land preparation as well as timely seeding/planting are gradually being increased enhancing productivity of crops around the AIF-2 sub-project areas. Area under surface water irrigation expanded, and this reduced dependency on the ground water for crop production. Post-harvest losses of rice, wheat and maize are significantly minimized due to the increased facilities of threshing. Use of plastic crates helped in maintaining quality of fruits and vegetables and loss minimization at post-harvest. Better opportunities for market access have been developed and the produced commodities are sold at fair prices at the distant and big markets. Incomes from machineries are good source of CIG saving.



Photo: Use of Power Tiller procured under AIF-2

With the AIF-2 fund the fisheries CIGs mostly procured transport, feed pellet machine, irrigation pump, nursery equipment and other minor items. A preliminary study with few samples conducted by PIU-DoF on the use of AIF-2 fund and their impact revealed within a period of 3 months operating time the transport owners generated

net income of Taka 60,050 and within a period of 2 months operating time the pellet feed machine owners generated net income of Taka 50,000. The water pump and aerator users covered an average area of 35.13 and 16.20 hectares of land for fish culture.

The livestock CIGs had used this AIF-2 matching grants for procuring Chopper machine, Feed mixing machine, Pasteurization machine, packing machine, Cool van, Incubator, Freezer etc. were the major equipment and materials.

SECTION 4: VALUE CHAIN AND MARKET DEVELOPMENT

Keeping the Project Development Objective (PDO) in mind, Hortex Foundation, the strategic partner of PIU-DAE and the other two value chain service providing firms hired by PIU-DoF and PIU-DLS, have been working for improving smallholder farmers' access to markets in the selected project areas. The specific objectives of the value chain and market development for crops, livestock, and fisheries are:

The Specific Objectives related to Value Chain and Market Development are:

For crops: Establishing value chains development program in 30 clusters in 30 upazilas of 22 districts; establishing 30 Commodity Collection and Marketing Centers (CCMCs) and 30 Collection Points and sell a total of 15,000 metric tons of agricultural commodities through project arranged marketing facilities by the end of project period;

For fisheries: Establishing 20 Producers' Organizations (POs) in 20 upazilas and 02 special POs in Mymensingh and Natore districts and supported with logistics and training for fisheries and selling 3000 metric tons of fishes and fish products through project arranged marketing facilities by the end of project period; and

For livestock: Establishing 120 Producers' Organizations (POs) in 60 upazilas and supported with logistics and training for livestock; and selling 3,400 metric tons of livestock commodities through project arranged marketing facilities by the end of project period.

4.1 Mobilization and Functioning of the Producer Organizations (POs)

Producer Organizations (POs) are very vital elements in facilitating sustainable access to markets for smallholders; POs have been established under all three extension components (crops, fisheries and livestock). POs are facilitating aggregate marketing of inputs and outputs, investing in increasing the bargaining power of producers, and promoting increased access to information, technical service delivery and access to finances. POs have a strong business orientation, they are the key to the sustainability of the CIGs, and their membership is open to non-CIG farmers as well. Table 1 provides details of the number of POs formed under crop, fisheries and livestock components by years.

Hortex Foundation formed and mobilized 30 POs - one at each CCMC, in 30 selected upazilas. All of the 30 POs and their executive committees, the Market Management Committees (MMCs), have been formed and mobilized. Continuous efforts are ongoing to strengthen and build capacity of the POs and MMCs. The MMCs regularly sit in meetings in the CCMCs, and get engaged in discussions regarding market linkage, savings, planning for AIF-3 matching grant sub-projects, etc. All the POs opened their bank accounts and the accounts are regularly operated. Trade licenses are also obtained by the POs. In question of capacity building, self-contained development and sustainability, savings activities are undertaken and regular savings activities are going on. In the meantime, four POs raised savings of around BDT 6 lakh, and 11 POs managed to save between BDT 1 lakh and Tk.3.5 lakh each.



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As per the project provision PIU-DOF formed 20 general POs with 750 members in each and 2 Special POs, one in Trishal, Maymensingh and another in Singra of Natore district, with 1200 members in each.

PIU-DLS also has identified clusters targeting a CIG, where the members of the CIG do not get fair prices for their products. A total of 120 POs have been formed in 60 upazila, while each PO comprises 30 stakeholders including non-CIGs farmers. The hired service provider is supporting for capacity building of POs and helping them to take initiatives to solve the marketing problems. The PMU monitored the formation and operation process of POs in the field.

Table 4.1: Mobilization and functioning of the producer organizations (POs)

PIUs	Target	Mobilization and Functioning of the POs		
		FY2017-18	FY2018-19	FY2019-20
PIU-DAE	30 POs	9 POs	30 POs	30 POs
PIU-DOF	22 POs	-	22 POs	22 POs
PIU-DLS	120 POs	-	25 POs	120 POs
Total	172 POs	9 POs	77 POs	172 POs

4.2 Value Chain and Market Development for Crops

Hortex Foundation is supporting PIU-DAE in value chain development of high value crops emphasizing better post-harvest management (PHM) practices as well as developing a marketing system. The activities are being piloted in 30 Upazilas of 22 Districts for vertical expansion of six selected HVCs, namely, brinjal, bitter gourd, sweet gourd, tomato, banana and aromatic rice and for horizontal expansion of some other identified vegetables and fruits. The activities of Hortex Foundation include: (1) organizing and mapping of cluster based production and marketing for horizontal and vertical expansion of selected high value crops, (2) providing marketing capacity building training to CIGs, POs and DAE staff/officials on value chain management, organizing and assisting POs in establishing/ renovation of CCMCs/CPs, (3) develop market linkages and contractual arrangements between CIGs/POs and traders, supermarkets, processor and exporter, (4) provide financial advisory services to CIGs/POs and entrepreneurs to apply for matching grants from AIF-2 for technology adoption and AIF-3 for markets and enterprises development, and (5) organizing awareness campaign on food safety, GAP, SPS, etc.

4.2.1 Establishment of the Commodity Collection and Marketing Centers (CCMCs) and Collections Points (CPs)

In FY2019-20, Hortex Foundation completed establishing all the 30 CCMCs and 4 CPs and those are now operationalized. All the POs and MMCs in all the 30 CCMCs were also made functional. Progress & locations (upazilas) of the established CCMCs and CPs are shown in Table 4.2 below.

Table 4.2: Progress & locations (upazilas) of the established CCMCs and CPs

Commodity Collection and Marketing Centers (CCMCs)		Collections Points (CPs)	
Target: 30	Achievement: 30	Target: 30	Achievement: 4
Location (Name of Upazilas) of the CCMCs & CPs			
(1) Birganj, (2) Chirirbandar, (3) Parbatipur, (4) Mithapukur, (5) Palashbari, (6) Shibganj, (7) Bogura Sadar, (8)NaogaonSadar, (9) Baraigram, (10) Godagari, (11) Kaliganj, (12) Jashore Sadar, (13) Jhikorgachha, (14) Bagharpara, (15) Nakla (16) Islampur, (17)Delduar, (18) Madhupur, (19) Muktagachha, (20) Kishoreganj Sadar, (21) Kapasia, (22)Savar, (23)Shibpur, (24)Belabo, (25)Rai-pura, (26) DakkhinSurma, (27) Sreemangal, (28) Chandina, (29) Mirsarai, (30) Khagrachhari Sadar		(1) Mithapukur, (2) Nakla, (3) Madhupur, (4) Chandina,	

4.2.2 Capacity Building of the CCMCs

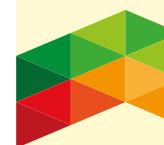
The CCMCs were equipped with essential logistics like basic furniture (tables & chairs) and operational items for PHM activities (weighing machines, sorting mats, grading tables, washing facilities, ceiling fans for drying, etc.). But running water for washing had been an issue, and to start with, plastic buckets were provided. This issue in 25 CCMCs has already been mitigated by developing full washing facilities completed with tube wells, piped connectivity, pump machines, overhead tanks and wash-bays (houses). Developing the complete washing facilities in other five CCMCs was interrupted and delayed due to a number of reasons including the crisis of COVID-19 pandemic.

4.2.3 Progress of Training of DAE Officials, LBFs, CIG/PO members and Traders

Since FY2017-18, rigorous training courses have been conducted on value chain development for the DAE officials, LBFs, CIG & PO members, and also for the traders. Table 4.3 below shows the participants' category wise progress of training.

Table 4.3: Progress of training on value chain development (*women)

Participants	Up to June 2019			2019-20			Client-days (total)	
	Batch- es	Parti- ci-pants (No.)	Client days (No.)	Batches	Parti- ci-pants (No.)	Client days	Target	Achieved
DAE Officers	6	147	294	-	-	-	300	294 (97%)
SAAOs	10	300	600	-	-	-	600	600 (100%)
LBFs	4	60	240	-	-	-	240	240 (100%)
CIG Farmers	284	8,513 (*1,883)	8,513	34	1,020	1,020	15,000	9,533 (64%)
POs	65	1,948 (*339)	1948	29	870	870	3900	2,818 (72%)
Traders	15	450	450	15	450	450	900	900 (100%)
Total	402	11,417	12,045	78	2340	2,634	20,940	14,385 (69%)



Data presented in the table reveals that by FY2019-20, most of the value chain development training, especially to SAAOs, traders linked to CCMCs, LBFs and DAE Officers are now completed. About 64% CIG farmers and 72% PO members in 30 clusters had also received the training on value chain development. Topics included in the CIG farmers training are: Maturity and harvest indices, contract farming, PHM practices, marketing, CCMC functionalities, food safety & quality of produces and especially hands-on practices on sorting, grading, washing (+drying) and packaging. As a result of these training courses, the producer farmers, both CIGs and non-CIGs, have access to the CCMCs and they can efficiently practice sorting, grading, washing and packaging facilities.



4.2.4 Farmers and Traders Access to Marketing through CCMCs

It is estimated that about 3,300 farmers, both CIGs and non-CIGs, take the privilege of accessing the 30 CCMCs every month. The data show that in a month a CCMC has been accessed by 110 farmers on an average. So far, between 200 and 450 traders are engaged with the CCMCs, and on an average 3-25 traders are involved in purchasing from one CCMC.

4.2.5 Marketing of High Value Crops through CCMCs

Since the inception of making the CCMCs functional, up to June 2020 over 13,960 metric tons (MT) of HVCs have been marketed through the 30 established CCMCs. Year wise progress of marketing of HVCs from the CCMCs is shown in Table 4.4 below.

Table 4.4: Year wise volume of HVCs marketed from the CCMCs

Year	No. of CCMCs operationalized	Volume of HVCs marketed (ton)	Major HVCs marketed (<i>crops are arranged in order of high volume to low volume</i>)
2016-17	01	100	Brinjal, Radish, Bitter gourd, Sweet gourd, etc.
2017-18	09	965	Lemon, Brinjal, Bitter gourd, Teasel gourd, etc.
2018-19	30	5072	Brinjal, Lemon, Aromatic rice, Potato, etc.
2019-20	30	7823	Banana, Country bean, A. Rice, Brinjal, etc.
Total		13,960	

As shown in the table there has been a gradual increase in the marketing volume through CCMCs in this current fiscal year and the highest sales were observed during December to March (Fig. 4.1). All the 30 CCMCs were also remained functional during April to June, the challenging time of Covid-19 countrywide lockdown. Of the total volume sold, significant portions were purchased for exporting to different ethnic markets in Malaysia, Dubai, Qatar and Saudi Arabia.

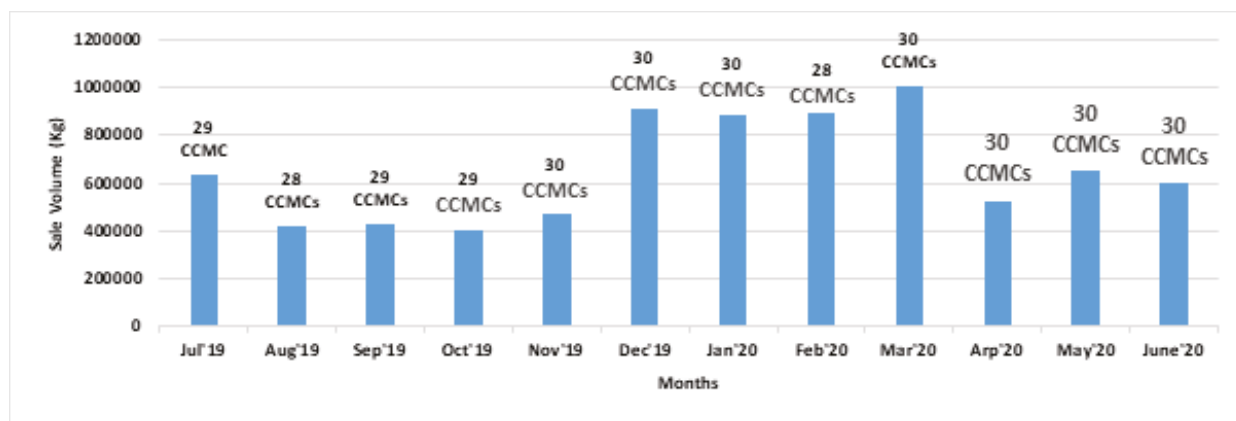


Figure 4.1: Volume HVCs marketed in CCMCs during FY2019-20.

In FY2017-18 there were only 52 tons exported followed by a jumping volume of around 770 tons in FY2018-19 which has then further, increased to 1,338 tons in FY2019-20. CCMCs of Shibpur & Belabo of Narshingdi, Mithapukur of Rangpur, Madhupur of Tangail and Chandina of Cumilla are contributing in this export trade and a total of 14 companies are involved/sharing the export activities. Hopefully, Hortex organized training supported by other orientation activities would help in expansion of the export market.

The exported commodities include mostly brinjal, teasel gourd, bottle gourd, bitter gourd, lemon and potato.

4.2.6 Export of CCMC Enrolled HVCs

A significant volume of CCMC enrolled HVCs are being exported since functioning of the CCMCs and the volume is gradually increasing over the time due to the quality of commodities and trustworthy trade. During the first year (FY2017-18) exported volume was 52 tons, followed by a jumping volume of around 770 tons during the FY2018-19. During FY 2019-20, the export volume, further, increased to 1,338 tons with the hope of gradual expansion in foreign trade of the CCMC commodities. During the years, CCMCs of Shibpur & Belabo of Narshingdi, Mithapukur of Rangpur, Madhupur of Tangail and Chandina of Cumilla are contributing in this export trade and a total of 14 companies are involved/sharing the export activities. Hopefully, Hortex organized training supported by other orientation activities would help in expansion of the export market.



The exported commodities include mostly brinjal, teasel gourd, bottle gourd, bitter gourd, lemon and potato, and the countries where these commodities mostly exported are Malaysia, Dubai, Qatar and Saudi Arabia.

4.2.7 Efforts Undertaken to Popularize the CCMCs

The CCMCs are located at the marketplaces to allow their all time exposure opportunity for the farmers, traders and others. At the very beginning, public announcements were made using mike/ loudspeakers to popularize and orient the CCMCs as purchasing points of bulk vegetables, and the traders were contacted to connect with the bulk marketing points (CCMCs). Mobilization of CIGs by the constant efforts of the LBFs and continued groundwork of SAAOs helped to convince the farmers to come to the CCMCs.

Showcasing the validated technologies of PHM like sorting, grading, washing, drying and packaging attracted the farmers, traders and entrepreneurs, and that contributed much in increasing the popularity of the CCMCs. Practical observation of the facilities of assembling vegetables, use of sorting mats & plastic crates, washing facilities, etc. at the CCMCs encouraged and attracted the traders. In some CCMCs (e.g. Chiribandar of Dinajpur), POs participated in the upazila agriculture fairs that enhanced publicity for the CCMCs.

4.2.8 Market Linkage Activities

Improving market linkages for the farmers is one of the most important activities to develop value chains of high value crops (HVCs) in NATP-2. The project has adopted an approach which is detailed below:

The CCMCs exist at the heart of market linkage approach, around which 20 CIGs comprising HVC farmers are organized in clusters in an upazila. The opportunities of improving produce quality, enhancing food safety, reducing post-harvest losses, and improving market linkage for the farmers are provided at the CCMCs. Here the farmers can adopt these improved PHM practices for their products to add value and earn a fair price.

The responsibility for managing the affairs of the CCMCs lies with the Executive Committee of the PO, which is the 29-member executive body of the PO, formed with the representatives of CIGs. The Executive Committee has to organize and oversee the overall marketing of the agro-commodities brought by the fellow CIG farmers. As a start, the LBFs appointed by the Project are assisting the POs to manage operations of the CCMCs, while they are gradually being trained to deal with all aspects of the CCMC functions.

In order to carry out their responsibilities of the Executive Committee, they are being trained up for certain skills to build their needed capacities through a series of training on Marketing, Good Governance, Market Management, Business Management, Financial Management, Contract Farming, PHM & Food Safety, Quality Assurance, etc. The POs are thus expected to be able to plan their operations, keep records of transactions, build relations with reputable traders and attempt to strengthen the business linkages through contractual agreements, keep track of product prices and demand, etc. in order to better marketing of their products.

The quality features upon which the POs are driving their market linkage approach are: (i) safety and quality assurance of the product ensured through sorting, grading, washing and proper packing, (ii) larger amounts assembled by the CIGs at the CCMCs to attract bulk buyers, and (iii) shelf life increased as diseased or rotten pieces sorted out and because these are washed and disinfected. The POs are able to highlight the advantages to the traders/buyers emphasizing that (a) they can save the costs of appointing a number of farias (collectors) to collect produces at the farmers' homes or

fields scattered across the areas, (b) to get better product quality, and (c) their possible loss during transport and storage is minimized due to sorting out unhealthy pieces and better packaging.

The POs, therefore, are encouraging their fellow CIG farmers to assemble products of better quality, adopt the proper PHM practices to attract big buyers for better margin. In this regard the POs are also planning for contract farming as the CIG farmers are trained to grow and supply quality products.

Whilst the POs establish links with the traders, buyers, processors, and exporters, these market actors are being oriented and trained so that food safety and quality are assured for the products during transport, storage and handling in value chain. The project is also providing plastic crates for vegetables and fruits shipping at the disposal of the POs at the CCMCs, so that the farmers and traders can use them. Support with rickshaw-vans to transport farmers' products from their farms using plastic crates to the CCMCs is also provided by the project.

4.2.9 Post-harvest Loss and Price Gap Minimization

The postharvest losses mostly occur during transportation due to improper packaging, rough handling during loading or unloading as well as crude way of piling or bundling on vehicles. Introduction of plastic crates for packaging is slowly but significantly preventing the slide. The figures for the losses are being collected, but only partially, as data collection up to retailer level is beyond the present capacity of the project. A preliminary rough estimate suggests that the loss reduction during transport from CCMCs to the next point of delivery ranges between no wastage and up to 15%. Research figures indicate that changing from sacks to crates reduces postharvest loss by almost 90%.

The price incentive due to sorting, grading is also still to materialize, but marginal gains are so far noticed in few CCMCs. A study of the data on price differences was calculated for brinjal, bitter gourd, tomato, sweet gourd and banana from various upazilas (Table 4.5). The period of observations ranged differently and it was in between November 2018 to December 2019. Number of observations also varied between crops. Maximum price gain was observed for tomatoes at almost 23%, while only around 3% higher price was recorded for bananas.

Table 4.5: Percent price gain to farmers due to adoption of improved PHM practices at the CCMCs

#	Crop	No. of Upazilas selected	Periods of observation	No. of observations	Price gain (%)
1	Brinjal	15	Nov-18 to Dec-19	101	10.66
2	Bitter gourd	13	Nov-18 to Dec-19	49	15.67
3	Tomato	9	Nov-18 to Dec-19	28	22.67
4	Sweet gourd	10	Mar-19 to Dec-19	47	8.82
5	Banana	6	Dec-18 to Dec-19	42	2.87

4.2.10 Organizing National Workshops

Hortex Foundation conducted two national workshops in this fiscal year. The first workshop was held on 6th February, 2019 on "Postharvest Management of Fruits & Vegetables for Food Safety & Quality Assurance" which was attended by a number of experts from different relevant institutes



and farmer delegates. In the workshop a keynote paper was presented that gave a background on post-harvest losses of fruits and vegetables in Bangladesh including detailed causes of postharvest losses & various hazards as well as highlighting proper requirements to minimize the losses. A video clip documenting the traditional rough handling of HVCs in terms of packaging, loading, unloading and transport was also demonstrated. In the workshop a set of recommendations were taken that included items to include for food safety campaigns, such as, safe pre-harvest intervals (PHI) in applying pesticides, printing & displaying posters to aware and encourage adoption of safe handling procedures, etc.

Hortex Foundation conducted another workshop on the 31st October 2019 to orient and motivate banana traders for adoption of proper PHM practices. The participants were the leaders of Tejgaon Banana Traders' Association, Dhaka and other value chain experts.

A keynote paper was presented along with a video, showcasing the proper practices vis-à-vis the prevailing traditional practices. A video clip demonstrating modern banana harvesting, processing and marketing was displayed as well. The cost-benefit aspects of modern methods were also clarified at the workshop.



Photo: View of the workshop

A very encouraging feedback was received from the traders association that the traders of the association agree with the recommendations of drastically reducing the post-harvest losses, quality improvement and obtaining the higher profits and sooner the possible, they would adopt the recommended practices from harvesting to marketing of banana.

4.3 Value Chain and Market Development for Fisheries

Under the fisheries component, Kranti Associates, a market access and supply chain service providing firm was appointed by the PIU-DoF in establishing market linkage of the fish farmers with traders, wholesalers and retailers. Presently the firm has completed mapping the supply chain of major fish species and critical inputs like fish seed and fish feed in the project areas (where POs are formed) and helping the fish farmers for online marketing of fish.

4.3.1 Formation of Fisheries Producers Organization (FPO)

As per DPP there is a provision of forming 20 Producer Organizations (POs) and 2 Special Producer Organizations (SPOs). In this regard PIU-DoF has identified the locations (Table 4.6), prepared a PO formation guideline and communicated that with the respective fisheries officers. Locations have been identified for formation of Producer Organizations (Table 4.6). Accordingly, 20 POs with 750 members including both CIG and non-CIG fish farmers, were formed. Two special POs, one at Trishal of Mymensingh and another at Singra of Natore, have been formed with 1200 members in each PO.

PIU-DoF had developed an online fish marketing website (www.pofishmarket.com) which also has a mobile apps version. This was launched immediately before the COVID-19 lockdown and was used

by the POs to connect to the city markets and online customers. During lockdown mobile vans were also used for fish sale in locality. Since formation of POs a total of 319 metric tons of fish have been marketed by the POs.

4.3.2 Establishment of Post- Harvest Service Centers (PHSCs)

For proper handling and processing of fish in one outlet and for surplus and peak catch even during emergency harvest, PIU-DoF made provisions for construction of two Post Harvest Service Centres (PHSCs). For construction of PHSCs, PIU-DoF selected two sites - one at Singra of Natore and another one at Trishal of Mymensingh, issued the work orders and construction works are now in progress. At each of the post-harvest service center, there will be office room, fish landing platform, ice plant water supply facility, insulated cold storage and effluent management system. Two local marketing facilitators (LMFs) have been employed, who have been supervising the construction activities.

Table 4.6: Location general producers organization and total number of CIG/PO members

Location of Producers Organization	Number of CIGs	Total number of CIG members in PO	Total number of members in the PO
1. Rajoir, Madaripur	22	440	750
2. Kotalipara, Gopalganj	24	480	750
3. Dumuria, Khulna	28	560	750
4. Bagerhat Sadar, Bagerhat	20	400	750
5. Satkhira Sadar, Satkhira	29	580	750
6. Naogaon Sadar, Nowgon	24	480	750
7. Adamdighi. Bogura	12	240	750
8. Bhairab, Kishoreganj	14	280	750
9. Nangolkoat, Comillas	32	640	750
10. Chatmohor, Pabna	22	440	750
11. Shibpur, Narsingdi	18	360	750
12. Barhatta, Netrokona	14	280	750
13. Bhola Sadar, Bhola	26	520	750
14. Baniyachong, Habiganj	30	600	750
15. Raiganj, Sirajganj	18	360	750
16. Manirampur, Jashore	34	680	750
17. Madhukhali, Faridpur	18	360	750
18. Raipur, Laxmipur	20	400	750
19. Mithapukur, Rangpur	34	680	750
20. Alamdanga, Chuadanga	30	600	750
Total	469	9380	15000

4.4 Value Chain and Market Development for Livestock

The market linkage and value chain activities of PIU-DLS are being carried out in two ways i.e. through Producer Organizations (POs) and Matching Grants under Agricultural Innovation Fund-



3 (AIF-3). As per provision of the project, the Center for Resources Development Studies (CRDS) Ltd hired and engaged as a service provider to carry out value chain and market linkage activities of PIU-DLS through formation and mobilization of POs with 120 CIGs in the project areas. Major responsibilities of the firm are to: facilitate the formation and functionality of the POs, conduct need assessment, provide necessary training, support to solve marketing problems etc. On the other hand, PIU-DLS is also carrying out value chain development activities through field level offices using matching grants under AIF. Through these efforts, 10 marketing arrangements have been established/organized in 10 different places and 527 metric tons of livestock products were marketed through these establishments. The list of 10 marketing arrangements is shown in Table 4.7.

Table 4.7: List of marketing arrangements in FY2019-20

Sl. #	Name of CIG or Entrepreneur	Title of the Sub-Project	Type of Activity	Milk Sold (MT)
1	Babna Para Cow Rearing CIG, Nagorpur, Tangail	Milk Pastuarization Machine, Packing Machine	Milk Pastuarization Machine , Packing and Marketing	4.35
2	Tipna Cow Reaing CIG, Dumuria, Khulna	Livestock Feed Processing, Milk Collection, Transportation	Livestock Feed Processing, Milk Collection, Transpotation	100.34
3	Paniarup Cow Reaining CIG, Kasba, B. Baria	HYV Grass Production, Milk Collection and Marketing	HYV Grass Production, Milk Collection and Marketing	6.64
4	Osmanpur Cow rearing CIG, Bodorgonj, Rangpur	Purchase of Milk Pastuarization Machine, Packing Machine	Milk Pastuarization Machine , Packing and Marketing	4.15
5	Fadullah - Radhapur Cow Rearing CIGG, Nabigonj, Hobigonj	Engine Van, Milk Cane, Fridge	Milk Collection and Marketing	15.31
6	Jiala Cow Rearing CIG, Tala, Satkhira	Pick up for Milk Transportation	Milk Collection, Transportation and Marketing	66.00
7	Jamtoil Cow Rearing CIG, Kamarkhond, Sirajgonj	Engine Van and Milk Cane	Milk Collection, Transportation and Marketing	31.50
8	Hope Agro, Raipura, Norsingdi	Delivery Van for Milk Transportation and Marketing	Milk Transportation and Marketing	35.18
9	Mousumi Moorsheda, Modhupur, Tangail	Preservation and marketing of milk after collection	Milk Collection, Transportation and Marketing	25.50
10	Shamol Kumar Ghosh, Birol, Kaharol	Milking Machine, Milk Cane, Transportation and marketing	Milking, Transporting and marketing	237.75
Total				526.72

Prior to hiring the specialized technical firm, PIU-DLS engaged one short-term consultant for preparing Terms of References (ToR) for hiring the firm. The consultant was also responsible for conducting some value chain analysis for dairy, goat and beef as well as for identifying the specific activities related to value chain and their implementation guidelines. The firm was selected and commenced the services in November 2019. During the FY2019-20, the firm completed formation of 120 Producers Organization (POs) and assessed the need of 32 POs. The POs were formed in a cluster targeting a CIG, where CIG does not get fair prices for their products. The hired firm is providing support for capacity building of the POs as well as taking necessary initiatives to solve the marketing problems of the farmers. The implementation progress of supply chain development is given in the Table 4.8.

Table 4.8: Information of implementation progress value chain and market linkage activity

Description of Activity	Target (No.)		Progress (No.)	
	2019-20	Project	2019-20	Cumulative
Engagement of specialized technical firm for Implementation of value chain development activities	-	1	-	Selected firm commenced the services from November 2019
Formation and mobilization of producers organization (No.)	95	120	95 (79%)	120 (100%)
No. of PO opened bank account	120	120	0	0
No. of PO started savings	120	120	0	0
No. of PO got registration	120	120	0	0
Implementation of Need Assessment through conducting FGD	120	120	32	32
No. of training batch organized on value chain development	30	120	0	0
No. of marketing solution undertaken through PO	30	120	0	0
No. of marketing solution undertaken through AIF-2 & 3 activities (No.)	0	0	10	10
Volume of commodities sold through new marketing structure/arrangement promoted by PO (In tons)	0	3,400	0	0
Volume of commodities sold through new marketing structure/arrangement promoted using matching grant under AIF-2 & 3 (In tons)	600	2,000	527.00 (87.83%)	527.00 (26.35%)

4.5 Agricultural Innovation Fund (AIF-3) for Market Access

AIF-3 is the third funding window and another scale up strategy and sources of direct funding for market access facilities. It is a non-reimbursable matching grant for eligible rural entrepreneurs to (1) facilitate smallholder farmers' participation to markets; (2) develop partnership among the CIGs, non-CIGs, Producer Organizations (POs) and agri-business entrepreneurs, and (3) enhance or develop capacity of agro-service providers/rural entrepreneurs. Value of the grant is 50% of the sub-project cost and the maximum ceiling is BDT 5.81 lakh.

NATP-2 has total 500 AIF-3 sub-project funding provisions – 240 for crops, 133 for fisheries and 127 for livestock components. AIF-3 Implementation Guideline prepared by PMU and endorsed by the World Bank provides the details of the selection process including eligibility criteria and the types of projects to be funded. PIUs made several calls for proposals by the end of June 2019 and awarded 74 sub-projects – 48 for crops, 10 for fisheries and 16 for livestock value chains development and support. Summary details of the types of machineries procured and supply chain activities supported are given in Table 4.9.

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Table 4.9: Progress of AIF-3 matching grant sub-project awards by 30 June 2020

	Target	Achievements			%	Equipment and Machinery Procured with AIF-3 Fund
		2017-18 & 2018-19	2019-20	Total		
PIU-DAE	240	48	24	72	30%	Commercialization of vermi- compost and tricho-compost; drying, grading, packaging and marketing of quality seeds; procuring pick up vans for transportation of commodities, mini-cold storage, honey production, etc.
PIU-DOF	133	10	92	102	77%	Aerator, pellet feed making machine, floating feed making machine, irrigation pump, magur culture in RCC tank, etc.
PIU-DLS	127	16	35	51	40%	Incubator, generator, pick-up, chopper machine, feed mixing machine, brooder, pasteurization machine, packing machine, cool van, incubator, freezer, etc.
Total	500	74	151	225	45%	

Outcomes of some of the awarded AIF-3 sub-projects: Vermi-compost and tricho-compost commercial plants helped in increased production, availability, sales and uses of the composts contributing to increased soil fertility and improve productivity and reducing degradation of soil. About 25 Vermi-compost and 30 Tricho-compost plants have been established by the CIG farmers. The produced quantities are procured by the entrepreneurs at fair prices for marketing.

Availability of quality seeds is increased and seed production and preservation technologies are being popularized. Transportation of produced commodities to the distant markets for getting fair prices has been facilitated. Post-harvest losses are minimized due to the use of crates. Honey collection boxes and extractors helped in increased collection of honey and motivating other honey collectors using the high potential and modern quality boxes. The sub-projects also helped in developing new entrepreneurs.

Results of a preliminary study with few samples from PIU-DoF component showed that within a period of 6 months operating time the pellet feed making machine owner's generated net income of Taka 89,500 and within a period of 6 months operating time the ice plant owner's generated net income of Taka 53,750. The transport owner within a period of half month (15 days) generated net income of Taka 5,600.

SECION 5: GENDER INTEGRATION, ENVIRONMENTAL AND SOCIAL SAFEGUARDS

Introduction

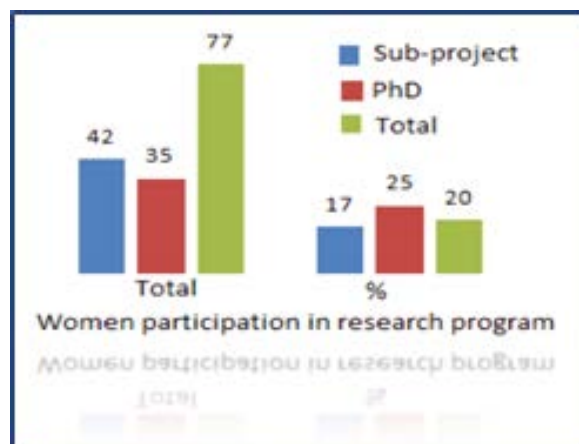
Gender, Environmental and Social Safeguards are mainstreamed in all aspect of the NATP-2 project cycle. Gender equality and women's empowerment of as well as improvement of poor and marginal farmers and ethnic peoples are well interlinked. The research and extension activities of the project contributed to increase agricultural productivity as well as working and income opportunity of the targeted groups having impact on food security and livelihood improvement. The activities of the NATP-2 project also facilitated to promotion of good agricultural practices which ensure environmental safety and promotion safe and quality agricultural products. Overall, the activities of the project have contributed to promotion of Gender equality and women's empowerment, improvement of environmental health and improvement of the socially disadvantaged people and the ethnic community. The Grievance Redress Mechanism (GRM) has impact to ensure the transparency and make the project accountable to the farmer and stakeholder.

5.1 Gender Integration

Women and men have significant contributions in agriculture sector. The gender issue has been addressed in NATP-2 project in considerations and recognitions of the roles and needs of women and men in agricultural production, post production and marketing systems. Considering the socio-religious-cultural aspects, the women have been integrated in various activities of NATP-2 project towards promoting gender equality and access to various services of the project and their empowerment. Participation of women is visible in operation of research program; access to extension services and marketing activities of the project.. Women have active participation and leadership roles in CIG management, operation of project activities, decision-making, inputs and resource management in technology demonstration, adoption and dissemination. Women farmers' involvement in f IGA activities contributed to poverty reduction, livelihood improvement and household nutritional status of the farming community. The detailed participation of women in research component is shown in Fig. 5.1.

5.1.1 Gender Integration in Research Program

The women researchers have involvement in the implementation of CRG & PBRG sub-projects. Women researchers were also awarded Ph.D scholarship.. Women share in the implementation of the CRG/PBRG sub-projects and receipt of PhD programs is almost 20% (77 nos.). In total, 42 women researchers are implementing research sub-projects where 33 women (13.69%) as the Principal Investigator (PI) and nine women (17.65%) as coordinator. Out of 140 PhD Scholars 35 women scientists were awarded PhD grants which is 25% of total PhD scholars where 27 women (almost 34%) were enrolled in -country and 8 (13%) enrolled as overseas students. A total of 601 women were provided training under the capacity



building program which is about 20% of total participants. Of them 599 (almost 20% of total) women received local training and only two women have participated in foreign training.

5.1.2 Gender Integration in Extension Services

Women farmers have active participation in the various areas of extension activities and services which included training; technology demonstration and dissemination; exposure visit; field day; leadership and access to FIAC services.

5.1.2.1 Women Participation in CIGs Activities

A total of 364,174 women CIG farmers have been participating in different activities of the project which represents 36% of total beneficiaries (Table 5.1).

Table 5.1: Status of women participation in CIG activities up to June 2020

	Total CIG Farmers		Women CIG farmers		
	Total		Total	% of total CIG farmers	% of total women
PIU-DAE	6,95,700		2,34,440	33.70	64.37
PIU- DLS	207,750		92,337	35.40	25.36
PIU-DOF	1,05,640		37,397	44.45	10.27
Total	10,09,090		3,64,174	36.09	100.00

5.1.2.2 Women Participation in Agricultural Production System

Up to June 2020 around 2,78 million client-days training were provided under three extension components of which 1008,485 (36%) were to women farmers. Women were participated in improved technology training, technology demonstration technology sharing training/gathering, exposure visit, field days that lead to dissemination of improved technology among the CIG & non-CIG women farmers (Table 5.2). Approximately, 710,680 CIG and non-CIG women farmers have participated in technology field day which was almost 30% of total participants. In total 219,181 (37%) women CIG farmers have adopted improved technology in crops, livestock and fisheries. (Table-5.2). The field level information indicated that the technology knowledge gap; high cost and quality inputs; shortage of capital limits the women to adopt improved agricultural technology.

Table 5.2: Women access to technology

PIU	CIG farmer		CIG Women in technology demonstration		Women in technology adoption	
	Total	Women	Number	% of women	Number	% of women
PIU-DAE	6,95,700	2,34,440	44,819	35.69	143,175	35
PIU-DoF	1,05,640	37,397	4,942	21.00	19,191	35.20
PIU-DLS	207,750	92,337	9,380	32.12	56,815	44.00
Total	10,09,090	3,64,174	59,141	33.17%	219,181	36.98

In total 387 (33% of total) sub-projects both of AIF-2 and AIF-3 have been awarded to the women

CIGs by PIU-DAE where the number of AIF-2 and AIF-3 is 374 and 13 respectively. PIU-DoF and PIU-DLS have no separate women CIG. The AIF-2 and AIF-3 sub-projects contributed to promotion of mechanization which facilitates agricultural productivity and reduction in production cost; also accelerated the marketing of agricultural products.

5.1.2.3 Women Leadership

In various roles and activities of the project, a total of 193,043 women (almost 53% of total CIG women) have been playing their role in executive committee of CIGs and POs; elected member of union parishad and executive member of School Managing Committee; religious organization; local club and cultural forum. In total 33,772 (9.27%) women CIG farmers have been selected as core leaders and they were provided capacity building training for better operation, management, strengthening & sustainability of CIGs (Table 5.3). The leadership capacity of women has accelerated the operation and management of CIG that included CIG registration, group savings, financial management, record-keeping, coordination, sub project preparation & management of AIF-2 & AIF-2 matching grant, inputs management, dissemination of technologies, marketing of the agricultural commodities e and role playing in decision-making.

Table 5.3: Leadership status of CIG women

Area of leadership	Representation of CIG women	
	Number	%
Total CIG women leader	193,043	53
Core leadership	33,772	9.27
Social leadership	4,993	1.3

5.1.2.4 Prospect of Gender Equality and Women's Empowerment

The extension services contributed to promotion of women's participation in project activities; skill and leadership capacity development of women; involvement of women in operation of income generating activities. Also, facilitated technology demonstration, adoption and dissemination of women; increases women capacity in decision-making both in the project, family and society; operation and management of CIG, inputs and resource management; develop linkage and networking; economic development and livelihood improvement which accelerated to promotion of gender equality and women's empowerment in the NATP-2 project. The following may be the potential prospect of women participation:

- Increase access to agricultural production;
- Create more scope of work for women in the project;
- Promotion of gender equality;
- Increase access to income generating activities (IGAs);
- Increase leadership capacity and role in decision-making;
- Economic development and empowerment of women.

5.2 Environmental and Social Safeguards

The NATP-2 project is assessing, preventing, mitigating or minimizing the potentials or identified adverse effects on environmental and social issues of the project activities.. Project activities are being implemented r to protect or avoid risks (do no harm), while promoting benefits (do well) associated with the project. Environmental and social safeguards assessment was done during the selection of the interventions in research, extension and value chain activities.

5.2.1 Environmental and Social Safeguards Compliance in Research Program

Bangladesh Agricultural Research Council (BARC)is coordinating the research program of the project. The CRG and PBRG sub-projects proposals were evaluated and are being implemented to generate and develop environmental & farmer-friendly improved agricultural technologies on crop, livestock and fisheries. Among the developed technologies, 11 such environmental technologies were selected for extension; DAE (6 nos.); DoF (2 nos.) and DLS (3 nos.). A total of 51 PBRG sub-projects are being implemented.. All the sub-projects are categorized into three groups such as (i) climate-neutral; (ii) having climate co-benefits and (iii) direct climate-related. Among them, 45 PBRG sub-projects are directly related to environmental and social safeguards related to f environmental improvement, and climate co-benefit. The sub-projects contributed in conservation and improvement of biodiversity, agroforestry, climate change impacts, increasing agricultural production as well as improving household food & nutrition security and livelihood and income diversification of the poor households. The sub-projects activities do not have any threats to native species, biodiversity system.

5.2.1.1 Environmental Safeguards

The research sub-projects are exhibiting diverse impacts. The major areas are: (i) improvement and conservation of biodiversity, ecosystems and agro-forestry system and practices; (ii) conservation of indigenous genetic resources; (iii) introducing of stress tolerant crop varieties; (iv) improvement of soil health; (v) solar irrigation system offer the environmental; and (vi) protection of pond water from pollution.

5.2.1.2 Climate Co-benefits

The sub-projects are exposed to pleasing compliances in climate co-benefits considering positive impact on climate change. The major identified areas are: (i) promotion and management of climate smart coastal ecosystems; (ii) emits low quantity of methane; (iii) reduce air temperature; (iv) increase oxygen percentage, reduces air temperature, and decreases of CO₂ concentration; (v) improvement of saline soil and resilience to climate change;(vi) improve carbon sink, physicochemical parameters and changes of gonadal maturation cycle; (vii) dissolved oxygen of water; (viii) Environmental development and conservation; and (ix)solar photovoltaic irrigation system mitigate the climate change.

5.2.2 Environmental and Social Safeguards in Extension Services

Extension services to the farmers are being provided by PIU-DAE, PIU-DoF and PIU-DLS by considering environmental and social safeguards aspects. Progress of major extension services in regards to environmental and social safeguards compliance are presented in Table 5.4.

Table 5.4: Progress of major extension services by PIUs

Sl.	Activities	Project target (Nos.)	Cumulative progress up to June 2020 (Nos./%)
PIU-DS			
1.	Demonstration of homestead gardening	540	540 (100%)
2.	Demonstration of pheromone trap in clusters	540	540 (100%)
3.	Demonstration of safety pesticide application materials (like eye protecting glass, face mask, hand gloves, apron etc.)	2,000	2,000 (100%)
4.	Demonstration of mass scale production of quick compost/vermi-compost	100	100 (100%)
5.	Demonstration of Integrated Pest Management (IPM)		432
6.	Demonstration of climate smart crop varieties cultivation	Continuous	3,423
7.	Demonstration of fruit orchard establishment and management	-	9,439
8.	Establishment of pest museum in the FIAC	1,107	1,107 (100%)
9.	CIG farmers' training on environmental and social safeguard issues and safe food production (client-days)	18,60,450	16,75,500 (90%)
10.	Training of agro-input dealers on effective use of pesticide and fertilizer use (client -days)	8,100	8,100 (100%)
11.	Testing of pesticide in the plant protection laboratory of DAE	Continuous	2,796
PIU-DoF			
12.	Beel management	40	23 (57.5%)
13.	Testing of pond water	Continuous	188,674 pond
14.	Limited Environmental Assessments (LEA)	Continuous	23,535 demo pond
PIU-DLS			
15.	Modern management of livestock resources	Continuous	4,93,140
16.	Implementation of vaccination campaign	Continuous	38,570
17.	Implementation of de-worming campaign	Continuous	14,319
18.	Preparation of cow dung pit	Continuous	2,755
19.	Preparation of compost	Continuous	727
20.	Establishment of Biogas plant <ul style="list-style-type: none"> ● Project funded ● Own funded 	220 -	190 2,083
21.	Demonstration of high yielding & salinity tolerant Napier	Continuous	8,388
22.	Demonstration of slat system housing for goat and sheep	Continuous	3,181

5.2.2.1 Environmental and Social Safeguard Measures in Crop Development

PIU-DAE has taken following measures to address the environmental and social safeguard issues

5.2.2.1.1 Implementation of Pest Management Plan (PMP)

PMP is being implemented by PIU-DAE for effective management of pest infestation and reducing reliance on chemical pesticides with a view to keep the environment safe. The approach mostly includes: (i) uses of resistant varieties/planting materials; (ii) use insect-pest & disease-free organic matters; (iii) uses of balanced doses of fertilizer; (iv) practices of IPM; (v) stop use of hazardous pesticides; (vi) immediate control of disease-pest infestation; (viii) disinfection of crop fields; (vii) use and promotion of sex pheromone trap; (ix) use of bio-pesticides; and (x) removing and burning the plant parts/ crop



Photo: Yellow trap of IPM practice

debris. Practices of sex pheromone trap in cucurbits reduced the uses of chemical pesticides by 50-60%. Application of PMP contributed to promotion of good agricultural practices having impact in environmental improvement as well as social safety net.



Photo: Application of pheromone trap

5.2.2.1.2 Uses the Safety Materials during Pesticide Application

A total of 2,000 demonstrations were conducted up to June 2020 in order to make awareness about the use of safety materials during pesticide application like gas mask, gloves, apron, gumboot, etc.

5.2.2.1.3 Establishment of Homestead Gardening

Demonstration of homestead gardening accelerated the promotion of homestead gardening on a wider scale. Vegetables were produced by women where they did not use chemical fertilizers or pesticides.

5.2.2.1.4 Preparation of Mass Scale Quick Compost/Vermi-compost

A total of 100 on-farm demonstrations have been established on quick compost/vermi-compost. The technology contributed in reducing the uses of urea by 30% to 50% and has impacted on improvement of soil health (Table 5.5).

Table 5.5: Status of organic matter content & pH in vermi-compost applied and non-applied soils

Factor	April 2019		July 2019		November 2019	
	Organic Matter (%)	Soil pH	Organic Matter (%)	Soil pH	Organic Matter (%)	Soil pH
Vermi-compost applied plots (ex-periment)	2.69	5.78	2.62	5.88	2.64	5.86
Vermi-compost non-applied plots (control)	1.87	6.0	1.85	5.92	1.83	5.94

5.2.2.1.5 Testing of Pesticide Samples in the Plant Protection Laboratory of DAE

As of June 2020, around 2,796 pesticide samples were tested and determined their active ingredients. The test results contributed to marketing quality pesticides which have positive impact on environmental improvement and social safeguards..

5.2.2.1.6 Establishment of Pest Museum in FIAC

In order to make the farmers familiar with the harmful and beneficial insects, 1,107 pest museums have been established in FIACs. The approach facilitated the increase of beneficial insects which contributed to reduce the use of chemical pesticides having impact on environmental conservation.

5.2.2.2 Environmental and Social Safeguard Measures in Fisheries Development

The PIU-DoF has taken various measures in regards to the environmental and social safeguards aspect. The following activities of DOF are contributing to environmental conservation.

5.2.2.2.1 Beel Management

Beel management program has been targeted to habitat improvement, establishment of beel nurseries, stocking of indigenous fish species, establishment of fish sanctuaries, and community based fisheries management. These activities are helping to conserve water bodies and indigenous fish species. Beneficiaries have been selected and a community based fishery management system is established near the selected beels. Beel management program is contributing environmental conservation as well as fishing opportunity of the poor fishermen leading to improvement of biodiversity and livelihood of the poor household.



Photo: Fish sanctuary

5.2.2.2.2 Limited Environmental Assessments (LEA)

Limited Environmental Assessments (LEAs) was conducted in 23,535 demonstration ponds and different types of negative impacts identified in 843 ponds. The negative impacts were: low height pond dike; pollution of water bodies; and soil sedimentation. Mitigation measures were taken based on the LEAs.

5.2.2.2.3 Waste Management

Post Harvest Fish Service Centers under PIU-DOF are under construction, one in Singra, Natore and another in Trishal, Mymensingh with provision of waste management facilities. Both the centers will have effective management of the solid and liquid waste disposal systems to maintain good environment of those centers.

5.2.2.2.4 Testing Quality of Pond Water

Water quality of pond (pH, dissolved oxygen, ammonia) was tested for both the CIGs (85,331 nos.) and non-CIGs (103,343 nos.) fish farmers (Table 5.6). Based on the test resuitigations measures taken were agitation and change of water; application of lime and zeolite which resulted improvement of natural fish feed diversity in ponds and production of safe fishes .

Table 5.6: Status of pond water test

Parameters	Ranges		No. of ponds		
	Suitable value	Tested value	CIG farmers	Non-CIG farmers	Total
Only Dissolved oxygen (O ₂)	5-6 ppm	2-6 ppm	35,268	47,813	83,081
Only pH	6.5-8.5	4-12	31,534	31,591	63,125
Only Ammonia (NH ₃)	0.01-0.05 ppm	0.01-0.03 ppm	2,067	512	2,579
O ₂ ; pH and NH ₃			3,958	5,740	9,698
Total			72,827	85,656	158,483

5.2.2.3 Environmental and Social Safeguards Measures in Livestock Development

5.2.2.3.1 Biosecurity Program

Up to June 2020, in total 38,570 vaccination and 14,319 deworming campaigns were conducted in order to reduce the disease infection of cattle and other livestock populations. Disease free livestock populations contributing to pollution free environment and social safeguards.



Photo: Cow Dung pit

5.2.2.3.2 Farm Waste Management

As of June 2020, 2,273 biogas plants have been established in project area. Among them 190 are from the project fund; 2,755 cow dung and 727 compost pits. The farm waste management program helped (i) cleanness of cattle/ poultry farms and homestead; (ii) reduce the risk of environmental pollution; (iii) reduce methane (CH₄) gas emission.

5.2.2.3.3 Fodder Cultivation

Eight thousand three hundred eighty eight (8,388) demonstrations were conducted on improved technology of fodder cultivation without using pesticide and chemical fertilizer.

5.2.2.3.4 Establishment of Slat System Housing for Goat & Sheep

Demonstration of Slat system housing for goats rearing is being conducted for healthy living environment and to protect them from disease infestation. So far 3,181 demonstrations have been conducted that contributes to clean living environment for the animal.

5.2.3 Environmental and Social Safeguards in Value Chain

The value chain system contributed to promotion of good agricultural practices (GAP) in all aspect of production, harvesting and postharvest activities having impact on safe and quality produces. Value chain system offered the farmers/stakeholders training, awareness program, inputs distribution in regards to address the environmental issues which leads to production of chemical free, safe and quality agricultural products. The details value chain approaches confirm the conservation of agro friendly environment, ecological balance, and biodiversity also offer working and income opportunity of the poor that have impact on livelihood which is likely to address social safety net.

5.2.4 Environmental and Social Safeguards Affairs for Indigenous People

About 503 CIGs are formed in 37 Upazilas involving 12,724 Indigenous People (IP). Most of the IP CIGs are located in hilly/CHT region comprising of Rangamati, Bandarban and Khagrachari districts because of their mass dwelling in that area. Garo, Chakma, Marma, Tripura, Tanchanga, Rajbangshi, Oraon, Munda, Santal, Rabidas, Monipuri, Teor, Kolshing, Boraik and Mahto are the identified ethnic group. Different research and extension activities contributed to capacity building; promote household food security and livelihood improvement of the Indigenous People (IP).

Table 5.7: Participation status of indigenous people by unit

Unit	Total	Women		Men	
		#	%	#	%
PIU-DAE	8,906	3,710	41.66	5,196	58.34
PIU-DOF	1,127	3,85	34.16	742	65.84
PIU-DLS	2,691	1,614	59.98	1,077	40.02
Total	12,724	5,709	44.87	7,015	55.13

5.2.4.1 Research Program for Indigenous People:

Six PBRG sub-projects are being implemented in CHT regions through practicing of different agro-forestry systems in hill regions in order to transfer of improved technologies for the improvement of indigenous people.

Table 5.8: List of PBRG sub-projects implemented in CHT region

1.	Transfer of Agricultural Technologies to Farmers' level for Increasing Farm Productivity (ID # 005)
2.	Food-based initiative for improving household food security, income generation and minimize malnutrition (ID # 011)
3.	Development of lean season fruit varieties and management packages (ID # 013)
4.	Adaptation and Scaling up Agroforestry for Livelihood Improvement of farmers in Agricultural Ecosystem of Bangladesh (ID # 049)
5.	Exploration, Identification, Characterization, Multiplication and <i>Ex-situ</i> Conservation of Endangered Forest Genetic Resources including Medicinal plants of Bangladesh (ID # 074)
6.	Collection, Conservation and Characterization of Important Plant Genetic Resources (ID # 128)

The sub-projects are sustainable in land use and management of agricultural hill farming and agroforestry system in terms of production, potentials, constraints and mitigation measures having impact on increasing agricultural productivity, optimizing the yield of food, fodder, timber, fuel-wood, bamboo, cane, lean season fruit variety development, ex-situ conservation of forest genetic resources and medicinal plants.

5.2.4.2 Extension services for Indigenous People

The indigenous peoples are being participated in the project activities through PIU provided diversified extension services.

Table 5.9: Participation status of indigenous people by activities

Participation of indigenous people in project activities	Male		Women		Total	
	No.	%	No.	%	No.	%
Number Indigenous people	11,110	1.72	1,614	0.44	12,724	1.26
Training client days	21,607	1.04	5,355	0.50	26,962	0.86
Technology demonstration	8,764	68.88	215	3.77	8,979	70.57
Technology adoption	26,356	207.14	993	17.39	27,349	214.94
Leadership development	4,672	36.72	888	15.55	5,560	43.70

The activities contributed to adopt the improved technologies, thereby increase farm income of the indigenous people. So far, 15 IP CIGs of Rangamati region (hilly area) are awarded with AIF-2 and AIF-3 sub-project which contributed to promotion of income generation opportunities. Over the period, food security and living standards of the indigenous people have been ensured.

5.2.4.3 Prospect of Environmental and Social Safeguards

The activities of NATP-2 project offer diversified prospect in environmental and social safeguards, such as:

- Increase knowledge and awareness of the farmers on environmental conservation and safe food production;
- Popularization and dissemination of environment friendly and climate smart improved technologies of crop, fisheries and livestock;
- Environmental conservation and development through promotion of good agricultural practices, compost production, establishment of biogas plant and installation of dung pit, assessment of net carbon balance, methane emissions and climate co-benefits;
- Production and promotion of safe crops, fruits, vegetables, livestock and fisheries products;
- Environmental improvement at household, farm and community level;
- Poverty reduction and livelihood improvement of small, marginal and ethnic peoples by increases of agricultural production and productivity through adoption of improved technologies.

5.3 Grievance Redress Mechanism (GRM)

Grievance Redress Mechanism (GRM) has been established in the NATP-2 project in order to ensure the accountability and transparency of the project implementation. Various initiatives have been taken in the research program and extension services in this respect.

5.3.1 GRM in Research Program

To address GRM, PIU-BARC has placed a complaints box and a registrar book in the office premise to receive or keep record of written complaints/suggestions by the stakeholders. Also, BARC has created provision for submitting complaints or constructive suggestions using the PIU-BARC website (www.natpbarc.gov.bd). PIU-BARC has appointed Grievance Redress Officer (GRO) and Appellate Officer (AO) to address the received complaints and/or suggestions. No complaints have been received so far.

5.3.2 GRM in Extension Services

Each project implementing unit has established a three-tier Grievance Redress Mechanism at upazila, district and PIU level. The Grievance Redress Officer (GRO) and Appellate Officer (AO) are assigned at each tier to resolve the grievance. The farmer, community and relevant stakeholders have provision to make complaints in the form of verbal, written and telephonic. A Grievance Redress Register Book has been opened at FIAC, upazila and district level for recording and documenting the complaints. Complaint boxes are also kept at the PIUs, district, upazila and FIAC offices to avoid the reluctance or unwillingness of the grievance redress officers to accept or record the complaints. In the FY2019-2020, some complaints were made by the CIG, Non-CIG farmers and some community people in the area of training, demonstration, AIF-2 & AIF-3 sub-projects, inputs, and services of the extension workers. Most of the complaints are made in the form of verbal. However, some of the complaints are recorded in the complaints registers. The major complaints have been presented below in summary form:

- Less number and amount of budget for technology demonstration;
- Less number of demonstrations for women;
- Less availability of quality inputs;
- No input support for non CIG farmer;
- Insufficient support to women for technology adoption;
- Less visit of field staff;
- Field staff are not well experienced to solve the problem related to production;
- Support for compost preparation is not enough;
- Inadequate equipment for pesticide application;





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- No support for marketing of the commodity;
- Low market price of milk, fish, vegetables and other products in the village;
- Less availability of SAAO/LEAF/CEAL at FIAC;
- Poor experience of the LEAF and CEAL;
- Dissatisfaction expressed by CIG members due to not awarding of AIF-2 and AIF-3 sub-projects submitted but not awarded.

The respective GRO and AO discussed and explained the issues with the complainer and solved all the complaints instantly. Moreover, some of the complaints were solved through telephonic conversation with the complainer. The issues were resolved by convincing the complainer in a satisfactory manner.



SECTION 6: RESEARCH - EXTENSION LINKAGE BUILDING

In agricultural development, the function of research and extension service is complementary to each other. Thus, a strong research-extension linkage is a prerequisite for successful generation of technologies and their adoption by the stakeholders. This demands a close working relationship between research and extension which is vital in providing quality agricultural services to the farmers. Close linkage between agricultural research and extension is essential for enhancing the growth rate of the agriculture sector. There is a prologue:

**“Research without extension is a folly;
Extension without research is a hobby.”**

Neither research nor extension can fulfill its responsibilities without the other: hence good communication, effective & timely interaction and collaboration are primary prerequisites. Differences in opinion between researchers and extension officials often hamper collaboration and linkage between research and extension. Technology transfer is becoming central to both groups (researchers and extension officials), and their operations are becoming increasingly more dependent on each other. Research and extension activities are interlinked and one depends on another for successful completion of the activities.

NATP-2 project is involved in technology transfer following both formal linkages (specified and mutually agreed by organizations) and informal linkages (person-to-person direct contacts based on the need). NARS institutes and universities have their own mechanisms of technology transfer by both formal (DAE, DoF and DLS) and informal (OFRD and outreach programs). NATP-2 works with Technology Transfer and Monitoring Unit (TTMU) of BARC, NARS institutes and universities for selection of technologies and facilitates the validation of the technologies in the farmers' fields. Under NATP-2 umbrella there is the provision of DECC (District Extension Coordination Committee) and UECC (Upazila Extension Coordination Committee) meetings. These committees organize meetings establishing linkage between research and extension. PMU organizes Research-Extension linkage workshops involving officials of different tiers.

The activities of NATP-2 to establish and strengthen the linkage between research and extension are highlighted in the following sub- sections.

6.1 Strengthening Research - Extension Linkage through Regional Workshops

The Project Management Unit (PMU) is mandated to strengthen the Research - Extension Linkage for better dissemination of technologies with a view to increase agricultural productivity and production. To fulfill this mandate, PMU organized Regional Research-Extension Linkage Workshops for face-to-face interactions and exchange of opinions among researchers and field level extension officials to identify the regional scalable technologies and their quick dissemination. In FY 2019-20, PMU had organized three regional workshops on Strengthening Research - Extension Linkage. Details of the workshops and the scalable technologies selected from the workshops for regional dissemination are available in the booklet “Scalable Technologies Identified from Different Regions of Bangladesh Through Regional Research-Extension Linkage Workshops” published by PMU, NATP-2 in 2020 (PMU Publication No. 03) and is now available at www.natp2pmu.gov.bd.



Workshops briefs are given below:

i. Workshop on Strengthening Research – Extension Linkage for Sylhet Region was held at Excelsior Sylhet hotel and resort, Khadimpara, Sylhet on 24. 08. 2019

About 150 participants from different research and extension offices of Sylhet region, World Bank Dhaka office, PIUs and PMU attended the workshop. Scientists of NARS institutes presented over 60 of their institute-wise technologies. After threadbare discussion in the wrap up session, scalable technologies were identified by the extension officials. The technologies were divided into two groups: a) Technologies identified for wide scale dissemination during 2019-2020, and b) Technologies identified for wide scale dissemination during 2020-2025.

a. Technologies Identified for Wide Scale Dissemination during 2019-2020

Institute	Identified Technologies for Sylhet Region
BARI	BARI Hybrid Bhutta- 9, 12 & 13; BARI Sharisha -14, 15 & 17; BARI Surjomukhi -2 & 3 in cluster cultivation; BARI Chinabadam- 8 & 9; Fruit bagging technology (good for quality mango production)
BIRRI	BIRRI dhan88 (Boro) & 90 (Aman); BIRRI dhan79 (Aman) (in submergence area)
BINA	Binasharisha – 10; Binachinabadam- 4; Binadhan-11 (Aman) (in submergence area)
BSRI	BSRI Akh 42 & 45 at Chunarughat with CIG farmers

b. Technologies Identified for Wide Scale Dissemination during 2020-2025

Institute	Identified Technologies for Sylhet Region
BARI	BARI Malta-1, BARI Dragon Phal-1, BARI Aam- 2,3, 4,10 & 11; BARI Panikachu-1 & 2, BARI Tomato-15, BARI Masur 6 & 8, BARI Mung 5 & 6, BARI Sheem -7 (summer)
BIRRI	BIRRI dhan82 (T. Aus), BIRRI dhan88 (Boro), BIRRI dhan92 (Boro), BIRRI hybrid dhan5 (Boro)
BINA	Binadhan-13 (Aman), Binadhan-16 (Aman), Binadhan-17 (Aman), Binamoog- 8 & 9, Binamasur-8, Binatomato-12
BSRI	BSRI Akh 43 & 46
BLRI	Goat/Sheep rearing- good breed selection, good planning, vaccination, etc. need to be considered.

ii. Workshop on Strengthening Research-Extension Linkage for Rajshahi and Bogura Regions was held at Bangladesh Sugarcrop Research Institute (BSRI), Ishurdi, Pabna on 07. 11. 2019

The workshop was attended by about 230 participants from Rajshahi and Bogura Regions including participants from PIU HQs and PMU, NATP-2. Major identified technologies are listed in the next page.

Institute	Identified Technologies for Rajshahi-Bogura Regions
BARI	<p>Pulses: BARI Masur- 8 & 9; BARI Mung- 6 & 8; BARI Chola-11; BARI Mash-4; BARI Motor-3; BARI Khesari-5</p> <p>Vegetables: BARI Hybrid Tomato-3, 4 & 8; BARI Begun-6 & 8; BARI Hybrid Patol-1</p> <p>Spices: BARI Piaz-4 & 6; BARI Rashun-3; BARI Morich- 2 & 4; BARI Halud-4 & 5; BARI Dhonia- 2; BARI Kalozira- 1; BARI Methi-3</p> <p>Fruits: BARI Aam-3, 4, 8, 9, 11 & 12; BARI Peyara-2 & 4; BARI Kul-1, 2 & 3; BARI Pepe-1; BARI Batabilebu- 3 & 6; BARI Malta-1; BARI Strawberry-3; BARI Bel-1; BARI Jamrul -3; BARI Dragan Phal-1</p> <p>Fertilizer use: Increased yield of wheat with the use of fertilizers and ash of rice bran at 260 kg urea, 150 kg TSP, 120 kg MOP, 94 kg gypsum, 3 kg zinc sulphate, 6 kg boric acid, 1.25- 1.50 ton ash of rice bran per hectare.</p>
BWMRI	BARI Gom- 32 & 33; BWMRI Gom -1
BRRRI	<p>BRRRI dhan28 (Boro) could be replaced by BRRRI dhan81 (Boro), BRRRI dhan86 (Boro) & BRRRI dhan88 (Boro)</p> <p>BRRRI dhan29 (Boro) could be replaced by BRRRI dhan89 (Boro) & BRRRI dhan92 (Boro)</p> <p>BRRRI dhan34 (Aman) could be replaced by BRRRI dhan90 (Aman)</p> <p>BRRRI dhan51 (Aman) & BRRRI dhan52 (Aman) could be replaced by BRRRI dhan79 (Aman)</p>
BINA	Binadhan -11 (Aman), 12 (Aman), 14 (Boro), 17 (Aman) & 19 (Aus); Binasharisha -9; Binatil -1 & 2; Binamoog- 8; Binamasur -8
BSRI	BSRI Aak 41, 42, 45 & 46; BSRI Tal 1

iii. Workshop on Strengthening Research – Extension Linkage for Jashore and Khulna Regions was held at Sheikh Hasina Software Technology (IT) Park, Jashore on 25.02.2020

About 240 participants attended the workshop. The scalable technologies identified for the region are stated below:

Institute	Identified Technologies for Jashore-Khulna Regions
PIU- BARC/ CRG Tech- nologies	<p>CRG generated 11 technologies for all regions</p> <p>Crops (6 technologies)</p> <p>Bio-organic fertilizer- A green technology to improve soil health and rice yield. Bio-organic fertilizer is the combination of degradable kitchen waste (79%), rice husk biochar (15%), and rock phosphate (5%) fortified by low-cost beneficial bacteria (1 g dry wt);</p> <p>Crop productivity enhancement in beel areas- Cultivation of BARI Sharisha-14 & 15, BARI Gom -30, maize- NK 40, 900 M Gold & Miracle, BARI Rashun-3 and BARI Piaz-4 in the upper land of Chalan beel provides higher production/ha;</p> <p>Tobacco replacement in char land through high value crops- BARI Gom- 30 & 33, BARI Hybrid Bhutta -9, BARI Chinabadam -8, BARI Kalozira-1, BARI Misti Alu-12, Chilli (Bindu), and local bottle gourd are recommended for cultivation in the char lands for higher yield and economic return;</p> <p>Bagging technology for safe and quality mango production- Use of brown paper double layered bag and white paper single layered bag is recommended for safe and quality mango production;</p> <p>Optimization of pre-harvest interval (PHI) of commonly used pesticides in some vegetables- The PHI is 10 Days after Spray (DAS) for fenvalerate in tomato and 14 DAS in hyacinth bean; for dimethoate it</p>

is 10 DAS in tomato and 12 DAS in hyacinth bean. The PHI is 5 DAS in cauliflower and 4 DAS in brinjal and cabbage for cypermethrin;

Introduction of high value vegetables in Sylhet region- Country bean genotype 'Sikribi sheem-1' in trellis or staking support systems is suggested during summer for higher yield (40-45 kg/decimal) in Sylhet region. Grafted summer tomato seedlings of BARI Hybrid Tomato-8, BARI Jharsheem-1 and broccoli genotype Centaru were successfully produced in the region.

Fisheries (2 technologies): Culture of short cycle high valued fish species in the drought prone area of Bangladesh. Shing 500 + Pabda 100 + Rajputi 10 + GIFT Tilapia 5 combination / decimal; Tengra 500 + Magur 100 + Rajputi 10 + GIFT Tilapia 5 combination/decimal enhanced fish production per unit area and time; **Mixed culture of golda and native catfish in south-western coastal gher.** Galda was successfully cultured with Shing and Magur in the south western coastal gher at reduced water level and low salinity.

Livestock (3 technologies): Cost effective complete pellet feed for commercial goat and sheep production. Complete feed prepared by using 40% roughage (rice straw) and 60% concentrate mixture is good for commercial goat and sheep production; **Low- cost technology for making processed cheese.** Production of cheese locally would reduce the cost of cheese in the local market; **Pro-biotic feed supplement for calves.** Probiotic feed supplement helps reducing diarrheal frequency and increasing immunoglobulin status in calves.

BLRI **Improved native chicken rearing model.** Management includes feed supplementation (60 g/day), following of vaccination schedule, artificial brooding (4 weeks), supply of light for 16 hours, and providing night shelter;

Salt tolerant Napier fodder. Suitable for coastal region of Bangladesh;

Buffalo & cattle fattening technology. Four steps are followed: collection of male, deworming, feeding & rearing, and marketing;

TMR (Total Mixed Ration) technology. Crop residues-based ration (roughage (50%): concentrate (50%)): rice, wheat, maize, soybean. It is suitable for feed crisis/ dry season;

High yielding fodder BLRI- Napier-4. Suitable for all types of soil, hilly and low-level saline soil. Planting continued for 3-4 year;

Urea molasses straw (UMS) technology (urea 3: molasses 15: straw 82);

Goat production under semi-intensive management. It includes housing, floor space 3-5 sq. ft. /adult animal, 5-7 sq. ft. / lactating doe, perch (macha) for night shelter (3-5 ft. high); 2 hours grazing in the morning and 1-2 hours in the evening; health management- vaccination (once a year), deworming (twice a year), deeping (1 time/ month);

Mini milk pasteurization and preservation technology. Mini milk pasteurization could be for 500 litre milk per day. Suitable for small and medium dairy farmers, sweet producer, small society & safe milk and milk products production. This is good for hot temperature areas;

Fodder preservation technique. Silage: Fermented grass at airtight conditions by polythene sheets (60-65% moisture), suitable grass - corn, figs, napier;

BLRI PPR control model for goat and sheep. It is necessary good quality PPR lab to monitor circulating virus, trained manpower, and good quality vaccine.

BFRI Seed production & culture of brackish water catfish (*Mystus gulio*); Breeding & seed production of Mullet (*Chelon subviridis*) in the coastal gher; Improved culture practices of Shrimp in gher; integrated farming of rice-fish and shrimp in the coastal gher; Early brood development of Prawn (*Macrobrachium rosenbergii*); Development of nursery and grower feed for shrimp; Mix culture technology of prawn and tilapia; Fattening of mud crab (*Scylla olivacea*) in pond and cages; Brood development and breeding of Mud Crab (*S. olivacea*); Soft-shell crab culture; Shrimp disease identification & prevention; Adaptation of BFRI evolved cage culture technology of high valued fishes in Baor.

BARI	<p>Oil crops: BARI Sharisha -14, 17 & 18; BARI Til - 4, BARI Surjomukhi -3 (dwarf type)</p> <p>Pulse crops: BARI Masur -8 & 9; BARI Motor -3; BARI Chola- 9; BARI Kheshari- 3</p> <p>Vegetable: BARI Lau -4</p> <p>Tuber Crops: BARI Misti Alu -14 & 15</p> <p>Spice Crops: BARI Piaz -3</p> <p>Fruits: BARI Aam -8 (polyembryonic)</p> <p>Coconut mite control: Coconut mite control with insecticides: Abamectin 1.8 EC (Vertimec) or Propargite 57 EC (Omite) at 1 ml/litre of water to be sprayed on cleaned top of coconut plant.</p> <p>Agricultural Machineries: BARI Seeder (Power Tiller Operated Seeder- PTOS), BARI potato planter; BARI potato harvester; BARI multi-crop power thresher, BARI power maize sheller.</p> <p>Production of spinach with mulch in coastal area (Dacope, Khulna)</p>
BRRRI	<p>BRRRI scientists presented over 12 technologies on variety, agricultural machineries, etc. Identified major technologies are mentioned below.</p> <p>Miniket and BRRRI dhan28 (Boro) could be replaced by BRRRI dhan81 (Boro), 84 (Boro) (iron & zinc enriched), 86 (Boro), 88 (Boro) & 96 (Boro)</p> <p>BRRRI dhan29 (Boro) could be replaced by BRRRI dhan89 (Boro)</p> <p>BRRRI dhan47 (Boro), 55 (Boro) & 61 (Boro) (salt tolerant) could be replaced by BRRRI dhan67 (Boro)</p> <p>BRRRI hybrid dhan1, 2 & 3 (Boro) could be replaced by BRRRI hybrid dhan5 (Boro) (more yield– 9 t/ha)</p> <p>BRRRI dhan56 (Aman), Sarna could be replaced by BRRRI dhan75 (Aman)</p> <p>BRRRI dhan40 (Aman), 41 (Aman), 53 (Aman) & 54 (Aman) (salt tolerant) could be replaced by BRRRI dhan73 (Aman)</p> <p>BRRRI dhan51 (Aman) & 52 (Aman) (water logging tolerant) could be replaced by BRRRI dhan79 (Aman) (water logging condition up to 21 days could be tolerated)</p> <p>BRRRI dhan34 (Aman) could be replaced by BRRRI dha90 (Aman)</p> <p>BRRRI dhan26 (Aus/Boro), 27 (Aus), 48 (Aus) & 55 (Boro/Aus) could be replaced by BRRRI dhan82 (T. Aus), 85 (T. Aus) & BRRRI hybrid dhan7 (T. Aus)</p> <p>BRRRI dhan48 (Aus) could be replaced by BRRRI dhan82 (T. Aus)</p> <p>BRRRI rice transplanter-cum granular urea applicator</p>
BINA	<p>Binadhan- 7 (Aman) could be replaced by Binadhan -16, 17 & 22 (Aman)</p> <p>BRRRI dhan62 (Aman) could be replaced by Binadhan -20 (Aman)</p> <p>BRRRI dhan 51 (Aman) & 52 (Aman) could be replaced by Binadhan -11 (Aman)</p> <p>Binadhan -8 (Boro) , BRRRI dhan47 (Boro) could be replaced by Binadhan- 10 (Boro)</p> <p>BRRRI dhan48 (Aus) could be replaced by Binadhan -19 (Aus)/Binadhan -21 (Aus) and popularization of Binachinabadam -9, Binahalud- 1, and Binalebu-1</p>
BSRI	<p>BSRI Akh 41 (chewing type), 42 (chewing type), 43, 44, 45 (average sugar content 13.94%) & 46 (low fiber content)</p> <p>BSRI Stevia-1 (110 days required to harvest fresh leaves)</p> <p>BSRI Tal- 1 (for coastal areas)</p> <p>BSRI power weeder (fixed capacity = 0.67 ha/man-day)</p>
BWMRI	<p>BARI Gom -25, 30, 32 & 33 (blast resistant & zinc enriched) (for Khulna and Jashore area)</p>



6.2 NECC, DECC and UECC Facilitate Research-Extension Linkage

To facilitate and oversee the extension activities of NATP-2 at different levels there are several formal committees consisting of officials from different extension (DAE, DoF and DLS) and research organizations. The committees with their major functions and composition are given below:

Committee	Composition and function of the committee
National Extension Coordination Committee (NECC)	<ul style="list-style-type: none"> operates at the national level consists of representatives from extension agencies (DAE, DoF and DLS), BARC, NATP-2, Krishi Bank, Agribusiness Community (crops, fisheries and livestock), etc. meets twice a year. provides guidance and oversees the implementation of the activities of the extension components
District Extension Coordination Committee (DECC)	<ul style="list-style-type: none"> operates at the district level consists of the concerned officials of the extension (DAE, DoF and DLS), representatives from local agricultural research stations, Krishi Bank, farmer representative, etc. meets at least four times a year. supervises and reviews the progress of implementation of Upazila Extension Plans (UzEP). suggests the improvement/modification of the UzEP.
Upazila Extension Coordination Committee (UECC)	<ul style="list-style-type: none"> operates at the upazila level consists of the representatives from extension (DAE, DoF and DLS), farmer, agribusiness representative, etc. meets at least four times a year. provides technical advice and logistic support to Upazila Resource Team (URT) and Union Extension Facilitation Team (UEFT).

The numbers of UECC, DECC and NECC meetings held during the project period are presented in Table 6.1. These meetings have established personal linkage among the stakeholders helping them to identify the problems and to find out the solutions of the same.

Table 6.1: Details of the Committee (UECC, DECC and NECC) meetings held during the project period

Committee	Meetings Held (cum. No.)				Activities performed
	2016-17	2017-18	2018-19	2019-20	
Upazila Extension Coordination Committee (UECC)	540	2700	3780	4860	Provided technical knowledge to URT and UEFT, prepared upazila extension plan, monitored the progress
District Extension Coordination Committee (DECC)	114	570	798	1026	Reviewed upazila extension plans and suggested improvement, supervised and monitored the implementation progress
National Extension Coordination Committee (NECC)		01	02	03	Reviewed progress, strengthened coordination among different agencies, supervised and monitored project activities

6.3 Strengthening Research - Extension Linkage through Introduction of New Varieties

During FY2019-20 PIU-DAE conducted the following validation trials in coordination with research scientists and PMU of NATP-2:

1. High yielding varieties BARI Sharisha-14 and BARI Tomato-14 in Debiganj (former Chitmahal, now under Bangladesh) in winter 2019. As Debiganj was under Chitmahal, farmers of this area did not receive high yielding varieties;
2. BU aromatic hybrid dhan 1 (developed during NATP- 1) and BU dhan-2 in Kapasia and Kaliakoir, Gazipur in Kharif- 2 season 2019;
3. BARI Surjomukhi 3 (a new dwarf & salt tolerant variety) in rabi season 2019 in Paikgacha and Dumuria of Khulna; and
4. BRRI Bio-organic fertilizer in the Boro season 2020 at Dhanbari, Tangail. This technology fulfills 30% urea and 100% TSP fertilizer requirements for rice production.

These validation trials have drawn attention of the farmers as new technologies have reached in their area and have established functional relationships among extension officials of DAE, scientists of BARI and BRRI, and teachers of a university (BSMRAU).

6.4 Extension Training Programs Build Research-Extension Linkage

Farmers acquire new technology knowledge mostly through trainings which enable them to understand initially and then adopt the technology.

PIU- DAE imparts training to farmers on different modern production technologies of different crops including fertilizer & irrigation management, management of major insects & diseases, etc. PIU-DAE invites resource speakers from NARS institutes based on the subjects to be covered. The scientists supply some training materials to farmers and also show them samples for better understanding of the subject.

PIU-DLS planned to provide training to 630 DLS officers and 840 staff on newly released livestock technology which are available at research institutions, universities and other organizations for dissemination to the farmers. PIU-DLS organized 12 batches training for 360 DLS officers on management of newly released livestock technology. BLRI outlined the course design, prepared training manuals and the scientists of BLRI conducted the training sessions. The field level officers of DLS and the scientists of BLRI have received an opportunity for direct interaction among them establishing the linkage between research and extension through such training courses.

PIU-DoF involves researchers (BFRI, BAU, etc.) for their technical assistance as and when needed. Research findings of these organizations are used in designing demonstrations and preparing different training modules. Thus some sort of linkage exists between DoF and researchers.

6.5 Technical Collaboration between BFRI and PIU-DoF in Pure Brood Supply and Multiplication

PIU-DoF is collaborating with BLRI regarding supply of pure brood and technical assistance for multiplication of the broods. Vietnamese Koi and GIFT (Tilapia) were produced in four farms

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(Nimgachi Aquaculture project, Raiganj, Sirajganj; Carp hatchery complex, Katiardi, Kishoreganj; Carp hatchery complex, Shantiganj, Sunamganj; Fish Hatchery and Training Center, Raipur, Laxmipur). Out of 548,000 fingerlings produced so far, 36.93%, 61.97% and 1.09% were sold, ready for sale and rearing as 2nd generation brood, respectively (Table 6.2). The assistance from BFRI has enabled the PIU-DoF to successfully develop pure line brood and fish seed production. The fingerlings were sold to the farmers.

Table 6.2: Production of Fish Seed from Pure Line Brood Development Program as of 30th June, 2020.

Hatchery	Fish species	Fingerlings (No.)			
		Produced	Sold	Ready for sale	Rearing as 2 nd generation brood
Nimgachi Aquaculture project, Raiganj, Sirajganj	Vietnamese Koi	80,000	48,000	31,500	500
	Vietnamese Pangas	Fingerlings will be produced in 2021			
	GIFT (Tilapia)	40,000	18,000	21,000	1,000
Carp hatchery complex, Katiardi, Kishoreganj	Vietnamese Koi	100,000	-	99,500	500
	Vietnamese Pangas	Fingerlings will be produced in 2021			
	GIFT (Tilapia)	75,000	30,000	44,000	1,000
Carp hatchery complex, Shantiganj, Sunamganj	Vietnamese Koi	80,000	-	80,000	-
	Vietnamese Pangas	Fingerlings will be produced in 2021			
	GIFT (Tilapia)	70,000	16,200	53,800	-
Fish Hatchery and Training Center, Raipur, Laxmipur	Vietnamese Koi	51,000	50,000	-	1,000
	Vietnamese Pangas	Fingerlings will be produced in 2021			
	GIFT (Tilapia)	52,000	40,200	9,800	2,000
Total		548,000	202,400	339,600	6,000
% of total		100	36.93	61.97	1.09

6.6 FIAC Activities Enhance Research-Extension Linkage

FIAC, a one stop extension service centre, is established by NATP-2 in two rooms of 1621 union parishad buildings of 270 project operated upazilas. It is considered as a unique door-step service for farmers in NATP-2. Technologies are transferred quickly through FIAC to CIG and non-CIG farmers. FIAC operates in the office time and SAAOs, LEAFs and CEALs sit in FIAC following a roaster and provide need based advice to farmers on different aspects of crop management including balanced use of fertilizers, management of insects & pests, water quality in ponds, Artificial Insemination (AI), deworming, vaccination, etc. SAAOs, LEAFs and CEALs working in FIACs had installed in the project provided mobile tablets the available mobile Apps ('KrishakerJanala', Rice Knowledge Bank, BARI Apps- 'Krishi Projukti Bhandar', etc.) with technology knowledge, mainly coming from research institutes, and use those as part of technology advice to the farmers. In the seed and pest museums established in FIAC, seeds of the latest crop varieties, major pests & diseases, beneficial insects, sex pheromone traps, booklets, posters, etc. are displayed and being used to motivate the visiting farmers in technology transfer/problem identification. Some of the samples of latest varieties, pest and disease samples, sex pheromone traps, etc. are collected from the research institutes.

6.7 Research-Extension Linkage through Training to Agro-inputs Dealers and Traders

Quality seeds and appropriate doses of fertilizers & pesticides are important components in modern agriculture for increased production & productivity, and for safe food production. Farmers usually get that knowledge while purchasing agro-inputs from local dealers and traders whom they know very well and farmers have confidence upon them. Considering the importance of agro-input dealers & traders, PIU-DAE conducted one batch of training in each of the 270 upazilas totalling of 8,100 client-days during FY 2017-18 in achieving its 100% target. Topics covered in the training were: Simple testing methods for identification of adulterated fertilizers & pesticides; Identification of pests & diseases; Use of right pesticides in right time in right doses; Eco-friendly management of pests & diseases; Balanced use of fertilizers; Fertilizer application method; Safe application of pesticides; Simple testing methods for identification of quality seeds; Proper techniques for seed storing; Fertilizer & pesticide Acts/Rules, etc. PIU-DAE invited scientists as resource speakers from research institutes (BARI, BRRI, etc.). Knowledge gained by the agro-input dealers through training helps guiding them to advise farmers to select agro-inputs.

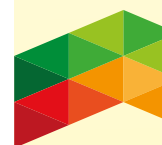
6.8 Bridging Research-Extension Linkage during the Implementation of CRG and PBRG Sub-projects

Under NATP-2 190 CRG sub-projects and 51 PBRG sub-projects were awarded by PIU-BARC. The CRG sub-projects encouraged short-term applied and adaptive research, while the PBRG sub-projects involved many research institutes and universities to work jointly for addressing national issues for increased productivity. Inception workshops were organized during the implementation of the sub-projects. Here scientists and extension officials were invited for their inputs in terms of the improvement of the programs including the methodology of the research work. Also, scientists and extension officials were invited in the annual progress review workshops for their valuable inputs on the progress of research activities. In such events scientists and extension officials interacted closely and put their comments for generation of viable technologies.

One PBRG-sub project (ID - 097) for livelihood improvement of farmers through integrated farming system research in Barind area, established a crop museum at Bashlitala, Godagari Upazila of Rajshahi district showcasing the latest varieties of different winter crops (potato, mustard, maize, wheat, lentil, chickpea, onion, garlic, etc.) developed by BARI. This has given the opportunity of the extension officials and neighboring farmers to see by themselves the performance of the varieties and to select the varieties for cultivation. This is a good mechanism to transfer the latest varieties. This sub-project has also incorporated fisheries and livestock as an approach of integrated farming.

6.9 Exposure Visits as Means of Strengthening Research-Extension Linkage

Exposure visit is a good practice between research and extension. Researchers are eager to disseminate the technologies to the farmers. Similarly, extension officials are interested to know the new technologies for dissemination to the end users. Therefore, exposure visits bring the researchers, extension officials and farmers together. Exposure visit is an effective way of learning and disseminating technologies from one area to another area. It involves taking a group of farmers, staff, officers or other stakeholders from their own villages or areas to other villages or areas. PIU-DAE organized exposure visits at the Research Stations, Horticultures Centers, etc. During the exposure visit technological facts and advantages as well as success stories were explained by the



host resource speakers. Progress of exposure visits is shown in Table 6.3.

Table 6.3: Cumulative progress of exposure visits by PIU-DAE, PIU-DoF and PIU-DLS

PIUs	Project target (No.)	Progress of exposure visits				Cumulative progress (%)	Participants (No.)		
		2016-17	2017-18	2018-19	2019-20		Male	Female	Total
PIU-DAE	1350	0	540	270	270	1080 (80%)	17,550	9,450	27,000
PIU-DoF	270	0	-	-	200	200 (74%)	5,752	648	6,400
PIU-DLS	1110	0	270	270	269	809 (73%)	18,430	9,076	27,506
Total	2730	0	810	1350	2,089	77%	41,732	19,174	60,906

There was good participatory interaction among the participants and resource speakers. Seeds/saplings were collected by the interested participants. This was indicative to effectiveness and instant adoption of technologies. In the exposure visits the knowledge gained is used by CIG and non-CIG farmers.

During 2019-20, PIU-DoF organized exposure visits in government and private farms, hatcheries, nurseries, pond sites of innovative and commercial farmers to see improved technologies and to gain/share knowledge.

Similarly, PIU-DLS so far arranged 809 exposure visits at the upazila levels, of which 269 exposure visits were organized in the FY 2019-20. In each exposure visit, generally 25 CIG farmers including minimum one third female farmers, 3-4 CEALs, 1-2 staff and officers from DLS attended as participants. The participated farmers expressed high satisfaction on visiting new or improved management practices observed in other areas or locations.

6.10 Publications, Websites, etc. Bring Research-Extension Linkage

Research institutes regularly publish their research results. They also keep their published materials in their respective websites. Therefore, printed materials/publications and materials kept in websites are important information sources for the extension agents. Extension departments also publish booklets/leaflets for dissemination of technology to the farmers. Here extension officials take information from research publications.

SECTION 7: NATP-2 PROJECT COORDINATION, MONITORING AND EVALUATION

The Project Management Unit (PMU) of NATP-2 is established under the Ministry of Agriculture and headed by an Additional Secretary of the Government of Bangladesh as the Project Director. PMU is responsible for overall coordination and management of the Project in line with the provisions as set out in the official project documents, namely in the DPP, PAD and PIM. PMU establishes liaison among components, with the World Bank and other development partners. Besides the overall project coordination, it carries out a range of fiduciary activities including overall financial management, training to PIUs and the research partners on cross-cutting issues; organizing annual progress review workshops & other PMU workshops on cross-cutting issues, value chain & marketing, gender equity; coordination of procurement and corresponding support to other components; etc. PMU is also responsible for coordinating overall Project Monitoring and Impact Evaluation (M&IE), reporting and implementation of the communication activities of the project. It also coordinates the implementation of selected overarching project activities with the support of external technical assistance, including baseline, mid-line and end-line surveys for the impact evaluation and project internal annual audit.

This section reports progress of activities PMU directly implemented in the FY2019-20 and cumulatively, as well as progress and results of overall coordination and monitoring of the project.

7.1 NATP-2 Project Coordination

The Project Management Unit coordinates and facilitates the overall implementation and management of NATP-2 under the direction and supervision of an inter-ministerial Joint Project Steering Committee (JPSC) and Project Implementation Committee (PIC). PMU facilitates project implementation being carried out by the four PIUs (PIU-BARC, PIU-DAE, PIU-DOF, PIU-DLS) in line with the provisions in the official project documents, consolidates NATP-2 annual budget and work plan, based on inputs from different implementing units, for approval by JPSC.

In FY2019-20, PMU had arranged 1 JPSC, 2 PIC, 11 Monthly Coordination meetings with the PIUs and also 11 PMU internal coordination meetings.

Joint Project Steering Committee Meeting

The Forth Joint Project Steering Committee meeting was held on 18 November 2019, where the NATP-2 consolidated annual work and procurement plans with budget of all components for FY2019-20 were presented and received formal approval. Major decisions taken in the JPSC meeting are as below:

<ol style="list-style-type: none"> 1. JPSC meeting should be organized regularly. In the meeting among others progress of activities will be reviewed against annual work plan, procurement plan and budget of the preceding year 2. Inter-ministerial Mid-Term Evaluation Committee (Corps), Inter-Ministerial Mid-Term Evaluation Committee (Fisheries and Livestock); Progress Monitoring Committee (Crops); Progress Monitoring Committee (Fisheries and Livestock) are to be formed as per DPP provision and start functioning immediately. Any change in the Committee composition needs to be agreed upon and incorporate during DPP revision 3. Validation trials of the technologies developed under CRGs and PBRGs should be conducted by the on-farm divisions of those NARS institutes under which the technologies have been developed. Executive Chairman, BARC may take the initiative in this regard 4. PhD programs, both in-country and overseas, are to be completed within the specified timeframe. The duration of extension request could be considered on case by case basis 	<ol style="list-style-type: none"> 5. The road map for implementation of NARS Institutional capacity enhancement activities including development and installation of ICT facilities, laboratory equipment and construction of research infrastructure facilities should be followed and the work to be completed as per the timeframe specified in the roadmap 6. For payment of farmer's allowances both the offline and online banking system can be used. In inevitable circumstances mobile banking options can also be explored and used 7. Considering the two years delay in the start -up of project activities on the ground, the Committee in principle agreed to have two years of no- cost extension for full implementation of the planned activities. The revised DPP of NATP-2 project should be submitted to the Ministry of Agriculture within February 2020 8. The work plan of selected 23 Beels out of 40, which were included in the DPP has been approved. PIU-DOF was directed to identify the remaining 17 Beels and incorporate in the revised DPP
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Project Implementation Committee of PMU (PMU-PIC) Meeting

Two meetings of PMU-PIC were held on 5th November 2019 and 9th March 2020, where the following important decisions were taken:

<ol style="list-style-type: none"> 1. PMU-PIC reviewed the NATP-2 consolidated work and procurement plans with budget for FY 2019-20 consistent with DPP provisions and recommended for consideration of JPSC; 2. Internal field monitoring by PIUs and PMU needs to be strengthened further in the event of not hiring the monitoring firm to accelerate the implementation and to keep track the project activities and quality of implementation; 3. PMU-PIC will review progress of activities against Annual Work Plan, Procurement Plan and budget and progress of implementation in relevance to logframe of the project; 4. All PIUs should prepare their Statement of Expenditure (SOE) based on actual expenses to avoid financial management complication. 5. PIU-DoF should implement the Beel Management program as per the road map submitted to JPSC. 	<ol style="list-style-type: none"> 6. Identified eleven technologies developed under CRG sub-projects of PIU-BARC, to be demonstrated at farmers' level by PIU-DAE, PIU-DLS and PIU-DOF. PIU-BARC should explore the possibilities of making a provision for validation of some of the remaining technologies developed under CRG sub-projects under the PBRG sub-project being implemented by the Technology Transfer and Monitoring Unit (TTMU) of BARC. 7. All PIUs and PMU should have discussed their underlying implementation issues during the upcoming World Bank Implementation Support Mission and jointly find out their solutions. 8. Civil works under Institutional Development are to be completed by June, 2021 9. PMU with the PIUs should immediately revise the project DPP and submit it to the Ministry of Agriculture for further processing and endorsement.
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Monthly Coordination Meetings of PMU with the PIUs

Monthly Coordination meeting with the PIUs and PMU is a problem solving forum where the component Directors give quick updates of their implementation progress, raise and discuss the recurrent problems and issues being faced and derive their solutions. Summary discussions and decisions taken in the Monthly Coordination meetings organized by PMU during FY2019-20 are as below:

- a. Finalized the field visit programs for the joint IFAD/World Bank July 2019 Technical Mission, and December 2019 and July 2020 Implementation Support Missions. Distributed the tasks for quality and timely preparation of all presentations and reports.
- b. Finalized the agenda for August 2019 JPSC Meeting.
- c. Relevant implementing units are to take all out measures for full utilization of AIF-2 and AIF-3 fund.
- d. For preparation of RDPP all PIUs will identify and provide in writing to PMU the areas for revision with justification and the revised cost table with year-wise breakdown. PMU will prepare a common cost table format and provide it to the PIUs.
- e. PIUs to prepare more publicity materials including short videos for wide spread circulation through TV and electronic media, and for uploading in the project websites, YouTube and Facebook
- f. Field level data in all tires up to CIGs must be maintained at respective PIUs and PMU;
- g. Broadsheet reply of Audit objection of PIU-BARC and PIU-DoF for FY2016-17 must be submitted to PMU by 21 October, 2019 without further delay.
- h. SOEs are to be submitted on time for timely reimbursement claim and steady fund flow to PIUs for smooth implementation of project activities.
- i. Monthly Coordination meetings are to be held regularly preferably first Monday of the said month. For holiday/unavoidable circumstances on the following working day shall be organized. All PIUs will submit the progress report against approved AWP up-to the previous month within the 3rd day of current month.
- j. All field level data related to the project should be collected by the field staff and maintained properly in their respective offices. These data are to be uploaded in their respective web site.
- k. E-nothi is to be introduced in all PIU offices and wherever necessary are to be linked with PMU for regular correspondence.

In the event of COVID-19 outbreak, PMU conducted series of virtual meetings with the PIUs using ZOOM Apps and the following decisions were taken and/or instructions were given:

- a. Deputed officers and consultants working in different NATP-2 units may directly communicate with each other for day- to- day activities in the interest of the project.
- b. Emphasis should be given on program implementation with special emphasis on timely availability of seeds, fertilizer, pesticides, feeds, fingerlings, vaccines and other inputs to keep the agricultural production systems moving.
- c. No land should remain fallow and vegetables should be grown in homestead areas too. Instruction should be given to the field level immediately



- d. Field officers & staff should be vigilant so that most needy farmers may avail government incentives provided for agriculture.
- e. Prepare list of affected farmers with probable loss incurred due to COVID-19, to avail government support.
- f. All government circulars related to transportation of agricultural commodities and production inputs should be well circulated.
- g. All implementing units should present field monitoring report in the next coordination meeting.
- h. A status paper on equipment procured under AIF-2 & AIF-3 with services provided including quantity is to be provided to PMU for compilation and submission to the MOA and MOFL
- i. In the present context, an operational guideline could be prepared for CCMCs.
- j. In office management e-nothi should be practiced in PMU & PIUs.
- k. All PIUs should continue to submit their field monitoring reports to Project Director.

7.2 PMU Training and Communication

PMU has a need based training, workshop and study visit programs; and communication activities to contribute to the project objectives through scaling up production technologies, skills development, knowledge sharing and learning. PMU also shares achievements and challenges of the project with the stakeholders.

PMU organizes in-country training courses on demand-led cross-cutting issues. In communication, it organizes workshops at national and regional level to review implementation progress, strengthen research-extension linkages, share knowledge & learning on specific subject/issue; arranges study visit/tour, training, conference attendance abroad; and publish reports including NATP-2 Annual Report.

NATP-2 supports the development of FIACs as fully equipped agricultural technology and knowledge sharing centers/hubs for rural people. NATP-2 ICT team is working on the digitization of FIACs.

7.2.1 Local Training

PMU organizes in-country training courses on demand-led cross-cutting issues, like Financial and Procurement Management, Communication Skills in Agriculture, e-GP and PRO-MIS, Fiduciary & e-nothi, etc. During the FY2019-20, PMU implemented 6 batches (17th-22nd) of the 6-day fiduciary training course entitled “Financial and Procurement Management” and trained 180 persons from DAE, DOF, BARC, PMU and NARS Institutes (as partners of PIU-BARC) for the improvement of knowledge and skill of individuals as well as institutional capacity building. In total so far, 22 batches of training are completed against the project target of 25 batches.

As the outcome of the training, the performance on fiduciary matters at upazila level is significantly improved and quality SOE from upazilas and other cost centers are coming. Pre- and post- training evaluation results of participants reveal that average pre-evaluation score per participant was about 9 (out of 30) which rose to about 25 (out of 30) as post-evaluation score. This is a clear indication of improvement of knowledge due to imparting training.

7.2.2 Local Workshops

During the FY2019-20, PMU organized and implemented the following three categories of workshops where participants from DAE, DOF, DLS, BARC, PMU, NARIs and local media & institutions attended.

A. NATP-2 Regional Progress Review Workshops 2019-2020 (PMU Organized 3 Workshops)

- 1) Mymensingh-Dhaka (Part) Regional Workshop held on 22 January 2020 at BINA, Mymensingh; where over 226 participants attended.
- 2) Jashore-Khulna-Barishal Regional Progress Review Workshop held on 27 February 2020 at CSS Ava Center, Khulna; where over 235 participants attended.
- 3) Rajshahi-Bogura-Rangpur-Dinajpur Regional Workshop held on 11 March 2020 at RDA, Bogura; where over 316 participants attended.

In the Regional Progress Review Workshops, PIUs presented their Annual Reports on progress, achievements, successes, challenges along with way-forward. The house discussed those, debated, suggested improvements, and drew conclusions & recommendations.

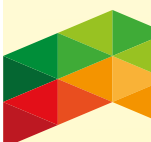
B. NATP-2 Workshops on Strengthening Research-Extension Linkage (PMU Organized 4 Workshops)

- 1) Barishal Regional Workshop on Strengthening Research-Extension Linkage held at RARS, Rahmatpur, Barishal on 29.06.2019; where over 100 participants attended.
- 2) Sylhet Regional Workshop on Strengthening Research-Extension Linkage held at Excelsior Sylhet Hotel & Resort, Sylhet on 24.08. 2019; where over 150 participants attended.
- 3) Rajshahi-Bogura Regional Workshop on Strengthening Research-Extension Linkage held at BSRI, Ishwardi, Pabna on 07.11. 2019; where over 230 participants attended.
- 4) Jashore-Khulna Regional Workshop on Strengthening Research-Extension Linkage held at Sk Hasina Software Technology Park (IT Park), Jashore on 25.02. 2020; where over 190 participants attended.

In the Strengthening Research-Extension Linkage Workshops, researchers presented their regional scalable technologies mentioning the benefits of those technologies. The extension officials and the house discussed those, debated and finally selected the scalable good ones for the region(s).

C. NATP-2 Workshops on Different Events (PMU Organized 2 Workshops)

- 1) Workshop on Gender Equality, Women Empowerment and Social Inclusion: Strategy & Action Plan held at SAC Conference Room, BARC Complex, Farmgate, Dhaka-1215 on 23.12.2019; where over 45 participants attended.
- 2) Workshop on Value Chain & Marketing held at SAC Conference Room, BARC Complex, Farmgate, Dhaka-1215 on 08.03.2020; where over 50 participants attended.



7.2.3 Publication of “NATP-2 Annual Progress Report”

PMU collects information on project implementation and progress from all components (PIUs); compiles, reviews and publishes them in concise form as “NATP-2 Annual Progress Report”. Annual Progress Reports 2017-2018 and 2018-2019 were published in due time and circulated among the PIUs and other stakeholders for sharing the project information, progress and challenges. This present report is NATP-2 Annual Progress Report 2019-2020.

7.3 Monitoring and Evaluation

Monitoring and evaluation are integral parts of project management. As per DPP, PMU is overall responsible for project’s results monitoring, while the day-to-day activity implementation monitoring and evaluation of CIG performances have been integrated within the decentralized project management arrangements.

7.3.1 Monitoring of Research Activities by PIU-BARC

PIU-BARC embedded monitoring and quality assurance role in all three phases of a research project i.e., at planning, during conduction and at closing of a study. It follows different steps from call for proposals to formal approval of a research project by the Executive Council of BARC/NARS. All the approved research sub-projects along with their proposed methodologies were also cross-reviewed and validated by a two-member expert panel from different specialized institutes and universities.

To monitor implementation progress of both research and PhD programs under PIU-BARC, it has established a central M&E Cell at BARC, Divisional M&E Cell at each division of BARC and institutional M&E Cell at respective research institutes. PIU-BARC also has formed a Monitoring Team for desk and field monitoring of on-going PBRG sub-projects.

M&E activities performed by PIU-BARC during 2019-20

1. Desk review of all half-yearly and annual progress reports for fund release – The Monitoring Team of PIU-BARC during FY 2019-20 had reviewed all the submitted half-yearly reports of PBRG sub-projects, checked and verified any deviation or lacking or shortage of data and information as the prerequisite for next instalment fund release by PIU-BARC, sent back the reports to the sub-project Principal Investigators (PIs) with the comments and requested for submitting revised reports. PIU-BARC then sent the reports to the respective divisions of BARC for their approval and required fund release. This is an on-going process. Following the same procedure stated for half-yearly reports, the Monitoring Team reviewed the annual reports submitted by PBRG sub-project PIs and recommended for next quarter fund release.
2. Annual progress review workshop on PBRG sub-projects was conducted during 16-20 November 2019 at BARC conference room -1. All the PIs and Co-PIs of 40 (155 components) PBRG sub-projects including the expert members and consultants/officials of BARC were present in the workshop. In addition 8 expert members in different disciplines were present who contributed to improve the field implementation of the research projects. The workshop proceedings with findings, observations and recommendations were duly sent to the respective PIs for considerations.

3. Field monitoring visits - Field monitoring of PBRG sub-projects conducted by the monitoring team of the Technical Divisions of BARC and PIU-BARC using prescribed format. For FY 2019-20, nine teams were formed to make field visits from Oct 2019 to Mar 2020. Till March 2020, five regions: Chattogram (Chattagram, CHT, and Noakhali); Mymensingh (Mymensingh & Jamalpur); Rangpur (Rangpur, Dinajpur, Thakurgaon, Panchagarh); Rajshahi (Rajshahi, Pabna, Sirajganj, Bogura, Natore); Sylhet Region (Sylhet, Moulvibazar) were covered out of 9 planned. Due to COVID-19 the other teams could not make field visit.



Photo: Monitoring visit to Sylhet, Moulvibazar from 9-12 Mar, 2020 to observe vegetable production using Gopalganj model and sunflower cultivation



Photo: Monitoring visit to experimental site in Mymensingh & Jamalpur

7.3.2 Monitoring of Extension Activities of PIU-DAE, PIU-DOF and PIU-DLS

On-site monitoring by the PIUs

The PIUs have established their own M&E Cells with their Deputed Departmental Officers and consultants working in the units for regular visits to observe the implementation progress at the field levels. In addition, the Upazila, District, Regional and HQ departmental Officials, Officials from the Ministries, IMED and PMU are also monitoring the project field activities. The M&E Specialists of implementing units had developed their M&E plans, formats and checklists to record the field observations and outputs data and their reporting from the field to PIUs and PMU.

During field visits, focus group discussions were conducted with the CIG members and evaluated their performances in respect of registration, generation of savings, holding of monthly group meetings, participation in the training program, quality of the training, establishment, management, productivity and profitability of demonstrations. During field visits, FIACs are also monitored in respect of use of different tools and kits by the farmers, use of mobile tablets by the SAAOs, CEAL and LEAF, record keeping of the visitors attending FIAC and information related to the extension services sought for and the advices given by the SAAOs, CEAL and LEAF.

ANNUAL PROGRESS REPORT 2019-2020



Photo: Monitoring of FIAC by PIU-DoF Personnel



Photo: Field monitoring by the Director and Officers

Some of the PIUs' fields monitoring observations are presented below:

- Overall observation showed the trend of achieving the increased farm productivity.
- Vermi-compost and Tricho-compost technology have been widely adopted among the farmers
- Area coverage under project promoted improved technologies and newly released crop varieties is gradually increasing
- Awarded AIF-2 and AIF-3 sub-projects are successfully implemented and the successful sub-projects are being used as showcases for exposure visits, seeing the successes many visiting CIG farmers started preparing AIF-2 sub-project proposals
- Demonstrations, training of CIG farmers, etc. are conducted within the timeframe even during the crisis of COVID-19 following the prescribed health safety measures
- Participation of 35% women and involvement of ethnic community members in extension activities are ensured
- Awareness about Environmental safeguard issues mostly developed and use trend of pesticides gradually declining
- FIAC are gradually popularized among the rural people. Many of the FIAC visiting farmers expressed their satisfaction getting the privileges of door-step quality services.
- Knowledge on improved and scalable technologies and awareness on modern management of fisheries and livestock has been improved due to training, demonstration and other project activities.

Organization of district and regional level progress review workshops

PIU-DAE and PIU-DLS had arranged annual progress review and work planning workshops during May-June at regional/division levels while PIU-DOF held regular two half-yearly workshops at all 57 districts. Concerned division, district and upazila level personnel of the three departments and officers and experts from PIU offices participated in the workshops.

Some of the recommendations came out from the eight Regional Progress Review Workshops of PIU-DAE during FY 2019-20 are noted below:

- a. Ensuring regular monthly meetings of the CIGs as well as writing the meeting minutes. SAAOs participating at the CIG meetings would provide help in discussion of the meeting agenda & in writing the meeting minutes. Upazila & District level officers would monitor the

activities of the CIGs & SAAOs.

- b. Emphasis to be given making the CIG savings fund enriched & investing the fund into IGAs, farm mechanization, building of assets, etc. The SAAOs would undertake the activity of utmost motivation.
- c. Registration of 100% CIGs to be completed by June 2020. Also 100% CIGs to be upgraded into "Grade A". In these regards all sorts of guidance and support to be given and monitoring to be conducted by the SAAOs and Upazila officers.
- d. Self-capacitating skill & efficiency of the CIG farmers to be built up in identifying the problems & preparing the CIG Micro Plans.
- e. Overall mobilization of the CIGs to be strengthened and sustainability to be developed targeting transformation of all into rural entrepreneurs.
- f. FIAC services to be made compatible & attractive; publicity inviting the FIAC services to be emphasized.
- g. Training of CIGs farmers to be conducted following the "Revised CIG farmer's training principles". "Farming as a business" to be included in training events. Oral pre-evaluation & post-evaluation of the trainee farmers must be ensured.
- h. Demonstrations to be established using newly released crop varieties. Seeds of demonstrations to be ideally preserved and distributed among the interested farmers. Increased crop coverage under the newly released varieties to be encouraged and documented.
- i. CIG farmers training and other technology disseminating activities like demonstrations, validation trials, field days, exposure visits, etc. to be made more effective and publicly focused. Outputs/outcomes/impacts of these activities to be made measureable. CIG & non-CIG technology dissemination ratio must not be below the level of 1:3. List of technology-wise adaptors, both CIG & non-CIG farmers, must be maintained in separate registers by each of the CIGs.
- j. Massive campaign to be conducted to popularize newly released & potential varieties, and all out efforts to be undertaken to increase the area under the new varieties of crops.
- k. Exposure visits are to be organized at the local successfully-performance-oriented venues, prioritizing the showcases of AIF-2/AIF-3 matching grant sub-projects and CCMCs.
- l. Massive motivational campaign & similar activities to be conducted to promote safe food production.
- m. Necessary guidance, cooperation & promotional supports to be provided to the CCMCs, and the advantages of CCMC activities to be publicly focused to enhance participation of farmers.
- n. Competition among the CIGs for AIF-2 matching grant awards to be inspired. CIGs to be motivated to include modern farm machineries/equipment like reapers/combined harvesters, transplanters, etc. in AIF-2 matching grant sub-projects rather than the power tillers or other ordinary machineries/equipment.
- o. Revised list of competent rural entrepreneurs for AIF-3 matching grant awards to be prepared and necessary guidance to the entrepreneurs to be given for submission of AIF-3 sub-projects.
- p. Potential uses of the project delivered equipment like mobile tabs, pico projectors, moisture meters, IRRI cocoons, etc. to be ensured following the directives given by PIU--DAE.

- q. Environmental & social safeguard issues to be actively considered and incorporated in all project activities. Massive awareness to be developed for extensive production & uses of Vermi-compost & Tricho-compost to protect soil from degradation; awareness also to be developed to promote adoption of AWD irrigation method that helps to increase use efficiency of irrigation water causing least possible disturbance to underground water table. Ratio of 35% women involvement to be maintained. Indigenous people must also be addressed in all project activities.
- r. Success stories of well-performed activities of the project to be documented and copies of the stories to be forwarded to the PIU-NATP2-DAE.
- s. “Complaint Registers” to be maintained in FIACs to record grievances of the aggrieved persons, resolved actions also to be recorded. Similar registers are also to be maintained in Upazila & District offices.
- t. Monitoring & supervision of Upazila & District level officials to be strengthened to facilitate noteworthy successes of project activities.

Balance Score Card based CIG performance evaluation by the field offices

During June of every year the field staff of the three PIUs conduct CIG performance assessments in all CIGs (PIU-DAE conducts the assessment twice in June and December) using a 16-indicator based tool named “Balance Score card” in order to make necessary adjustments in extension service deliveries. Through these reviews CIGs are categorized as Grade A (very good) when the achieved score becomes 4.0, Grade B (Good) when score become 3.00-3.99, Grade C (Average) when grade becomes 2.0-2.99 and Grade D (Poor) when score becomes <2.

The CIG performance evaluation of the last three consecutive years presented in Table 7.1 reveals a significant shift from Grade “C” to “B” and “A” which was expected.

Table 7.1: Results CIG performance evaluation using balance score card

	PIU-DAE			PIU-DOF			PIU-DLS		
	2017-18	2018-19	2019-20	2017-18	2018-19	2019-20	2017-18	2018-19	2019-20
GRADE A	16.5	41	45	4.8	28.5	55.4	3.4	6.3	14.8
GRADE B	63.5	59	49	64.2	60	43.3	40.1	55.2	61.4
GRADE C	20.0	0	5	29.1	11.5	1.3	50.1	35.7	22.1
GRADE D	0	0	1	1.9	0	0	6.5	2.8	1.7

7.3.3 Monitoring Activities Performed during COVID-19

In the beginning of April 2020, soon after the COVID-19 lockdown, the Project Director had introduced and convened frequent virtual meetings with the PIUs initially through skype, and then using Zoom Apps, and encouraged all to submit all the documents for getting his approval in e-nothi. PMU had developed two formats – one for the PIUs and their regional and Upazila officials to guide and record the activity implementation progress, the problems faced and discussing and resolving the issues with innovative solutions. Another boro harvest monitoring format was given to DAE local office to record the progress of harvesting boro rice, use of AIF-2 equipment, especially reaper; thresher, power tiller etc., in boro harvesting, no. of farmers including CIG members

received government boro incentives, etc. Hortex Foundation also collected information from the CCMCs almost daily using the first format. PIU-BARC conducted separate online rapid surveys with their PIs of PBRG sub-projects and the PhD Fellows. Findings of these monitoring initiatives during COVID time are presented below:

7.3.3.1 Impact of COVID-19 on NATP-2 Project Management

From March 25 to May 30, 2020, all PIU and PMU offices remained fully and/or partially closed. From June 1, 2020 the offices started working with limited capacity. PMU and PIUs cancelled all the international training and study tour programs for the whole remaining project period and temporarily suspended all local training and exposure visits. The procurement packages of all five components which were under various stages of processing were halted.

7.3.3.2 Impact of COVID-19 on PBRG Research

PIU-BARC received responses from around 120 PIs of 43 PBRG sub-projects. The general responses mentioned by the PIs are:

- Majority PIs anticipated no or limited impact of corona pandemic on the field activities of the sub-projects (farming system sub-projects (ID # 061, 077, 096), agricultural engineering/ machinery (ID # 001, 002, 064), technology transfer (ID # 005) etc.). These sub-projects are field oriented and mostly managed by farmers under the guidance of field staff of research institutes.
- Number of PIs assumed time extension for their sub-projects, those have lab analysis (ID # 029, 030, 064, 134, 135, 156, 159), data collection (soil management: ID # 043, 134, 135); field surveys (AERS sub-projects); fisheries & mud crab (ID # 029, 036, 037); and nutritional analysis sub-projects
- Many of the PIs reported that farmers faced acute problems of low prices of vegetables, fishes and milk in the market due to lack of demand related with the communication breakdown throughout the country
- Numbers of poultry rearing cycles might be omitted due to lack of supply of all sorts of inputs
- The fruit orchards and nurseries including tea gardens are facing management problems due to absence of required numbers of staff of the projects
- Large numbers of PIs are hopeful to finish their sub-projects by time schedule but simultaneously they mentioned if the locked down continued for months then time extension could be needed to achieve the set objectives and for completion of the sub- projects.

7.3.3.3 Impact of COVID-19 on PhD Program

The short online study conducted during April 2020 revealed that none of local PhD scholars will face major difficulty by corona pandemic to complete their course and field works. As because, most of the local PhD students have set their field research (experiments) in their own research organizations (where they are scientists) and continued the field management but lab facility is out of function due to corona lockdown. But during the meeting with Director PIU-BARC on 14 June most of them (68 out of 80) informed that there will be damage of field and or lab works as the holidays in educational institutes are being prolonged, so they would need time extensions of 6-12 months with additional funding.

The situation is bit different for foreign PhD scholars, over 50% of the scholars informed that because of COVID-19 they may need extension of their PhD duration by 6 or more months in addition to their earlier set durations. Many scholars earlier said they would need extra time to finish the degree and this corona lockdown again put extra load on them. Considering all these the time duration of most of the PhD programs need to be extended for 6-12 more months with additional funding.

7.3.3.4 Monitoring of PIU-DAE Activities during COVID-19 Lockdown

PIU-DAE conducted monitoring of field activities regularly strictly following the health protection measures since the emergence of COVID-19 - by making telephonic/video contacts with the DAE District & Upazila officers, also with SAAOs. Cross monitoring is also done making contacts with the CIG farmers. Analysis of internal data reveals that:

- With few exceptions CIG meetings are not held regularly and savings were not provided by the farmers initially. Reorganizing the CIG monthly meetings started after a very short break following careful health protection measures like using mask and, physical distancing, washing hands, etc. CIGs updated their monthly saving installments payments and regularities are maintained.
- Interactions and monitoring of activities with the CIG farmers are continued by SAAOs/ Upazila officers/Monitoring officers of PIU-DAE are regularly over mobile phone, video conferencing, etc. and need-based advices/prescriptions are provided. CIG farmers are encouraged and motivated for their internal and external interaction over mobile phone and the system is reasonably activated.
- None of the farming/project activities are halted or delayed, but accelerated and time performed making active & virtual contacts with the farmers from different corners of Districts, Upazilas and PIU-DAE.
- Collective marketing of commodities were organized in many of the CIGs because of taking initiatives from Upazila DAE officers following the advices of PIU-DAE. Pick up vans procured with the support of AIF-2 and AIF-3 sub-projects were made extensively used for transportation of farm commodities of CIG/non-CIG farmers to the suitable markets.
- During COVID-19 CIG farmers training have been conducted maintaining social distance and health guidelines in the field.
- Aus demonstration inputs have been provided maintaining social distance and even though home delivery of inputs has also been ensured in some upazilas for establishing aus demo timely. Roughing were done in the community seed production demonstration in boro rice.
- Following the government circular for restriction-free transportation of agricultural commodities including agri-inputs, Secretary, MOA issued an urgent notice regarding this and this message has been widely circulated among the farmers and traders by the SAAOs. As a result, agricultural input shops remained open during lockdown so that farmers can buy their seed, fertilizer, pesticides, and machinery as required.
- Equipment like reapers, threshers, power tillers, etc. procured from AIF-2&3 were in exhaustive for harvesting and threshing in boro rice, power tiller is used for timely cultivating aus land of CIG & non-CIG farmers. The pick-up vehicle, engine vans, power tiller with trolley etc were used carrying vegetables, fruits to nearer and distant markets so that farmers sold their produces with fair price at this crisis. Besides vegetables are sold by using mobile van also. In the CCMCs sorting, grading, washing, packaging of vegetables are practiced maintaining

health hygiene and social distancing measures.

- During lockdown Government rehabilitation program include vegetables e.g. potato, sweet gourd, bottle gourd, brinjal etc so that farmers can get fair price and overcome this crisis. Over 40,000 CIG farmers of the total 0.6 million farmers have got Government incentives (seed, fertilizer) for aus (rice) cultivation.
- CIG registration documents were submitted to the cooperative office. CIG Micro Plans are prepared and follow up activities are on-going.

7.3.3.5 CCMCs during COVID-19 Lockdown

Under lockdown situation, CCMCs faced serious challenges to operate:

- Traders, usually coming from outside to buy produces from the CCMCs, could not come due to shut-down of public transport;
- Transports were not available for the same reason to enable shipping fresh produces to different higher markets or related destinations;
- Movement restrictions prevented farmers from bringing their products to the CCMCs;
- Forced closure of some of the CCMCs by police/administrative authorities was applied as a blanket rule to keep all market/shops closed, despite government directive to allow uninterrupted flow of food and related agricultural products.

As a result, prices went down, farmers were discouraged from harvesting their produces to bring for sale, and even in some places farmers destroyed their crops and planted a next season crop.

In the first few weeks following the lockdown, almost all the CCMCs faced some level of disruption or closure. There were lots of confusion about organizing and keeping chains of essential supplies open, as concerns of catching the infection also troubled people. In some cases, the whole areas remained under lockdown and so nobody could move, in some places the LBFs could not come as they were obstructed on their way and the CCMCs could not be opened. Three of the LBFs were forced to leave the stations for their homes as their co-habitants left and food became unavailable, but they left arrangements with MMC functionaries to keep the CCMCs operational. Despite all odds, all the CCMCs managed to operate once or twice every week during the first few weeks of the lockdown. But as has been mentioned earlier, fewer farmers brought produces for sale while few local traders bought those as demands and prices were low.

Hortex Foundation was ahead of the crisis and had already sent leaflets recommending practices (hand-washing, social distancing, etc.) for its staff and farmers for safety measures against possible infection. Necessary soap for hand-washing at the CCMC for all and masks, gloves, etc. for the LBF were provided. In order to avoid crowding by farmers at the CCMC, Hortex worked with the CIGs along with DAE officers and staff to organize group marketing. One member of a CIG would thus bring produce from other fellow farmers of the group to the CCMC, whilst sharing transport and other costs between them. Hortex kept contact with the UAOs, LBFs and the MMCs for keeping the CCMCs functional. MMC members were requested and LBFs were instructed to approach the UAO for supporting CCMC operations, so that Police would not arbitrarily close a CCMC. Gradually, the business improved.

The LBFs mobilized the CIG farmers and traders to join the temporary open field markets where

upazila administrations organized such system for maintaining social distancing as regular markets and shops were kept closed. In a number of places, the PO-MMC with the help of UAO and upazila administration organized vegetable sale for the local consumers using the rickshaw vans. In Mithapukur of Rangpur and Palashbari of Gaibandha, the upazila administrations took advantage of the regular vegetable assembly at the CCMCs that they purchased for distribution as relief material to the poor and needy. The LBF in Muktagachha of Mymensingh organized vegetable sales to the BGB there. UAO of Jashore Sadar organized door-to-door vegetable sale collecting on a truck from the CCMC as all other markets were closed. He also contacted other group buyers, like 'Ad-Din' to regularly lift vegetables from the CCMC. The LBF from Raipura CCMC organized sale to Dhaka cantonment that eased the clearing of farmers' vegetables. Wherever traders were absent, the LBFs called the local ones over phone to help dispose-off the farmers' assembled vegetables within the local markets of the area. Very quickly, the farmers were able to sell in all CCMCs at agreeable prices.

Hortex also arranged from time to time the sale of CIG farmers' vegetables from Savar, Shibpur, Belabo, Madhupur at the Farmers' Market operating during the weekends at Sech Bhaban, Manik Mia Avenue, Dhaka.

With the recent launching of online marketing of fresh produces by Hortex at www.hortexbazarbd.com, CIG farmers around different CCMCs are connected to sell their products here.

All the undertaken measures proved effective and therefore, the CCMCs are operational and vibrant despite the restrictions and turmoil. As a result, the CIG farmers are able to resume business at the CCMCs as before.

7.3.3.6 Monitoring of PIU-DoF Activities during COVID-19 Lockdown

PIU-DoF maintained continuous contact with the field through mobile phone calls, Skype meetings and using social media to get prompt response from field and for dissemination of office orders and instructions of PIU-DoF. Division-wise direct monitoring of component activities were also assigned to Assistant Directors (AD), Senior Assistant Directors (SAD). The PIU officers were present virtually at different training programs arranged at field level through Skype video calls. To monitor the ongoing construction and renovation works, Director and the PIU officers also made frequent field visits maintaining proper safety measures and social distancing.

Beel management activities were also monitored by active field visits from personnel of PIU-DoF. Due to restriction of physical movement of the extension service provider and extension service receivers, mobile network was used for dissemination of required technical information. Analysis of May 2020 field monitoring data and information flow of PIU-DoF component found that there were 424 calls from the fish farmers to LEAF (12), Field Assistants (303), Extension Officers (87), Upazila Fisheries Officers (43) and Senior Upazila Fisheries Officer (50). The fish farmers mostly sought extension advices on different technologies and their related application methods including application lime and feeding, water testing, incident of fish diseases and their remedies, AIF-2 and AIF-3 funding and others (details are given in Table 7.2). This process of information communication eliminated physical movement of people, time required and cost incurred for physical movement as well as risk of infection of COVID-19. All the suggestions are beneficial for those who asked for the required information. Adoption of online communication system facilitated the transmission of information between the receiver and provider smoothly during the COVID-19 situation.

Table 7.2: Dissemination of information to the fish farmers through mobile phone during May 2020

	Most frequently asked questions	Solutions provided
Local Extension Agents for Fisheries (LEAF)	Incidence of fish disease	Advised as per disease concern
	How to cultivate fish in bio flock method	Preliminary idea was given to the farmers.
	About the stocking density of carp poly culture.	Advises were given on stocking density of carp poly culture system.
	Selection procedure of demo farmers.	Selection procedure of demo farmers was discussed.
	Scarcity of fish seed.	Informed about the sources of quality fish seed in the locality.
Field assistants (FA)	Scarcity of oxygen in the pond water.	Advised to test dissolved oxygen level in the pond water and gave necessary management solution
	Red layer on the surface of pond water	The farmer was advised to remove the layer by using rope of dried banana leave.
	Slow growth of fish in the pond.	The farmer was advised to reduce the density of fish and provide feed 3 -5% of the total body weight of the fish every day.
	The fish are dying in the pond.	The farmer was advised on the basis of diagnosis
	Process of lime and fertilizer applications during pond preparation.	The CIG member was advised to use lime 1 kg per decimal and 200 gm of Urea and 100 gm of TSP per decimal of water body.
Extension Officers (EO)	About application of fish feed in the pond	Advised to apply 3-5% of feed of the total body weight of fish regularly
	Service of FIAC center during COVID-19 Lockdown.	It was advised to get help from LEAF through Mobile phone or online video calling.
	How to increase natural feed in the pond?	Use 150 gm of urea/decimal and 75 gm of TSP/decimal fortnightly
	Sources of quality fingerlings.	Quality fish seed is available at nearby government hatchery.
	Rate of lime and fertilizer application during pond preparation.	Advised to use 1kg lime/decimal, 200gm urea/decimal and 100gm TSP/decimal.
Upazila Fisheries Officers (UFO)	Selection of demo pond.	Requested to contact with LEAF.
	Testing of pond water quality.	Asked to contact with Md. Delwer Hossain, LEAF,
	Pre stocking pond management practices for carp poly culture.	The officer explained the management practices and told him to contact with LEAF.
	About AIF-2 and AIF-3 fund disbursement	Informed about the distribution procedure of AIF-2 and AIF-3 and requested to communicate with the respective Upazila Officers.
	Control of fungal disease of fish.	Advised to apply lime 150gm/decimal and salt 150gm/decimal.
Senior Upazila Fisheries Officer (SUFO)	Control of bacterial disease of fish	Farmers are advised to (1) Change water (2) Use Net or Bamboo to remove toxic and other wastage (3) Use 1kg lime and 1kg salt for 2 times up to 2 weeks for 4-6 feet depth.
	Pond Preparation	Pre stocking pond preparation includes (01) Use 1kg lime per decimal, (02) Create protected Net and give Sumithion 2-3ml/dec before release fish fry, (03)Use Urea and TSP 100-150gm/dec respectively.
	Natural Fish Feed Production in the Pond	Advised to use Urea 200 gm and TSP 100 gm per Decimal.
	Importance of conditioning of carp fry before transportation and transportation	Proper and soft handling, Ensure appropriate transport procedure and conditioning. Stop feeding the fry 48hrs before transportation.
	Distribution of input for demonstration pond.	Input distribution is in progress to the selected farmer maintaining social distance strictly.
Senior Upazila Fisheries Officer (SUFO)	Plankton Bloom	The fish farmer was suggested to stop feeding the fish temporarily and input some fresh water from deep tube well if possible.
	Nursery pond operation system	Suggestion was given to carp nursery pond preparation, carp nursery stocking and feed management.
	About selling fish via PO	The PO Chairman was told that members of PO can sell fish via PO, but during this COVID-19 situation they don't have to bring the fish to PO, rather they can contact with the buyer through on line.
	About selling fish via PO	During this COVID-19 situation mobile fish sale is initiated.

7.3.3.7 Monitoring of PIU-DLS Activities during COVID-19 Lockdown

PIU-DLS officers remained vigilant and monitored field level activities regularly over phone and submitted weekly reports to the Director, PIU-DLS. PIU-DLS officers and LEOs contacted with the ULOs, CEAL and CIG farmers, took update of the implementation progress and discussed around the problems and issues created due to lockdown, and ways for resolving them. The field level officers were requested to disseminate the message of government incentive package for the livestock farmers to cope up with the loss incurred from lockdown.

PIU-DLS officers and LEOs submitted 21 field reporting reports. In total 242 field monitoring reports are obtained from the field. Summary message received from the reports are as below:

- 1) In some places price of milk, meat and egg, especially milk price, decreased up to 50% till Ramadan started. To minimize the loss, the upazila officers were requested to take motivational initiatives among the people for including milk, meat and egg in their daily meal as to stimulate immune system of body to fight against Corona Virus. This has increased the demand of milk, meat and egg at local level. They also opined that the demand of milk can be increased if the local sweetmeat shops reopen. The field level officers were also advised to take initiatives for door to door marketing of milk, meat and egg through mobile van and or any other suitable vehicle. Some CIG members successfully started “Market on Wheel” through Rickshaw Van, Motorized Auto etc. and also continuing.
- 2) Price of animal feed had slightly increased due to insufficient supply. They were advised to provide low cost feed rationing formula to the farmers as well as use more green fodder for reducing high value feed ingredients. The field officers were advised to motivating CIGs to submit sub-projects under AIF-2 matching grant to buy feed crushing, feed mixing units etc. so that their dependency on feed companies is reduced in this COVID like situation.
- 3) The field level officers maintained regular over phone contacts with the CIG farmers and CEALs and provided extension services for health and feed management of dairy, goat and poultry etc.
- 4) Most of the upazila level DLS officers are staying at their respective work stations and performed their regular veterinary hospital services as like normal time, attended public calls for treatment of sick animals at the farm levels and provided treatment over phone for different diseases such as FMD, LSD, mastitis, Anorexia, coughing, emaciation, milk fever etc.
- 5) The CEALs were advised to take initiatives for preparing micro plan at CIG levels and collect information on Milk and Egg price
- 6) PIU officers have taken information about the implementation status of AIF-2 and AIF-3. Upazila offices were advised to uplift the beneficial effect of AIF-2 and AIF-3 during this COVID-19 pandemic.

CRDS, the hired Firm for Supply Chain Management and Market Linkage suspended their field activities for about two months due to COVID. New action plan was then proposed by the firm to adjust the stipulated activities within contract period.

7.4 Performance Monitoring of Extension Components by PMU

During FY2019-20, PMU Specialists and officials made frequent field monitoring visits and also conducted three (3) regional progress review workshops with the upazila and district level departmental officers involved in implementation of the crop, fisheries and livestock component activities on the ground. The field visit reports and review workshop proceedings were shared back with the PIUs and their field offices.

Below are the summary of suggestions and recommendations by PMU to PIUs for improving the program implementation and delivery performances are described below:

Issue areas	Monitoring findings, observations, suggestions and recommendations
PBRG related	<ul style="list-style-type: none"> Monitoring need to be stepped up by BSRI PIU-BARC for PBRG activities undertaken by BSRI.
CIG related	<ul style="list-style-type: none"> CIG registrations are progressing well. PIU-DAE and PIU-DLS should complete the CIG registration as early as possible; preferably within December 2020. The concerned officials at Upazilla level should work closely with Upazila Cooperative Officer to expedite the registration process following the suggestions of Cooperative office. All CIGs should have their bank account opened immediately so that CIG registrations along with savings mobilization become faster. The CIGs must be made smart by improving savings, regularly holding of meetings and group investments in agricultural activities for CIG performance improvements and their up graduations from C to B and B to A. The PIU upazila offices should support, mentor, monitor and motivate the CIGs through intensive interaction with the group. The CIG members should be encouraged for income generating activities for the sustainability of CIGs. The income generating investment activities should be such that all the group members will be the owner in the invested activities (e.g., buy a van for the group, land lease, pond lease, establishing a shop, etc.). Need to increase communication and interaction between the CIG members and SAAO, FA, CEAL and LEAF, explain and clarify the objective of CIG formation; To fill-out the vacant management positions in the CIGs, the PIU field administrations were advised to immediately arrange CIG meetings and reelect or select a new person through consensus basis and fill-out those positions. The process and outcome of the decisions should be properly noted down in the meeting minutes register.
Research Extension Linkage building and coordination	<ul style="list-style-type: none"> Efforts should be made so that DECC and UECC meetings are held regularly and successfully in the designated offices by rotation. The meeting proceedings should be regularly shared with PIUs and PMU through email. Working paper for the DECC meeting should be prepared and circulated before the meeting, so that proper representation, especially from research center/organization, could be ensured in the meeting. Working paper must include the agenda for NATP-2 DAE, DOF and DLS. It should also include current field problems and steps to be taken for its solution. NATP-2 district work plan should be discussed in the meeting so that three departments at district level; PIU-DAE, DOF and DLS should aware of the program for easy coordination, monitoring and supervision. Efforts should be made from the end of DD-DAE to make sure the participation of the designated members of DECC to attend the meeting for fulfilling the effectiveness and objectives of the meeting.

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FIAC service related	<ul style="list-style-type: none">• Multiple approaches should be followed in providing extension services to farmers that includes a) face to face consultation at FIAC, over phone advice, on-site/farm visit and display of capture good practices using PICO Projector in courtyard meeting/training, CIG group meeting etc.
AIF-2 & AIF-3 related	<ul style="list-style-type: none">• AIF 2 support to women should be user friendly for women;• PIU-DAE, DoF and DLS should immediately provide a guideline to the recipients of AIF-2 and 3 for recording of their income and expenditure from the use of tools and machineries procured under AIF-2 and 3 matching grants. The data should be presented in the future workshops and also in all reports.
Value chain and marketing related	<ul style="list-style-type: none">• The CCMCs are found well equipped with relevant tools and materials; Executive Committees of the CCMCs in Tangail Sadar, Delduar and Madhupur found weak and are not functioning well. It needs to be restructured immediately;• The paddling system rickshaw vans are mostly sitting idle. No guidelines were found for renting/ operating the rickshaw vans; The manual operated rickshaw van could be converted into engine operated rickshaw van by the PO/ market management committee with their own fund. Hortex Foundation should follow it up.• All CCMCs must have water supply facilities for cleaning of produce for hygienic, better look and higher price.• Efforts should be made by the concerned to link the CCMC with farmers and exporters.• PIUs should facilitate and mentor the PO Executive Committees to gradually phasing out the operational expenses of the PO Office• Hortex Foundation and the two other marketing firms need to support the PO Executive Committees to a) prepare a business plan for the PO, record and b) maintain a register in the PO office with daily sale information.
Technology demonstration related	<ul style="list-style-type: none">• Field demonstrations and validation trials should be conducted with recently released new crop varieties in consultation with research scientists. The yield data from demonstrated variety and control plots should be recorded and reported.• Demonstration should be selected considering the interest of the farmers as well as suitability of the area;• Intercropping sugarcane with short duration crops like vegetables, pulses, oilseeds, potato, onion, maize, etc. has been identified for dissemination to the farmers in both sugar mill zone and gur zone areas of Pabna. BARI masur 8, BARI chola. 10, BARI mug 8 could be used by DAE for up-scaling in Pabna district through establishing demonstrations with these varieties.• Farmers should be encouraged for the field application of vermi compost in their crop fields for maintaining good soil health and ultimately safe and healthy crops.• Name of the technology adopter farmers along with their address, technology adopted, yield and telephone number must be maintained at FIAC. Upazilla level officers must ensure it during their field visit and monitoring.• Women friendly technology should consider for women participants;• Need to strengthen motivational activities for technology adoption;

Validation trial related (BU aromatic hybrid dhan-1 and BU dhan- 2)

- Crop conditions of BU aromatic hybrid dhan-1 and BU dhan- 2 at tillering stage were found good in Kapasia & Kaliakoir. Number of tiller/hill ranges from 14-28 in both the varieties.
- There was some incidence of bakanae disease in the validation trial field. They (DAE officials) uprooted and destroyed the diseased plants. During my visit no incidence of bakanae disease observed.
- Suggested to provide required crop management practices by DAE for the field.
- Data on yield contributing characters should be recorded by DAE along with the control plot.
- It would be useful to visit the plots during panicle emergence and at harvest time by PIU-DAE, NATP-2 and PMU, NATP-2 officials.

Financial management related

- Cash books are maintaining by recording the transactions mentioning the date, figure, bill number, cheque number. But writing of cash book of different offices is not uniform and instant recording after occurring transaction is not maintained.
- Some offices used fluid in the cash book.
- In cash book, amount in cash column is inserted which is not permissible as per financing agreement.
- Bill register and cheque register are maintained.
- CIG wise goods distribution registered are maintained but maintenance of Farmers Card is not evidence.
- It is advised to update Cash Book regularly and correctly (as soon as the transaction is occurred).
- Hands on training have given to maintain uniform process in writing cash book and recording the payment only in bank column of cash book.
- Hands on training have provided to prepare bills by using proper economic code, particulars, attachments, verification of bills, recording the vouchers/ bills in cash hook and allocation register.
- Closing balance (if any) should be refund to PIU at the end of each year or informed the closing balance to Phi and need to be adjusted in the following year's allocation.
- Advised to maintain Farmer Card for recording the goods distributed among the Farmers.
- Also advised to send the Statement of Expenditure (SoEs) regularly.

7.5 Performance Review by the World Bank and IFAD

During FY2019-10, the World Bank and IFAD conducted two technical Missions from 14-18 July 2019 and from 3-13 February, 2020 and the third Implementation Support Mission from 24 November to 1 December 2019.

The objectives of the two Technical Missions were to discuss, agree, and take corrective measures on key on-going needs/problems facing the project and that were delaying project implementation while the third Implementation Support Mission had formally assessed the implementation progress



towards meeting the project development objectives and disbursement targets to date; and followed-up implementation of the Actions agreed during the last two Technical Missions.

The 3rd Implementation Support Mission report noted that the project's productivity targets appear on track to be achieved by project-end. The Mission also expects that now that both marketing firms are fully on board, the volume of commodities sold annually through new market structures and arrangements is expected to increase significantly for PIU-DLS and PIU-DOF. The AIF-2 and AIF-3 funds should be mostly used for improving market access and strengthening the value-chains.

7.6 Achievements against Targets in the Results Framework

The internal MIS data reveals that NATP-2 is on track in almost all indicators (Table 7.3). The project has already mobilized over one million of smallholder farmers and formed the CIG groups during first year, thus, overachieved its beneficiary target; undertook 241² research sub-projects against the total target of 133 and the achievements is 181%; imparted 3.6 million client days training against the target of 4.3 million client days training and thus already achieved 84% against the target. There were however some delays in the launching of supply chain and marketing and also in AIF-2 and AIF-3 activities and because of that the performances against targets of Indicator #2, 7 and 8 show some relatively low performances.

The PIUs component reports reveal that a total of 592,705 CIG and non-CIG farmers (crop- 409,072, fisheries- 54,520 and livestock- 129,113) adopted the project promoted scalable technologies and thus achieved 93% of its total target. As a result farm productivity gains for 12 different crops have reached 60% to 70% of their project end targets. The livestock sector also has achieved over 69% of its cumulative change targets for dairy (3.62 ltr milk/day/cow against the six year target of 3.9 ltr milk/day/cow with a baseline value of 3.0/ltr milk/day/cow) and for beef fattening the achievement is 65% (202.15 kg live weight/cattle against the six year target of 225 kg live weight/cattle with a baseline value of 160 kg live weight/cattle). Productivity increase for culture fish has reached to 4.88 t/ha against the target of 4.8 t/ha for 2021. For captured fish the productivity has reached to 1.25 t/ha from the baseline value of 0.7 t/ha.

Table 7.3: NATP-2 updated results framework as on June 30, 2020

#	Outcome Indicators	Baseline (2014)	End Target 2021	June 2020	Achievements (%)
1	2	3	4	5	6 = $\{(5-4)/(4-3)\} * 100$
1	Farm Productivity:				
	Rice(paddy) -t/ha	4.7	5.40	5.12	60%
	Tomato - t/ha	30	36.00	33.49	58%
	Banana - t/ha	18.23	20.96	19.97	64%
	Eggplant- t/ha	27.17	33.96	32.03	72%
	Mustard- t/ha	1.12	1.25	1.21	69%
	Maize- t/ha	6.74	7.54	7.27	66%
	Wheat- t/ha	2.91	3.20	3.11	69%
	Lentil- t/ha	1.1	1.27	1.22	71%

²Comprising 190 research sub-projects implemented under CRG window funding and 51 research sub-projects are being implemented under PBRG window funding. The 190 CRG sub-projects generated 69 new technologies of which 11 were handed over to PIU-DAE (6 crop technologies), PIU-DLS (3 livestock technologies) and PIU-DoF (2 fishery technologies). Under PBRG window funding 51 research sub-projects with 190 components are on-going with satisfactory performance.

Mungbean- t/ha	1.1	1.27	1.21	65%
Potato- t/ha	18.75	20.25	19.68	62%
Onion- t/ha	9.1	10.00	9.73	70%
Garlic- t/ha	6.55	7.20	6.98	66%
Dairy - ltr milk/day/cow	3	3.9	3.62	69%
Beef- kg live weight/cattle	160	225	202.15	65%
Culture (ponds) - t/ha	3	4.8	4.88	104%
Capture (<i>beel</i>) - t/ha	0.7	1.4	1.25	79%
2 Commodities sold (amount)	0	21,400	14035.14	66.0%
3 # of Direct beneficiaries:	352,900	1,000,000	1009090	100.9%
4 # of Technologies demonstrated		40	11	27.5%
5 Research projects (CRG&PBRG)		133	241	181.0%
6 Client satisfaction (%)	Tbd	93%		87.0%
7 Technology adoption (No)	0	640,000	592,705	93.0%
8 Marketing solutions (No)		140	66	47.0%
9 AIF-2 & AIF-3 projects		3,500	1949	55.7%
10 Client-days training		4,300,000	3,592,796	83.6%

7.7 ICT Initiatives under NATP-2

NATP-2 Project supports and encourages use of ICT in agriculture. As a result, all components/PIUs started using ICT in all possible areas of the project. Particularly, COVID-19 pandemic situation accelerated the use of ICT as the major tool of communication; organizing meeting, workshop, training, monitoring, etc. During COVID-19 situation when physical mobility was restricted, communication using ICT the only way with different stakeholders of the project. Every Officer of NATP-2 carried out their official communication through online by using internet, laptop and smart phone. PMU purchased licensed copy of Zoom Conference System for organizing online meeting and conference. NATP-2 continued supervision and monitoring the field activities by organizing video conference meetings. Some online trainings are being conducted and upcoming training also be conducted by Zoom Conference System. PMU planned to conduct online training on Information and Communication Technology for Officers and Staff through Zoom Video Conference System. During the FY2019-2020, some of the uses of ICT are briefly given below.

PIU-DAE: A PIU-DAE web portal “www.natp2dae.gov.bd” has been developed and used for dissemination of various technological information, project guidelines, reporting forms & compiled reports, project database, reading materials and apps. The website is regularly updated and enabled the users to know the project activities. A web application “<http://info.natp2dae.gov.bd/>” is developed to strengthen and accelerate reporting system as well as easy access to data management & data storing (data base) system. Besides PIU-DAE personnel, cost centers, DAE regions, districts, upazilas & FIACs can use this application. The application is useful in almost all sorts of financial & developmental activities of DAE project component. The financial activities include Statement of Expenditure (SoE), budgets & budget allocation, etc. and the development activities include data of CIGs, CIG farmers, training, demonstration, validation trials, field days, exposure visits, BSC monitoring, etc. The application enabled the reporting & data management system easier and faster.

Hortex: Online marketing of fresh vegetables, fruits and other agricultural commodities was started by Hortex Foundation from June 2020. The portal <https://hortexbazarbd.com> was developed as a

full-phased e-commerce site having all the user-friendly features. The idea was mooted in early 2019 with the prospects of linking markets for the Commodity Collection and Marketing Centers (CCMCs).

PIU-DoF: An online fish marketing website “www.pofishmarket.com” is developed by PIU-DoF and marketing fish through this e-commerce platform is now ongoing. POs sold 315 Mt of fish through online till December 2020. Online reporting from field level using online platform (e.g. social media and messenger and e-nothi), meeting, supervision and monitoring were done at field level.

PIU-DLS: PIU-DLS has undertaken the necessary initiatives to implement the ICT activities. A responsive dynamic website, network infrastructure, CCTV and PABX system have been developed and installed at PIU-DLS office. Necessary operational training was provided to respective CEALs on using of Tablets and Pico-projectors. Video Clip based extension activities showing and disseminating to non-CIG members i.e. Success Stories of CIG famers are shown with Pico-projector and installed and used “Livestock Diary” Mobile apps for dissemination of livestock knowledge.

PMU: PMU designed three online forms in Kobo Toolbox for a) CIG Performance Evaluation using Balance Score Card (BSC), b) Client Satisfaction Survey of NATP-2 to generate Client Satisfaction Survey Report, and c) Grievance Redress Information of NATP-2 to generate Grievance Redress Information Report through online reporting system. A modern online File Transfer Protocol (FTP) server has been setup at NATP-2 for storing and sharing field level data. The user of PMU of NATP-2 are storing and sharing the reports, documents, picture, video clips etc. with themselves including PIUs. Reports are being sent and received without emailing with any boundary of big size file attaching.

Digitization of FIAC: Mobile tablets were provided to all the 2715 LEAF, 2681 CEAL and 4336 SAAOs serving in 2715 unions of 270 project Upazilas and for use in 1621 FIACs. Mobile Tablets are used as a tool for connecting and interacting with the farmers in their fields and meeting places and also for data collection, training, communication, collaboration, market access, citizen feedback and social accountability. The Mobile Tablets users are provided a SIM Card with internet and data connectivity and a formal training with user guide. To observe the use of mobile tablets, SAAOs, CEAL and LEAF serving in 18 selected FIAC (the pilot FIAC) were given required training and brought under close supervision. Tablets are being widely used for both video conferencing and also for taking activity pictures and videos and uploading them in the component Facebook pages for wider sharing with the groups. Mobile Tablets are used for online and offline data collection. The PICO Projectors were mostly for farmer-to-farmer interaction to pilot a video-based extension & advisory services approach initially in 5 districts and potentially scaling up. Success Stories of CIG famers are shown to other CIG & non-CIG farmers using PICO Projectors.

SECTION 8: PROGRESS OF PROCUREMENT AND FINANCIAL MANAGEMENT & AUDIT

8.1 Procurement Management

NATP-2 procurement is handled by the PMU and the PIUs both. All procurements are done following GOB's PPA/PPR and World Bank procurement guidelines as agreed with the Bank. NATP-2 procurements comprise a massive array of goods, works and services and thus seven (7) procurement specialists were recruited- four of them engaged in research and extension components, and three in PMU. The overall progress of procurement of NATP-2 is presented in Table 8.1.

Procurement during COVID-19 Pandemic: COVID-19 Pandemic affected Bangladesh from March 2020. In fact the Nation was in Covid -19 alarm from December 2019 Government of Bangladesh declared Lockdown throughout the country and extended the lockdown several times and finally the lockdown was relaxed on 30 May 2020. The government also advised the people to maintain Social Distancing and limited office attendance of the officials by following a Roaster.

The following sections describe PMU and PIU-wise procurement progress of FY2019-2020

8.1.1 Procurement Procedures and Guidelines

Procurement under the NATP-2 was carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers, January 2011 revised in July 2014 " (the Procurement Guidelines) and "Guidelines: Selection and Employment of Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers, January 2011 revised in July 2014 " (the Consultant Guidelines), and the provisions stipulated in the NATP-2 Financing Agreement and PAD. All national competitive bidding (NCB) and request for quotation (RFQ) packages were conducted as per Public Procurement Act (PPA-2006) and the Public Procurement Rules (PPR-2008) and subsequent amendments.

8.1.2 Procurement Progress

The following sections describe PMU and PIU-wise procurement progress of FY2019-2020.

Procurement of PMU: Procurements of FY2019-2020 were heavily interrupted because of office closure due to the COVID-19. PMU's Annual Procurement Plan (APP) and updated procurement plan of FY 2019-2020 consisted of 15 packages. But HOPE of PMU (Secretary, Ministry of Agriculture) did not approve 2 (two) packages. These packages were: (1) Pooled Procurement of Digital Camera and Video Camera Hyndycam; and (2) Consulting Firm Hire for Audio Video/ Film Production. Of the 13 (thirteen) approved packages, there were 4 (four) packages for consulting firm hire : 2(two) pooled procurement of consulting firm hire for PIU-DAE, PIU-DLS and PIU- DOF; and 2(two) procurement of consulting firm hire for PMU. There were 3 packages of individual consultants. Among the approved packages there were 5 (five) goods packages and one Works package. Packages of individual consultants and the Consulting Firms hire well progressed up to March 2020. RFP for pooled procurement of PMIS was issued on 03/03/2020 and deadline for the submission date was 02/04/2020. But due to COVID-19, submission date was extended four

times. After government's relaxing the lockdown period on 30/05/2020, the deadline for proposal submission of PMIS was finally re-fixed on 10/06/2020. TORs and Advertisement notices for appointing other consulting firms /individual consultants were ready by March 2020. Due to COVID-19 situation, almost all offices of consulting firms were closed and even the newspaper offices were functioning in limited scale. Considering feeble chances of obtaining competitive EOIs/ RFAs from consultants, the REOI advertisement notices for appointing other consulting firms/ consultants were not published. Among 5 (five) packages of goods, 4 were completed and the rest 1 was scheduled to be completed in April -May 2020 but COVID-19 paused its progress. The works package was completed in scheduled time. Due to closure of FY2019-2020 in June, the PMU then carried over all the incomplete procurements into FY 2020-2021.

Procurements of PIU-BARC: Annual Procurement Plan (APP) for FY2019-20 consisted of 19 packages: 6 packages of goods, 8 packages of works and 5 packages of services. Out of 6 packages of goods, 3 packages were completed. Of the 8 packages of works, only 2 (two) completed; and among 5 packages of services, 3 completed. Considering COVID-19, the World Bank suggested to drop 3 goods packages, 5 works packages and 2 service packages. PIU- BARC also could not publish one work package due to COVID-19, which was then carried over to FY2020-2021.

Procurements of PIU- DAE: During FY2019-20 , procurements of PIU-DAE consisted of 7 packages: 6 packages of goods, no package of works and 1 package of services. All 6 packages of goods were completed through RFQM (Request for Quotation Method) ; and 1 package individual service was completed through SIC method (Selection of Individual Consultant) .

Procurements of PIU-DoF: PIU- DOF had 32 procurement packages: 11 goods packages 21 works packages, and one pooled service package (PMIS). Out of 11 packages of goods , 10 were completed- 9 packages through RFQM and one package through NCB (National Competitive Bidding) ; among 21 works packages , 20 were completed through NCB . One (1) pooled service package for PMIS was to be carried out by PMU through QCBS (Quality and Cost Based Selection). PMU could not complete the service package in FY2019-2020 because of COVID-19. Owing to closure of FY2019-2020 in June, the PMU then carried over this incomplete procurement into 2020-2021. PMU, however, completed this service package on 20/09/2020.

Procurements of PIU-DLS: Procurement plan of PIU-DLS for FY2019-20 consisted of 11 packages. Out of the 11 packages there were 6 packages of goods ; 3 packages for works; 2 packages for services. PIU-DLS completed 4 goods packages through RFQ; and two packages through NCB; 3 packages of works packages through RFQ. Two (2) service packages- (a) Pooled Procurement of PMIS for PIU-DAE, PIU-DLS and PIU-DOF; and (b) Pooled Procurement for Hiring a Software Firm to Design and Develop the Knowledge and Learning Platforms for PIU-DAE, PIU-DOF and PIU-DLS - were to be carried out by PMU through QCBS (Quality and Cost Based Selection). PMU could not complete the service packages in FY2019-2020 because of COVID-19. As a result of closure of FY2019-2020 in June, the PMU then carried over these incomplete services into FY 2020-2021. However PMU completed the PMIS on 20/09/2020.

Total Procurements of NATP-2: In total NATP-2 had 82 packages during FY2019-2020, out of which 62 packages were completed. The remaining packages, specially the service packages (pooled and non-pooled of PMU) could not be completed due to COVID-19. Further, considering COVID-19, the World Bank suggested PIU-BARC to drop 10 packages - 3 packages of goods; 5 packages of works; and 2 packages of services. PMU and PIU-wise procurement progress of FY2019-2020 are presented in Table 8.1 below.

Table-8.1: Procurement progress of PMU and PIUs for FY2019-20

Compo- nents	Goods			Works			Services			Total		
	Target	Achievements		Target	Achievements		Target	Achievements		Target	Achievements	
		No	%		No	%		No	%		No	%
PMU	5	4	80	1	1	100	7	3	42.85	15	8	53
PIU- BARC	6	3	50	8	2	25	5	3	60	19	8	42
PIU-DAE	6	6	100	0	0	0	1	1	100	7	7	100
PIU- DLS	6	6	100	3	3	100	0	0	0	9	9	100
PIU- DOF	11	10	90	21	20	95	0	0	0	32	30	94
NATP-2	34	29	85	33	26	78	13	7	54	82	62	76

8.2 Financial Management and Audit

Fiduciary and other relevant issues is managed and disbursed directly to the PIU-Directors or head of implementing units as per GOB and the World Bank rules and procedures. The key project accounting responsibilities/functions lie with PMU. Cash basis accounting system especially double entry book keeping principle is followed in the project accounting. All payment is done following GOB's PPA/PPR and World Bank procurement guidelines as agreed with the Bank.

8.2.1 Funds Flow and Disbursement Arrangements

NATP-2 receives IDA and IFAD funds in the form of reimbursement from IDA against withdrawal application. Project Management Unit (PMU) transfers IDA and IFAD funds to four implementing units and PMU on the basis of six monthly estimated expenditure, approved work plan and ADP allocation. PMU receives Statement of Expenditure (SOE) from PIUs/PMU and claims reimbursement to IDA through withdrawal application. All PIUs disburse fund to their spending units (Districts, Upazilas, Research Institutes, Universities, Training Institutes and Principal Investigators) according to their need after submission of SOE.

GOB contribution is routed through Ministry of Agriculture (MOA) for PMU, BARC, DAE and through Ministry of Fisheries and Livestock (MOFL) for DOF and DLS. IDA and IFAD funds are claimed by PMU, NATP-2 and IDA deposits the amount in DOSA Account maintained in Bangladesh Bank which is maintained by PMU, NATP-2. From inception to February 2018 NATP-2 project maintained CONTASA account for IDA fund management but from March 2018, NATP-2 project has been maintaining DOSA account with the Bangladesh Bank. On the other hand SAFE account has been maintained for the IFAD fund management from the beginning of the project.

During the FY2017-18 NATP-2 claimed reimbursement against IDA fund amounting to BDT 2493.85 million through 9 (nine) Withdrawal Applications (WA-02 to 10) to the World Bank. Against IFAD fund amounting to BDT 386.55 Million through 4 (four) Withdrawal Applications (WA-01 to 04) to the World Bank (Table 2.1). FY 2018-19 NATP-2 claimed reimbursement against IDA fund amounting to BDT 3005.523 Million through 5 (five) Withdrawal Applications (WA-11 to 15) to the World Bank (Table 2.1). During the FY 2019-20 NATP-2 claimed reimbursement against IDA fund amounting to BDT 2328.31 Million through 4 (four) Withdrawal Applications (WA-16 to 19) to the World Bank (Table 8.2).

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Table 8.2: IDA and IFAD funds flow for the FY 2016-17, 2017-18, 2018-19 & 2019-20

Donor	FY 2016-17		FY 2017-18		FY 2018-19		FY 2019-20	
	BDT (In million)	USD (In million)	BDT (In million)	USD(In million)	BDT (In million)	USD(In million)	BDT (In million)	USD (In million)
IDA	400	5.232	2493.85	30.169	3005.523	35.750	2328.31	27.49
IFAD			386.55	4.689	418.209	4.970	398.24	4.70
USAID	70	0.849	320.81	3.962	26.361	.315	-	-
TOTAL	470	6.081	3201.21	38.820	3450.93	41.035	2726.55	32.19

8.2.2 Fund Allocation and Expenditure Incurred

The project activities started one and half years after the NATP-2 effective date due to late recruitment of the Project Director and other experts in PMU and PIUs. This has resulted in a much lower expenditure. In FY2016-17 total expenditure incurred in NATP-2 stands to BDT 5,566.3 Lakh and FY2017-18 total expenditure incurred in NATP-2 stands to BDT 31,615.99 Lakh. Statements of component wise actual expenditure for the year 2019-20 and incurred expenditure is BDT 28,089.26 Lakh shown in Table 8.3 below.

Table 8.3: Expenditure incurred during FY2019-20 and inception to 30 June 2020

(Taka in Lakh)

Components	Expenditure		Inception to 30 June 2020
	Up to 30 June 2019	FY2019-20	
PMU	1,456.89	695.00	2,151.89
BARC	11,507.97	5,603.15	16,111.12
DAE	29,118.06	9,290.73	38,408.79
DLS	16,699.54	6,563.86	23,263.40
DOF	16,993.68	5,936.52	22,930.20
TOTAL	75,776.14	28,089.26	102,865.40

External audit of NATP-2 for the FY2017-18 was conducted by representative of C&AG (FAPAD) from August to November 2018 and for the FY2018-19 was conducted by representative of C&AG (FAPAD) from August to November 2019. Final audit report already issued to the project authority.

8.2.3 Audit

External Audit: External audit of NATP-2 for the FY2017-18 was conducted by representative of C&AG (FAPAD) from August to November 2018 and for the FY2018-19 was conducted by representative of C&AG (FAPAD) from August to November 2019. Final audit report already issued to the project authority.

Internal Audit: An audit firm appointed to perform Financial and Performance Audit for the next period of the project. The firm conducted audit for the FY 2017-18, 2018-19 and FY 2019-20. Final audit report already issued to the project authority.

8.2.4 Interim Un-audited Financial Report (IUFR)

PMU, NATP-2 has been submitting quarterly Interim Un-audited Financial Reports (IUFRs) to the World Bank. Four IUFRs were submitted duly to the World Bank for the FY 2019-20 (Table 8.4).

Table 8.4: Financial statement of PMU for the FY2019-20 on 30 June 2020

(Taka in lakh)

Category of Expenses	Total Component Budget		Cumulative Achievement till June/2019		July/19-June/20 Budget		Expenditure (July/19 - June/20)	
	GOB	RPA	GOB	RPA	GOB	RPA	GOB	RPA
Salary & allowances (4500-4700)	459.00	535.00	91.18	185.57	30.12	84.60	12.38	76.50
Supply & Services (4801-4833 other than below items, plus 4846-4863,4885-4893)	56.00	1,487.00	3.26	277.19	5.38	76.21	15.67	87.61
CRG (4829) - AIF1								
PBRG (4829) - AIF1								
Training and Workshop, Conference (4800)		295.00		75.93		169.50		27.00
Consultant & Consultancy Services (4874)		5,834.00		575.30		523.79		458.68
Extension Activities at the CIG Level (4899)								
Miscellaneous 4899 other than CIG related)								
Repair, renovation and maintenance (4900)		61.00	16.04	16.77	9.50	12.00	8.50	8.60
AIF-2 (5900)								
AIF-3 (5900)								
Sub-total (revenue)	515.00	8,212.00	110.48	1130.76	45.00	866.10	36.55	658.39
Capital items (6800)	176.00	110.00	150.29	65.35		6.00		
Construction & works (7000)								
CD VAT	280.00					4.90		
Sub-total (capital)	456.00	110.00	150.29	65.35		10.90		
Price contingency		693.00						
Grand Total	971.00	9,015.00	260.77	1196.11	45.00	877.00	36.55	658.39

Financial Information of BARC (in Lakh Taka): The project has been financed by GoB and Development Partners (World Bank, IFAD & USAID). The total expenditure incurred BDT 5603.15 Lakh during July 2019 to June 2020. DPP and RADP allocation of funds for PIU-BARC component is shown in Tables 8.5 & 8.6.

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Table 8.5: Total DPP allocation for PIU-BARC

Source of Fund	Amount in BDT (Lakh TK)	% Share
GOB	1,245.00	3.09
World Bank	29,277.60	72.69
IFAD	3,992.40	9.93
USAID	5,758.00	14.29
Total	40,273.00	100

Table 8.6: RADP allocation for PIU-BARC in FY2019-20 (In Lakh Taka)

Sources of Fund	RADP Allocation	Fund Utilization	Year-end Balance	% Expenditure
GoB	38.00	29.53	8.47	77.71%
RPA	6,670.00	5,573.62	1,096.38	83.56%
Total	6,708.00	5,603.15	1,104.85	83.53%

Financial Information of PIU-DAE: During the reporting year (FY2019-20) an amount of Taka 9,290.73 lakh was spent by PIU-DAE of which Taka 193.55 lakh was from GOB and Taka 9,097.18 lakh from RPA (Table 8.7).

Table 8.7: RADP Allocation in FY 2019-20, PIU-DAE (In Lakh Taka)

Sources of Fund	RADP Allocation	Fund Utilization	Year-end Balance	% Expenditure
GoB	225.00	193.55	31.45	86.00%
RPA	9,760.00	9097.18	662.82	93.21%
Total	9,985.00	9290.73	694.27	93.04%

Financial Information of PIU-DoF: During the reporting year (FY2019-20) an amount of Taka 5,936.51 lakh was spent by PIU-DoF of which Taka 922.57 lakh was from GoB and Taka 5013.94 lakh from RPA (Table 8.8).

Table- 8.8: RADP allocation in FY 2019-20, PIU-DOF (In Lakh Taka)

Sources of Fund	RADP Allocation	Fund Utilization	Year-end Balance	% Expenditure
GoB	928.00	922.57	5.47	99.40%
RPA	5,319.00	5,013.94	305.06	94.26%
Total	6,247.00	5,936.51	310.53	95.02%

Financial Information of PIU-DLS: As per FY 2019-20 revised Annual Development Program (RADP), Total PIU-DLS expenditure was Tk. 6,563.86 lakh (GoB Tk. 930.41 lakh and RPA Tk. 5,633.45 lakh). Table 8.9 shows year-end balance and percentage of expenditure.

Table 8.9: RADP allocation in FY2019-20, PIU-DLS (In Lakh Taka)

Sources of Fund	RADP Allocation	Fund Utilization	Year-end Balance	% Expenditure
GoB	950.00	930.41	19.59	97.94%
RPA	6,828.00	5,633.45	1,194.55	82.51%
Total	7,778.00	6,563.86	1,214.14	84.38%

SECTION 9: CHALLENGES FACED AND LESSONS LEARNED

NATP-2 is a multi-agency and multi-stakeholder complex project that supports research, extension, supply chain and marketing activities of crops, livestock and fisheries. The FY2019-20 was a very difficult year for the project, particularly due to the outbreaks of COVID-19 pandemic which hampered implementation of many NATP-2 activities. Thus, while implementing the project activities it faced a number of challenges at the same time also learned many lessons. The major challenges faced and lessons learned are briefly described below:

9.1 Challenges Faced

Research Related

- PBRG sub-projects will continue their implementation till the end of 2022 and there will not be enough time remaining to select and validate the technologies generated under PBRGs. Also in the existing DPP there is no budget provision under Component-I for this validation.

PhD Related

- A total of 140 (in-country: 80 and foreign: 60) scientists and officers have been awarded PhD scholarships for 42 person months each. Most of the awarded candidates enrolled in the second half of 2018 and few of them even enrolled at the end of 2019 due to delayed clearance from their line departments and ministries. As a result, almost 95% of them will not be able to complete their PhD program/degree within the present project duration and will require a minimum of 6 to over 12 months of time beyond the present project period. The COVID-19 situation may cause further delay of their PhD completion.

CIG Related

- Due to cumbersome procedure CIG registration is slow and difficult; many of the unregistered CIGs want to see the advantages of registration.
- Due to low savings and non- registration many CIGs are unable to apply for AIF-2 and AIF-3 grants.

CCMC and Value Chain Related

- Difficulty in finding a suitable place with necessary structure for a CCMC.
- The day to day operations in CCMCs are being managed and looked after by the Local Business Facilitators (LBFs) who are recruited and trained by the Hortex Foundation. At present LBFs are being paid a salary of Taka 12,000 per month and because of this low salary nine (9) trained LBFs have already left the job. The activities of CCMCs are being significantly hampered due to the leaving of trained, skilled and experienced LBFs.
- Getting traders and market actors to adopt new and improved PHM practices poses the next most formidable challenge.



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- Developing marketing strategies to help marginal farmers to sell their produces during COVID-19.

Technology Demonstration and Adoption Related

- All CIG-members want demonstration.
- Seeds availability of newly released crop varieties is inadequate to meet the farmers' demand.
- Generation of location specific technology and its proper dissemination is difficult.

FIAC Related

- Reaching FIAC services to unions without Union Parishad building, as having no FIAC (about 50% unions).
- 5-10 days training program is not sufficient for CEAL and LEAF to provide effective service at FIAC.

AIF-2 & AIF-3 Related

- The livestock CIGs are not interested to apply for farm equipment and materials under AIF-2.

Project Management Related

- Because of COVID-19 pandemic which has already affected most of the sectors of the country, many of NATP-2 planned programs like regional progress review workshops, trainings, international training and study tours could not be arranged due to bio-security reasons.
- The PhD programs both in-country and abroad are being hampered as all the universities and research institutes globally remain closed.
- The activities of some PBRG sub-project are also disrupted due to COVID-19 effect. Physical monitoring of the activities was also hampered which may affect the progress of the farmers' activities related to project outcomes.
- There is no forecasting about the ending of the COVID-19. Considering the reality and if this situation continues, there is an uncertainty or project will not be able to implement the activities in time.

9.2 Lessons Learned

Through planning, implementation and supervision of project activities and sharing views with field level officers, staff, and farmers, the following lessons have been learned:

Project Management Related

- Inter-departmental collaboration & cooperation is essential for successful implementation of the project interventions.
- Payment of beneficiaries and other stakeholders through bank account is time consuming and disliked.
- For continuing LEAF and CEAL services, more logistic supports & capacity building seems important.

CIG Related

- Technology transfer and communication is more effective through group approach.
- Members having leadership qualities in the CIGs helped in smooth functioning of group activities.
- Registration procedure of CIGs is complicated, which creates less interest.
- CIG mobilization and strengthening through motivation is essential for successful project implementation.
- CIGs can play as media between service providers and community people.
- Female members are enthusiastic to involve themselves in the mainstream of agriculture.
- AIF-2 and AIF-3 are very innovative ideas of NATP-2 and CIGs are very happy by getting those funds.

Technology Demonstrations and Adoption Related

- Community seed production is an excellent way of quality seed production in larger quantities.
- Skills development through training & demonstration is important for dissemination of modern technology. Demonstration helps in promotion of GAP.
- Technology selection is very important for different agro-ecological regions.
- Validation trial gives actual idea of location specific yield of a crop.
- Dissemination of aquaculture technologies is easier through a group rather than an individual.
- Technical assistance can bring a satisfactory change in production up to 30% and also in income.
- Exposure visit is a good initiative for farmers to learn new and innovative practices.

CCMC Related

- Selected HVCs for vertical expansion in some upazilas are not grown anymore; farmers shift to other crops after a certain period due to compounding disease-pests, change in demand, or market competition, etc. Periodically, old crops to be replaced by new popular crops.
- Reaction from training sessions: too many topics covered in too little time.

AIF-2 & AIF-3 Related

- Quick mobilization of AIF-2 and AIF-3 supported equipment helped in timely and quickly harvesting of boro rice, especially in haor areas, to avert flash flood and also for overcoming labour shortage.

COVID-19 Related

- It is true that COVID-19 affected many project activities, but it is also true that it promoted the use of electronic/virtual media tremendously. Electronic/virtual media (like, ZOOM Platform) is found very effective to organize meetings, workshops and also for monitoring of field implementation to some extent.



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- Arranging beneficiary training at the farmers' doorstep under tree shade maintaining social distance has been proved a good alternative option during crisis time.
- The different alternative options tried like, targeting the local markets (village, upazila, para), linking CCMCs with the bulk buyers (BDR, Army, Hospital suppliers) and also including vegetables in the relief package , using mobile van for door to door selling of vegetables, fish, milk, meet and egg helped in restoration of the almost broken supply chains to a greater extent.
- Supply of critical inputs package i.e., seeds and fertilizer at the doorstep of farmers avoiding mass gathering, helped farmers continue their farming.
- During COVID-19 dissemination of information to the Fish Farmers through Mobile Phone, Social Media and Internet is found very effective.
- Online fish marketing and mobile fish market for fish selling was very useful whilst COVID-19, organization of online meetings for the project personnel was successful in efficiently running the project.

Annex-2.1: List of Selected 69 Technologies Developed from CRG Sub-projects**Crops (51 technologies):**

1. Bio-organic fertilizer: A green technology to improve soil health and rice yield (ID 707)
2. Crop productivity enhancement in beel areas (ID 688)
3. Tobacco replacement in char land through high value crops (ID 440)
4. Integrated rodent management of rice and wheat (ID 729)
5. Production and bulb preservation technology of Liliium (ID 479)
6. Improved sugarcane power crusher for gur production (ID 748)
7. Non-chlorine sanitizers for safe and quality betel leaf production (ID 452)
8. Optimization of Pre-Harvest Interval (PHI) of commonly used pesticides in tomato and country bean (ID 529)
9. Improved cropping patterns for productivity enhancement in Sylhet region (ID 490)
10. Integrated Pest Management (IPM) for sustainable tea production (ID 337)
11. Improved cropping patterns for productivity enhancement in enclaves (Sitmahal) of northern Bangladesh (ID 672)
12. Introduction of high value vegetables in Sylhet region (ID 345)
13. Integrated management of major insect pests of soybean (ID 732)
14. Bio- rational management of fruit-flies of fruits and vegetables (ID 526)
15. Eco-friendly management of sucking insects in cotton (ID 584)
16. Eco-friendly Integrated management for major insect pest and diseases of chilli (ID 477)
17. Bagging technology for safe and quality mango production (ID 444)
18. Management of bacterial diseases of silkworm (*Bombyx mori* L.) (ID 518)
19. BARI Surjamukhi-2: A promising salt tolerant sunflower variety (ID 459)
20. BARI Sarisha-16: A promising salt tolerant mustard variety (ID 459)
21. Healthy seedling raising of boro rice against blight disease (ID 708)
22. Ankuri: A healthy rice seed germinator and disinfectant
23. BRRRI head-feed mini combine harvester (ID 705)
24. BRRRI dhan91: A high yielding deepwater rice variety (ID 765)
25. Management of insects and diseases of rice under changing climate in southern region (ID 698)
26. Quality seed production of BRRRI released rice varieties at farmers' level (ID 716)
27. Ginger production under soilless culture using fertigation technique (ID 323)
28. Maize based cropping patterns for sustaining soil fertility and enhancing income (ID 382)
29. Management of acid soils for sustainable crop production (ID 419)

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30. Fertilization for rooftop gardening (ID 499)
31. Crop yield enhancement in saline soil using polythene mulch and potassium fertilization (ID 570)
32. Exploitation of kitchen waste for vermicompost production and utilization (ID 735)
33. Vermicompost and organic manure: Improvement of soil fertility and crop productivity (ID 802)
34. BTRI tea clones for enhancing quality seed production (ID 342)
35. Tomatillo: A unique introduction as new crop (ID 376)
36. Cotton production in the drought prone Barind Tract (ID 583)
37. Eco-friendly technology for promoting vegetable production on rooftop (ID 623)
38. Enhancing crop productivity in saline area through climate smart technologies (ID 656)
39. Productivity enhancement of kenaf in char lands (ID 755)
40. Productivity enhancement of saline areas through underutilized crops (ID 768)
41. Improved cropping pattern for productivity enhancement in coastal areas (ID 442)
42. Safe vegetable production in urban area through vertical farming (ID 521)
43. Mechanical coconut de-husking machine (ID 307)
44. Improved coconut tree climber (ID 307)
45. Power operated oil palm fruit stripper (ID 576)
46. Productivity enhancement of lac through modern production practices (ID 528)
47. Shelf stable value added products of onion, garlic and ginger (ID 728)
48. Fresh cut processing technologies for fruits and vegetables (ID 465)
49. Gummosis management of shade trees in tea garden (ID 815)
50. Moringa based agro-forestry system for increasing productivity (ID 432)
51. Agor-based agro-forestry system for Sylhet region (ID 439)

Fisheries (8 technologies):

52. Productivity enhancement of coastal ghers through year round Shrimp-Tilapia alternate culture (ID 778)
53. Culture of short cycle high valued fish species in the drought prone semi-arid zone of Bangladesh (ID 825)
54. Mixed culture of Galda and native Cat fish in south-western coastal ghers (ID 827)
55. Hygroryza aristata: A floating grass utilized as fish feed is a new initiative for sustainable aquaculture (ID 410)
56. Captive culture of Seabass in the coastal brackish and freshwater of Bangladesh (ID 464)
57. Breeding and larval rearing technique of Gutum (*Lepidocephalichthys guntea*) (ID#553)
58. Production enhancement of craps and tilapia in creeks of Chittagong Hill Districts (ID # 833)
59. Culture of nutrient rich live feed (micro algae) for larvae of brackish water fish (ID 779)

Livestock (10 technologies):

60. Floating bed fodder cultivation in submerged and flooded areas (ID 647)
61. Cost effective complete pellet feed for commercial goat and sheep production (ID 788)
62. Low-cost technology for making processed cheese (ID 661)
63. Suitable estrus synchronization protocols for treating an-estrus cows (ID313)
64. Duck diseases in Hakaluki and Tanguar Haor and their preventive strategies
65. Pro-biotic food products for human and feed products for poultry (ID 532)
66. Suitable long bone fracture management techniques in animals (ID 533)
67. Formalin killed egg drop syndrome vaccine using local isolates(ID# 556)
68. Manipulative reproduction technologies for quick genetic improvement in cattle (ID 603)
69. Pro-biotic feed supplement for calves (ID 790)

List of selected 11 technologies from CRG sub-projects handed over to DAE, DLS and DOF for demonstration in the farmers' fields of the project area.

Crops (6 technologies):

1. Tobacco replacement in char land through high value crops (ID 440)
2. Crop productivity enhancement in beel areas (ID 688)
3. Bio-organic fertilizer: A green technology to improve soil health and rice yield (ID 707)
4. Bagging technology for safe and quality mango production (ID 444)
5. Optimization of Pre Harvest Interval (PHI) of commonly used pesticides in vegetables (ID 529)
6. Introduction of high value vegetables in Sylhet region (ID 345)

Livestock (3 technologies):

7. Cost effective complete pellet feed for commercial goat and sheep production (ID 788)
8. Pro-biotic feed supplement for calves (ID 790)
9. Low-cost technology for making processed cheese (ID 661)

Fisheries (2 technologies):

10. Culture of short cycle high valued fish species in the drought prone areas of Bangladesh (ID 825)
11. Mixed culture of Galda and native Cat fish in south-western coastal ghers (ID 827)

Annex-2.2: National Training Organized in FY2019-2020

SL#	Name of Training	Participant (No.)	Organized by (Venue)	Duration (days)
1	Administrative and Financial Management	30	BARD	13
2	Haor adapted Livestock Technology	20	BARC	3
3	Global Plan of action reporting and collection, documentation of plant genetic resources	40	Do	3
4	Variety profile of potential major crop varieties.	40	Do	3
5	Balanced diet for young children, Pregnant woman and lactating mother	40	Do	5
6	Sustainable Development Goal	30	Do	3
7	Monitoring and Evaluation in project Management	29	PIU-BARC	5
8	Skill development on ICT	18	Do	5
9	Capacity building of NARS scientist to achieve sustainable development goals (SDG)	30	BARC	3
10	Make the Service easy	40	Do	2
11	Research Methodology	30	GTI	14
12	Research Methodology	30	Do	14
13	Training on Report Writing and editing	25	BARC	3
14	Antimicrobial Resistance in Bangladesh	30	Sylhet SAU	3
15	Antimicrobial Resistance in Bangladesh	30	Rajshahi University	3
Total		462		

Annex-2.3: National Workshop Arranged in FY2019-2020

SL#	Name of Workshop/Seminar/Meeting	Participant (No.)	Organized by (Venue)	Duration (days)
1	Financial Management Workshop	160	PIU- BARC	1
2	Progress Review of In country Ph.D. Scholars	88	Do	1
3	Progress Review of In country Ph.D. Scholars	110	Do	2
4	PBRG Annual progress review-Crops	438	Do	1
5	PBRG Annual progress-AERS	-	Do	1
6	PBRG Annual progress review-P&E	-	Do	1
7	PBRG Annual progress review--Fisheries	-	Do	1
8	PBRG Annual progress review-Livestock	-	Do	1
9	PBRG Annual progress review-NRM	-	Do	1
10	Seminar Aquaculture & Fisheries Dev in Bangladesh	200	BARC	3
11	Innovation & Service Process Simplification	50	Do	3
12	ISM World Bank meeting	78	PIU-BARC	1
13	Agricultural Research For Food and Nutrition Security in South Asia: Challenges and Way Forward	100	BARC	1
14	Crop diversification and intensification for food and nutrition security of Bangladesh	400	BARI	1
15	Progress review on Biotechnology research based on biotechnology policy-2012	42	BARC	1
16	Transferable matured technology on safe food production development by NARS Institute	120	Do	1
17	Awareness raising meeting against crime	60	Do	1
18	stakeholder consultation for SDG Progress	80	Do	1
19	Production and Marketing of tissue culture based planting materials of high value crops	120	Do	1
20	National Good Governance	39	Do	1
21	Promoting collective action for strengthening value chain of safe and nutritious food.	300	Do	2
Total		2,385		

Annex 3.1: NATP-2 Component-wise Extension Delivery Targets and Their Cumulative Achievements as of June 2020

9.5	Description of Variables	PIU-DAE		PIU-DOF		PIU-DLS			Total cum. achnts	%
		6yrs target	cum. achnts	6yrs target	Cum. achnts	6yrs target	cum. achnts	6yrs target		
1	Formation of CIG Groups	27150	27150	5430	5282	8082	8082	40662	40514	99.6%
	Old	11880	11880	2376	2272	3471	3471	17727	17623	99.4%
	New	15270	15270	3054	3010	4611	4611	22935	22891	99.8%
2	CIG Beneficiaries	695700	695700	108600	105640	207750	207750	1012050	1009090	99.7%
	Old	237600	237600	47520	45440	69420	69420	354540	352460	99.4%
	New	458100	458100	61080	60200	138300	138330	657480	656630	99.9%
3	CIG Micro Plan	135750	108600	27150	21128	40650	32328	203550	162056	79.6%
4	Union Extension Micro Plan	13575	10860	13575	10560	13495	10724	40645	32144	79.1%
5	Upazila Extension Plan	1350	1080	1350	1080	1350	1080	4050	3240	80.0%
6	No. of Households Benefitted	1,898,610	1182690	10860	5282	568,263	548050	2477733	1736022	70.1%
7	Beneficiary Training (person-days)	2393000	2124780	705949	685395	554010	493140	3652959	3303315	90.4%
8	Staff Training (person-days)	52980	51180	6216	3285	7580	5176	66776	59641	89.3%
9	International training/ study visit (persons)	260	169	120	88	140	78	520	335	64.4%
10	No of Field Demonstration Conducted	136104	126652	23535	23535	40515	29203	200154	179390	89.6%
11	Field Days	15976	14435	23535	18641	40515	27739	80026	60815	76.0%
12	Exposure Visit	1350	1080	270	270	1110	809	2730	2159	79.1%
13	Pest & Seed Museum	1107	1107	-	-	-	-	1107	1107	100.0%
16	Vaccination Campaign Organized (No.)	-	-	-	-	58338	38570	58338	38570	66.2%
17	De-worming Campaign Organized (No.)	-	-	-	-	29169	21047	29169	21047	72.2%
18	Infertility Campaign Organized (No.)	-	-	-	-	22925	7088	22925	7088	30.9%
19	FIAC	1621	1621	1621	1621	1621	1621	4863	4863	100.0%
20	CEAL/LEAF	-	-	2715	2640	2681	2681	5396	5321	98.6%
21	AIF-2	1320	1110	740	505	940	108	3000	1723	57.4%
22	AIF-3	240	75	133	104	127	47	500	226	45.2%
23	Marketing Solutions	60	32	22	0	120	30	202	62	30.7%

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24	Volume of Commodities Sold (mt)	15000	8025	500	Not started	3400	423.14	18900	8448.14	44.7%
25	Safeguard Intervention									
	Compost Pit/ Vermi Compost/ Homestead Gardening/Pheromone Trap/ Safety Pesticide Application	3180	3180					3180	3180	100.0%
	Establishment of Bio-gas Plant					270	99	270	99	36.7%
	Cow-dung Preservation Pit					270	0	270	-	
	Slurry Preservation Pit					150	99	150	99	66.0%
	Open Water Fisheries:									
	Habitat Improvement of Beels (No)			40	Established nurseries in 23 beels.			40	23	57.5%
	Stocking of Indigenous Fish Species (Kg)			48000				48000	-	
	Establishment of Beel Nurseries (No)			200				200	-	
	Establishment of Fish Sanctuaries (No)			40				40	-	
26	Infrastructure Support									
	<p>PIU-DAE Target: 20 Horticulture centers, one central pesticide laboratory, 8 seed testing laboratory of SCA and 546 training facilities (district-16, upazila-80 and FIAC-450)</p> <p>Achievements FIAC renovation-450 nos., delivery of equipment for central lab and SCA lab is going on, Mobile Tab, Air cooler, computer, IRRI Cocoon, Pico Projector, Foot Pump, Moisture metre, furniture for FIACs have been supplied in the field. Work started for construction of District Training center, Tissue Culture Lab and earth work for Horticulture centers</p> <p>PIU-DOF Target: Repair & renovation of 03 rooms in 03 training centers for computer lab, repair & renovation of 07 training rooms, renovation of 07 dormitory in 07 training centers (110 rooms), establishment of fish 02 fish landing centers, lab. Equipment for 02 feed and ingredient testing laboratories</p> <p>Achievements Not done yet</p> <p>PIU-DLS Target: Laboratory equipment and materials for Central Disease Investigation Lab, Field Disease Investigation Lab, Central Nutritional Laboratory, AI Laboratory, Public Health Laboratory, and Upazila Veterinary Hospitals of DLS provided;</p> <p>Achievements Equipment & materials support provided to CDIL, Public Health Laboratory and Central Nutritional Laboratory and Veterinary Training Institute and Officer Training Institute supported for repairing</p>									

Annex- 4: Composition of JPSC, PIC, Project Management Team and Contributors to Annual Progress Report 2019-2020

I. Composition of Joint Project Steering Committee (JPSC)

1	Secretary, MOA	Chair
2	Secretary, MOFL	Alternate Chair
3	Addl. Secretary (PPC), MOA	Member
4	Executive Chairman, BARC	Member
5	Division Chief, Agriculture, Water Resources and Rural Development, Planning Commission	Member
6	Director General, DAE	Member
7	Director General, DOF	Member
8	Director General, DLS	Member
9	Joint Chief (Planning), MOA	Member
10	Joint Chief (Planning), MOFL	Member
11	Representative from Ministry of Finance	Member
12	Representative from ERD	Member
13	Representative from IMED	Member
14	Representative from one of the Agricultural Universities	Member
15	Farmer representative	Member
16	NGO representative	Member
17	Representative from Agro- Business Entrepreneurs	Member
18	Project Director, PMU, NATP- Phase II Project	Member-Secretary

II. Composition of Project Implementation Committee (PIC)

1	Additional Secretary (PPC), MOA	Chair
2	Additional/Joint Secretary, MOFL	Co-Chair
3	Joint Chief (Planning), MOA	Member
4	Joint Chief (Planning), MOFL	Member
5	Member Director (P&E), BARC	Member
6	Director (Field Service), DAE	Member
7	Director (Extension), DLS	Member
8	Director, Inland Fisheries, DOF	Member
9	Director, PIU-BARC	Member
10	Director, PIU-DAE	Member
11	Director, PIU-DOF	Member
12	Director, PIU-DLS	Member
13	Project Director, PMU, NATP- Phase II Project	Member-Secretary

III. Project Management Team (PD, DPD & PIU-Directors)

Sl.	Name	Designation & Address
1	Md. Motiur Rahman	Project Director (Additional Secretary), NATP-2 Projects Project Management Unit (PMU) AIC Building 3 rd Floor BARC Complex Farmgate, Dhaka-1215. Phone: 58155097 E-mail: pdnatp02@gmail.com
2	(Vacant During the Period)	Deputy Project Director (Joint Secretary), NATP-2 Projects Project Management Unit (PMU) AIC Building 3 rd Floor BARC Complex Farmgate, Dhaka-1215. Phone: 58151657 E-mail:
3	Dr. Md. Harunur Rashid	Director Project Implementation Unit (PIU), NATP-2 Bangladesh Agricultural Research Council (BARC) Farmgate, Dhaka-1215. Phone: 9130702 (Off.) 01716-950421 E-mail: directornatpbarc@gmail.com
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IV. Contributors to NATP-2 Annual Progress Report 2019-2020

Sl.	Name & Designation
1.	Md. Motiur Rahman Project Director (Additional Secretary), NATP-2
2.	Dr. Md. Abdur Razzaque Sector Coordinator Extension, PMU, NATP-2
3.	Md. Harun-ur-Rashid Training and Communication Specialist, PMU, NATP-2
4.	Dr. Shantana R. Halder Monitoring and Evaluation Specialist, PMU, NATP-2
5.	Dr. Gour Pada Das Research Extension Linkage Specialist, PMU, NATP-2
6.	Mohammad Shahajahan Manager (Financial Management), PMU, NATP-2
7.	Dr. Md. Mahbub Alam Producer Organization Mobilization Specialist, PMU, NATP-2
8.	Md. Sirajul Haq Procurement Specialist, PMU, NATP-2
9.	S.M. Sharifuzzaman Gender Specialist, PMU, NATP-2
10.	Md. Mahabbat Hossain ICT Specialist, PMU, NATP-2
11.	ALL PIUs of NATP-2 (BARC, DAE, DOF and DLS)



NATP2

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