



GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
NATIONAL AGRICULTURAL TECHNOLOGY PROGRAM-PHASE II PROJECT

NATP2

REPORT
ON
GENDER INTEGRATION, ENVIRONMENTAL and SOCIAL SAFEGUARD COMPLIANCE



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TABLE OF CONTENTS

LIST OF ABBREVIATION	ii
EXECUTIVE SUMMARY	
iv	
SECTION 1: INTRODUCTION.....	1
1.1 Conceptual Framework.....	2
SECTION 2: METHODOLOGY AND INSTITUTIONAL ARRANGEMENTS	4
2.1 Methodology	4
2.2 Institutional arrangements	4
SECTION 3: STATUS OF GENDER INTEGRATION, ENVIRONMENTAL AND SOCIAL SAFEGUARDS COMPLIANCE	6
3.1 GENDER INTEGRATION	6
3.1.1 Gender integration in research program.....	6
3.1.2 Gender integration in extension program	7
3.1.2.1 Project beneficiaries	7
3.1.2.2 Access to technology and agricultural production	8
3.1.2.3 Access to Agricultural Innovation Fund	8
3.1.2.4 Access to leadership	8
3.1.3 Prospect and challenges of gender integration in NATP-2 project	9
3.2 Environmental and social safeguards compliance in research program	10
3.2.1 Environmental conservation and improvement.....	10
3.2.2 Climate Co-benefits	13
3.3 Environmental and Social safeguards Compliances in Extension Program	15
3.3.1 Common Extension Activities of Environmental and Social Safeguards Compliances.....	15
3.3.2 Activities of PIU-DAE in Environmental and Social Safeguards Compliances.....	16
3.3.3 Activities of PIU-DoF in Environmental and Social Safeguards Compliances	18
3.3.4 Activities of PIU-DLS in Environmental and Social Safeguards Compliances.....	19
3.5 Prospect of environmental and social safeguards.....	23
3.6 Avoiding negative impacts.....	23
3.7 Enhancing positive impacts	23
3.8 Monitoring of environmental safeguards.....	23
4. Conclusion.....	24
Annexure 1: GENDER PARTICIPATION MATRIX	25
Annex 2: Implementation plan of Pest Management Plan (PMP)	29
Annex 3: Format: Determining Extent of Adoption of Good Aquaculture Practices	30
Annex 4: Format: Environmental Management Plan (EMP) of the Demonstration Pond	31
Annex 5: Format: Limited Environmental Assessment of Demonstration Pond.....	32

LIST OF ABBREVIATION

BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BAU	Bangladesh Agricultural University
BFRI	Bangladesh Fisheries Research Institute
BINA	Bangladesh Institute of Nuclear Agriculture
BJRI	Bangladesh Jute Research Institute
BLRI	Bangladesh Livestock Research Institute
BRRRI	Bangladesh Rice Research Institute
BSMRAU	Bangabandhu Sheikh Mujibur Rahman Agricultural University
BSRI	Bangladesh Sugar crop Research Institute
BSRTI	Bangladesh Sericulture Research & Training Institute
BTRI	Bangladesh Tea Research Institute
BWMRI	Bangladesh Wheat and Maize Research Institute
CCMC	Commodity Collection and Marketing Centre
CDB	Cotton Development Board
CEAL	Community Extension Agents for Livestock
CHT	Chittagong Hill Tracts
CIG	Common Interest Group
CP	Collection Point
CRG	Competitive Research Grant
CSA	Climate Smart Agriculture
CU	University of Chittagong
DAE	Department of Agricultural Extension
DD	Deputy Director
DFO	District Fisheries Officer
DLO	District Livestock Officer
DLS	Department of Livestock Services
DoF	Department of Fisheries
DU	University of Dhaka
FIAC	Farmer's Information and Advice Center
GAP	Good Agricultural Practice
GOB	Government of Bangladesh
GRC	Grievance Redress Cell
GRM	Grievance Redress Mechanism
GRO	Grievance Redress Officer
ICM	Integrated Crop Management
IFAD	International Fund for Agricultural Development
IGA	Income Generating Activities
IP	Indigenous People
IPM	Integrated Pest Management
JUST	Jashore University of Science and Technology
KU	Khulna University

LEA	Limited Environmental Assessments
LEAF	Local Extension Agent for Fisheries
MOA	Ministry of Agriculture
NAP	National Agriculture Policy
NARS	National Agricultural Research System
NSTU	Noakhali Science and Technology
OM	Organic Manure
PBRG	Program Based Research Grant
PIU	Project Implementation Unit
PMP	Pest Management Plan
PMU	Project Management Unit
PO	Producer Organization
PSTU	Patuakhali Science and Technology University
RU	Rajshahi University
SAAO	Sub-Assistant Agriculture Office
SAU	Sher-e-Bangla Agricultural University
SRDI	Soil Resource Development Institute
SUST	Sylhet University of Science and Technology
UAO	Upazila Agriculture Office
UFO	Upazila Fisheries Office
ULO	Upazila Livestock Office
USAID	United States Agency for International Development
WB	World Bank

Executive Summary

The objective of the gender integration, environmental and social safeguards compliance report is to assess compliance of the NATP-2 project with the safeguards standards of the World Bank's (WB's). Furthermore this compliance report also appraise the impact of the project intervention on promotion of gender equality and women's empowerment, environmental improvement and social safeguards; improvement of the indigenous people (IP) in all aspects of the research, extension and value chain. The Grievance Redress Mechanism (GRM) has ensured the transparency and accountability in implementation of the project interventions.

The research and extension program of the project have been implementing in regards to gender integration, environmental and social safeguards compliance. Almost 13% women scientists have been associated as the coordinator and principal investigator in implementation of the research sub-project. Total 35 women scientist (25% of total) have been enrolled in PhD program. In total 364,174 women CIG farmer (36% of total beneficiaries) are being benefited through extension services where representation of ethnic women is 5,709 (almost 45% of total ethnic CIG farmer). A total of 73,434 CIG women (37% of total) have been participated in technology demonstration and 236,763 women CIG member (65% of total women CIG) have been adopted improved agricultural technology having impact on increase production and income. The women CIGs have awarded 427 AIF-2 sub-projects (18% of total) and 58 women entrepreneur (10.6% of total) have awarded AIF-3 sub-projects. More or less 1,833 women farmer have access to market which is 16 percent of total farmer. Leadership of women have been established within and beyond of the project. Total 135,115 women (almost 37% of total CIG women) have been playing leadership role including 2065 ethnic women (36% of total ethnic women). The details gender analysis recognized the active participation and leadership role of women across the project which leads to promotion of gender equality and women's empowerment in the NATP-2 project.

The research program have significant positive impact on environmental and social safeguards. A total of 51 PBRG sub-projects including 11 for indigenous people (IP) are being implemented. The key focus areas of the research program in regards to environmental and social safeguards compliance which are: (i) Environmental conservation and improvement; (ii) Climate co-benefit and (iii) Livelihood improvement. The sub-projects contributed in conservation and improvement of biodiversity, ecosystems, management of agro-forestry system; climate co-benefit, increase productivity and income and household food security and livelihood improvement of the small and marginal farmer including women and indigenous peoples.

Different extension activities are being implemented in environmental and social safeguards compliance. The activities presented positive changes in terms of reduces the use of chemical fertilizer and pesticides; reduces the risk of health hazards; management and utilization of household and farm wastage; protection of soil and water pollution; increase productivity and income, production of safe food, scope of working and earning opportunity. The application of improved technologies and good agricultural practices (GAP) confirms the conservation of agro friendly environment, ecological balance, biodiversity and improvement of livelihood and food security. Almost 634,851 small and marginal farmers (83% of total CIG) have improved their livelihoods and food security by adopting the improved agricultural technologies. The improved technologies have impact on increasing production of crop, vegetables, fisheries and livestock as well as increase income. A total of 12,724 (1.26% of total CIG members) Indigenous People (IP) including 5,709 women have been included as project beneficiaries under extension program. So far, 11,056 ethnic CIG farmer (87% of total IP-CIG) have been benefited by practicing improved technology of crop, fisheries and livestock.

Grievance Redress Mechanism (GRM) has ensured the accountability and transparency of the project implementation. Some of the farmers have expressed their complaints in the area of Management and Functionality of CIG, AIF-2 and AIF-3 matching grant, Technology demonstration, FIAC services, services of extension professionals, efficiency of the field staffs and frequency of visit. The issues have been solved by details discussion and explanation in a satisfactory manner.

SECTION 1: INTRODUCTION

The NATP-2 project has been implementing in order to improve national agricultural productivity, market linkage and farm income with the financial assistance of World Bank (IDA credit), International Fund for Agricultural Development (IFAD), the United States Agency for International Development (USAID) and the Government of Bangladesh (GOB). The project is being implemented by Ministry of Agriculture (Lead Ministry) and Ministry of Fisheries and Livestock. Bangladesh Agricultural Research Council (BARC), Department of Agricultural Extension (DAE), Department of Fisheries (DoF) and Department of Livestock Services (DLS) are responsible for implementation of the project. The Project Management Unit (PMU) is coordinating the activities implemented by PIU through technical support and management assistance.

Gender, Environmental and social safeguards issues are mainstreamed in all aspect of the project cycle. The issues have been addressed in the program and activities of research; extension and value chain. The Grievance Redress Mechanism (GRM) has been introduced in the project in order to ensure the transparency and make the project accountable to the farmer and stakeholder.

Gender Integration refers to strategies applied in program assessment, design, implementation and evaluation to take gender norms into account and to compensate for gender-based inequalities. Gender integration supports the development and implementation of gender-transformative programs, policies, and services. Environmental and social safeguards refer to relying on separate processes to design and enforce environmental and social objectives and safeguards. The objective of the environmental and social safeguards compliance report is to assess compliance of the NATP-2 project with the safeguards standards. Furthermore this compliance report also appraise the impact of the project intervention on promotion of gender equality and women's empowerment, environmental improvement and social safeguards; improvement of the indigenous people (IP) in all aspects of the research, extension and value chain. National Agricultural Technology Program-Phase II Project (NATP-2) is being implemented by ensuring adherence to gender and social inclusion strategy, environmental and safeguards policies and rules; legalistic and rights connotation of GOB and World Bank. The project also focused on preventing negative project outcomes ("do no harm"); mitigate, where negative impact is unavoidable. The programs and activities of the NATP-2 project have been facilitated in generation and dissemination of climate smart and environmental friendly improved agricultural technology having significant impact on environment development and sustainability, improvement of poor and marginal farmers as well as women and indigenous people (IP)/tribal community; production of safe and quality agricultural commodities; livelihoods and food security of the poor; gender equality and women's empowerment.

Equality, development and empowerment issues of socially disadvantages people as well as women and ethnic peoples are well interlinked. Participation; access to resource, leadership, decision-making, mobilize their unique knowledge has significant importance to increase agricultural productivity that will contribute to ensure benefit from the development project. The climate smart and environmental friendly improved agricultural technologies and good agricultural practices (GAP) contributed in environmental improvement, production of safe and quality agricultural products, offer working and income opportunity of the poor which likely to address the livelihoods and food security. Agricultural hill farming and agroforestry system facilitated to development of the indigenous people (IP)/tribal community. The project activities have impact on capacity development to increase production and promotion of IGA that ultimately contribute livelihood improvement of the indigenous people. The impact on gender integration, environmental and social safeguards in regards to women participation, development of environmental and social issues have been reflected in (i) Research (ii) Extension and (iii) Value chain. The project introduces the Grievance Redress Mechanism (GRM) in order to make the project more accountable to the farmer and stakeholders.

1.1 Conceptual Framework

The gender strategy of NATP-2 project has developed in regards to inclusive participation, leadership development, economic and social benefits to both women and men. The project adopts the following principles in addressing gender considerations:

- Identifying women and disadvantaged groups that are left behind and encourage to participate through creating more inclusive cultural and social environment;
- Address the needs, priorities, participation and practice of women and socially disadvantaged population;
- Program activities as a base to advocate for gender issues and social inclusion in the resources mobilization and distribution;
- Program delivery and monitoring and evaluation will formalize and explicit in considerations of gender and social inclusion;
- Policy advocacy and develop collaborative networks with relevant stakeholders in order to gender equality, social inclusion and economic empowerment of all project participants;

It is important to emphasize that the project is run in an integrated and coordinated manner, which is operated and managed by expert professionals. Although the strategy leads to promotion of gender equality, women's empowerment and social inclusion in diversified activities.

The sound environmental management is critical to sustainable development. Conservation and sustainable development of environmental issues in regards to land, water, and biodiversity are the key consideration of environmental safeguards. NATP-2 classified as category "B" under OP/BP 4.01 with partial assessment as environmental impacts are likely to be small scale and site specific and with no irreversible impacts. Comprehensive environmental management is critical to sustainable development. A good agricultural extension plan addresses activities that minimize and manage environmental risk associated with pesticide use; promote and support safe, effective and environmentally sound pest management. NATP-2 project is designed in accordance with the World Bank operational Guidelines and environmental considerations are fully mainstreamed in project planning, operation and project monitoring. Efforts are given to improve the existing practices with environment friendly technologies, so, it is not expected to have any major adverse impact on the environment. NATP-2 activities promoted sustainable production practices of fisheries with environment friendly technologies. Key environmental issues have been addressed in NATP-2 project.

Environmental Management Framework (EMF): The Environmental Assessment (OP/BP 4.01/BP) and Pest Management (OP/BP 4.09) policies of the World Bank's environmental safeguards are relevant to the NATP-2 project. The EMF approach has been adopted to provide general guidelines and procedures for environmental management of interventions to be supported under NATP-2. The purpose of the EMF of the NATP-2 is to integrate environmental concerns into the identification, design and implementation of all sub-project interventions in order to ensure that all the interventions are environmentally sustainable. The EMF will contribute to environmental sustainability by:

- Excluding the interventions that pose serious threat to the environment;
- Preventing and/or mitigating any negative environmental impact that may emerge from the interventions;
- Enhancing environmental outcomes of the activities implemented under individual intervention. The EMF will facilitate compliance with the policies, acts, and rules of the Government of Bangladesh and environmental safeguard policies of the World Bank.

Environmental Assessment (EA) Categorization of NATP-2 Interventions: The NATP-2 supports a range of activities including research, training, ICT, infrastructure support (lab renovation and upgrading), agricultural equipment, agro-processing units, cold storage units, market yards, homestead gardening, cattle rearing units, milk chilling and processing centers, small scale slaughter houses, feed manufacturing units,

bio-gas units, fish rearing (mono and poly culture), fish processing units, etc. The potential environmental impact of these activities varies depending on the nature, scale and location of the activity. Considering these criteria, as well as the categorization stipulated under the Environment Conservation Rules 1997, the sub-projects in NATP-2 have been categorized into 3 categories: those that require Limited Environment Assessment (LEA), those that required Detailed Environment Assessment (DEA) and those that do not need any assessment.

Environmental Management Process: The following principles will be followed in the overall environmental management of interventions to be implemented under the NATP-2:

- Activities with severe negative environmental impacts will not be supported by NATP-2;
- Activities involving financing of CIGs, POs, SMEs and research proposals will go through environmental screening and assessment and will have intervention specific Environmental Management Plans (EMPs);
- Environmental enhancement measures' will be recommended specifically to address adaptation needs in the context of climate change.

The following steps or supporting elements ensure systematic implementation of the environmental management:

- Reviewing negative list of attributes;
- Categorization of sub-projects;
- Environment assessment of sub-projects and development of EMP;
- Institutional arrangements;
- Capacity building;
- Monitoring.

SECTION 2: METHODOLOGY AND INSTITUTIONAL ARRANGEMENTS

2.1 Methodology

The report has been prepared on the basis of implementation progress of the four Implementing units of NATP-2 project those are: PIU-BARC, PIU-DAE, PIU-DLS and PIU-DoF. Each PIU have collected have collected qualitative and quantitative data from implementing field by using the format and checklist which was developed in consideration of specific objectives of the assignment. The report has been prepared in consideration of the implementation status of (1) Research program (2) Extension services (3) Value chain development and access to market and (4) Ethnic community.

2.2 Institutional arrangements

Gender integration, Environmental safeguard compliance has been taken into consideration in all aspects of project implementation which has been implemented by the PIU-BARC, PIU-DAE, PIU-DLS and PIU-DoF in coordination with PMU. Environmental and Social Safeguards Specialist of PIUs are responsible to implement the program where Gender Specialist of PMU is coordinating the overall program and activities. Each PIU have assigned a person with specific responsibilities at each level to implement the issues which has been presented below in the form of matrix:

Table 1: Responsibility matrix to implement the safeguard issues

Level	Responsible person/ Focal point	Responsibility/Description of tasks
Union	SAAO/CEAL/LEAF	<ul style="list-style-type: none"> • Deliver the project support to CIGs and POs in consideration of safeguards issues; • Facilitate to address safeguards issues in preparation of Micro plan; • Conduct awareness and training program on gender and safeguards issues in the community level; • Data collection and submission to respective offices;
Upazila	UAO/ULO /UFO	<ul style="list-style-type: none"> • Assist and supervise to implementation of gender and safeguards issues; • Technical guidance to the SAAOs/CEALs/LEAFs for implementation of gender and safeguards issues; • Coordinate and monitor the activities including data collection of of gender and safeguards issues; • Provide data to respective PIU;
District	DD-DAE/DLO/ DFO	<ul style="list-style-type: none"> • Coordinate and support the Upazila Officers (UAO/ULO/UFO) in implementation of the of gender and safeguards issues;
PIUs	Environmental and Social Safeguards Specialist	<ul style="list-style-type: none"> • Coordinate the field activities of gender and safeguards issues; • Technical assistance to the field units to implement of gender and safeguards issues; • Field visit and monitoring of gender and safeguards issues; • Provide data of gender and safeguards issues to the PMU and assist to prepare report; • Report preparation on gender and safeguards issues;
PMU	Gender Specialist	<ul style="list-style-type: none"> • Develop a gender strategy and action plan to promote participation and empowerment (including social issues) of women farmers; • Facilitation to transfer women friendly technology;

		<ul style="list-style-type: none"> • Development of training module; • Make coordination for inclusion of gender and environmental and social issues in the training session provided by PIUs of DAE, DOF and DLS; • Develop monitoring format to Monitor and Evaluate the Gender, Environmental and Social safeguards related activities; • Facilitate to conduct studies to assess the changes/result/impact/status of safeguards and Gender issues; • Develop and publish various promotional materials on “Gender and safeguards issues”; • Report preparation on Gender and safeguards issues.
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SECTION 3: STATUS OF GENDER INTEGRATION, ENVIRONMENTAL AND SOCIAL SAFEGUARDS COMPLIANCE

The program and activities of NATP-2 project has been implementing in compliance of gender integration, and environmental and social safeguards standards. Moreover this compliance report also consider the impact of the project activities towards promotion of gender equality and women’s empowerment, environmental and social development; improvement of the indigenous people (IP) in all features of the research, extension services, and value chain. The project introduces the Grievance Redress Mechanism (GRM) in order to make the project more accountable to the farmer and stakeholders.

3.1 GENDER INTEGRATION

Gender Integration refers to strategies applied in program assessment, design, implementation, and evaluation to take gender norms into account and to compensate for gender-based inequalities. Gender integration supports the development and implementation of gender-transformative programs, policies, and services. Gender transformative approaches seek to change gender norms that restrict women and men’s access to services and realization of best. They question and challenge the unequal distribution of power, lack of resources, limited opportunities and benefits, and restrictions on human rights. Gender integration in the NATP-2 project has assessed by collecting and analyzing sex-disaggregated data and qualitative information.

Women and men have active participation in research program & extension services in regards to agricultural production, and value chain development including marketing. The women have active participation and leadership role in technology demonstration, adoption and dissemination as well as in operation of project activities; decision-making in input and resource management. A total of 3,64,260 (36.08%) women are being participated in project activities where 86 women in research program and 364,174 women in extension services. The detail gender analysis patently recognized the participation and leadership role of women across the project which facilitated to bring the progress of the project and leads to promotion of gender equality and women’s empowerment.

3.1.1 Gender integration in research program

Besides men, the women have been participated in implementation of the CRG & PBRG sub-project. A total of 14 research sub-projects have to be considered as women friendly having impact on women’s livelihood and empowerment. A total of 86 women (16% of total) have been associated in implementation of the research sub-projects and PhD program. A total of 51 women scientists have been involved as Coordinator and Principal Investigator (PI) in implementation of research sub-projects which is about 13 percent of total Coordinator and Principal Investigator.

Table 1: Women participation in research program

Area of participation		Total	Women	
		No.	No.	%
CRG sub-project	PI	190	22	11.6
PBRG sub-project	Coordinator	51	9	17.6
	PI	156	20	12.8
	PBRG sub-project	207	29	14.0
Total women in Research sub-project		397	51	12.8

There are 35 women scholars in PhD program which is 25 percent of total scholars. About 20% women have participated in training program for capacity building.

Table 2: Women participation in PhD program

Category	Total student	Women student	
	Quantity	Quantity	%
Local student	80	27	19.3
Foreign student	60	8	5.7
Total	140	35	25.0

A total of 736 women participated in training under the capacity building program which is about 20.26 percent of total participants. Of them 734 (almost 20% of total) women received local training and only two (2) women participated in foreign training. About 1300 women have participated in the training have been provided by PI under the components of PBRG sub-project which is around 36 percent of total participants.

Table 3: Women participation in training program

Category	Under Human resource development				Under PBRG sub-project		
	Target	Total	Women		Total	Women	
			No.	%		No.	%
Local	3500	3631	734	20.2	3583	1300	36.28
Foreign	260	52	2	3.8			
Total	3760	3683	736	20			

3.1.2 Gender integration in extension program

3.1.2.1 Project beneficiaries: There are 364,174 women (36.09% of total CIG farmers) have been included as project beneficiaries under different extension program of PIU-DAE, PIU-DoF and PIU-DLS. The representation of women by PIU-DAE, PIU-DoF and PIU-DLS is 33.7%, 35.4% and 44.45% respectively. The details statistics of women participation is presented in the Table 4).

Table 4: Participation status of CIG women up to June 2021

Total CIG Farmer		Women Beneficiary		
		Total	% of total beneficiary	% of total women
PIU-DAE	695,700	234,440	33.70	64.37
PIU- DLS	207,750	92,337	35.40	25.36
PIU-DoF	105,640	37,397	44.45	10.27
Total	1,009,090	364,174	36.09	

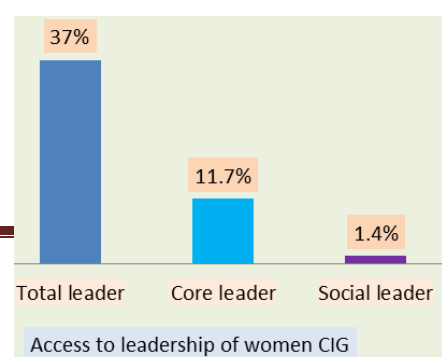
3.1.2.2 Access to technology and agricultural production: So far 100% women CIG farmers are being received training on improved technology where total training client days of women was 13,08,155 which is almost 34% of total training client days. The non-CIG women farmers have participated in technology sharing training/meeting/workshop organized by PIU-DAE, PIU-DoF and PIU-DLS. Participation of women have been reported in



technology demonstration, adoption, technology field day, exposure visit and FIAC services. In order to dissemination of improved technology about 73,434 women farmers have participated in implementation of technology demonstration which was about 37 percent of total demo participants and 20 percent of total women beneficiaries. So far, 236,763 women CIG farmers have adopted improved agricultural technology which is 37.3 percent of total adopter and 65 percent of total women beneficiaries. The highest adoption rate of women CIG have been observed in PIU-DLS followed by PIU-DAE which was about 43 percent and 36 percent respectively. The adoption rate of fisheries women CIG is 30.47 percent. The production of crop, vegetables, fruits, fisheries and livestock have been increased due to adoption of improved technology. The analysis says that some issues limits the women to adopt improved agricultural technology where knowledge gap to proper application of technology; high cost and quality inputs; shortage of capital could be considered as major. FIAC has significant contribution in technology dissemination and adoption as well as increase agricultural production. Both CIG and non-CIG women farmers have visited FIAC in order to getting proper guidance in regards to agricultural production. The services of FIAC contribute to increase production and productivity of the women farmers also problem solving. The findings indicate that the distance of FIAC from home; information about the time schedule of LEAF and CEAL; types of available services are the considerable challenges of women to avail the FIAC services. The analysis expressed the increasing trend of women’s visit over the period. Details status of women participation is given in Annex 1.

3.1.2.3 Access to Agricultural Innovation Fund: A total of 427 AIF-2 sub-projects have been awarded to the women CIG which was 18.12 percent of total awarded sub-project. Of them 406 sub-projects were awarded by PIU-DAE and 21 sub-projects by PIU-DLS. The PIU-DOF has no separate women group. In total 58 AIF-3 sub-projects have been awarded to the women agricultural entrepreneur where the distribution by PIU-DAE, PIU-DOF and PIU-DLS were 28, 19 and 11 sub-projects respectively. The AIF-2 sub-projects contributed to increase income of the women CIGs. The AIF-3 sub-projects mostly have an impact to enhance the transportation facilities of agricultural commodities. The women agricultural entrepreneur becomes benefited through AIF-3 sub-projects in terms of transported their own product and enhancing their income.

3.1.2.4 Access to leadership: The extension services contributed to development of women leadership. Women CIG member have been playing leadership role in CIGs, POs and as a social leader like member of union parishad and different institutions and social & cultural organizations. Training was provided for capacity building



of women in order to better operation, management, strengthening & sustainability of CIG. The leadership capacity of women have accelerated in operation and management of CIG which includes CIG registration, group savings, financial management, record-keeping, coordination, awarding of AIF-2 & AIF-2 matching grant, inputs management, dissemination of technologies, marketing of the produce and role play in decision-making. A total of 63,744 women which is 19.4 percent of total CIG leader and 18.5 percent of total women beneficiaries. Out of total women beneficiaries, about 42,737 (26.26% of total core leader and 12% of total women beneficiaries) women CIG farmers are holding core leadership positions in the CIGs and POs those are designated as president, vice-president, secretary and cashier. The leadership of women CIG has also been established in union parishad and different social organizations in the locality. Besides participation in the project activities number of CIG women member have established their leadership in local government and different social organization by holding position in the executive committee of school managing committee, religious organization/Institution, local club and cultural forum. Approximately 1.37 percent CIG women are being leading in the social sector as member of union parishad and different position of executive committee of School Managing Committee, religious organization/institutions, local club and cultural forum. Almost 0.5 percent CIG women have elected as union parishad member and 0.87 percent CIG women in different social, cultural and religious organization/institutions.

Table 5: Leadership status of CIG women

Area of leadership	Total	% of total leader	% of total women CIG
Total CIG leader	135,115	34.95	37.10
Executive member of CIG	103,224	28.31	28.34
Core leadership	42,737	26.35	11.74
Social leadership	4,993	22.70	1.37

3.1.3 Prospect and challenges of gender integration in NATP-2 project: The findings endorse that the initiatives, approach and efforts of the project contributes to promotion of women participation in project activities; skill and leadership capacity development of women; involvement of women in operation of income generating activities. The analysis of the findings stated that the initiatives, approach and efforts of extension services facilitated in 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 issues could be the considerable challenges in regards to promotion of gender equality and women's empowerment:

- There is no specific program or budget allocation for women;
- Women do not have well access in ownership of women in land/pond and cattle/poultry housing and other productive resources;
- No special training facilities for the women for their skill and capacity building;
- Fewer number of women friendly technology demonstrations implemented by women;
- Poor technical knowledge of women in adoption and practice of improved technology;
- Women do not have sufficient knowledge about post-harvest management;
- There is no women friendly marketing facilities, moreover women do not have knowledge about commodity marketing;
- Marketing almost driven by the male member of the family;
- Women have limited access to decision-making process both in production, and commodity

- Women have limited access in big item of income generating activities.
- Women do not have control over income and financial issues.

The followings are the most potential prospect of women participation in the project which may be achieved by overcoming the challenges:

- Promotion of gender equality in the NATP-2 project;
- Increase women participation in crop, vegetables, fruits, fisheries and livestock production;
- Increasing trend of practicing the women friendly improved technology;
- Ensure to production of safe agricultural food;
- Increase access to income generating activities of the women;
- Increase women leadership within CIG and other social sectors;
- Women economic development and women's empowerment.

3.2 Environmental and social safeguards compliance in research program

Bangladesh Agricultural Research Council (BARC) has been coordinating the research program. Different research institutions like; NARS institutes i.e. BARC, BARI, BRRI, BFRI, BLRI, BINA, BWMRI, BJRI, SRDI, CDB and universities i.e. BAU, BSMRAU, JUST, CU, PSTU, RU, SUST, KU, SAU, NSTU and DU have participation in implementation of the sub-projects. Both the male and female have involvement as Principal Investigator and Coordinator in implementation of the CRG & PBRG sub-project. The research program is being operated in consideration of environmental and social safeguards compliance in order to generation and development of farmer's friendly improved agricultural technologies on crop, livestock and fisheries. There are Competitive Research Grant (CRG) and Program Based Research Grant (PBRG) research program are being implemented under the research program. The implementation of CRG has been completed in 2018 where 190 sub-projects were implemented. A total of 51 PBRG sub-projects covering different improved technologies of crop, livestock and fisheries are being implemented having satisfactory compliance with safeguard measures based on exclusion criteria and environmental screening matrix. All the PBRG sub-projects are categorized into three groups such as (i) climate-neutral; (ii) having climate co-benefits and (iii) direct climate-related. The sub-projects contribute to face future climate change impacts having climate co-benefits. No PBRG sub-projects offered land acquisition, involuntary resettlement, encroachment of reserve forests, and use of prohibited pesticides. The PBRG sub-project does not imply any threats to native species, biodiversity system, rural livelihoods, food & nutritional security, and gender sensitivity and social issues. Possible all types of environmental issues are addressed in the sub-projects which can be categorized as: (i) Biodiversity and (ii) Unfavorable environmental (Char, Coastal, Haor & Beel, Drought, Madhupur gar) that contributed to improvement of biodiversity, mangrove ecosystems, agro-forestry, water management, climate change impacts, methane emission and its mitigation options, low carbon farming technique, improvement of soil quality & soil health, food safety issues and improvement of farmers livelihoods. No complain has been received from any individuals, group or category of people and any other stakeholder associated with the subprojects. Moreover, all the Coordinators and Principal Investigators (PIs) of the PBRG sub-project are well aware about to measure and management of environmental and social safeguard issues in designing and implementation of the sub-project that confirms the environmental and social safeguards compliances. The PBRG sub-projects have contributed to environmental conservation and improvement, increase of agricultural production and production, improve livelihood and food security having positive impact on improvement of the poor households. The detailed analysis have identified the three key focus areas of PBRG sub-projects in regards to environmental and social safeguards compliance which are: (i) Environmental conservation and improvement; (ii) Climate co-benefit and (iii) Livelihood improvement.

3.2.1 Environmental conservation and improvement

Both the Competitive Research Grant (CRG) and Program Based Research Grant (PBRG) sub-projects have contribution on environmental conservation and improvement. The sub-projects directly or in some way are associated to environmental safeguards affairs through addressing the conservation of biodiversity, ecosystem and indigenous genetic resources; climate change management; strengthening of IPM approach leading to reduce the use of agrochemical; improvement of soil quality & soil health; protection of air and water pollution; promotion of safe food and nutritional improvement; and improvement of farmers livelihoods including women and indigenous people. No sub-projects offered land acquisition, involuntary resettlement, encroachment of reserve forests, and use of prohibited pesticides. The sub-project does not imply any threats to native species, biodiversity system, rural livelihoods, food & nutritional security, and gender sensitivity and social issues.



3.2.1.1 Environmental safeguards compliance in CRG program

PIU-BARC implemented 190 Competitive Research Grant (CRG) sub-projects and all of which were screened through an environmental screening matrix on bio-diversity (Flora, fauna, genetic diversity, hybrids), soil quality (Organic matter, chemical fertilizer use, soil salinity, fertility status, microbial activity, heavy metal contamination, water quality), agro-chemicals (Pesticide use, pest infestation, bio-pesticides, health hazard) and pollution (Soil, water, air) along with a self-screening checklist on environmental safeguards. These sub-projects were reviewed & verified and showed satisfactory compliance with safeguard measures based on exclusion criteria and environmental screening matrix:

Table 6: Category of sub-projects in compliance to environmental and social safeguard

Sl. No.	Category	Environmental safeguards
1.	Biodiversity	Biodiversity is conserved through collection and characterization of important plant genetic resources including crops, forest and medicinal plants. Enhanced genetic improvement on crops, fish and livestock species.
2.	Unfavorable environmental (Char, Haor, Beel, Coastal, Drought, Madhupur gar) ecosystems	Contributed to identification of appropriate ecosystem model which have impact on protection and improvement of environmental safeguard issues.
3.	Mangrove ecosystem	Environmental improved through development of climate resilient mangrove ecosystem in the Sundarban.
4.	Madhupur garh ecosystem	Development of agroforestry model having impact on conservation of Biodiversity and expansion of vegetation.
5.	Rooftop gardening	Rooftop gardening have contribution in environmental improvement through reducing CO ₂ in the air.
6.	Up-scaling of lac production technologies	Utilization of beneficial insect has contribution to reduce the use of chemical pesticides having impact on environmental improvement.
7.	Integrated Pest Management (IPM)	Pesticide use reduction targeted; conservation of beneficial insects promoted, and reduced health hazards. Use of IPM reduces environmental pollution.
8.	Soil quality/ Soil deg-	Soil health improved through management of acid soils for sustaina-

	radation	ble crop production in Madhupur Tract and Northern & Eastern Piedmont Plains.
9.	Bio-fertilizer up-scaling; production of compost, vermi-compost and tricho-compost	Use of inorganic fertilizer reduced; enhanced soil health and organic matter content; reduced methane emission. Improves soil health and reduces the use of chemical fertilizers resulting in reduced environmental pollution.
10.	Methane emission	GLEAM model in dairy production has impact to reduce methane gas emission.
11.	Food safety	Food and nutritional safety issues were adequately addressed through balanced uses of fertilizer and pesticides which have environmental impact.

3.2.1.2 Environmental and social safeguards compliance in PBRG program

A total of 51 Program Based Research Grant (PBRG) sub-projects of crop, livestock and fisheries are being implemented having satisfactory compliance against environmental and social safeguard measures. Hence, the technologies of PBRG sub-project to be considered as environment friendly and social development.

- Improvement of biodiversity and agro-forestry (8 nos.);
- Improvement of unfavorable environmental (Char, Haor, Beel, Coastal, Drought) ecosystems (10 nos.);
- Environment friendly integrated farming systems (3 nos.);
- Improvement of Soil quality and Soil health (3 nos.);
- Improvement of Irrigation system by using of solar pump for surface water irrigation (1 no.);
- Strengthening of IPM approach leading to reduce the load of agro-chemical uses at farm as well as at national level (4 nos.);
- Reducing of Methane emission (1 no.);
- Food security, food safety and livelihood improvement (9 nos.);
- Women empowerment (4 no.);
- Ethnic community development (6 nos.);

The sub-projects both the CRG and PBRG exhibited satisfactory impact on social safeguards based on exclusion criteria and screening matrix. The implemented sub-projects confirmed equitable benefits of diversified group of people by practicing various improved agricultural technologies; creates working and income opportunities of the women, poor and vulnerable groups which lead to improve living standards and enhance livelihoods of the indigenous peoples, women, poor and vulnerable groups. The major areas of impact are as followings:

1. Promotion of agricultural farming and productivity through introducing of improved agricultural technologies; improvement, conservation and practices of biodiversity, ecosystems and agro-forestry system; indigenous genetic resources both for agriculture, livestock and fisheries;
2. Crop cultivation in unfavourable agro ecological environment by developing of stress tolerant crop varieties (saline, heat, drought, disease etc.) and climate smart agricultural technologies;
3. Improvement of soil health, reduces the application of chemical fertilizers and increases of rice production by applying of Bio-fertilizer;
4. Promotion of climate resilient technologies and enhancing the productivity of crop, fisheries and livestock;
5. Reduces of chemical fertilizers, pesticides and other relevant agrochemical;
6. Bio-fertilizer contributes to improvement of soil health and increase rice yield;

7. Production and application of compost, vermi-compost and tricho-compost contributed to reduce environmental pollution, soil degradation, improvement of soil fertility and increase crop productivity;
8. Promotion of high value crops contributed to replacement of tobacco that have an impact on environment and social safeguard;
9. Promotion and eco-friendly management of crop, fisheries and livestock;
10. Reduce of human health risk and hazards through introducing of Integrated Pest Management (IPM);
11. Development of a low carbon farming technique;
12. Rice-based agroforestry for sustainable land use system and combating future climate change challenges;
13. Development and adaptation of water saving irrigation techniques for upland crops;
14. Protection of air and water from pollution.
15. Development of supply chains by the assessment of postharvest losses and marketing performances in vegetable;
16. Development of value chains of fruits and vegetables through a combination of best practices of postharvest technologies;
17. Promotion of quality and safe mango production by using various fruit bagging materials;
18. Promotion of rice-cotton based hill farming system by developing of agro-forestry model;
19. Increase vegetable cultivation and nutritional improvement through mitigating the contamination of vegetable crops and soil under irrigation with urban wastewater;
20. Shelf stable value added onion, garlic and ginger production;
21. Creation of business opportunities through the development of ornamental fisheries;
22. Productivity enhancement of carps and tilapia in creeks of Chittagong hill districts;
23. Food Security of the fish farmer by development of indigenous fisheries in *Baors*;
24. Enhances of livestock farming by reducing calf mortality in buffalo;
25. Development of effective vaccine against Bovine Mastitis;
26. Increases of poultry farming in the locality due to development of live attenuated duck plague vaccine;
27. Increase of poultry farms through economics of adoption of bio-security measures for controlling avian influenza;
28. Promotion of livestock farming through establishment of suitable fracture management techniques in different animals (cattle, goat, dog, cat);
29. Promotion of livestock farming through development of pro-biotic feed supplement for calves;
30. Promotion of commercial goat and sheep production through development of cost effective complete pellet feed;
31. Safe poultry production through applying mining noble probiotics from Red Jungle fowl (*Gallus gallus*) as the alternatives to antibiotics;
32. Production of low cholesterol healthy mutton by using natural herbs;
33. Value addition and standardization of nutritional level by using selected food items of animal and plant origin;
34. Fortification and standardization of nutritional level by using selected human foods and efficacy test of polyphenolic compounds in livestock products;
35. Improvement of human health by controlling the contamination and adulteration of food and food products, process, chain and mollification.

3.2.2 Climate Co-benefits

Climate Co-benefits in regards to Environmental Safeguards Compliance have been identified in Competitive Research Grant (CRG) and Program Based Research Grant (PBRG) sub-projects. A total of 20 sub-

projects which includes 15 CRG & 5 PBRG sub-projects are exposed pleasing compliances in climate co-benefits considering positive impact on climate change.

The sub-projects presented satisfactory impact in terms of climate co-benefits where followings could be considered as major:

1. Improvements of carbon sink through development of mangrove vegetation in the coastal areas leads to improve carbon sink;
2. Promoted climate smart and sustainable management of coastal ecosystems;
3. Actual amount of enteric methane emitted from dairy animal;
4. Rooftop gardening reduced air temperature by 5.2°C, oxygen percent has been observed higher and CO₂ concentration lower in the garden than the bare roof;
5. The low carbon has been decreased 25% production costs and enhance yield. Low carbon farming has been able to provide additional short and long-term co-benefits to the environment, including improving saline soil and resilience to climate change;
6. All the crops associated with jackfruit based multistrata agro-forestry systems will augment soil-N, organic carbon, organic matter and P^H in compared to control field;
7. Germplasm conservation and up-scaling of agro-forestry systems facilitate to improvement of vegetation, contributes in carbon sink, augment soil-N, organic carbon, organic matter and P^H which have impact to mitigation of climate change;
8. Floating bed fodder cultivation has a positive impact with dissolved oxygen of water;
9. Integrating farming technique of crop and cattle promote low carbon which contribute to improve saline soil and resilience to climate change;
10. Dominant species of arthropods in Bangladesh have been confirmed and seasonal prevalence of arthropods has been determined. Number of arthropods has been correlated with meteorological data;
11. Use of solar photovoltaic irrigation pump will contribute to reduce fossil fuel burning, save energy which have impact on environmental improvement and mitigate the climate change;
12. Climate Resilient Farming Systems Research will contribute to conserve ecosystem, promote vegetation which have impact on improve the carbon sink, physicochemical parameters (temperatures, dissolved oxygen, P^H and salinity) and changes of gonadal maturation cycle;
13. Energy to be saved and environment to be improved by reducing fossil fuel burning through up-scaling and application of Solar Photovoltaic Pump;
14. Improved Agro-forestry Practices in Char Land Ecosystem will facilitate to environmental development and conservation;
15. Germplasm conservation and improved Agro-forestry Practices will contribute to mitigate the climate change.

3.2.3 Impact on livelihood improvement: The sub-projects demonstrate significant impact on livelihood improvement of the targeted groups that recognize the social safeguards. The major areas of impact are as followings:

1. Increases overall farm productivity of crop, vegetable, fruit, livestock and fisheries through introducing improved technology;
2. Create employment opportunity, increase income, improve livelihoods and food security and nutritional status of the poor, other disadvantages people, women and ethnics communities due to promotion and improvement of agricultural farming;
3. Livelihood improvement of the farmer's household due to cultivation of high value crops;
4. Poverty reduction of the ultra-poor and marginal farmers by up-scaling of improved production technologies of crop, vegetable, fruit, livestock and fisheries;
5. Improvement of livelihood and ensure food security of the farmer through innovative agro-forestry technologies;

6. Increases of fruit cultivation and farmers income due to development of lean season fruit varieties and management packages;
7. Improve income and livelihoods of the char lands peoples by introduces of profitable agro-ecologically suitable crop varieties and development of marketing systems;
8. Promotion of safe food and nutritional improvement through organic vegetables production in urban area by vertical farming technology;
9. Increase production and farmers' income through introducing of saline, heat, drought, disease tolerant varieties;
10. Increase income of the farmers through floating bed fodder production in submerged and flooded areas;
11. Increases of fruit cultivation, farmers income and nutritional improvement due to popularization of minor fruits to rural and urban communities;
12. Safe and quality vegetables and fruits production through developing of protective culture technology;
13. Enhance nutritional security by developing fish-based food products and extension of shelf life;
14. Upliftment of fishers' livelihood through increasing productivity of haor floodplain fisheries;
15. Increase income, food security and livelihood improvement of livestock farmers through implications for milk market price and livelihood improvement policy.

3.3 Environmental and Social safeguards Compliances in Extension Program

Extension services to the farmers are being provided in consideration of environmental safeguards aspects. The PIUs DAE, DoF and DLS have been providing various extension services having impact on environmental safeguards. Each PIU has separate activities in regards to environmental safeguards compliance. However, there are some common activities of extension services mostly includes; (i) Preparation of micro extension plan; (ii) Training/ Capacity building; (iii) Dissemination of improved agricultural technology; (iv) FIAC services and (v) Good agricultural practices of crop, fisheries and livestock production. The details analysis evidently stated that the extension activities have contributed in climate change adaptation leads to environmental improvement and social safeguards issues. The major identified impact of the extension program are: (i) dissemination of climate resilience improved technologies; (ii) reduces the use of chemical fertilizer and pesticides in crop production; (iii) improvement of soil health and protection of water from pollution; (iv) protect the environment from chemical hazards; (v) improvement of pond water bodies; (vi) keeps the post-harvest fish processing center clean and hygienic; (vii) increase of small indigenous fish species and maintaining fish biodiversity; (viii) management and diverse utilization of livestock farm wastage; (ix) prevention and reduces the rate of disease infection of livestock; (x) improvement of animal health; (xi) Improvement of animal health leads higher production; (xii) safe production of crops, fruits, vegetables, livestock and fisheries; (xiii) created income opportunity and increases of income; (xiv) livelihood improvement of the crop, fisheries and livestock farmer.

The extension services demonstrated satisfactory impact in regards to environmental development. The major activities with potential output/outcomes under extension services in regards to environmental safeguards compliance are reflected in the activities of PIU-DAE, DOF and DLS:

3.3.1 Common Extension Activities of Environmental and Social Safeguards Compliances

3.3.1.1 Micro extension plan: Micro extension plan is the basis of operating the CIG activities. A total of 229720 micro extension plan have been prepared in consideration of environmental and social safeguards aspect.

3.3.1.2 Training/ Capacity building: The Upazila level officers, field based service and providers and beneficiaries were trained on Environmental Social Safeguard issues. Environmental and social safeguard issues in respect to potential adverse effect on environment and social risks in crop, fisheries and live-

stock production and possible mitigation measures of the extension activities are discussed in the training. The training contributed to increase knowledge and skill on environmental safety measure during implementation of the project activities. Capacity building of the officer/staff and beneficiaries on Environmental and social safeguard issues has impact to implement the field activities in environmental and Social safeguard compliance.

3.3.1.3 Dissemination of improved agricultural technology: Various improved agricultural technologies of crop, fisheries and livestock are being implemented by PIU-DAE, DOF and DLS which are environment friendly and have impact on social development. A total of 187,564 demonstrations (PIU-DAE: 135,024, PIU-DOF: 23,535, PIU-DLS: 29,005) on improved technology have been disseminated which have impact on environmental and social safeguard. Furthermore, sum of 634,851 CIG farmers demonstrations (PIU-DAE: 417,550, PIU-DOF: 63,736, PIU-DLS: 153,565) have adopted improved technology where ethnic farmer was 11,056, which is 1.74 percent of total adopter and about 87 percent of total ethnic peoples.

3.3.1.4 Access to FIAC services: The SAAO, LEAF and CEAL have provided various advisory services to the farmers in order to crop, fisheries and livestock production in consideration of environmental and social safety net. The major/considerable FIAC services are: information about the source of quality inputs; pest and disease management; fertilizer application; good agricultural practices including solving measure in order to crop, vegetables, fruits, livestock and fisheries production; marketing of the produce and so one. FIAC ensured door step services to the farmers on crop, vegetables, fruits, fisheries and livestock production. It is recognized that all types' farmers beyond of CIGs have access to FIAC services. FIAC services have greater contribution to adoption of improved technology by the small & marginal farmers; socially disadvantages groups, women and ethnic communities having impact on household food security and livelihoods.



FIAC services

3.3.1.5 Good agricultural practices: The Good Agricultural Practices (GAP) likes to avoid and or reduce the use of chemicals of crop, fisheries and livestock production. The NATP-2 project has been encouraging the farmers about to apply Good Agricultural Practices in crop, fisheries and livestock production through field visits, training, demonstrations, distributing posters, leaflets and other printed material. The collective approach of GAP contributed to conservation and improvement of environment.

3.3.2 Activities of PIU-DAE in Environmental and Social Safeguards Compliances

Environmental safeguards issues are being taken into the consideration of the program and activities of PIU-DAE which have impact on sustainable environmental conservation and improvement.

3.2.2.1 Implementation of Pest Management Plan (PMP): PMP is being implemented for effective management of pest infestation and reduced reliance on chemical pesticides with a view to keep the environment safe. The PIU-DAE officials of different tires (union, upazila, and district) have provided technical guidance and assistance to the farmer for implementation of PMP. Campaign was organized to make the farmers aware and motivate in order to reduces the use of chemical pesticides in crop production mostly includes: (i) uses of resistant varieties and planting materials; (ii) use insect-pest & disease-free organic matters; (iii) uses balanced doses of fertilizer; (iv) practice IPM; (v) stop use of unregistered & hazardous pesticides; (vi) immediate control of disease-pest infestation; (viii) disinfection of in crop fields; (vii) promotion of sex pheromone trap; (ix) encourage to use bio-pesticides; (x) removing and burning the infested crop plants/plant parts/crop debris. The



Photo: Yellow sticky trap of IPM practice



Photo: Application of pheromone trap

filed findings declared the extensive practice of PMP by the farmers resulting to reduce the use of chemical pesticides also pest infestations. Specific observation shows that practices of sex pheromone trap in cucurbits reduce the uses of chemical pesticides by 50-60%.

Demonstration of Pest Management Plan (PMP) contributed to promotion of good agricultural practices among the farmers. PMP is being practiced by the farmers which demonstrate the impact in the area of: (i) reduce the use chemical pesticides; (ii) protect the environment from pesticide hazards; (iii) promotion of safe crops, fruits and vegetables; (iv) saves money in buying chemical pesticides.

3.2.2.2 Demonstration on Pheromone trap in cluster: Up to reporting period a total of 540 demonstrations have been demonstrated on cluster based sex pheromone trap. The farmers found interested to apply the technology. Promotion of pheromone trap in clusters contributes to reduce almost 50% production cost. Also reduced the use of chemical pesticides in cucurbits by 50-60% having impact on environmental improvement and social safety net.

3.2.2.3 Demonstration on uses the safety materials during pesticide application: The program was implemented in order to make awareness about to use of safety materials for pesticide application like gas mask, globs, apron etc. in this respect a total of 2000 demonstration was demonstrated up to reporting period. Positive impacts have been reported in terms of farmer's awareness and uses of gas mask, globs, and apron etc. pesticide application.



Photo: Demo of use safety materials during pesticide application

3.2.2.4 Demonstration on homestead gardening: A total of 540 demonstration have been establishment on homestead gardening up to reporting period. The program facilitated to promotion of safe vegetable and fruits production which offer environmental and social safety.

3.2.2.5 Demonstration on preparation of mass scale quick compost/vermi-compost: In order to production and promotion of mass scale quick compost/vermi-compost among the farmer. Up to reporting period a total of 100 demonstration was established at farmer's level. The technology becomes popular having impact on environmental development through followings:

- Uses of household and livestock farm wastage which have impact on improvement of household and community environment;
- The use of compost improves the soil health;

3.2.2.6 Demonstration on management of fruit orchards: The orchards management technology has been disseminated among the farmers through establishment of demonstrations. The promotions of appropriate management of fruit orchards have impact to reduce the application of chemicals in fruits production. Production of chemical free fruits to be considered as environment-friendly.

3.2.2.7 Establishment of pest museum in the FIAC: The activities facilitated to make the farmers familiar with the harmful and beneficial insects through visiting pest museum which contributes to increases beneficial insects. As a result, harmful insect's attacks are reduced having impact on environmental safety.

3.2.2.8 Impact the extension program of PIU-DAE on environmental and social safeguards

- Awareness created among the farmers on environmental and social safety net;
- Reduced the use of chemical fertilizer and pesticides;
- Reduced potential degradation of soil;
- Ensured health safety of the pesticide applicator;
- Reduced the risk of health hazards;
- Increased productivity of crops, fruits and vegetables;
- Farmers are producing safe food Promoted of safe fruits and vegetables having impact on improvement of households nutritional status;

- Increased crop, vegetables, fruits production and income;
- Livelihood of the farmer has improvement.

3.3.3 Activities of PIU-DoF in Environmental and Social Safeguards Compliances

The PIU-DoF has been providing support to sustainable development of inland culture fisheries (small scale aquaculture ponds) and inland capture fisheries (open water fisheries in beels). The PIU-DoF has been implementing the activities in compliance with environmental safeguards:

3.3.3.1 Beel management: The program is being implemented in 40 beels (inland capture fisheries) by the PIU-DoF in order to fresh and safe fish production. Habitat improvement, establishment of beel nurseries, stocking of indigenous fish species, establishment of fish sanctuaries, and community based fisheries management are the considerable activities of beel management. Beneficiaries have been selected and community based fishery management system is established. Necessary initiatives are taken for successful implementation of the activities. Beel management program facilitates to production of fisheries in natural environment having impact on environmental conservation leads to management and improvement of biodiversity.



Photo: Indigenous fishes stocking in Beel



Photo: Fish Sanctuary in Beel

3.3.3.2 Conducted Limited Environmental Assessments (LEA): Limited Environmental Assessments (LEAs) have been conducted in 23,535 demonstration ponds and 40 beels up to reporting period. A total of 843 ponds had been identified having 8 types of potentials negative impacts. The considerable negative impact were: low dike of pond, intrusion of unsafe water and polluted water from the house and agricultural lands, mixing of household wastes, soil sedimentation, broken of pond embankment. The pond owners were advised to adopt mitigation measures by good aquaculture practices to avoid the possibilities negative impacts by raise pond dike, isolated waste disposal from the demo sites, tested pond water quality regularly, removal of soil sediments in dry season.

3.3.3.3 Waste Management System: Two Post Harvest Fish Service Center has been established at Singra upazila of Natore district and Trishal upazila of Mymensingh district. Waste management facilities has established in both the centers for effective management of the solid and liquid waste in order to keep the Center clean with attention to free from germs by disposing of the wastes properly which have impact on environmental safeguards.

3.3.3.4 Testing the quality of pond water: PIU-DoF has provided training and water testing equipment to the field extension workers in order to test the pond water to determine the P^H; Dissolved oxygen; Ammonia. Up to reporting period the quality of pond water was tested in 10,48,336 ponds which included both the CIGs (636,652 nos.) and non CIGs (411,684 nos.) fish farmers. The activity contributed to make awareness among the fish farmers which resulted ensured the quality of pond water. The followings impact have been recorded in this respect:



LEAF is Testing Pond Water Quality

- Biodiversity and other relevant environmental issues are conserved through improvement of pond water;
- Production friendly water quality ensured in the pond;
- Production of safe fisheries is ensured;

Table 7: No. of pond tested by parameters

Parameters	Nos. of ponds tested		
	CIG	Non-CIG	Total
Only Dissolved oxygen (O ₂)	189,659	121,662	3,11,321
Only P ^H	235,937	151,266	387,203
Only Ammonia (NH ₃)	211,231	138,756	349,987
All (O ₂ ;P ^H and NH ₃)	636,652	411,684	10,48,336

Table 8: Findings of testing the quality of pond water

Parameters	Ranges		Actions taken		Remarks
	Suitable value	Tested value	For higher value	For lower value	
Dissolved oxygen (O ₂)	5-6 ppm	2-6 ppm	-	Water agitation and water exchange Aerator	Improve- ment of pond wa- ter quali- ty in to a suitable value
P ^H	6.5-8.5	4-12	Tested high values are within tolerable range	Use lime and zeolite	
Ammonia (NH ₃)	0.01-0.05 ppm	0.01-0.03 ppm	Water exchange and/or reduction of biomass	Low or zero value is good for fish culture	

3.2.4.1 Impact the extension program of PIU-DOF on environmental and social safeguards

- Awareness created among the farmers on environmental and social safety net;
- Protected the pond water from pollution;
- Maintained the quality of the pond water;
- Made the fish processing center clean and hygienic;
- Increased the indigenous fishes, conserved fish biodiversity and livelihood improvement of the fishermen.
- Increased fisheries production and income,
- Livelihood of the fisheries farmer has improvement.

3.3.4 Activities of PIU-DLS in Environmental and Social Safeguards Compliances

Various interventions are being implemented under the PIU-DLS in order to environmental improvement. To address and implementation of Environmental issues, intensive awareness program; stakeholders through training; good farming practices are the major areas of PIU-DLS under NATP-2 project. Moreover periodical formal training on environmental issues is being provided to the Officer, Staff, CEAL and also CIG members.

3.2.4.2 Awareness campaign on disease prevention and livestock development: Up to reporting period the PIU-DLS organized campaign on Vaccination (54,734 nos.), De-worming (27,775 nos.) and Infertility (10,639) in order to reduce the disease infection and improvement of the cattle and others livestock population. Disease free livestock populations contribute to ensure the pollution free environment of surrounding areas of cattle farm including homestead which have positive impact on environmental and social safeguards.

3.2.4.3 Farm house management: The PIU-DLS has implemented improved technology in order to farm house management by applying improved management practices. The practices include use of floor mats, maintaining proper slope to drain out of urine, heat protective shed, wear of gum boot for maintenance of house,



Photo: Cow Dung pit

cleaning and disinfection of the shed and utensils by spray antiseptic fluid etc. The activities of farm house management contribute to maintaining biosecurity of farm.

3.2.4.4 Management of farm wastage: The activity contributed to installation of biogas plant, dung pit & compost pit through utilization of farm wastage which contributes to (i) clean environment of the home-stead and cattle/ poultry farm; (ii) reduce the risk of environmental pollution; (iii) reduce methane (CH₄) emission having impact on environmental improvement. Till to reporting period the followings are the outputs of farm wastage management:

- A sum of 224 Biogas plant have been established. Installation of Bio-gas plant reduced CH₄ emission from cow dung and urine;
- CIG farmers have established 2288 Biogas plant by own cost;
- Establishment of 106 demonstration on 'Improved compost pit';
- CIG farmers have prepared 836 Improved compost pit'
- CIG farmers have prepared 3,711 cow dung pit;



3.2.4.5 Establishment of slat system housing for goat: In order to disseminate the technology of slat system housing at the farmer's level, up to June 2021 the PIU-DLS has established 4,275 nos. demonstrations where women participants were 2,229 (52%). The activities and practices of the technology contribute to cleanliness of the house having impact on environmental safeguard.

3.2.4.6 Fodder cultivation: The PIU-DLS has established 8,388 nos. including 2,355 (28%) demonstrations on fodder cultivation. The demonstration focused to cultivate the fodder by using only green manure. The technology is highly environment friendly having positive impact on environmental development also ensure low cost production due to non-uses of pesticide & chemical fertilizer.

3.2.4.7 Impact the extension program of PIU-DLS on environmental and social safeguards

- Awareness created among the farmers on environmental and social safety net;
- Reduced the rate of disease infection of livestock;
- Animal health has improved;
- Livestock farm is clean and hygienic;
- Increased livestock production and income,
- Livelihood of the livestock farmer has improvement.

3.3 Gender integration, Environmental and Social Safeguards compliance in Value Chain

The project has been undertaken initiatives to ensure women participation in access to market. The project also initiated to find out the gap and scope of enhance women participation in marketing. A study have conducted to assess the gender gap and identified some potential areas in order to integrate the women in the value chain and marketing. The identified areas are: make communication and networking with the market actors; distance of market and less transportation facilities; local vendor offer less price; lack of access to market information; marketing almost driven by the male member of the family; sometimes produce sell at farm site (house/pond). The PIUs have been working to improve the situation. Although women face many limitations in value chain and marketing, however a total of 1883 women marketed 1344 MT commodity through CCMC and POs which represents almost 4.1 percent of total marketed commodity. The post-harvest activities offered working opportunities of the poor including women. The comprehensive value chain approaches leads in safe and quality agricultural production of products having impact on livelihood improvement.

The environmental and social safeguards issues were taken into the consideration at different phases of value chain especially in production and post-harvest processing. The value chain emphasized on safe and quality produces following improved technologies and good agricultural practices (GAP) in all aspect of production, harvesting and post-harvest activities which have positive impact on environmental and so-

cial safeguard. In this respect the farmers, producers and stakeholders were trained on “GAP” which leads to production of chemical free, safe and quality agricultural products. The Good Agricultural Practices (GAP) mostly focused on use of good quality of seed/seedlings/planting materials/breed/fingerlings, application Integrated Nutrient & Pest Management (INPM) which includes use of organic manures and vermicompost, balanced use of fertilizer, application of IPM (sex pheromone trap, yellow sticky trap, habitat of beneficial insects, judicious use of pesticides etc.), improvement of water bodies, use of improved breed, use quality feed, housing management, health management, etc. The proper management of post-harvest activities i.e. handling, sorting, grading, washing, packaging, storage, transportation and cooling system contributed to reduce the post-harvest loss and ensured quality products. The management of the product wastage in the post-harvest processing center have impact to prevent the environmental degradation. The post-harvest activities offered working opportunities of the poor including women. The comprehensive value chain approaches confirm the conservation of agro friendly environment, ecological balance, and biodiversity also leads in safe and quality agricultural production, which have impact on livelihood improvement.

3.4 Integration of Indigenous People

The research and extension program have been implementing with a view of livelihood improvement of the Indigenous People (IP). Different activities under the research program are being implemented in order to promote household food security and livelihood improvement of the indigenous people (IP)/tribal community through capacity building on practicing different agro-forestry systems to address different aspects of agricultural production. Most of the IP-CIGs are located in hilly and 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, Kol shing, Boraik and Mahto are the identified ethnic group.

3.4.1 Integration of Ethnic people in research program: Sub-project and PhD research are being implemented under research program in regards to address the needs and capacity building of indigenous people in regards to increase agricultural production. Total eleven (11) PBRG sub-projects under the research program are being implemented in (i) Chattogram Hill Tract- 6, (ii) Modhupur Tract (Mymensingh)-2, (iii) Sylhet region-2, and (iv) Barind Tract area (Rajshahi/Chapai)-1. The research program and PhD research exhibited positive changes in the area of household food security, income generation and minimize malnutrition; development of lean season fruit varieties and management of wild fruits; adaptation and scaling up agro forestry; exploration, identification, characterization, multiplication and ex-situ conservation of endangered forest genetic resources including medicinal plants and other important plant genetic resources those have socio-economic impacts leads to promotion of household food security and livelihood improvement of the indigenous people (IP)/tribal community.

3.4.2 Ethnic planning in extension services: A total of 503 CIGs have formed in 37 Upazilas where 12,724 (1.26%) Indigenous People (IP) including women have been included as project beneficiaries. A total of 5,709 ethnic women have been included as project beneficiaries which is 44.87% of total ethnic and 1.57% of total women beneficiaries. (PIUs wise status in the Table 4).

Table 9: Distribution of ethnic CIG beneficiaries by PIUs

Total Beneficiaries		Ethnic Beneficiaries		Ethnic women beneficiaries		
		Number of Ethnic Beneficiaries	% of total beneficiaries	Total Ethnic women CIG	% of total ethnic beneficiaries	% of total women Beneficiaries
DAE	695,700	8,906	1.28	3,710	41.66	1.58
DoF	105,640	1,127	1.07	385	34.16	1.03
DLS	207,750	2,691	1.30	1,614	59.98	1.75
Total CIG	1,009,090	12,724	1.26	5,709	44.87	1.57

The PIUs have considered all the activities for the IP which have been designed for the plain land farmers those are: (i) impart training program, (ii) support for technology adoption through establishment of technology demonstration, organize exposure visit & field day, (iii) guidance for management and operation of CIGs, AIF-2 and 3 awarding, group savings, IGA promotion, access to FIAC services, market access and value chain development, leadership development.

Almost 100 percent ethnic CIG farmers have received training on improved technology where total 26,463 including 9,291 women training client days are reported. A total of 7,198 ethnic CIG farmers including 3,415 ethnic women CIG farmers have participated in technology demonstration. The representation of ethnic CIG farmers in technology demonstration is 3.63 percent of total CIG farmers and ethnic women CIG represent 4.65 percent of total women demo participants and 59.82 percent of total ethnic women CIG. So far, 11,056 (1.74% of total adopter) ethnic CIG farmer have been adopted improved technology of crop, fisheries and livestock where women representation was 4,692 (1.98% of total adopter). The IP have also participated in technology field day, exposure visit, FIAC services, and matching grand support (AIF-2 & AIF-2).

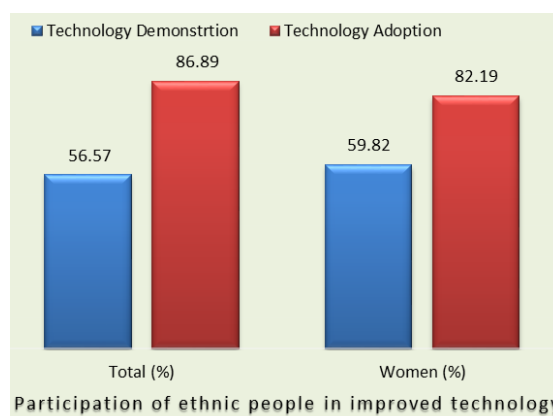


Table 10: Ethnic Participation in Technology Demonstration

Total CIG participants in technology demonstration		Ethnic CIG			Ethnic women CIG			
		Total participants	% of total participants	% of total ethnic CIG	Total participants	% of total women participants	% of total ethnic participants	% of total ethnic women CIG
DAE	146,094	6,469	4.43	72.64	3,050	5.38	47.15	82.21
DoF	23,535	324	1.38	28.75	107	3.19	33.02	27.79
DLS	28,899	405	1.40	15.05	258	1.93	63.70	15.99
Total/Average	198,528	7,198	3.63	56.57	3,415	4.65	47.44	59.82

Table 11: Ethnic Participation in Technology Adoption

Total CIG participants in technology demonstration		Ethnic CIG adopter			Ethnic women CIG adopter			
		Total	% of total adopter	% of total ethnic CIG	Total	% of total women adopter	% of total ethnic adopter	% of total ethnic women CIG
DAE	417,550	8,631	2.07	96.91	3,602	2.38	41.73	97.09
DoF	63,736	550	0.86	48.80	89	0.46	16.18	23.12
DLS	153,565	1,875	1.22	69.68	1,001	1.52	53.39	62.02
Total/Average	634,851	11,056	1.74	86.89	4,692	1.98	42.44	82.19

The ethnic CIG farmer have access to leadership within in CIG, UP and other social and cultural institutions. About 5,512 indigenous CIG farmers have access to leadership in CIG, UP and other social and cultural institutions. The representation of ethnic CIG farmers in technology leadership is 1.43 percent of total CIG leader. The leadership of ethnic CIG women have been reported among 2065 ethnic women CIG which represents 1.5 percent of total women leader, 37 percent of total ethnic leader and 36 percent of total ethnic CIG women. The analysis says that almost 1749 ethnic CIG farmers including 624 ethnic women CIG farmers have elected as core leaders in the CIG. The representation of ethnic CIG farmers is 1.08% of total core leader and 13.75% of total IP CIG farmer whereas the representation of IP CIG women is 1.46 percent of total core women leader, 35.73 percent of total ethnic core leader and 10.95 percent of total ethnic CIG women. Total 621 CIG ethnic farmer (4.88% of total ethnic CIG farmer) have entered in social leadership as the member of union parishad, member of executive committee of School Managing Committee, religious

organization/institution, local club and cultural forum where women is 244 (4.27% of total ethnic women) (*Details in Annexure-1 : Gender Participation Matrix*). The extension services have contributed to increase agricultural productivity and farm income. Services are also being provided to the ethnic for marketing of their commodity. The research and extension program have contributed to enhance farming and farm productivity leading to increased income and improved livelihood of the Indigenous People.

3.5 Prospect of environmental and social safeguards

The NATP-2 project is being implemented in consideration of environmental **and social** safeguards aspect. The activities are being implemented by addressing the environmental and social development issues in view of sustainable improvement. Hence, the project has diversified prospect in terms of environmental and social safeguards aspect.

- Promotion, popularization and adoption of environment friendly and climate smart improved technologies of crop, fisheries and livestock;
- Promotion of IPM, PMP and other environmental friendly technology through production of safe and nutritious Food;
- Environmental conservation and development through promotion of IPM, PMP, compost and establishment of biogas plant and installation of dung pit, assessment of net carbon balance, methane emissions and climate co-benefits;
- Improvement of livelihood of the small and marginal farmers including other socially disadvantages peoples.

3.6 Avoiding negative impacts

Avoiding of negative impacts that might be caused by NATP-2 project activities is the major concern of environmental and social safeguards. The targets and potential impacts of NATP-2 activities are analyzed at the planning stage. The possible negative impacts are identified, improvement measures, such as changing the plan or adding compensatory measures, were adopted. The activities of NATP-2 project have been designed by remembering that any negative impact to the environment or the community might lead to the failure of the entire project.

NATP-2 project usually leads to conservation and improvement of biodiversity, mangrove ecosystems, agro-forestry, water management, climate change impacts, methane emission and its mitigation options, low carbon farming technique, improvement of soil quality & soil health, food safety associated with environmental conservation. However, such positive effects might be limited unless the conservation of environmental issues is ensured. In addition, when managing the displacement of emissions, one must ensure that non-forest ecosystems (or low-carbon forests) with high value of biodiversity and ecosystem services are not converted to other land-use. Environmental conservation and improvement related activities have been introduced and implemented under the project which could be considered as useful. Diverse measures are adopted to address negative impacts under NATP-2 project environmental safeguards, and they were considered in close relationship with social safeguards, especially for matters involving indigenous peoples and members of local communities.

3.7 Enhancing positive impacts

Unlike other items of the environmental and social safeguards encourage the enhancement of social and environmental benefits. Avoid negative impacts while enhancing positive impacts in the NATP-2 project seems demanding. However, NATP-2 project has the potential to achieve both carbon and non-carbon benefits simultaneously. Environmental benefits can be promoted by preferentially practicing of Environmental Management Framework (EMF); Environmental Assessment (EA); Environmental Management Process and the good agricultural practices.

3.8 Monitoring of environmental safeguards

Monitoring is being implemented of project activities through collecting relevant information and other is needed for implementing environmental and social safeguards activities in order to adaptive manage-

ment of NATP-2 projects and environmental and social safeguards compliance. In particular, safeguard monitoring is being made whether project activities are bringing positive rather than negative impacts to the identified conservation targets as planned.

4. Conclusion

The overall performance of gender integration, environmental and social safeguards compliance in NATP-2 project is satisfactory. The details gender analysis recognized the active participation and leadership role of women across the project which leads to promotion of gender equality and women's empowerment in the NATP-2 project. The program and interventions of National Agricultural Technology Program-Phase II (NATP-2) project have significant impact on environmental safeguards compliance in terms of environmental conservation and improvement of the marginal farmer including the women and ethnic peoples. Appropriate measures in consideration of environmental and social benefits in conjunction with NATP-2 project activities are planned and implemented accordingly. Environmental and social safeguards compliance in respect to benefits can also be promoted by preferentially practicing of Environmental Management Framework (EMF); Environmental Management Process, good agricultural practices and the Social Management Framework.

Annexure 1: GENDER PARTICIPATION MATRIX

1. Project Beneficiaries									
Total Beneficiaries			Women Beneficiaries		Ethnic Beneficiaries		Ethnic women beneficiaries		
			Total CIG	% of women beneficiaries	Number of Ethnic CIG	% of total beneficiaries	Total Ethnic women CIG	% of total ethnic CIG	% of total women CIG
CIG	DAE	695,700	234,440	33.70	8,906	1.28	3,710	41.66	1.58
	DoF	105,640	37,397	35.40	1,127	1.07	385	34.16	1.03
	DLS	207,750	92,337	44.45	2,691	1.30	1,614	59.98	1.75
	Total	1,009,090	364,174	36.09	12,724	1.26	5,709	44.87	1.57
PO	DAE	1,800	137	7.61	60	3.33	27	45.00	19.71
	DoF	17,400	5,756	33.08	61	0.35	16	26.23	0.28
	DLS	3,600	1,056	29.33	36	1.00	27	75.00	2.56
	Total	22,800	6,949	30.48	157	0.69	70	44.59	1.01

2. Training Client Days								
Total training Client days	Women client days in training			Ethnic client days in training		Ethnic women client days in training		
	Total client days	% of total client days	Total client days	% of total client days	Total client days	% of total client days	% of total ethnic training client days	
DAE	2,389,020	757,832	31.72	9,798	0.41	1,231	0.16	12.56
DoF	647,325	216,598	33.46	6,346	0.98	1,913	0.88	30.14
DLS	818,097	333,725	40.79	10,319	1.26	6,147	1.84	59.57
Total/Average	3,854,442	1,308,155	33.94	26,463	0.69	9,291	0.71	35.11

3. Participation in Technology Demonstration											
Total CIG participants in technology demonstration		Women CIG participants			Ethnic CIG participants in technology demonstration			Ethnic women CIG participants in technology demonstration			
		Total	% of total	% of total women CIG	Total	% of total	% of total ethnic CIG	Total	% of total	% of total	% of total
DAE	146,094	56,717	38.82	24.19	6,469	4.43	72.64	3,050	5.38	47.15	82.21
DoF	23,535	3,356	14.26	8.97	324	1.38	28.75	107	3.19	33.02	27.79
DLS	28,899	13,361	46.23	14.47	405	1.40	15.05	258	1.93	63.70	15.99
Total/Average	198,528	73,434	36.99	20.16	7,198	3.63	56.57	3,415	4.65	47.44	59.82

4. Participation in Technology Adoption											
Total CIG Adopter		Technology adoption by women CIG farmer			Technology adoption by Ethnic CIG farmer			Technology adoption by Ethnic women CIG farmer			
		Total	% of total	% of total	Total	% of total CIG adopter	% of total Ethnic	Number of women adopter	% of total women adopter	% of total ethnic adopter	% of total ethnic women
DAE	417,550	151,381	36.25	64.57	8,631	2.07	96.91	3,602	2.38	41.73	97.09
DoF	63,736	19,418	30.47	51.92	550	0.86	48.80	89	0.46	16.18	23.12
DLS	153,565	65,964	42.96	71.44	1,875	1.22	69.68	1,001	1.52	53.39	62.02
Total/Average	634,851	236,763	37.29	65.01	11,056	1.74	86.89	4,692	1.98	42.44	82.19

5. Participation in Exposure visit											
Total CIG participants in exposure visit		Participation of women CIG in exposure visit			Participation of ethnic CIG in exposure visit			Participation of ethnic women CIG in exposure visit			
		Total	% of total	% of total women CIG	Total	% of total	% of total ethnic CIG	Total	% of total	% of total	% of total ethnic women CIG

DAE	33,750	11,812	35.00	5.04	850	2.52	9.54	161	1.36	18.94	4.34
DoF	7,695	738	9.59	1.97	134	1.74	11.89	25	3.39	18.66	6.49
DLS	30,779	10,478	34.04	11.35	423	1.37	15.72	252	2.41	59.57	15.61
Total/Average	72,224	23,028	31.88	6.32	1,407	1.95	11.06	438	1.90	31.13	7.67

6. Participation in Field days (CIG and non-CIG)

Total field day participants	Participation of women farmer in field days		Participation of ethnic farmer in field days		Participation of ethnic women farmer in field days		
	Total participants	% of total participants	Total participants	% of total participants	Total participants	% of total women participants	
DAE	1,274,160	445,956	35.00	960	0.08	265	0.06
DoF	1,529,775	385,974	25.23	9,791	0.64	1,467	0.38
DLS	895,525	367,165	41.00	9,134	1.02	4,750	1.29
Total/Average	3,699,460	1,199,095	32.41	19,885	0.54	6,482	0.54

7. Access to FIAC services (CIG and non-CIG)

Farmers' access to FIAC services	Women farmer's access to FIAC		Ethnic farmer's access to FIAC services		Ethnic women farmer's access to FIAC services			
	Total	% of total	Total	% of total	Total	% of total ethnic participants	% of total women participants	
DAE	6,662,310	2,331,808	35.00	65,906	0.99	5,527	8.39	0.24
DoF	622,464	6,223	1.00	9,791	1.57	1,467	14.98	23.57
DLS	1,565,886	328,836	21.00	15,346	0.98	6,905	45.00	2.10
Total/Average	8,850,660	2,666,867	30.13	91,043	1.03	13,899	15.27	0.52

8.1: Access to CIG in Leadership

Total CIG leader	Women CIG farmer leader			Ethnic CIG farmer leader			Ethnic women CIG farmer leader				
	Total	% of total	% of total women CIG	Total	% of total	% of total Ethnic CIG	Total	% of total women leader	% of total ethnic leader	% of total ethnic women CIG	
DAE	256,743	111,028	43.24	47.36	4,110	1.60	46.15	1,426	1.28	34.70	38.44
DoF	52,554	7,830	14.90	20.94	545	1.04	48.36	131	1.67	24.04	34.03
DLS	77,328	16,257	21.02	17.61	857	1.11	31.85	508	3.12	59.28	31.47
Total/Average	386,625	135,115	34.95	37.10	5,512	1.43	43.32	2,065	1.53	37.46	36.17

8.2: CIG farmer in EC											
Total EC member		Women CIG farmer in EC			Ethnic CIG farmer in EC			Ethnic women CIG farmer in EC			
		Total	% of total	% of total women CIG	Total core ethnic EC	% of total EC	% of total Ethnic CIG	Total core ethnic women EC	% of total	% of total ethnic EC	% of total ethnic women CIG
DAE	244,350	80,685	33.02	34.42	2,880	1.18	32.34	1,008	1.25	35.00	27.17
DoF	47,538	7,452	15.68	19.93	430	0.90	38.15	104	1.40	24.19	27.01
DLS	72,738	15,087	20.74	16.34	618	0.85	22.97	373	2.47	60.36	23.11
Total/Average	364,626	103,224	28.31	28.34	3,928	1.08	30.87	1,485	1.44	37.81	26.01

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8.3: CIG farmer in Core Leadership											
Total core CIG leader		Women CIG farmer in Core Leadership			Ethnic CIG farmer in Core Leadership			Ethnic women CIG farmer in Core Leadership			
		Total	% of total	% of total women CIG	Total core ethnic leader	% of total core leader	% of total Ethnic	Total core ethnic women leader	% of total	% of total ethnic leader	% of total ethnic women CIG
DAE	108,600	35,864	33.02	15.30	1,284	1.18	14.42	448	1.25	34.89	12.08
DoF	21,238	1,467	6.91	3.92	199	0.94	17.66	23	1.57	11.56	5.97
DLS	32,328	5,406	16.72	5.85	266	0.82	9.88	153	2.83	57.52	9.48
Total/Average	162,166	42,737	26.35	11.74	1,749	1.08	13.75	624	1.46	35.68	10.93

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8.4: CIG in Social Leadership											
Total social leader		Women CIG farmer in social Leadership			Ethnic CIG farmer in social Leadership			Ethnic women CIG farmer in social Leadership			
		Total	% of total	% of total	Total	% of total	% of total Ethnic CIG	Total	% of total	% of total ethnic leader	% of total ethnic women CIG
DAE	12,393	3,445	27.80	1.47	267	2.15	3.00	82	2.38	30.71	2.21
DoF	5,016	378	7.54	1.01	115	2.29	10.20	27	7.14	23.48	7.01
DLS	4,590	1,170	25.49	1.27	239	5.21	8.88	135	11.54	56.49	8.36
Total/Average	21,999	4,993	22.70	1.37	621	2.82	4.88	244	4.89	39.29	4.27

8.4.1: CIG in up member

Total UP member		Women UP member			Ethnic CIG farmer in UP member			Ethnic women CIG farmer in UP member			
		Total	% of total	% of total women CIG	Total UP member	% of total UP member	% of total Ethnic CIG	Total	% of total UP member	% of total ethnic UP member	% of total ethnic women CIG
DAE	5,150	1,521	29.53	0.65	57	1.11	0.64	20	1.31	35.09	0.54
DoF	791	151	19.09	0.40	12	1.52	1.06	4	2.65	33.33	1.04
DLS	450	135	30.00	0.15	32	7.11	1.19	17	12.59	53.13	1.05
Total/Average	6,391	1,807	28.27	0.50	101	1.58	0.79	41	2.27	40.59	0.72

8.4.2: CIG in Social organization

Total organizational leader	Organizational leadership of women	Organizational leadership of ethnic	Organizational leadership of ethnic women
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	Total	% of total	% of total women CIG	Total	% of total organizational leader	% of total Ethnic CIG	Total	% of total	% of total	% of total ethnic women CIG	
DAE	7,243	1,924	26.56	0.82	210	2.90	2.36	62	3.22	29.52	1.67
DoF	4,225	227	5.37	0.61	103	2.44	9.14	23	10.13	22.33	5.97
DLS	4,140	1,035	25.00	1.12	207	5.00	7.69	118	11.40	57.00	7.31
Total/ Average	15,608	3,186	20.41	0.87	520	3.33	4.09	203	6.37	39.04	3.56

9. Access to commodity marketing

9.1 Access to CCMC/PO services for commodity marketing

Farmers' access to CCMC/PO services	Women's access to CCMC/PO		Ethnic farmer's access to CCMC/PO			Ethnic women farmer's access to CCMC/PO			
	Total women seller	% of total seller	Total Ethnic seller	% of total seller	% of total Ethnic farmer	Number of ethnic women seller	% of total ethnic seller	% of total women seller	
DAE	3,567	177	4.96	118	3.31	1.32	42	1.12	23.73
DoF	7,703	1,665	21.61	0	-	-	0	-	-
DLS	198	41	20.71	0	-	-	0	-	-
Total/ Average	11,468	1,883	16.42	118	1.03	0.93	42	0.79	2.23

9.2 Volume (MT) of commodity sold through CCMC/PO

Volume (MT) of commodity	Volume (MT) sold by women		Volume (MT) sold by ethnic CIG		Volume (MT) sold by ethnic women			
	Total	% of total	Total volume	% of total	Total	% of total	% of total	
DAE	24,632	149	0.60	723	2.93	29	0.12	3.98
DoF	4,530	554	12.23	0	-	0	-	-
DLS	3,210	642	20.00	0	-	0	-	-
Total/ Average	32,372	1,344	4.15	723	2.23	29	0.09	3.98

10. Access to Matching Grant

10.1 Awarded of AIF-2 sub-project

Total AIF-2 sub-project awarded	Total AIF-2 sub-project awarded by women CIG		Total AIF-2 sub-project awarded by ethnic CIG		Total AIF-2 sub-project awarded by ethnic women CIG			
	Total awarded	% of total awarded	Total awarded	% of total awarded	Total awarded	% of total awarded	% of total awarded by ethnic	
DAE	1,314	406	30.90	45	3.42	10	0.76	22.22
DoF	699	0	-	0	-	0	-	-
DLS	344	21	6.10	2	0.58	0	-	-
Total/ Average	2,357	427	18.12	47	1.99	10	0.42	21.28

10.2: Access to AIF-3 sub-project

Total AIF-3 sub-project awarded	Total AIF-3 sub-project awarded by women CIG		Total AIF-3 sub-project awarded by ethnic CIG		Total AIF-3 sub-project awarded by ethnic women CIG			
	Total awarded	% of total awarded	Total awarded	% of total awarded	Total awarded	% of total awarded	% of total awarded by ethnic	
DAE	238	28	11.76	7	2.94	0	-	-
DoF	208	19	9.13	5	2.40	1	0.48	20.00
DLS	104	11	10.58	0	-	0	-	#DIV/0!
Total/ Average	550	58	10.55	12	2.18	1	0.18	8.33

Annex 2: Implementation plan of Pest Management Plan (PMP)

#	Activity	Time schedule	Responsibility for implementation	Monitoring
1	Campaign, motivation & awareness development	Before each cropping season	DD-DAE/ UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
2	Displaying PMP at FIACs/Union arisad offices & focusing to the visiting farmers	Before each cropping season	SAAO	AD/DD-DAE/NATP-2, DAE/UAO
3	Enhancing use of pest & disease resistant varieties	At the very beginning of cropping seasons	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
4	Avoid application of over dose urea & encourage balanced fertilizer dose	At cropping seasons	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
5	Using pest & disease-free seeds/planting materials	At the beginning of cropping seasons/planting time	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
6	Using insect-pest & disease-free organic matters	At land preparation	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
7	Practicing IPM	All through crop cycle	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
8	Controlling pests immediate to infestation & stop outbreak	Standing crop condition	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
9	Discouraging indiscriminate use of inappropriate pesticides	Year round	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
10	Stop use of unregistered & hazardous pesticides	All through cropping season	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
11	Sanitation in crop fields	Cropping seasons/Crop harvest	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
12	Enhancing sex pheromone trap/color cards in vegetable fields	Cropping seasons	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
13	Encouraging bio-pesticides	Cropping seasons	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
14	Removing infested crop plants/plant parts	Standing crop condition	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
15	Burning infested crop plants/crop debris	In field condition	UAO/SAAO	AD/DD-DAE/NATP-2, DAE/UAO
16	Conducting pest surveillance & awareness development	Standing crop condition	SAAO	AD/DD-DAE/NATP-2, DAE/UAO

Annex 3: Format: Determining Extent of Adoption of Good Aquaculture Practices

Name of district:	Name of Upazila:	
Name of the CIG:	Grade of the CIG (A/B/C):	
Total number of members in the CIG:		
Total number of CIG members present at the Focus Group Discussion:		
SI No.	Parameters of Good Aquaculture Practices	Response
1.	Number of respondents protected ponds from inflow of polluted water	
2.	Number of respondents removed sediments from the pond bottom during dry season	
3.	Number of respondents removed weeds from the pond before stocking	
4.	Number of respondents tested pond water quality before stocking	
5.	Number of respondents stocked healthy fish seed from a reliable supplier	
6.	Number of respondents removed dead fish away from the pond if any	
7.	Number of respondents avoided use of unapproved chemicals to maintain fish health	
8.	Number of respondents tested pond water quality after stocking	
9.	Number of respondents used aerator in the pond	
10.	Number of respondents used lime to maintain pond water quality after stocking	
11.	Number of respondents used dry net for harvesting fish	
12.	Number of nursery operators adopted bio-safety measures	
13.	Total quantity of fish harvested (Kg)	
14.	Quantity of harvested fish washed using clean water (Kg)	
15.	Quantity of harvested fish kept in clean containers after washing (Kg)	
16.	Quantity of live fish sold (Kg)	
17.	Quantity of harvested fish packed with ice for long distance market (Kg)	

FGD conducted by: Designation: Date:

Annex 4: Format: Environmental Management Plan (EMP) of the Demonstration Pond

Identify mitigation/Enhancement measures Tick (✓) all required measures	Implementation schedule	Budget	Monitoring frequency
1. Location of fish farm (ponds and wetlands) to be approved by the relevant LEAF & CIG members for avoiding obstruction of flow of canals, and contaminating surrounding water bodies.			
2. Households waste disposal practice properly surrounding demo ponds			
3. Raise and maintenance of pond dike			
4. Use of permitted chemicals and antibiotics in recommended doses.			
5. Selection of improved varieties that does not pose any threat to local species.			
6. Pond side turning done to manage erosion and to stop water intrusion from surrounding agricultural land			
7. Any other, mention:			

Prepared by

Name:

Designation:

Signature):

Date:

Reviewed and Approved by

Name:

Designation:

Signature):

Date:

Annex 5: Format: Limited Environmental Assessment of Demonstration Pond

General information of CIG

Name of CIG:..... Union:.....Upazila:..... District.....

Name of technology for demonstration:

Tick (✓) likely impacts during implementation of demonstration

1. Demonstration pond obstructing/ interfering flow of surrounding water (e.g. canals, wetlands etc.)
2. Demonstration pond pollution due to polluted surrounding water bodies
3. Demonstration pond pollution due to adverse effect of flood
4. Demonstration pond pollution due to use of chemical feeds, fertilizers and antibiotics
5. Loss of native fish diversity and aquatic diversity due to introduction of new and improved species
6. Demonstration pond pollution due to disposal of wastes from surrounding households
7. Demonstration pond pollution due to intrusion of water from surrounding agricultural land
8. Any other, mention:

Assessed by

Name:

Designation:

Signature):

Date: