Final Evaluation Report of

Agriculture and Food Security (AFSP III) Project of SID-CHT

August 2022

D M WATCH

UNDP

Acknowledgment

The final evaluation team would like to thank the many individuals who contributed their time, expertise, observations, and experiences in support of this evaluation and who provided valuable feedback. Numerous contributors at the national, district, Upazila, and union levels enriched the evaluation with their insightful contributions. The team would like to express its sincere appreciation to the United Nations Development Programme (UNDP), Agriculture and Food Security (AFSP III) team, and officials at the Local Government Institutions who helped obtain a clear understanding of the national perspective. In addition, the project team would like to thank the representatives of three Hill District Councils (HDC) for their assistance throughout the research.

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The Union Parishad (UP) Chairman, the UP Members, and the UP Secretary made the survey team and evaluation process run smoothly through their generous contributions. With their assistance, the field team could readily identify project locations and examine the project intervention in detail.

Last but not least, the research team extends its deepest appreciation to every respondent who generously contributed their time to ensure the evaluation's success.

Project and evaluation information details

Project/outcome Information		
Project/outcome title	Agriculture and Food Security Project (AFSP)	
Atlas ID	00094983	
Corporate outcome and output	**Outcome 1**: Agricultural productivity of female and male marginal and small farm households increased and diversified through IFM-FFS in the Chittagong Hill Tracts **Output**: a. Community groups and stakeholders mobilized through establishment of IFM-FFS b. IFM-FFS Curricula Developed and Promoted c. Knowledge and skills of CHT stakeholders [Master trainers, FFS Facilitators, Government of Bangladesh (GoB) Officers] enhanced d. IFM-FFS implemented through participatory and learning by doing approach e. Access to market linkages promoted and facilitated **Outcome 2**: Hill District Councils are managing transferred agricultural services in line with the CHT Peace Accord **Output:** Coordination enhanced and HDC strengthened to manage transferred agriculture services and monitor Local Resilience Plans	
Country	Bangladesh	
Region	Chittagong Hill Tracts (CHT)	
Date project document signed	15/07/2018	
Project dates	**Start**	**Planned end**
	01 January 2018	30 June 2021
Total committed budget	**DKK 37 million**	
Project expenditure at the time of evaluation	**DKK 37 million**	
Funding source	**DANIDA**	
Implementing party[1]	**Ministry of Chittagong Hill tract Affairs (MoCHTA)**	

[1] This is the entity that has overall responsibility for implementation of the project (award), effective use of resources and delivery of outputs in the signed project document and workplan.

Evaluation information		
Evaluation type (project/ outcome/thematic/country programme, etc.)	Agriculture and Food Security Project (AFSP III)	
Final/midterm review/ other	Final Evaluation	
Period under evaluation	**Start**	**End**
	2018	2022
Evaluators	DM WATCH	
Evaluator email address	disastermanagementwatch@gmail.com	
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List of acronyms and abbreviations

AFSP	Agriculture and Food Security Project
AGEP	Agricultural Growth and Employment Programme
APU	Agricultural Planning Unit
BARI	Bangladesh Agricultural Research Institute
BDT/Tk	Bangladeshi Taka
BTOR	Back to Office Report
CARP	Community Aquaculture Resource Person
CBO	Community Based Organization
CHT	Chittagong Hill Tracts
CHTDF	Chittagong Hill Tracts Development Facility
CHTRC	CHT Regional Council
CLW	Community Livestock Worker
CPW	Community Poultry Worker
DAE	Department of Agricultural Extension
DANIDA	Danish International Development Agency
DFO	District Fisheries Officer
DFFSEs	District Farmer Field School Experts
DKK	Danish Kroner
DLS	Department of Livestock Services
DO	District Officer
DoF	Department of Fisheries
DWG	District Working Group
FA	Field Assistant
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FF	Farmer Facilitator
FFS	Farmer Field School
GoB	Government of Bangladesh
HDC	Hill District Council

HH	Household
IFM	Integrated Farm Management
IFM-FFS	Integrated Farm Management-Farmer Field School
IFMC	Integrated Farm Management Component
M&E	Monitoring & Evaluation
MLI	Market Linkage Initiatives
MoA	Ministry of Agriculture
MoCHTA	Ministry of Chittagong Hill Tracts Affairs
MoFL	Ministry of Fisheries and Livestock
MT	Master Trainer
NGO	Non-Government Organization
PDC	Para Development Committee
PNDG	Para Nari (women) Development Group
SAAO	Sub-Assistant Agriculture Officer
SID-CHT	Strengthening Inclusive Development in Chittagong Hill Tracts
SLL	Season Long Learning
TAC	Technical Advisory Committee
ToT	Training of Trainers
UMS	Urea Molasses Straw
UN	United Nations
UNDP	United Nations Development Programme
USD	United States Dollar
UzDCC	Upazila Development Coordination Committee
VFA	Veterinary Field Assistant

Executive summary

Evaluation Background and Objectives

Agriculture and Food Security Project has been running in the Chittagong Hill Tracts since 2010. The project ran in three phases: AFSP I from 2010 to 2013, AFSP II from July 2013 to December 2017, and AFSP III from February 2018 to June 2021. In this project, Chittagong Hill Tracts Development Facility-UNDP and three Hill District Councils worked together to establish and run Farmer Field Schools (FFS).

The current study evaluated the AFSP III project that covered 23 Upazilas in CHT (4 in Bandarban, 9 in Khagrachari, and 10 in Rangamati). To reduce geographical challenges and improve communication and logistics, the study team conducted the study in ten Upazilas under the three districts.

The overall objective of the evaluation was to document achievements and analyse the outcomes and impact of the AFSP III project since 2018. Based on the findings, the study team prepared recommendations for future programmes. This evaluation study followed a mixed-method approach, combining qualitative and quantitative methods of investigation. A stratified random sampling technique was used to collect the quantitative data. The data were collected from 16 March to 29 March 2022. A total of 1,552 quantitative household surveys (Treatment=1027, Control=525) were carried out with farmers. To collect qualitative data, the evaluation team conducted focus group discussions and interviewed government stakeholders and project officials.

Key Findings from the Evaluation

Relevance

The updated 2016 National Agricultural Extension Policy emphasized the importance of effective communication with farmers and the importance of punctuality, and a bottom-up approach. Working with farmer groups is one of the Department of Agricultural Extension's (DAE) 'Revised Extension Approach' principles. The approach allows the extension service to reach many farmers at once. One of the DAE's extension methods is establishing farmer's field schools. DAE headquarters usually help set up and run farmer's field schools. They are usually organized to help introduce new technology into a national programme. The AFSP III project is structured to align with the updated National Agricultural Extension Policy. To provide agricultural extension services to the poor and marginalized farmers living in remote hills, approaches must consider their agricultural culture, lifestyle, social systems, ecology, land use, and agricultural environment. AFSP III recognized the scenario and assigned HDCs to improve project efficiency and effectiveness. AFSP III was designed to align with the Agriculture Ministry's national targets and SDG goals.

The Bangladesh country programme of UNDP was designed to help implement Bangladesh's 8th Five-Year Plan (2021-2025) inclusively and sustainably. The Country Programme aimed to help Bangladesh address challenges related to “Agricultural Growth and Employment” by improving skills, organisation, and market access. The focus is on marginal and small farm households. At least 50% of the target group was female. The AFSP III outcomes included increased agricultural growth and employment, capacity-building activities, and market linkages.

Effectiveness

Outcome 1: Agricultural production of female and male marginal and small farm households increased and diversified through IFM-FFS in the CHT

Indicator 1.1: % Increase in yields and production of beneficiary households

To examine the percentage increase in yields and production of treatment households, the yield and production of grains, vegetables and spices, fruits, milk, eggs, meat, fish, cows, goats, and pigs are calculated.

Yield of grains, vegetables, and fruits

The average increase of yield for the grains (rice, wheat and maize) was around 1410 kg/ha (endline treatment compared to baseline treatment). In this study, the farmers from the beneficiary group had 2.3 times higher yields than the farmers from the control group.

Compared to the baseline average, around 68.2 percent of beneficiary household had increased vegetable yields and production with an average yield of 5.4 ton/ha. The achievement of yield increase of vegetables exceeded the LF target (40%). For the beneficiary farmers, the yield of all types of vegetables have increased. Increasing number of farmers was found to be engaged in vegetable cultivation as much land is not required and the project provided training for homestead gardening to the beneficiary farmers.

The achievement of yield for beneficiary farmers' increase of fruits exceeded the LF target (30%) with an average of 57 percent increase in yields of fruits. Identifying beneficial and harmful insects for the production of fruit is one of the primary factors influencing fruit production.

Production of milk, egg, meat, and fish production

Production of milk (in liter) and chicken egg (in number) increased significantly compared to the baseline production. Compared to the baseline average, around 49 percent of the beneficiary households had increased production of cow milk with an average of 393 Litre/hh. In terms of quantity, milk production per household increased from 150 liters to 393 liters. In the baseline average production of chicken egg was 80 no./hh, around 44 percent of the households had increased production of chicken eggs with an average of 231 No/hh. According to the beneficiaries, many illnesses among the husbandry animals have become less frequent and less common. In the baseline average production of chicken meat was 24.3 kg/hh, about 20 percent of the households increased production of chicken meats with average being 17.2 kg/hh. The control group farmers produced 12.34 kg of chicken meat on average.

Compared to the baseline average of 4.5 kg/decimal fish production, around 100 percent of the beneficiary households had increased production of fish with an average of 26.34 kg/decimal. The production of fish by beneficiary farmers exceeded the LF target (50%).

Cow, goat, and pig

Compared to the baseline average of 3.2 No/hh, around 48 percent of the beneficiary households had increased rearing of goat with an average of 3.92 No/hh. On the other hand, around 6 percent of the beneficiary households had increased pig rearing from the baseline with an average of 1.74 No/hh. In almost all cases (cross cow, goat, and pig), the average number of animals (cow, goat, and pig) per household was higher for beneficiary farmers than control farmers.

Indicator 1.2: % HH intake of diversified nutritious food

From the findings it becomes apparent that the project had a good positive impact on the food security of the beneficiary households. Most households (99%) consumed at least 5 food groups, which included milk, cereals, pulses, vegetables and tubers. The mean average of the Household Dietary Diversity Score (HDDS) was 8. In addition, Household Food Consumption Score (HFCS), showed that the majority of the beneficiary households had adequate levels of food consumption. Most of the beneficiary household's (92%) food consumption level was found to be on an acceptable range (above 35) according to their food consumption score. The end line results show 15.8 percent increase beneficiary households with average per capita per day calorie intake of 2204. According to Household Income and Expenditure Survey of 2010 the national average per capita per day

calorie consumption is 2318.3 Kcal. The findings showed that the average per capita per day calorie consumption of the beneficiary households of AFSPIII was 2204 Kcal and 2336 Kcal for the control households.

In the context of Bangladesh, a calorie threshold of 2122 Kcal is used for determining absolute poverty, 1805 Kcal is used for hard core poverty and 1600 Kcal is used for ultra-poverty (suggested by FAO). Among the beneficiary households, about 41 percent had food consumption level over the poverty line. The calorie intake for the control group household was 2336.

Indicator 1.3: % of beneficiary HH in target communities with increased access to decentralized extension

Support received from Government Line Departments

Around 67 percent of the beneficiary households had increased access to government extension services (necessary support 68%, training support 65%, technical support 69%) while around 5.8 percent control farmers have received support from government extension services. Beneficiary farmers from Rangamati have received most of the necessary support from two departments (DoF and DLS) compared to the other two districts. Majority of respondents (65.2%) received technical assistance from one of the three government line departments. DAE (63.5%) and DLS (39.4%) provided most of the technical support to beneficiary farmers among three departments.

Indicator 1.4: % of HH which adapted climate resilient technology

The AFSP III delivered around 75 agricultural technologies through Farmer Field School. Among the beneficiary farmers, 98.2 percent of them had adopted at least one of the climate resilient technology. On the other hand, among the control group farmers, 65.2 percent of them had adopted at least one of the climate resilient technology.

Indicator 1.5: % of GoB Line Department offers that provided follow up support

Around 64.1 percent of the beneficiary farmers received follow-up from any of the three Government line departments. All three districts received most of the follow-up support from DAE (Bandarban- 81.3%, Rangamati- 67.8%, and Khagrachari- 31.3%). DoF provided the least follow-up support compared to the other two departments in all three districts. It is also noticeable that most of the beneficiary farmers from the Khagrachari district (64.3%) did not get follow-up support from the government line departments.

Assistance received from the service providers

Overall, it is found that 89.7 percent of the beneficiary farmers (N=728) received assistance from Community Livestock Workers (CLW). Beneficiary farmers from all three districts received assistance from CLW. On the other hand, control farmers from Rangamati (94.1%) and Khagrachari (68.4%) received the most assistance from CLW. Rangamati farmers reported to have received assistance from Community Poultry Workers (CPW).

Output 1.5 Access to market linkages (Input-output) promoted and facilitated

Access and satisfaction with quality agricultural inputs

In AFSP III, 349 FFS communities and 282 non-FFS communities were connected to 104 collection points. Around 50 percent of beneficiary farmers had access to quality agricultural inputs. Where else. only 6 percent of control farmers have access to quality agricultural inputs. On the other hand, almost all control farmers from all three districts did not have access to quality agricultural inputs. About 74.5 percent of beneficiary farmers were very satisfied with the quality of agricultural inputs.

Output 1.1 Community groups and stakeholders mobilized through the establishment of IFM-FFS

A total of 998 IFM-FFS were formed and established, with a total of 26,505 farmers participating (M: 10,035; F: 16,470). Women participated at a rate of 62 percent. The formation and establishment of IFM-FFS include

mobilization meetings with each community's farmers, primary listing of interested farmers, resource mapping, assessing farmers' farming needs, finalizing the list of interested farmers, developing curricula, and conducting sessions for 15 months.

Output 1.2 IFM-FFS Curricula Developed and Promoted

One curriculum and 11 different types of learning modules (60 sessions) were developed which included preparatory work, vegetable gardening, fruit gardening, rice cultivation; poultry and pig rearing; cattle rearing; pond/creek fish culture; marketing; nutrition; and high-value crops.

Output 1.3 Knowledge and skills of CHT stakeholders [Master trainers, FFS Facilitators, Government of Bangladesh (GoB) Officers enhanced

The project strengthened the capacity of relevant stakeholders to enhance service quality, knowledge and skill development, and to increase their understanding of how to conduct project interventions smoothly. A total of 187 GoB line department officers were trained in seven batches on IFM-FFS implementation and monitoring, after which they visited IFM-FFS communities for follow-up. This evaluation did not conduct a survey of GoB line department officers due to the evaluation team's difficulty in reaching all trained CHT stakeholders. There was a time constraint, and the scope of the study precluded this as well.

Output 1.4 IFM-FFS implemented through participatory and' learning by doing approach

Around 92 percent of the people who took part in the IFM-FFS have graduated, with 59 percent of them being women and 41 percent being men. In addition, 92 percent of the participants of IFM-FFS shared the learnings with their family (86%), relatives (96%), neighbours (96%), other community members and friends (28%).

Outcome-2: Hill District Councils (HDC) are managing transferred agricultural services in line with CHT Peace Accord

The outcome focuses on strengthening the HDCs' capacity to manage agricultural services decentralized through the CHT Peace Accord and subsequent legal reforms - the Peace Accord transfers 33 functions and powers to the HDCs, including agricultural services. Although extension departments and other line departments have been formally transferred to Hill District Councils, head offices in Dhaka continue to manage resources. There were four district working group meetings held during the project period. These meetings expedite agricultural activities through a variety of decisions.

Efficiency

To be efficient, an intervention must deliver results in an economical and timely manner, as defined by the OECD/DAC Network on Development Evaluation. To calculate the costs of AFSP III, it was first necessary to decide which costs to include. According to the AFSP III's completion report, the project's budget was DKK 37 million (USD 5.75 million, 468 million BDT), which was received in four stages. The project established 998 Integrated Farm Management-Farmer Field Schools (IFM-FFS) and covered 26,505 farmers (female-16,470, male- 10,035; 62% women). However, 200 FFS were reduced from 2020 target (1200 FFSs) due to COVID-19 pandemic. Over 40,000 people supported during the COVID-19 pandemic.

Following an examination of the four-year AFSP implementation period, the average yearly gain in total income for FFS members was BDT 4596, according to the findings (from BDT 128206 to BDT 132802). The agricultural net income is increased by 9 percent last year while the income from non-agricultural sector decreased by 35 percent. Overall, the yearly net income of beneficiary farmers climbed by 4 percent, expressed as a proportion of their total annual revenue.

The AFSP III project completed on time and on budget, according to the final report. From qualitative data, the study discovered that some stakeholders indicated a budget deficit and that the project's outcomes might not be sustainable within this budget. Concerning the project's timeliness, the study's findings indicate that the majority of activities were completed on time.

Sustainability

Sustainability is the continuation of a development intervention's benefits after major development assistance has ended. AFSP III closely aligns with GoB policies. Aspects of the AFSP are also implemented by the UNDP in collaboration with HDCs under the MoCHTA, with GoB line departments, including DAE, providing trainers and technical support. Instilling a sense of ownership among stakeholders is critical to fostering sustainability. Stakeholder ownership is the act or degree of relevant actors and beneficiaries taking ownership and responsibility for any initiatives or activities undertaken by stakeholders. Ownership entails accountability for any programmes that empower relevant actors and beneficiaries. Local elites could institutionalize farmer groups. The project supervises and monitors. Illegal logging, which increases slope erosion, hurts CHT farmers. Better communication between residents, business owners, and community leaders, and threat assessments, reduced risks.

Coherence

To ensure the coherence of key stakeholders, the project team organized an introductory program and met with all stakeholders at the start of the project and again at the conclusion. They encountered a variety of issues throughout the project's development phase, such as land disputes and political issues, but they have managed to overcome the challenges through strengthening internal coordination and building synergies with key stakeholders.

Impact

The output level findings indicated that the project had a beneficial impact on the lives of individuals and communities. The project contributed to lots of positive and few negative changes to target beneficiaries, their communities, and duty bearers. In the identification and solution of problems regarding agricultural production, the farmers are now developing decision-making skills through the initiative of the project. As a result, agricultural production has increased. From the qualitative findings, it was found that farmers are utilizing unused or vacant land by using different types of seeds. For cultivating and sustaining the production, it is crucial to understand the importance of climate change, and how it is changing, so that we can prepare for the future. In the CHT hill tracts, people are becoming aware of climate change. The project has an impact on the lives of farmers and members of the community. However, there were no significant changes in policy as a result of this. Qualitative findings hinted no significant changes in institutional policy and practice.

The agriculture and food security (AFSP III) project had significant impact on the life of poor marginalized farmers of CHT. Farmers are now using modern and climate resilience agricultural technology for crops production. The project had also contributed to increase in knowledge of the farmers in fisheries and livestock sectors. Although the project has performed well to fulfil the targets according to its log frame, it had its shortcomings. This project focused more on agriculture than the other sectors like fisheries and livestock which have contributed to this shortcoming. The positives outcomes the project may sustain longer as the farmers shared their learnings with the other farmers who were not beneficiaries. To avoid over-reliance on government and non-governmental organisations (NGOs), the FFS programme should continue, but communities should be empowered, and farmers' participation should be increased.

1 Introduction

The Chittagong Hill Tract (CHT) is a place where 11 different ethnic groups reside. The Chakma, Marma, Pankho, Khumi, Lusai, Murong, Bonojog, Tanchanya, Khyang, Tripura, Mro these ethnic groups have more in common with other Sino-Tibetan people living in Myanmar and the Indian states of Tripura and Mizoram than with Bangalis (Bengalis), who make up the majority of Bangladesh's population[2].The CHT covers an area of about 13,344 sq km, approximately one-tenth of the total area of Bangladesh covering a population of 1.58 million. Throughout the early eighties as part of the countrywide administrative reforms the Chittagong Hill Tracts was divided into three individual districts. These are Rangamati, Khagrachhari and Bandarban districts[2]. For decades, ethnic conflict has raged in Bangladesh's Chittagong Hill Tracts, on the country's southeastern border. The conflict arose in response to *Pahari* demands for recognition and protection of their traditional territories and autonomy, as well as their opposition to government attempts to assimilate them into the Bengali dominant culture on the mainland[3].

With an objective to elevate the political, social, cultural, educational and financial rights and to accelerate the socio-economic development processes of all citizens in CHT, the National Committee on CHT and the *Parbatya Chattagram Jana Samhati Samiti* arrived at an agreement on 2 December 1997, which is called the Chittagong Hill Tracts Peace Accord, 1997. More than two decades of violence, which ended in a Peace Accord in 1997, have left the majority of its residents in extreme poverty. Furthermore, populations in the region are increasingly experiencing the effects of environmental and climate change on their livelihoods, including deforestation, landslides, seasonal water scarcity, soil erosion, and monsoon flash floods.

Throughout the previous decade, the Ministry of Chittagong Hill Tracts Affairs (MoCHTA) has implemented many projects in three Hill Districts in conjunction with UNDP and other Development Partners. These initiatives' principal interventions focused on improving community stability and assisting communities in developing resilience and collective action. This joint development effort has officially been accelerated through implementing the Strengthening Inclusive Development in CHT (SID-CHT) project. This project's primary outcome is “Citizen Expectations for voice, development, and accountability are met by strengthened institutions to deliver universal access to basic services”.

This outcome of this programme has been achieved through some distinct outputs those are Strengthened community land, resource, and livelihood management, increased participation and influence to shape decision-making, democratic governance strengthened with responsive institutions and effective services. Agriculture and Food Security Project (AFSP III) has been a major project that has been implemented to meet the outcomes of the SID-CHT programme.

1.1 The purpose of the evaluation

The main purpose of this evaluation was to collect the endline data/ information of the Agriculture and Food Security Project (AFSP III) to measure the most significant changes and results at the output/outcome level for beneficiaries, institutions, and communities with a focus on the overall implementation process and progress

[2] *Hossain, D. M. (2013). Socio-Economic Situation of the Indigenous People in the Chittagong Hill Tracts (CHT) of Bangladesh. Middle East Journal of Business, 8(2), 22–30. https://doi.org/10.5742/MEJN.2013.82231*

[3] *Amena Mohsin, The Politics of Nationalism: The Case of the Chittagong Hill Tracts, Bangladesh, Dhaka: University PressLimited, 1997 (Amena Mohsin, The Politics of Nationalism). See also Amena Mohsen the Chittagong Hill Tracts, Bangladesh: On the Difficult Road to Peace, International Peace Academy Occasional Paper Series, Lynne Rienner Publishers, 2003 (Mohsin, On the Difficult Road to Peace).*

towards project targets. The key findings of this evaluation will be used for future project design and policy implications at UNDP and the Government of Bangladesh.

1.2 Primary audience or users of the evaluation

The primary users of the evaluation results will be UNDP, but the evaluation results will equally be useful to relevant GoB ministries, development partners, and donors. In addition, UNDP will consider all useful findings, conclusions, and recommendations from the evaluation, prepare a systematic management response for each recommendation, and implement follow-up actions as per UNDP Evaluation Resource Center guidance/policies.

1.3 Project interventions under the evaluation

The evaluation assessed the progress of the AFSP project to date and it has evaluated the performance and accomplishments of the project, and the validity of its overall approach and quality; and provided recommendations for adjustments and lessons learned to inform the development of the next phase. The evaluation also places special emphasis on determining the project's contribution to gender equality, environmental protection, and governance strengthening.

The objective of the final evaluation is to critically assess and identify what has worked well in the project, what obstacles have been encountered, and what lessons have been learned to improve future programming. In addition to generating knowledge for broader application, assessing the feasibility of scaling up the current project, and serving as a quality assurance tool for both upward and downward accountability, the evaluation will generate knowledge for broader use.

This evaluation will provide credible, useful, evidence-based information that will allow UNDP and other key stakeholders to incorporate its findings, recommendations, and lessons into their decision-making processes in a timely manner.

1.4 Description of the intervention

Since 2010, a Danish International Development Agency (DANIDA)-funded Agriculture and Food Security Project was introduced in Chittagong Hill Tracts as a Phase-I or pilot project till 2013. The project is being implemented jointly by CHTDF-UNDP and three Hill District Councils, with the core program focusing on the establishment and execution of Farmer Field Schools (FFS)[4]. The project was extended as phase-II (AFSP- II) for five years from July 2013 to June 2017, benefitting a total of 59,045 poor and marginal farmers through 2,490 Farmer Field Schools (FFS) in 121 Unions of 26 Upazilas of 3 Hill Districts in the light of Integrated Farm Management and improved farming practices on crops, fruits, vegetables, spices, livestock and fish[5] . Afterwards, the AFSP III had been run from February 2018 to June 2021, with an aim to support 1,200 para/villages with a total coverage of 30,000 poor and marginal farm households covering 138,000 people in 3 CHT districts by gradually establishing 1,200 new FFS in 26 Upazilas[6].

The main objective of AFSP III was to increase pro-poor inclusive agricultural growth and sustainable employment creation for marginal and small farm households with enhanced Food Security in CHT and to enhance Hill District Councils' (HDCs) capacity to manage transferred agricultural services in line with CHT Peace Accord. There are two major outcomes of this project: i) increasing and diversifying agricultural productivity of

[4] Rhaman, C. M. A. (2018). *Impact of Farmer Field Schools on Farmer's Development under Agriculture and Food Security Project-II in Khagrachari Hill District, Bangladesh*. *5*, 9.

[5] *Agriculture and Food Security Project (AFSP)- III in Chittagong Hill Tracts*. (n.d.). 38

[6] *CHT Climate Resilience Project (CCRP), Bangladesh*. (n.d.). 27.

female and male marginal and small farm households through IFM-FFS in the Chittagong Hill Tracts and ii) managing transferred agricultural services in line with the CHT Peace Accord by Hill District Councils.

The AFSP III established 997 Integrated Farm Management – Farmer Field Schools with around 23,900 farmers (62% female) through mobilization and facilitation of Farmer Field School learning approach in respective communities. To run the IFM-FFS properly, the project has developed 333 new Farmer Facilitators and 28 Master Trainers. The project has also produced 11 modules comprising 60 sessions, including preparatory, vegetable gardening, fruit gardening, rice cultivation, poultry rearing, pig rearing, cattle rearing, fish culture in pond/creek, marketing, nutrition and high-value crop modules.

To engage the government line department with the project, GoB line department officials were trained on AFSP III and FFS implementation. The project also arranges regular monitoring visits of the GoB line department officials to look after the project initiatives after the project period.

Along with the production increase, the project has also worked on the market linkage of the marginal farmers. To improve the access to agricultural inputs, 485 farming input suppliers (11% women) were trained on the quality farming inputs, preventive measures, and general advice during the selling of inputs. This project has also developed 101 Community Livestock Workers (CLWs) to vaccinate FFS farmers' livestock animals. Moreover, this project has established a market linkage initiative where the community manages 95 market collection points by linking farmers and traders for competitive sales and mutual benefits. The Agriculture and Food Security component also developed knowledge and skills of Hill District Councils and GoB line department officials on improved coordination mechanism and management functions of transferred agricultural services through different platforms and formally conducted training events.

2 Evaluation scope and objectives

2.1.1 Evaluation scope

The main purpose of this evaluation was to collect the endline data/ information of this DANIDA-funded project to measure the most significant changes and results at the output/outcome level for beneficiaries, institutions, and communities with a focus on the overall implementation process and progress towards project targets. The aim of this evaluation is to assess the project's relevance, effectiveness, efficiency, impact, sustainability and coherence in line with the OECD evaluation criteria. The key findings of this evaluation can be used for future project design and policy implications by UNDP and the Government of Bangladesh.

2.1.2 Geographical area under the consideration for evaluation

This evaluation focused on the AFSP III project implementation areas. The AFSP III project covered 23 Upazilas (4 Upazilas in Bandarban, 9 Upazilas in Khagrachari and 10 Upazilas in Rangamati District) in CHT. To mitigate some of the geographical challenges and optimize communication and logistics capacity, the study team selected ten Upazilas for conducting the study after reviewing the baseline report, progress reports, annual reports, result frameworks and theory of change of the project, therefore, it provided an advantage to reach appropriate sample size for statistical analysis across the Upazilas. The evaluation purposively covered 3 Upazilas in Bandarban, 4 Upazilas in Khagrachari, and 4 Upazilas in Rangamati. The following table illustrates the study area under consideration for this final evaluation.

Table 1: Geographical coverage of AFSP III project evaluation

District	Selected Upazilas for AFSP III Evaluation
Bandarban district	Bandarban Sadar
	Ruma
	Thanchi
Khagrachari district	Khagrachari Sadar
	Mahalchhari
	Guimara
	Dighinala
Rangamati district	Rangamati Sadar
	Bilaichhari
	Juraichhari
	Langadu

2.1.3 Evaluation objectives

The specific objectives of the study included:

- To assess to what extent AFSP III have contributed to addressing the needs and problems identified during programme design
- To measure Impact level changes of the project
- To measure intended outcomes of the project

- To assess the efficiency and effectiveness of various project interventions and to identify causes of success and/or failure with recommendations
- To measure the value addition of the AFSP III project after continuing over decades
- To examine how the initiatives of the project are mainstreamed in the government process
- To measure the value for money
- To provide forward-looking programmatic recommendations (for any course correction) to achieve the intended results/outcome

2.1.4 Evaluation criteria

For conducting this evaluation, the study team considered all the criteria of the OECD-DAC framework. Besides answering to specific evaluation questions under each OECD-DAC criteria, the study also sought answer to the questions under some cross-cutting issues.

2.1.5 Evaluation questions

2.1.5.1 OECD framework

The evaluation covered all the six OECD-DAC criteria—relevance, efficiency, effectiveness, sustainability, impact, and coherence. Each of the criterion has specific purpose and looks into different dimensions of the project.

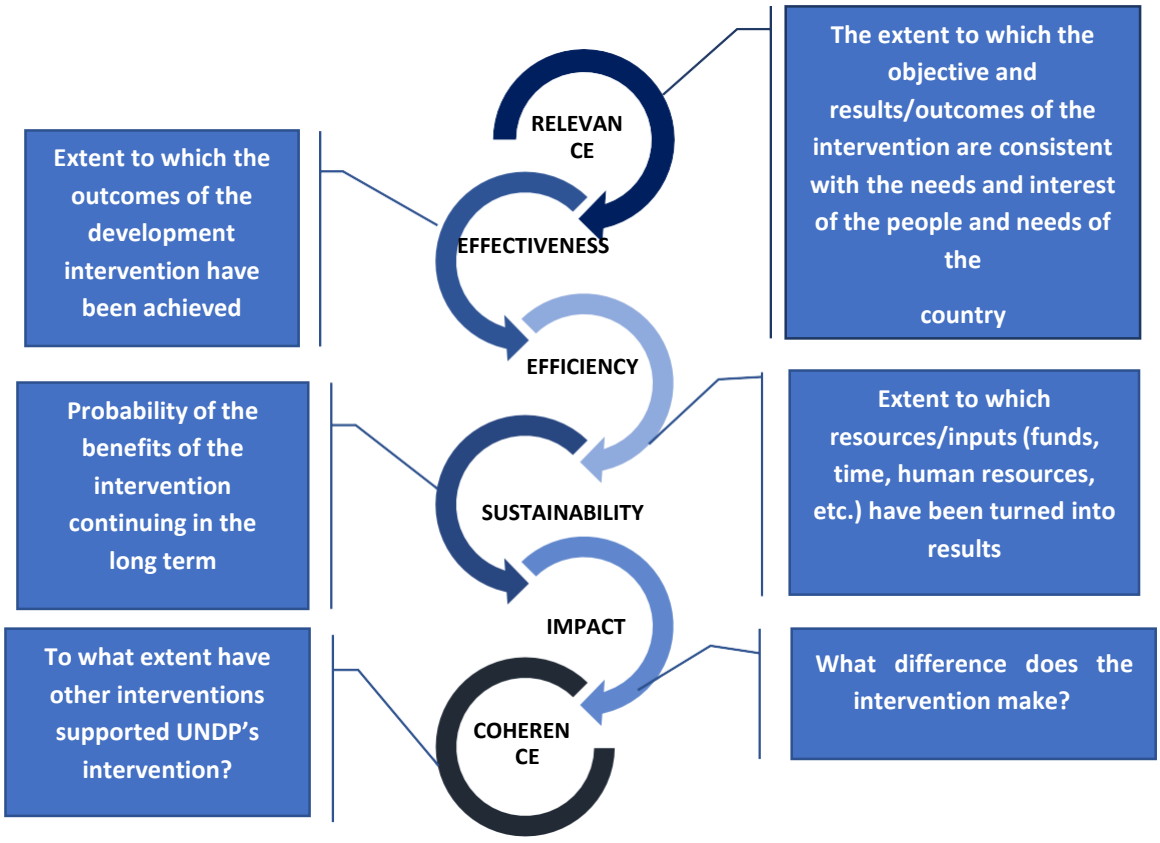

Figure 1: Thematic diagram of the OECD-DAC evaluation criteria

2.1.5.2 Other Cross Cutting Issues

Leave no one behind

The evaluation assessed to what extent have the project's response and recovery initiative(s) been inclusive in supporting the most vulnerable and marginalized group in the implementing area.

Lessons learned

The evaluation also considered the lessons learned from the previous terms of the project, by asking the following key questions:

- What are the lessons that the project has had learned so far?
- What are the challenges that the project has faced during their implementation?
- What measures have already been taken to mitigate those challenges?

Way forward

Based on the achievements to the date, this evaluation provided forward-looking programmatic recommendations to the UNDP for its course correction and future programming.

Overall, the final evaluation assessed the results achieved in terms of policy support and institutionalization through interventions over the years. It has identified value additions in terms of knowledge /skill enhancement and sharing towards facilitating national resilience focusing on climate change. It also explored the gaps and areas of focus, which need further attention for promoting national resilience. Additionally, this evaluation followed a strategic approach to identify potential sectoral collaboration, and areas of scaling up that should be taken forward to build resilient Bangladesh.

Gender and Human Rights-based Approach

The evaluation's approach and methodology considered different groups in the SID-CHT project intervention – women, youth, minorities, and vulnerable groups, persons with disabilities (PwD) following the new UNDP evaluation report checklist.

Gender equality

- To what extent have gender equality and women's empowerment been addressed in the design, implementation, and monitoring of the project?
- Is the gender marker data assigned to this project representative of reality?
- To what extent has the project promoted positive changes in gender equality and the empowerment of women? Were there any unintended effects?

Human Rights

- To what extent have poor, indigenous, and physically challenged women and other disadvantaged and marginalized groups benefited from the work of UNDP in the country?

3 Evaluation approach and methods

3.1 Evaluation approach

To achieve the objectives of the evaluation, the research team adopted a comprehensive methodology in each of the activities, e.g., document review, strong team mobilization, data collection and analysis. A mixed- method design was employed, where both qualitative and quantitative data (both primary and secondary) were collected from the respondents. The following steps were undertaken to conduct the study.

Step 1

- A meeting with the stakeholders of the UNDP team took place in order to discuss and gain an in- depth understanding of the background and objectives of the assignment. Baseline data and relevant information related to the programme were collected which aided the working team in having a deeper understanding on how to carry out the evaluation. A selection of sites to pre-test the tools were decided in consultation with the team.

Step 2

- An in-depth desk review was conducted using programme documents, relevant strategies and guidance from the UNDP, relevant documents from UN organizations and Ministries, and scholarly works. Based on the understanding, the inception report was produced and finalized. In the process of finalizing the documents and deliverable, the feedback from the assignment-commissioning parties was incorporated.

Step 3

- The team designed a detailed set of tools to collect data from different stakeholders. The tools are: structured household survey questionnaire, Key Informant Interview (KII) checklist, Focus Group Discussion (FGD) checklist, and Case study guidelines.

Step 4

- After developing the primary quantitative and qualitative tools, a pre-test survey was conducted. The feedbacks from the pre-test were used in the final adjustment of the structured survey questionnaire and qualitative checklists.

Step 5

- A field research team was recruited based on their knowledge of collecting information on a similar study. Also, their prior experience of collecting data on livelihood was given higher consideration.

Step 6

- The primary quantitative data were collected using the household survey. Demographic variables of interest were included, but not limited to gender, age, ethnicity, and differently-abled persons. The collected data were disaggregated as much as possible so as to unfold the real picture of the situation.

Step 7

- For qualitative data collection, KIIs, FGDs, and case studies were conducted. The findings from qualitative data were triangulated with the quantitative findings.

Step 8

- Triangulated data were used for in-depth analysis, following a pre-determined analysis plan. The report answered the evaluation questions and objectives in the light of the evaluation criteria.

Therefore, instead of taking the traditional approach, the assignment undertook a holistic approach based on the principles of compliance. The survey design focused on mobilization of inputs in time, completion of planned activities and deliverance of expected outputs and outcomes.

3.2 Data sources and Sampling

3.2.1 Data sources

For this study, the evaluation team collected relevant information from the Project Document, Annual Work Plans, Financial reports, Event database, M&E plan, periodic progress reports, donor reports, policy documents, produced IEC/BCC materials, facts sheets, case studies, meeting minutes, study reports, baseline report, and any other relevant documents.

For primary data collection, the following sources were included:

- At the national level: National Project Director (SID-CHT), Deputy National Project Directors (SIDS-CHT), Staff of Project, Donors, other relevant government as stated in the stakeholder list in Data collection procedures and instruments section

- At the field level: HDCs, District and Upazila Administration including Deputy Commissioner (DC), Deputy Director (DD-LG), UNO, Upazila Parishads (UZP) Representatives of Upazila Parishads and Union Parishads (UPs), Steering Committee Members, Ward Committee Members, and Secretaries, Gram Police, Community Livestock Workers, Farmer Facilitator, Para Development Committees (PDCs), CRC members, and project beneficiaries.

3.2.2 Sample and sampling frame

Quantitative Sampling Strategies

Quantitative data were collected from two groups, (i) Treatment group (beneficiaries of the project) and (ii) Control group (individuals from non-project areas).

Probability sampling strategy ("Stratified Random Sampling") was used for selecting the respondents from the study area. To get a statistically significant sample size, we used the Cochran's formula.

$$n = \frac{p(1-p)(Z95\%)^2}{(P-p)^2} \dots\dots\dots\dots\dots \text{Equation (1)}$$

Where,

P = Proportion to be estimated = 50%, which gives statistically significant sample size

P – p = Margin of error

Z95% = Z-value at the 95% confidence level

n = Sample size

Treatment Group

The treatment groups in a research study are the groups of people who are subjected to some kind of manipulation or deliberate modification in the independent variable of interest. They are an important aspect of experimental study design because they aid in the measurement of effects and the determination of causality (Allen, 2017). In this study, participants for the treatment group were selected from the project areas. The criteria for being selected under the treatment group includes:

- Individuals who have received at least one intervention under the project.

The criteria for the selection of treatment group are illustrated in the following chart:

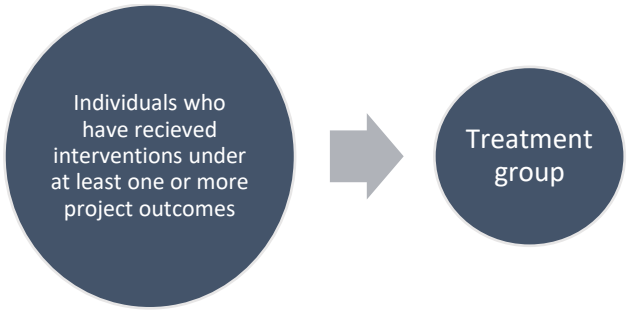

Figure 2: Criteria for Treatment Group

Control Group

The introduction of control groups enables researchers to validate that the study outcomes are the consequence of manipulating independent variables (IVs) rather than extraneous variables (Allen, 2017). For this study, the control group was selected from the same Upazilas and Union Parishads where treatment groups were selected. The control group participants were selected based on some specific criteria:

1. Respondents from the same Upazilas and adjacent to paras/communities where treatment groups were selected.
2. Individuals are not direct beneficiaries of the project.
3. Individual households are not located in the same paras/villages as the treatment groups.

Based on these criteria individual households were selected for Control Group.

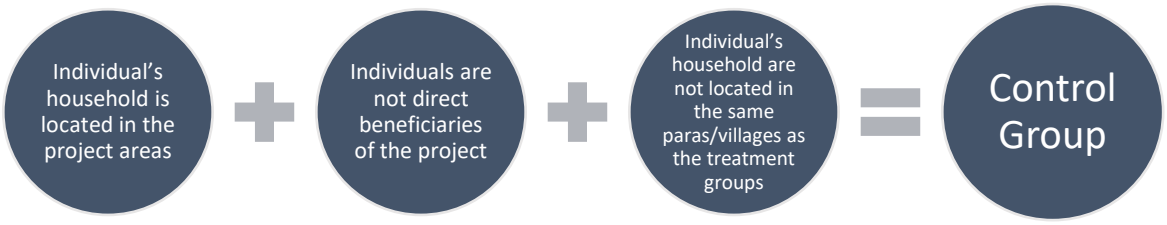

Figure 3: Criteria for Control Group

Quantitative Sample Size

The total beneficiary number of the AFSP-III project is 26,505. For treatment group, substituting the values in the Equation 1 with 95% level of confidence, 3% margin of error and 50% expected prevalence, we get a sample size of around 1030. This number was proportionately distributed among the selected districts. According to ToR, The AFSP III has around 26,505 beneficiary farmers in the Farmer Field Schools (FFS), of which 62% are female. Considering this, the total sample size has been distributed between male and female beneficiaries.

For the control group, substituting the values in the Equation 1 with 95% level of confidence, 4.25% margin of error and 50% expected prevalence, we get a sample size of 522, rounding up to 525. The number was also divided among the districts and sex, assuming the proportion similar to the treatment group.

Table 2: Quantitative sample distribution for AFSP III project

District	Treatment		Control	
	Male	Female	Male	Female
Bandarban	143	146	103	97
Khagrachari	126	224	141	48
Rangamati	153	235	99	37
Sub-total	422	605	343	182

Total	1027	525

Qualitative Sample Distribution

For qualitative data collection, the study team conducted KIIs, FGDs, case studies, and field observations with different stakeholders and beneficiaries. The evaluation looked into the positive or negative impacts created on the lives of the communities as well as other relevant stakeholders. It also looked into the policy level implications of the project. While conducting the qualitative survey, a maximum saturation of information/data was ensured. The sample was selected purposively. The key stakeholders were mapped after reviewing the project documents including progress reports, annual reports, and baseline reports. A total of 44 KIIs, 5 FGDs and 3 Case Studies were conducted. The following table shows the size and distribution for the qualitative surveys.

Table 3: Qualitative sample distribution

Tools	Level	Stakeholders	Total	Zilla
KII	District	Department of Agricultural Extension	2	Khagrachari, Rangamati
		Department of Livestock Services	3	Bandarban, Khagrachari, Rangamati
		department of Fisheries	1	Khagrachari
		Deputy Commissioner (DC)	1	Bandarban
		Deputy Director (DD-LG)	2	Bandarban, Rangamati
	Upazila	Upazila Nirbahi Officer	3	Bandarban, Khagrachari, Rangamati
		Upazila Parishad Chairman	2	Bandarban, Rangamati
		Upazila Agricultural Officer	2	Bandarban, Khagrachari
		Upazila Livestock Officer	2	Bandarban, Khagrachari
		Upazila Fisheries Officer	1	Bandarban
		Sub-assistant Agriculture Officer (SAAO)	3	Bandarban, Khagrachari, Rangamati
		Sub-assistant Livestock Officer	1	Rangamati
		Sub-assistant Plant Protection Officer	1	Rangamati
		Hill District Councils (HDC)	3	Bandarban, Khagrachari, Rangamati
		Upazila Development Coordination Committee (UzDCC)	2	Bandarban, Rangamati
		Implementing Partner Staffs	3	Bandarban, Khagrachari, Rangamati
	Union	Union Development Co-Ordination Committee (Female UP Ward Member)	3	Bandarban, Khagrachari, Rangamati
	Para	Headman/karbari/Village Common Forest committee members	3	Bandarban, Khagrachari, Rangamati
		Master Trainer	3	Bandarban, Khagrachari,

Tools	Level	Stakeholders	Total	Zilla
				Rangamati
	Project	UNDP AFSP Project Officials	3	Bandarban, Khagrachari, Rangamati
Total			**44**	
Focus Group Discussion	District	Farmer Facilitator (FF)	3	Bandarban, Khagrachari, Rangamati
	Para	Para Development Committee (PDC)	2	Bandarban, Rangamati
Total			**5**	

3.3 Data Collection procedures and instruments

3.3.1 Primary data collection tool

In realization of the project objectives and deliverables of the assignment, the study used qualitative and quantitative approach to collect primary data. The subsequent table highlights the approaches of the used tools, purposes of the tools and data sources thereof.

Table 4: Data collections tools for final evaluation

Tools	Approach	Purpose of the tools	Targeted people
Structured Household Survey	One-to-one interview with the household members under study	To understand their resilience capacity, how the project addressed the issues related to gender equality and need of the most vulnerable population.	Community People (Women, men, youth, minorities, and vulnerable groups, Persons with Disability -PwD)
FGD	Participatory group activity that includes close interactions with the respondents. FGDs were conducted with groups consisting of Upazila and Union-level local stakeholders, FFS members, CRC representatives. Open-ended FGD guidelines were used for conducting FGD sessions.	To understand the existing gaps in service delivery, implementation mechanisms, and challenges.	Women beneficiaries, local representative Women-led CSOs, Volunteer Group, NGO representatives working at the local level
KII	Key Informant Interviews involve interviewing people who have particularly informed perspectives on an aspect of the study. Semi-structured checklists were used to conduct KIIs.	To better understand the existing gaps, way forwards and recommendations	Government officials, National Programme Coordinator, Programme Coordinator, Project Directors of each subproject, Project Managers & Technical Specialist, Staff of Programme Coordination, Management Team (PCMT), Donors, and other relevant government stakeholders at district, Upazila, and Union level.
Case study	A case study generates an in-depth, multi-faceted understanding of a complex issue in its real-life context. Different sorts of tools can be used to identify cases.	To better understand about the outstanding success or failure in learning lessons	Community people/programme beneficiaries/any outstanding phenomenon.

Tools	Approach	Purpose of the tools	Targeted people
Physical Observation	Local Resilience Plan sites were physically observed and activities were recorded	To find out if the resilience process and measures are in place in the Local Resilience Plan sites. Also, to assess if the resilience of the community has been improved through project intervention in the selected areas.	Local Resilience Plan sites

3.3.2 Pre-test of the tools

After the approval of the quantitative and qualitative tools, checklist/guidelines were finalized by incorporating the feedback from UNDP project team. A pre-test of the tools was conducted to discover any challenge so as to optimize the tools. Based on the mock test and all the incorporated feedback, the tools were fine-tuned for using in the real scenario. Finally, the tools were shared with the project team to get the final approval and incorporated according to feedback.

3.3.3 Recruitment and Training of Study Team

A field research team was recruited based on its knowledge of collecting information on a similar study. Also, the members' prior experience of collecting data on livelihood were given higher consideration.

Because the language of the respondents is an important factor for conducting a successful survey, we hired local enumerators who are already well-trained in conducting social surveys. The study team adopted the standard training materials used for community surveys for data collector training.

3.3.4 Preparation of field plan and field mobilization

After finalizing the checklists and questionnaires, a comprehensive guideline was developed for the Data enumerators, Research Associate and supervisor for conducting (one-to-one) survey questionnaire, FGD, and KII, which specifically described important definitions, terminology, question objective, data input instructions, skipping, etc. This guideline was easy to use and helpful in the data collection process. As a process of field mobilization, the consultant familiarized themselves with the local authority and project officials. A detailed schedule with date, time and venue was also prepared and shared with the relevant stakeholders.

3.4 Data collection process for the evaluation

3.4.1 Preparing and finalizing of study tools

In realization of the project objectives and deliverables of the evaluation, the following data collection instruments were used for qualitative data collection.

a) Secondary document review
b) Structured questionnaire for household survey
c) FGD checklist
d) KII checklist
e) Case study guideline
f) Physical observation checklist

3.4.2 Data collection process (digital)

For questionnaire surveys of this study, advanced digital forms were developed in the KoboToolbox for Android using the pre-developed questionnaire. The survey was carried out using a modern tablet-based survey instrument. The system also recorded the geographical location of the beneficiaries (GPS coordinates), which ensured the transparency in data collection method.

Moreover, KoBoToolbox is committed to protecting the data of its users. It employs industry standard best practices (both technical and administrative) to protect against unauthorized access to users' data. To protect from loss of data, it does frequent system and incremental backups which are stored encrypted in various locations.

Although a general practice for building digital forms is to use the defined web-form builders, this approach has many disadvantages. However, unlike others, DM WATCH used the advanced approach using "XLSForm". XLSForm is a form standard in MS EXCEL that can be converted to an "ODK XForm", a popular open form standard, that allows the form developers to author a form with complex functionality like skip logic in a consistent way across a number of web and mobile data collection platforms. Importantly, users can use multiple languages in the same form, which the users/enumerators can switch anytime depending on their needs. This facility reduced the chances of mistakes caused by the language barrier. Because a clean dataset can be obtained either in English or in Bangla, it reduced the amount of time needed for data cleaning significantly.

3.5 Data management

2.3.3.1 Data quality control and assurance

3.5.1.1 Quantitative data management

Accompany check: Field Supervisors reviewed the process of the one-to-one interview by accompanying the Enumerators. The schedule for the check was randomly designed and executed.

Daily check: The Research Associates checked the data every day to make sure that the data is entered correctly. Research Associates ran a logical check of the database.

Back-check: 5% of respondents were randomly chosen for back check. A Kobo-based form was prepared using a subset of important cross-checkable questions from the main questionnaire. The chosen respondents were re-surveyed over phone using the subset of questions. Finally, their responses were compared with their prior responses during the field survey.

3.5.1.2 Qualitative Data Management

Note keeping: Research Associates kept the notes of the interviews with the key informants and other stakeholder, which they used later to prepare transcripts.

Feedback: Research Associates discussed with the lead researcher and other members of the research team on the findings of the qualitative surveys at the end of each field day.

3.5.1.3 Data processing

After collecting data from the field, corrupt or inaccurate records were identified from the record set, table or database. Consequently, these identified data were referred to as incomplete, incorrect or irrelevant which were finally replaced, modified or deleted. After cleaning and editing the collected data, a final screening was performed to ensure the usability, reliability, and validity for testing. Besides, in need basis, data were transformed into suitable code for computer-aided analysis.

3.6 Ethical Considerations

DM WATCH followed several ethical guidelines throughout the study-

Participatory Approach: Participatory approach was followed to involve all the key stakeholders of the project.

Inclusiveness: The study team ensured that people with disabilities and people who may be excluded or discriminated against in their community are included as participants.

Other considerations: The evaluation was guided by the principals outlined in the UNEG "Ethical Guidelines for Evaluation" (UNEG, 2020). They include, but are not limited to:

- Sensitive— to human rights, gender, inclusion and cultural contexts
- Integrity— honest and truthful in communication and actions. Professional, credible and trustworthy behaviour, alongside competence, commitment and ongoing reflective practice. Independent, impartial and incorruptible.
- Accountability— transparent regarding evaluation, responsive, responsible.
- Respect— access to the evaluation process and products by all relevant stakeholders, meaningful participation and equitable treatment, fair representation of different voices and perspectives in evaluation products (reports, webinar, etc.)
- Beneficence— explicit and ongoing consideration of risks and benefits from evaluation processes. Maximum benefits at systematic (including environmental), organizational and programmatic levels. Principal of no harm and evaluation makes an overall positive contribution to human and natural systems and the mission of the United Nations
- Confidentiality and data protection – measures were put in place to protect the identity of all participants and any other information that may put them or others at risk.

3.7 Stakeholder communication and engagement plan

First, the stakeholders were identified according to their area of benefits from the programme, involvement with the programme and significance of their views about this study. The stakeholders were selected upon their consent, direct or indirect interest. The stakeholders were selected so as to be useful in programme improvements and providing recommendation. Representatives from all the stakeholder groups as mentioned in the ToR such as implementing partners, government stakeholders, community groups, and beneficiaries, selected without any preconceived bias. Data collection methods were age and gender appropriate.

UNDP provided DM WATCH the profile and contact info of the stakeholders. DM WATCH planned a schedule according to the convenience of the participants by prior communication with them. The tentative schedule was planned and shared with UNDP.

Overall:

- The study guided by the principals outlined in the UNEG "Ethical Guidelines for Evaluation"
- Informed Consent: All participants were informed to provide their consent following standard and pre-agreed upon consent protocols.
- Systematic inquiry: Researchers conducted systematic inquiries throughout the study.
- Integrity/honesty: Researchers displayed honesty and integrity in their own behaviour and attempt to ensure the honesty and integrity of the entire survey process.
- Respect for people: Enumerators respected the security, dignity and self-worth of respondents, program participants, clients, and other survey stakeholders. The Enumerators obtained the informed consent of participants to ensure that they can decide in a conscious, deliberate way whether they want to participate.
- Survey respondents didn't give any monetary benefits. Facilitation process were monitored and equal participation from the respondents were ensured.
- All evidence collected from the interviews held by DM WATCH in the strictest confidence and were not shared with any other individual or organization. Responses included for the study are fully anonymized so that the individual concerned cannot be identified.

3.8 Major limitations of the methodology

Issues with baseline information

A major limitation of the evaluation was the unavailability of true baseline information. The end line study for AFSP phase II, conducted in 2018, was considered as the baseline for this study. The second phase of the AFSP project ran from July 2013 to December 2017. Treatment group information retrieved from the AFSP II end line research represents the data of farmer groups that received project intervention for 4 years. At the third phase

of the project, the project scaled up and set up more FFS in the communities. The newly established farmer field schools (which were established after 2018) was sampled for the end line evaluation. As such, no baseline information was available for the beneficiaries who participated in those FFS. Robust analysis such as difference in difference (DID) could not be carried out due to the lack of a true baseline.

Control group issues

Still, information on the control group at the end line study of AFSP phase II can be considered as the baseline for the evaluation. But, the matching criteria for the treatment and control group respondents were different. The end line study of AFSP phase II selected control group farmers having similar characteristics of the beneficiary farmers. No such matching criteria were set in this evaluation study. For this study, instead of purposive selection, the control group respondents were selected randomly from neighboring communities/Para where the FFS has not been formed. In addition to that, the AFSP project has been running in the CHT region since 2009 and is now in its third phase, as such, the interventions carried out in this region is showing diffusion properties. This effect has been confirmed in this evaluation where knowledge on agricultural technology use diffused from intervention participants to control groups. It is only natural that a people-centred learning-based approach of Farmer Field Schools (FFS) would have such diffusion effects on the region. The evaluation's findings should be interpreted in light of these ground realities.

Evaluability issues

Another major limitation for the evaluation was related to the objective measurement for some of the indicators. The evaluation heavily relied on the perception of the respondents where some of the indicators required accurate information like agricultural production and food consumption. The study relied on respondent’s memory and certain recall periods was set to collect the information. The poor and marginalize farmers do not have the practice to document their yearly agricultural production. Standard methodological framework from FAO, WFP, which is widely used by development practitioners, were used. However, differentiated and evidence-based analysis could not be carried out due to lack of information, time and human resource. This is also a common constraint faced by the development practitioners worldwide.

4 Data analysis

4.1 Triangulation and data analysis

Transcripts were prepared for all the qualitative data. A summary of the transcripts was prepared, so as to optimize time for report writing and reviewing. The study used data from both secondary and primary sources. Qualitative tools provided the basis for both content and impact analysis. Nevertheless, primary and secondary data (e.g. Project related documents) were investigated based on the indicators. To check the overall progress and impact of the project on the beneficiaries, the consultant analysed both the qualitative and quantitative data aligned with the OECD-DAC framework.

Quantitative data acquired through questionnaire interviews were analyzed using SPSS and MS Excel software. For cleaning and editing, a final screening was performed which ensured the usability, reliability and validity for data analysis. Besides, data were transformed into suitable code for computer-aided analysis. Both raw data and processed quantitative and qualitative data were saved in csv and excel (also other formats such as SPSS) formats respectively to share with UNDP team. For the final-term evaluation, some descriptive statistical values including frequency counts, contingency tables/crosstabs, percentage, min value, max value, and average were calculated in order to explain indicators set by the study. The t-test was carried out to find out any potential difference between the treatment group and the control group. Also, correlation analysis were shown to figure out the relation among the variables. Quantitative and qualitative findings were triangulated under each indicator, along with the graphical and tabular representation of data.

4.2 Content analysis

To check the consistency of specific and factual data items, the quantitative data collected from questionnaire surveys were triangulated within themselves, and with the qualitative data collected from KIIs, FGDs, case study, and field observations. The collected qualitative data/ information was entered into a database and organized by category and informant group under each output. Qualitative data analysis was organized into four steps:

- Preliminary analysis of the findings with research associate who was involved in qualitative data collection in a separate session.
- Thematic coding of data according to content and specific categories.
- Compiling data by themes to systematically analyse qualitative data; and
- Compiling qualitative observations by themes and selecting issues and appropriate quotations.

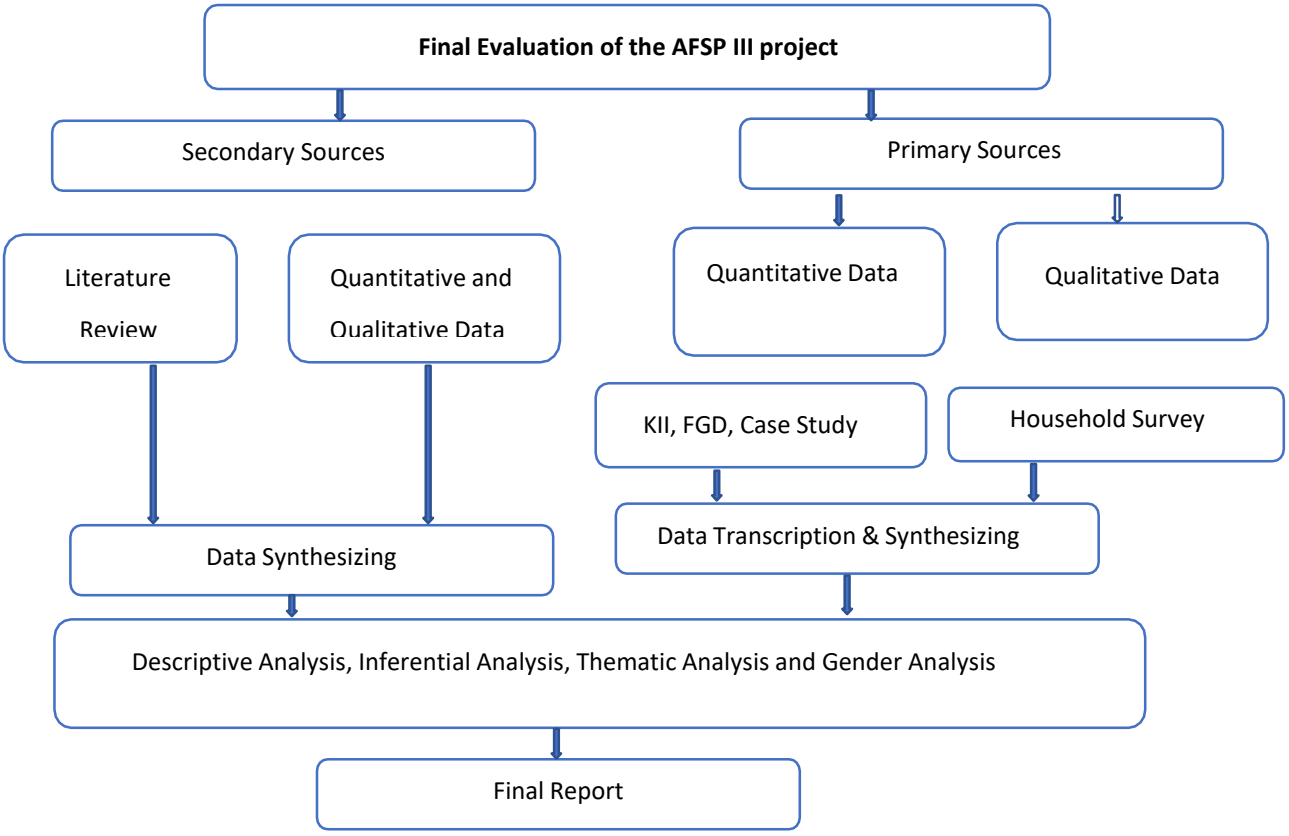

Figure 4 Content analysis plan

4.3 Gender Assessment Plan

Gender analysis is a subset of socio-economic analysis to identify, understand, and explain gaps between men and women in households, communities, and countries, the relevance of gender norms and power relations in a specific context. As part of the requirement, the evaluation included an assessment of the extent to which the design, implementation, and results of the project have incorporated gender equality perspective and rights-based approach. Ignoring gender dynamics undermines the accomplishment of core human rights and fails to recognize the harm done to women and other vulnerable groups. In order to assess to what extent have gender equality and the empowerment of women been addressed in the design, implementation and monitoring of the programme, the evaluation adopted gender analysis module prepared by USAID. The study team considered the followings for the evaluation.

- Combining qualitative and quantitative sampling methods
- Establishing evaluation teams comprised of both males and females appropriate for the cultural context and data being collected
- Ensuring that samples consist of both men and women and/or boys and girls as appropriate to the evaluation questions
- Including relevant evaluation questions

The study team also followed the Harvard Gender Analysis framework (March, Smyth, & Mukhopadhyay, 1999) to carry out a gender analysis.

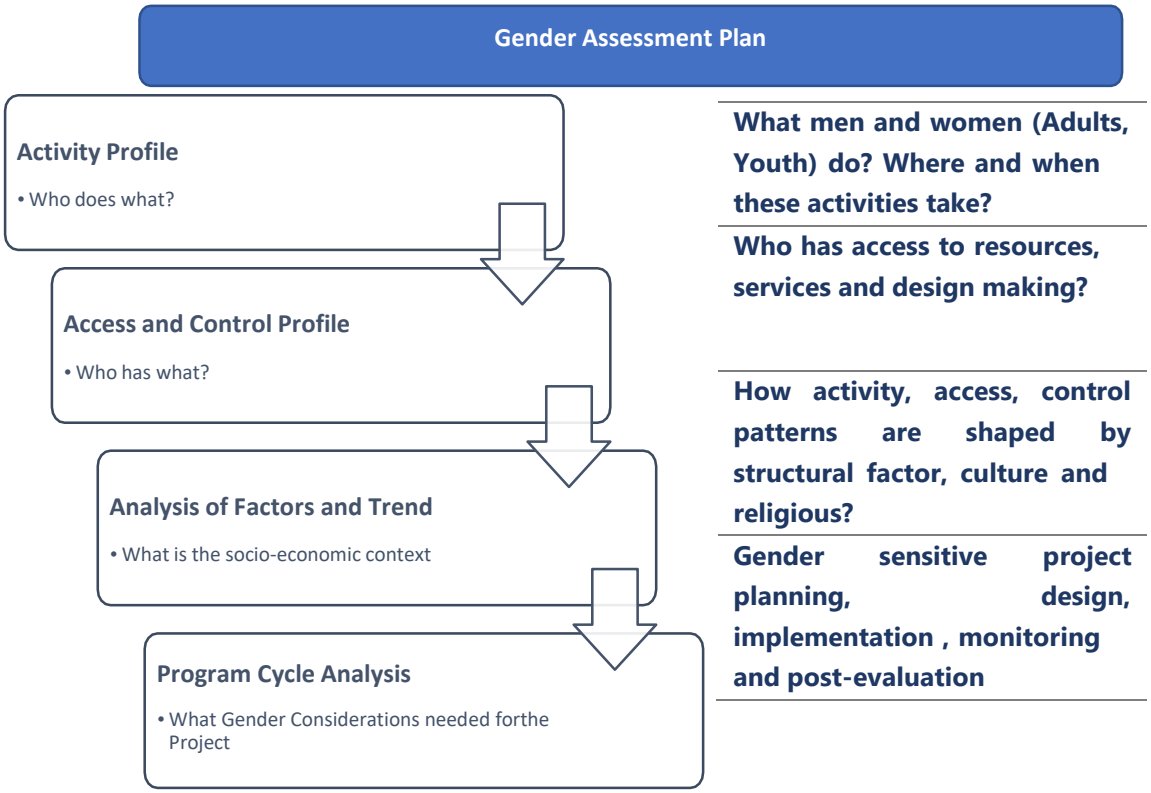

Figure 5: Thematic Diagram showing Gender Assessment Plan

4.3.1 Approach for Food Security Assessment

The study measured the status of food security in various dimensions. The study adopted various standard indexing such as food consumption score (FCS); household dietary diversity score (HDDS); and Food Consumption Score Nutritional Quality Analysis (FCS-N). In addition, the study analysed per capita caloric intake of the beneficiary households.

Food Consumption score (FCS)

The Food Consumption Score (FCS) is an index that was developed by the World Food Programme (WFP) in 1996. The FCS aggregates household-level data on the diversity and frequency of food groups consumed over the previous seven days, which is then weighted according to the relative nutritional value of the consumed food groups. For instance, food groups containing nutritionally dense foods, such as animal products, are given greater weight than those containing less nutritionally dense foods, such as tubers. Based on this score, a household's food consumption can be further classified into one of three categories: poor, borderline, or acceptable.

Household Dietary Diversity score (HDDS)

Household dietary diversity, defined as the number of unique foods consumed by household members over a given period, has been validated to be a useful approach for measuring household food access, particularly when resources for undertaking such measurement are scarce. This guide provides an approach to collecting and measuring household dietary diversity as a proxy measure of household food access.

Household dietary diversity - the number of different food groups consumed over a given reference period - is an attractive proxy indicator for the following reasons.

- ✓ A more diversified diet is an important outcome in and of itself.
- ✓ A more diversified diet is associated with a number of improved outcomes in areas such as birth weight, child anthropometric status, and improved haemoglobin concentrations.
- ✓ A more diversified diet is highly correlated with such factors as caloric and protein adequacy, percentage of protein from animal sources (high quality protein), and household income. Even in very poor households, increased food expenditure resulting from additional income is associated with increased quantity and quality of the diet.
- ✓ Questions on dietary diversity can be asked at the household or individual level, making it possible to examine food security at the household and intra- household levels.
- ✓ Obtaining these data is relatively straightforward. Field experience indicates that training field staff to obtain information on dietary diversity is not complicated, and that respondents find such questions relatively straightforward to answer, not especially intrusive nor especially burdensome. Asking these questions typically takes less than 10 minutes per respondent.

Food Consumption Score Nutritional Quality Analysis (FCS-N)

The way in which the FCS is analysed does not explicitly provide information on the main macronutrient (carbohydrate, fat, protein) and micronutrient (vitamins and minerals) adequacy and consequent potential risks of deficiencies of these nutrients, but the data recorded in the FCS module provides enough information to throw light on the consumption of these nutrients. The FCS-N analysis provides information on specific nutrients – the FCS-N. While it will not allow us to understand individual nutrient intake, the 'Food consumption score nutrition quality analysis' fills this gap at HH level and attempts to improve the link between household food access/consumption and nutritional outcomes. Outputs from this innovative analysis can help select the appropriate food transfer modalities (food, cash or vouchers) and feed into decisions on nutrition-sensitive programming. Furthermore, it can provide information to stakeholders in the nutrition sphere for analysis regarding the population's nutritional intakes.

5 Findings

Findings is presented as statements of fact that are based on analysis of the data. This section is structured around the evaluation questions to make the connection between what the project intended and what was achieved. Variances between planned and actual results is explained, as well as factors affecting the achievement of intended results. Assumptions or risks in the project or programme design that subsequently affected implementation is discussed as well.

5.1 Relevance

5.1.1 National development priorities, the country programme's outputs and outcomes, the UNDP Strategic Plan, and the SDGs

National Development Priorities and SDGs

The 1996 National Agricultural Extension Policy has been updated, and a draft of the 2016 National Agricultural Extension Policy has been prepared. The Revised Extension Approach emphasizes punctuality, a bottom-up approach, discipline, field worker training, a link between farmer-extension-research, open information flow, collaboration, working with farmer groups, and the importance of effective communication with farmers. The "Revised Extension Approaches" can help ensure that an extension service is highly effective. The approach is based on five guiding principles:

i. Decentralization ii. Targeting iii. Farmers' needs responsiveness iv. Application of a variety of extension techniques v. Collaborating with farmer organizations or groups.

Working with farmer's groups or farmer's organisations is one of the principles of the Department of Agricultural Extension's (DAE) 'Revised Extension Approach.' This has the advantage of allowing the extension service to reach a large number of farmers simultaneously. Establishing Farmer's field schools is one of the extension methods that the DoA is using. Farmer's field schools are usually established and operated with the assistance of DAE headquarters. They are generally organized to facilitate the introduction of a new technology as part of the national program. The IFM-FFS approach first piloted in CHT in 2010. Utilizing the learning from the pilot project, implementations expanded all over the country including CHT. The 3 hill districts were covered by UNDP and the remaining 63 districts were arranged by DAE. The AFSP III project is clearly structured to be in accordance with the updated National Agricultural Extension policy and its guiding principles. All of the suggested group extension techniques, which are at the core of all of DAE's extension approaches, were incorporated into the project design. One aspect of the project that needed to be modified as it was being designed was that the Hill District Councils(HDCs) are managing and operating the transferred agricultural services in CHT.

Bangladesh's Hill region is comprised of the Rangamati, Khagrachari, and Bandarban districts and covers approximately one-tenth of the country's total land area. Several minority ethnic groups (Chakma, Marma, Tripura, Rakhain, Garo, and Tanjunga) coexist with Bengalis in these regions. Each tribe is distinct in terms of language and culture. While "jhum" is their traditional agricultural occupation, modern agriculture has attracted them as well. Extension strategies here in the CHT must be developed with the tribal people's agricultural culture, life styles, social systems, ecology, land use, and agricultural environment in mind in order to bring agricultural extension services to the poor tribal people living in remote hills. (Department of Agricultural Extension, 2018). The scenario was recognized by AFSP III, and HDCs were assigned to oversee project activities in order to make them more efficient and effective.

Apart from the National Agricultural Extension Policy, AFSP III was designed with the MoA's national targets in consideration, which were aligned with the SDG goals. The relevant national targets are represented in table 1 along with the project's relevance to them.

Table 5 Relevance to the National targets and SDGs

Target	Goal	Role of MoA	Relevance
Target 2.1	By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.	Lead	
Target 2.3	By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.	Lead	
Target 2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	Lead	
Target 2.5	By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.	Lead	
Target 2. A	Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries	Lead	

Bangladesh Country Programme 2016-2021

AFSP III project is designed in accordance with the Bangladesh Country Programme 2016-2021 which was consistent with the Denmark-Bangladesh Country Policy. The country program was developed to contribute to the inclusive, pro-poor, and sustainable implementation of Bangladesh's 7th Five-Year Plan (2016-2021), "Accelerating Growth, Empowering Citizens." The Country Programme was divided into three thematic components. **1.** Agricultural Growth and Employment **2**. Resilience to Climate Change and Sustainable Energy **3.** Government and Rights.

The Country Programme aimed at contributing to Bangladesh's endeavours to address challenges regarding "Agricultural Growth and Employment" by promoting inclusive agricultural growth and rural employment through improved skills, organization, and market access. Particular emphasis is placed on marginal and small farm households. Women account for at least 50% of the target group. (DANIDA, 2016)

Under the Thematic Programme "Agricultural Growth and Employment", there are two development engagements. **DE 1:** Integrated Farm Management Component II with the objective 'Agricultural productivity among participants in FFS increased.' **DE 2:** Agriculture and Food Security Project in the Chittagong Hill Tracts (AFSP III) with the objectives 'Increased pro-poor inclusive agricultural growth and sustainable employment creation for marginal and small farm households with enhanced food security in CHT'; and 'Hill District Councils with enhanced capacity to manage transferred agricultural services in line with CHT Peace Accord.'

The components and activities of AFSP III were designed in such a way that they may contribute to this Country Program, as the AFSP III's outcomes included enhanced agricultural growth and employment, capacity building activities, and market linkages.

Agriculture and food security (AFSP III) project has a substantial impact on national development and is relevant to the country program's outputs and outcomes, according to interviews with key stakeholders in the study areas. They've assured that all of the project's actions are in line with UNDP's strategic plan as well as the Sustainable Development Goals. Although UNDP is implementing this project, the government of Bangladesh planned this project, therefore they are usually aligned with national priorities and other policies, according to the majority of the respondents to the KIIs.

CHT peace accord

The Chittagong Hill Tracts' line departments of agriculture, fisheries, and livestock services are accountable to the Hill District Councils, and they responsible for the AFSP III project's management and implementation. To successfully implement the project, the Hill District Councils transfer the project's overall strategy to the mentioned government line departments. Following the CHT peace accord, approximately 33 government departments were transferred to the Hill District Council, and this project is also managed by the HDCs; as a result, this project has been managed strictly in accordance with National Policy and the CHT peace agreement.

Although extension departments and other line departments have been formally transferred to Hill District Councils, head offices in Dhaka continue to manage resources. As a result, HDCs have limited institutional capacity to carry out their mandates, and cross-cutting coordination with other relevant government agencies could be strengthened. (DANIDA, 2016)

In an interview, a representative from the office of DAE in Rangamati stated that,

> *"The CHT peace accord is a significant achievement. If we look at the project in its entirety, the interventions were consistent with the CHT Peace Accord. They (project partners) collaborated with the local government of CHT, including the HDC and the CHT Development Board. At the local level, they collaborated with the traditional system, such as creating a village committee comprised of karbaries and headmans."*

5.1.2 The theory of change for the relevant country programme outcome

The Thematic Programme (TP) on Agricultural Growth and Employment seeks to achieve inclusive agricultural growth by improving agricultural skills, organization, and market access. Agriculture is central to the Country Programme's goal of poverty reduction, growth, and sustainable development. Food, agriculture, and agro business are also a priority sector for Denmark's broader economic diplomacy efforts.

According to the theory of change for this thematic programme, agricultural growth and employment can be boosted by increasing the productivity of small and marginalized farming households through adult education. This will result in increased income, improved food security, increased employment, and a reduction in poverty. They will gain empowerment as a result, becoming more capable of representing themselves and taking control of their own lives. Adult education is delivered through Farmer Field Schools (FFS), where groups of participants learn how to increase production across the board, including crops, livestock, vegetables, and fisheries. Farmer

Field Schools are non-hierarchical and take place in the immediate vicinity of the farmers. Special attention will be paid to ensuring that at least 50% of participants are female. Additionally, training will be tailored to their specific needs. Participants in the FFS are assumed to use newly acquired skills to improve their income and nutrition, and that establishing forward links to markets benefits poor farmers.

One of agriculture's major constraints is the absence of critical linkages between production, processing, and marketing. As a result, poor farmers have not always benefited from increased production because the marginal surplus was insufficient to sell at a market. As a result, forward linkages between production and marketing must be strengthened. This is accomplished through training, during which new market-related skills are acquired. Additionally, organization is critical so that farmers can band together to bundle their surplus and sell them at the market.

Following the Thematic Programme's theory of change, AFSP III covers all the aspect in a very planned way. From targeting small and marginalized farming households to creating the market linkages, this project has incorporated everything that was mentioned in the ToC. AFSP III intended to cover all districts in the Chittagong Hill Tracts which lags behind the rest of Bangladesh in terms of development. The area is more impoverished, and access to social services such as education, health, and water and sanitation is less than the national average. This reflects a protracted post-conflict situation in which unresolved issues from the 1997 Peace Accord remain. The Peace Accord established a number of unique public institutions, including Hill District Councils (HDCs), which are responsible for the region's public services. As previously stated, this project has also been managed by the respective HDCs.

5.1.3 Relevance of AFSP III to the lessons learned from other relevant projects

Danida has over two decades of experience in working with agricultural extension in Bangladesh. Significant results have been achieved over the last decade by reaching out to approximately three million people in half a million households. According to a 2011 evaluation, Danida-supported FFS have been an effective way to increase productivity, income, and food security through the spread of knowledge and technology. Participating households' annual incomes increased by 38%. Gender data also indicated beneficial effects. Female participation was found to be high, reaching 61 % and 72 % in Barisal and Noakhali, respectively. (DANIDA, 2016)

The Evaluation strongly recommended that the FFS approach be considered as a critical tool for reducing vulnerability and improving food security, nutrition, and livelihoods in poor rural households, including those with the most severe poverty and marginalization. Using FFS, the Engagements under the current TP should promote the concept of Integrated Farm Management. Danida has also aided in the transition away from a focus on output per unit toward using the market to incentivize farmers to increase the productivity of their work. (DANIDA, 2016)

Following the recommendation, AFSP III was also designed with the FFS at the core. It was designed to ensure that at least 50% of women participated in all activities. The project's design successfully incorporated Integrated Farm Management to boost productivity, income, and food security in CHT's targeted areas.

5.1.4 Stakeholder targeting

The mandate of the Department of Agricultural Extension is to provide extension services to all categories of farmers. As a result, the needs and concerns of various farmers must be identified, and responsive services must be provided. DoA suggests that any relevant project should include the following farmers while implemented; i. Female farmers ii. Future farmers and young people iii. Small and marginal farmers iv. Farmers in the large and medium categories v. Members of landless families who lack farmland but have a homestead or cultivate land owned by others. (Department of Agricultural Extension, 2018). The AFSP III selected beneficiaries in accordance with the prescribed process for identifying and targeting farmers.

Apart from selecting appropriate beneficiaries, this project engaged stakeholders at various levels and organizations (both governmental and non - governmental) in a range of activities. The project engaged representatives from GoB line departments, HDCs, UzDCC, and UDCC in mobilization meetings of stakeholders on FFS at the Upazila level. Twenty-three mobilization meetings were held in the Rangamati, Bandarban, and Khagrachari Hill districts with the participation of Upazila Parishads, Union Parishads, traditional leaders, community leaders, service providers, and other stakeholders from the project intervention Upazilas. Apart from these mobilization meetings, a total of 2,265 Para Development Committee executives and para/village representatives received training in 60 batches on the IFM-FFS implementation process, monitoring, and the PDC role.

The AFSP III communities were chosen following a thorough screening process that included consultations and meetings with stakeholders at the para/village, union, upazila, and district levels, as well as project team members and government line departments. Throughout the duration of the project, 998 IFM-FFS were formed with the participation of 26,505 farmers (Male: 10,035 and Female: 16,470; 62% female). (UNDP, 2021)

According to Upazilla Livestock Officer of Khagrachari,

"This project was designed according to the needs of the targeted beneficiaries and all the relevant stakeholders were included in the project planning and designing."

He stated that he became involved in the project activities after being invited to an inception meeting organized for marginalized farmers and ethnic minority groups. He also attended farmer field days and was taken aback by the farmers' improved hatching pans. According to an implementing partner staff member of AFSP, the issue is that everyone wants to be a beneficiary of the project, but it is not possible to include all members of a community in the project. To maintain social harmony, those who were not beneficiaries were given the opportunity to learn at the farmer field school but were not provided with support services. According to one of the Karbaris interviewed, he was invited to a meeting attended by UNDP officials, the chairman, members, and other community representatives. He added that at that meeting, modern approaches to paddy cultivation, poultry husbandry, and cattle husbandry were demonstrated. He also stated that prior to the start of the project intervention, he was invited to a meeting where the project was discussed.

The District Livestock Officer of Rangamati proposed strengthening the livestock component, as the entire AFSP project places an emphasis on agriculture. According to him, the CHT area lacks plain land suitable for agriculture, whereas livestock management requires no plain land. He continued,

"Generally, projects are designed by individuals who are unfamiliar with the CHT's unique conditions. This eliminates the opportunity for input during the design phase."

5.1.5 Gender equality, women's empowerment, and the human rights-based approach

Respect for universal human rights continues to be a priority in Bangladesh. In its eighthfive-year strategic plan for 2016–2020, the National Human Rights Commission identified a number of challenges in the areas of civil, political, social, and cultural rights, including "Women Empowerment and Discrimination Against Women, Gender-based Violence"; "Occupational Safety, Wages, and Welfare, including Trade Union Rights of Garment Workers"; and "Full and Prompt Implementation and Compliance with the CHT Accord Focusing on Land Rights" (NHRC, 2016).

Failure to address basic development needs and ethnic minorities' rights, for example, in the CHT, has left the region behind the rest of the country. Only 7.8% of people living in CHT complete primary education, and absolute poverty and extreme poverty are prevalent in ethnic communities at rates of 65% and 44%,

respectively [7]. The CHT Peace Accord, signed in 1997, brought an end to years of insurgency in the region, but it has not been fully implemented. One area that requires additional attention is resolving land disputes that arise as a result of common-law and traditional land use patterns. Without clearly defined property rights, this is a delicate issue that requires informed resolution.

While gender inequality has improved in general in Bangladesh, gender-based violence and equal access to health, education, and employment remain unaddressed (UN, 2014). Continued efforts in this area will also contribute to increasing women's economic participation, which is necessary for growth to accelerate.

FFS as a concept incorporates a Human Rights-Based Approach in its application to improve livelihoods, expand and diversify sustainable production, increase income and productivity, and connect small scale and marginal farmers to markets. Direct measures to strengthen the government extension services' inclusive, participatory, and experience-based learning approaches, as well as the fact that trainers and facilitators are selected by farmers and their organizations, are both transparent and participatory. Women and marginalized and ethnic minority groups are included in the TP's intervention to ensure non-discrimination. Rural areas and decision makers face exclusion barriers based on income, gender, and ethnicity. The program is designed specifically to address these issues. Gender equality is ensured through a focus on female-headed households and women's selection for FFS. (DANIDA, 2016) Throughout the duration of the project, 998 IFM-FFS were formed with the participation of 26,505 farmers where there were 10,035 male members and 16,470 (62%) female members.

UNDP project official from Bandarban said that women in CHT are generally more involved in agricultural work than men, and this project further assisted women in decision-making, market access, and obtaining a fair price for agricultural products.

According to Khagrachari's Upazilla Agricultural Officer, this project reached out to the most marginalized groups, including youth and women. He added that he had previously attended a farmer field day event/field exhibition and was astounded by the involvement of women in this project, stating that women were more involved than men. The Upazilla Livestock Officer in Khagrachari said,

> *"I saw a nutrition chart for pregnant women at the farmer field day event, and I believe that this project has increased food security for women and empowered them as well."*

5.1.6 Responsiveness to political, legal, economic, institutional, etc., changes in the country

Contextual and political issues: In the CHT, risks arise from the post-conflict context, where political negotiations related to the CHT Peace Accord's implementation may result in strikes and unrest on a local level, independent of national politics. Mitigation measures have been introduced to manage relations with local people and institutions including hiring staff locally, alignment with local structures as well as national ones (where these differ); and, using local focal points to manage contacts with communities. UNDP has also developed emergency procedures and mitigation measures to deal with political unrest.

Programmatic issues: There are risks associated with a lack of sufficient staff in terms of both quantity and quality. This is especially true for Farmer Facilitators who work directly with farmers on the ground. They may leave for a variety of reasons. This can be mitigated through close supervision and prompt replacement recruitment. Additionally, there is a programmatic risk that the quality of work on the ground in terms of conducting Farmer Field Schools will deteriorate as the program's scale and institutional support requirements grow. This can be mitigated by consistent supervision, monitoring, and follow-up.

Chittagong Hill Tracts intervention carries unique risks due to the local context and post-conflict situation. Programmatic risks include the possibility that FFS participants in the CHT will be compelled to leave their homesteads despite the Peace Accord. Their land may be converted to commercial orchards or other

[7] Government of Bangladesh (2015): "7th Five-Year Plan (FY2016-FY2020) – Accelerating Growth, Empowering Citizens", pp. 12 and 680

plantations. Such threats can be assessed during FFS group formation, and connections with local institutions and leaders can be maintained to ward off such risk. The UNDP will collaborate with both government and traditional CHT institutions to mediate in such instances.

Institutional issues: There is also an institutional risk that Farmer Organizations will be captured by community elites. This is addressed through supervision and follow-up.

Farmers participating in the CHT may be impacted by nearby illegal logging, which results in increased erosion from denuded slopes, lowering the quality of cultivated lands downhill. Improved communication among community members, commercial operators, and community leaders, as well as vulnerability assessments for such threats, may help to mitigate such risks. Additionally, field personnel may be exhausted. This is due to the area's remote location and relatively difficult living conditions. It is preferable to continually train and develop additional MTs/FFs to hold in reserve for necessary backstopping.

Implementing Partner Staff of AFSP from Bandarban revealed that the project adapts to changes in the country's political, legal, economic, and institutional landscapes. As the project organizes meetings and works at the grassroots level, officials from Upazila Parishad and Union Parishad attend and are involved in selecting and monitoring farmer field schools. Additionally, they have organized a meeting with UDCC every three months to discuss all of the issues and work diligently to resolve them.

UNDP Project Officials from Rangamati stated that they have attempted to overcome obstacles that have emerged at various points in time. He uses the Covid-19 pandemic as an example, stating that they attempted adaptation during the pandemic. They divided the sessions into two sections during the covid-19 period in order to maintain social distance or other precautions. One of the Implementing Partner Staffs of AFSP project in Rangamati said that sometimes there were some political obligations when distributing support services among the farmers. About aligning the project to CHT peace accord, he said that there is social harmony among the community people because when the beneficiaries were selected, half of them were Bengali population and the other half of were hill people.

5.2 Effectiveness

5.2.1 Achievement against outcome and output indicators

As there was no baseline study completed for the AFSP phase III project, there is no baseline data available for the targeted beneficiaries. The end line study for AFSP phase II conducted in 2018 served as the baseline for this evaluation. The data of the farmers in the control group from the AFSP phase II endline study were deemed the baseline data for this evaluation study. In the hereafter, baseline will correspond to the control group data of the AFSP phase II endline study.

5.2.1.1 Outcome 1: Agricultural production of female and male marginal and small farm households increased and diversified through IFM-FFS in the CHT

Indicator 1.1: % Increase in yields and production of beneficiary households

To examine the percentage increase in yields and production of treatment households, the yield and production of grains, vegetables and spices, fruits, milk, eggs, meat, fish, cows, goats, and pigs are calculated. The results of this endline evaluation are discussed further below.

Yield of Grains

The yield of grains indicates the measurement of the amount (kg) of grain grown, or product such as rice, wheat, and maize produced, per unit (hectare) area of land. The information acquired was dependent on the farmer's memory, and its accuracy cannot be validated. In addition to that, there was no set target for the increase in the yield of grains in the project's logical framework.

The study looked into the yield of grains is estimated through `two dimensions (see Table 6). First, the average yield of grains (rice, wheat, and maize) of the treatment group farmers is compared to the baseline. The change in yields between "baseline (AFSP II project end line results of the control group farmers) and endline treatment", and also the difference in "endline treatment and endline control" is depicted both in 'kg/ha' and '%'. Second, the % of treatment HH who were able to increase their yields compared to the baseline yield average is calculated.

In the first dimension, it was observed that the yields of rice have increased significantly for treatment farmers (52%) compared to the baseline. Along with rice, the yield of maize (37%) also increased.

Moving on to the second dimension, the endline results showed that around 69 percent of the beneficiary households had increased rice yields compared to the baseline average. In this case, the average yield for rice was 3219 kg/ha in the baseline. Also, around 42 percent of the beneficiary household had increased maize yield than the baseline average. In the case of maize, the average yield was 2285 kg/ha in the baseline.

Overall, compared to the baseline the yield and production of grains for treatment farmers had increased significantly. The provision of high-quality seeds, power pumps, and power tillers are some of the key factors which have contributed to the increase of yields of rice and maize. In addition, farmers are cultivating hybrid varieties of rice. The hybrid verities have higher yields than local and high-yielding varieties of rice. By cultivating hybrid verities, farmers now produce twice as much rice as before.

Furthermore, the installment of irrigation pumps has helped the farmers in increasing their yields. Karbari from Rangamati stated that power pumps were provided by the project to irrigate the paddy fields, which doubled the average production of paddy. He added that they could only cultivate paddy once a year before the project intervention. The ease of irrigation made possible by the project enabled the farmers to cultivate a few varieties of paddy and other crops nearly year-round.

Table 6: Grain yields of treatment and control farmers during baseline and end line period of AFSP II

Grains	Baseline	Endline	Change between Baseline and Endline		Endline		Difference between Endline Treatment and Control		% of treatment HHs increased rice yields compared to the baseline average
			Kg/ha	%	Treatment	Control	Kg/ha	%	
	Kg/ha	*Kg/ha*			*Kg/ha*	*Kg/ha*			
Rice	3219	4908	1689	52	4908	4457	451	10	69%
Wheat		1703	1703		1703	359	1344	374	
Maize	2285	3122	837	37	3122	2943	179	6	42%

Yield of Vegetables and Spices

The yield of vegetables and spices indicates the measurement of the quantity (kg) of different types of vegetables and spices cultivated or produced, per unit (hectare) area of land.

Likewise, grains, the yield of vegetables is analyzed on two dimensions. In the case of yield of vegetables in the endline compared to the baseline, it is observed that vegetable yields increased significantly for treatment group farmers (216%). The highest increasing yields of vegetables are sweet gourd (310%), Radish (279%), Brinjal (251%), and Tomato (195%). Moreover, around 68 percent of the beneficiary households had increased

vegetable yields compared to the baseline average. This finding also suggests that the achievement of yield increase of vegetable crops exceeded the LF target (40%).

In terms of spices (chili, ginger, and turmeric), it is noticed that average yield of spices increased significantly for treatment group farmers (82%). The spices with the highest increasing yields are chili (124%) and ginger (100%).

Table 7: Vegetable and spice yields of beneficiary and control farmers during baseline and end line period of AFSP II

Vegetables and Spices	Baseline	Endline	Change between Baseline and Endline		Endline		Difference between Endline Treatment and Control		% of treatment HHs increased vegetables yields of compared to the Baseline average
			Kg/ha	%	Treatment	Control	Kg/ha	%	
	Kg/ha	*Kg/ha*			*Kg/ha*	*Kg/ha*			
Vegetables	**1570**	**4955**	**3385**	**216**	**4955**	**4210**	**745**	**18**	68%
Brinjal	1437	5047	3610	251	5047	4446	601	14	
Sweet gourd	1738	7125	5387	310	7125	3925	3200	82	
Marpha	1478	3831	2353	159	3831	2201	1630	74	
Tomato	1372	4048	2676	195	4048	2833	1215	43	
Radish	1789	6783	4994	279	6783	3110	3673	118	
Potato	2574	5043	2469	96	5043	4640	403	9	
Bean	1977	3794	1817	92	3794	4363	-569	-13	
Yardlong bean		4264			4264	2952	1312	44	
Okra		3624			3624	748	2876	384	
Cucumber		7935			7935	6075	1860	31	
Bottle gourd		6975			6975	8485	-1510	-18	
Spinach		990			990	1891	-901	-48	
Spices	**2846**	**4957**	**2111**	**82**	**4957**	**5831**	**-874**	**-15**	
Chili	1860	4168	2308	124	4168	3681	487	13	
Ginger	3265	6532	3267	100	6532	8848	-2316	-26	
Turmeric	3414	4171	757	22	4171	4963	-792	-16	

Source: End Evaluation Household Survey, 2022

Overall, vegetables and spices experienced improvement in terms of yield and production. The reason for the increased cultivation of vegetables can be many. Master Trainer from Bandarban also mentioned that one of the most significant achievements of the project is the cultivation of vegetables. The introduction of modern technology may become an important factor behind the increased vegetables cultivation in CHT regions. In a recent research in CHT regions, Haque et al. (2021) also indicated that modern technology combined with high-quality seeds, horticultural improvement, a good market, and value chain growth are one of the major contributors of increased vegetable agriculture.

Statistical analysis was carried out to find out relationship of AFSPIII technology adoption on productivity of improvement of sweet gourd, radish, brinjal, and bottle gourd. Significant positive correlation was found with Preparation and use of Farm Yard Manure (FYM), use of IPM techniques, use of fertilizer, and use of homesrtead planning on improving productivity of these crops of the beneficiary farmers.

Adopted technology	*Improvement of productivity of vegetables*			
	Sweet gourd	*Radish*	*Brinjal*	*Bottle gourd*
Preparation and use of farm yard manure (FYM)	0.17**	0.19**	0.03	0.09
Use of Integrated Pest Management (IPM) techniques	0.18**	0.18**	0.09	0.23**
Homestead Space Planning	0.16**	0.06	0.07	0.21**
Use of fertilizer	0.33**	0.13**	0.19**	0.22**

*** Correlation is significant at the 0.01 level (2-tailed).*

** Correlation is significant at the 0.05 level (2-tailed).*

Yield of fruits

The yield of fruits is the amount (in kg) of different kinds of fruits grown or produced per unit area of land (in hectares).

The highest increase in fruit yield of beneficiary farmers was found for Orange (502%), jackfruit (197%), papaya (143%), and pineapple (104%).

One of the main reasons for the yield of fruits is the identification of useful insects for the production and harmful insects for the production. Farmers are learning hand pollination, applying it in their farming, and ultimately it increased the cultivation of fruits. The Implementing partner staff of AFSP III from Bandarban also stated that previously farmers thought all the insects are enemies but now the project has shown by hand which insects are useful and which are not. Farmers also learned how to do hand pollination and are improving agricultural production by using the learning from FFS. One of the Master trainers from Bandarban also found significant improvement in the cultivation of fruits.

Storage/collection point is another reason for increasing the yield of fruits. Farmers can store their fruits in a specific place which will allow them to keep the fruit deliverable in the market. A proper collection point or storage can also minimize the chances of food wastage. As a result, the sale and yield will be increased. UNDP project officials of AFSPII opined that a collection point has been set up in each union through the project. The purpose of a collection point is to designate a specific place where agricultural products will be stored and sold. One of the farmer facilitators (FGD, Khagrachari) said that there is a collection point under the project and they buy and sell agricultural products in the collection point which saves their time and effort. Another farmer facilitator added that before they didn't get the proper price for their agricultural products and now, they get the proper price.

Table 8: Change in fruit yields of beneficiary and control farmers during the period of AFSPII

Fruits	**Treatment**		**Change**		**Treatment**	**Control**	**Change**	
			Baseline Treatment vs End line Treatment				**Endline Treatment vs Endline Control**	
	Baseline	*Endline*	Kg/ha	%	*Endline*	*Endline*	Kg/ha	*%*
	Kg/ha	*Kg/ha*			*Kg/ha*	*Kg/ha*		
Mango (kg/ha)	4870	7948	3078	63	7948	8646	-698	-8
Litchi (no/ha)	26471	41789	15318	58	41789	26577	15212	57
Lemon (no/ha)	17318	19807	2489	14	19807	17216	2591	15
Tamarind (kg/ha)	3335	6458	3123	94	6458	4122	2336	57

Pineapple (kg/ha)	5370	10969	5599	104	10969	13721	-2752	-20
Papaya (kg/ha)	3460	8396	4936	143	8396	7267	1129	16
Jackfruit (no/ha)	3888	11563	7675	197	11563	8474	3089	36
Orange (kg/ha)	959	5769	4810	502	5769	2921	2848	98
Other fruits:								
Malta (kg/ha)		6902			6902	6707	195	3
Watermelon (kg/ha)		49426			49426			
Sugarcane (kg/ha)		63519			63519	42153	21366	51
Woodapple (kg/ha)		13311			13311	12146	1165	10
Cashewnut (kg/ha)		3110			3110	9144	-6034	-66

To explore the connection between the AFSPIII technology adopted and the fruit productivity of the beneficiary farmers, the Pearson correlation analysis was employed (see Table 9). Here, fruit productivity is calculated by averaging all the fruit production; Technology adoption means the use of IPM techniques in production; Pruning indicates the use of pruning in fruit trees; fertilizer use suggests the use of fertilizer in fruit trees.

The Pearson correlation analysis suggests that technology adoption, use of pruning, and use of fertilizer have a positive and significant association with fruit productivity. This means that all of them are significantly assisting beneficiary farmers to increase their fruit productivity. Advanced science and technology may help to enhance the management of fruit production while also creating a favourable environment for farmers to succeed in their businesses. Advances in technology have increased the size, speed, and productivity of agricultural equipment, enabling more areas to be farmed more efficiently as a result of these advancements. Seed, irrigation, and fertilizer quality have all improved significantly in recent years, allowing farmers to enhance productivity. One of the farmer facilitators (FGD, Bandarban) mentioned that the adoption of technology is helping them with their fruit production. Additionally, Das & Mandal (2015) found that increasing agricultural productivity, particularly in the food sector, often results from the appropriate use of improved technologies.

Also, it is noticeable that the use of pruning and use of fertilizer in fruit trees also have positive and significant connections with technology adopted in production.

Table 9: Correlation of AFSPII technology adopted and fruit productivity of the beneficiary households

	Fruits productivity	*Technology adopted*	*Pruning*	*Fertilizer use*
Fruits productivity	1			
Technology adopted	0.11**	1		
Pruning	0.10*	0.35**	1	
Fertilizer use	0.08*	0.11**	0.31**	1

*** Correlation is significant at the 0.01 level (2-tailed).*

** Correlation is significant at the 0.05 level (2-tailed).*

Production of milk, egg, and meat

Table 10 outlines the production of milk and egg by the beneficiary HH. Compared to the baseline average, around 49% of the beneficiary households had increased production of cow milk with an average of 393 Litre/hh. In the baseline average production of chicken egg was 80 no./hh, around 44 percent of the households had increased production of chicken eggs with an average of 231 No/hh. It is evident from the End Line Household Survey (2022) that the production of milk (in litre) and chicken egg (in number) increased significantly compared to the baseline survey. In terms of quantity, milk production per household increased from 150 litres to 393 litres.

One of the main reasons for increasing egg production is to ensure the vaccination, vitamins, and minerals of the chicken. As a result, the chances of getting affected by many diseases have decreased over the years. One of the farmer facilitators (FGD, Rangamati) stated that because of providing vaccinations and vitamins, the chicken egg production has increased. He also mentioned that in the old system, many eggs would be wasted, and the chicken would die if the chicken hatched from the egg. But now the chicken production process has become much easier and more successful than before, which is contributing to the improvement of the economic condition of the people.

Table 10: Production of milk and egg by the beneficiary HH

Livestock product	Annual production per beneficiary HH		Change	
	Baseline	*Endline*	*Quantity*	*%*
Milk (in litre)	150	393	243	162
Chicken egg (in no)	80	231	151	188.7
Duck egg (in no)	280	69	-211	-75.4

Source: End Evaluation Household Survey, 2022

Table 11 presents the production of poultry meat of beneficiary and control farmers. In the baseline average production of chicken meat was 24.3 kg/hh, around 20 percent of the households had increased production of chicken meats with an average of 17.2 kg/hh.

The beneficiary respondent farmers produced 17.62 kg of meat of local chicken and 16.83 kg of cross chicken while control farmers produced 12.34 kg and 6 kg of local chicken and cross chicken respectively. On the other hand, beneficiary farmers produced 8 kg of local ducks whereas control farmers produced almost half of it (4.11 kg). Also, control farmers did not produce any cross duck whereas beneficiary farmers produced 5.2 kg of it.

The production of local chicken by beneficiary farmers is lower in Bandarban district (2 kg) compared to Rangamati (15.17 kg) and Khagrachari (21.74 kg). Similar scenario is observed in the production of cross chicken by beneficiary farmers. It can happen, as only one respondent from Bandarban was found in the sample.

Table 11: Production of poultry meat: a comparative scenario of beneficiary and control farmers

	Meat (kg/hh)							
	Rangamati		Bandarban		Khagrachari		All districts	
	Beneficiary	Control	Beneficiary	Control	Beneficiary	Control	Beneficiary	Control
Chicken								
Local	15.17	14.86	2	2	21.74	12.65	17.62	12.34

	Meat (kg/hh)							
	Rangamati		Bandarban		Khagrachari		All districts	
	Beneficiary	Control	Beneficiary	Control	Beneficiary	Control	Beneficiary	Control
Cross	21.75	14	2	4	12	0	16.83	6
Duck								
Local	5.91	0	8	5	11.33	5.25	8	5.2
Cross	0	0	0	0	12.33	0	4.11	0

Source: End Evaluation Household Survey, 2022

Fish production

Table 12 illustrates the production of fish by the beneficiary and control farmers. It is found that beneficiary farmers involved with pond aquaculture increased the production of fish by 32.9 percent (182 kg). In addition, creek fish production has also increased by 4.1 percent. Compared to the baseline average of 4.5 kg/decimal fish production, around 100 percent of the beneficiary households had increased production of fish with an average of 26.34 kg/decimal. The production of fish by beneficiary farmers exceeded the LF target (50%).

High-quality fish feed and seed, as well as the widespread use of induced breeding technologies are some of the key factors behind this increase. Farmers were trained on fish farming-related topics such as fish feed and seed production, fish diseases, and farming strategies that they may put to use in their own fish farming operations. As a consequence, fish farming is becoming a more popular form of farming in CHT. One of the farmer facilitators from Rangamati also stated that they had received training in fish farming, which had proven to be quite beneficial to them in their fish farming operations.

Table 12: Production of fish by the beneficiary and control HH

Type of culture (fish)	Production per HH (kg)		(kg) per HH Change in production	
	Baseline	Endline	Quantity (kg) per HH	%
Beneficiary				
Pond	553	735	182	32.9
Creek	807	840	33	4.1
Capture	647	-	-	-
Control				
Pond	209	240	31	14.8
Creek	660	700	40	6.06
Capture	888	-	-	-

Source: End Evaluation Household Survey, 2022

The correlation between technology adoption and fish production of the beneficiary farmers is presented in Table 13. The statistical analysis suggests that productivity of pond fish and creek fish are positively correlated with AFSPIII technology of adoption of preparation of the pond/creek for stocking although it is not significant. However, it suggests that the more pond/creek stocking is prepared, the production of fish will also be increased.

Table 13: Correlation of technology adoption and fish production of the beneficiary households

	Pond fish (kg/hh)	Creek fish (kg/hh)	Prepared the pond/creek for stocking
Pond fish (kg/hh)	1		
Creek fish (kg/hh)	0	1	
Prepared the pond/creek for stocking	0.22	0.11	1

Source: End Evaluation Household Survey, 2022

Cow, goat, and pig

Table 14 depicts the production of cow, goat, and pig by both beneficiary and control farmers. Compared to the baseline average of 3.2 No/hh, around 48 percent of the beneficiary households had increased rearing of goat with an average of 3.92 No/hh. On the other hand, around 6 percent of the beneficiary households had increased pig rearing from the baseline with an average of 1.74 No/hh. In this study, in almost all cases (cross cow, goat, and pig), the average number per HH was higher for beneficiary farmers than control farmers. However, the average number of local cows was equal (2.35) between beneficiary and control farmers.

In the case of value, the difference between beneficiary and control farmers was high for local (73109.13) and cross cows (39924.34).

Table 14: Production of cow, goat, and pig of beneficiary and control farmers

	Beneficiary		Control		Difference between Beneficiary and Control farmers	
	Average Number per HH	Average Value per HH	Average Number per HH	Average Value per HH	Average Number per HH	Average Value per HH
Cow						
Local	2.35	159429.76	2.35	86320.63	0	73109.13
Cross	1.55	109091	1.00	69166.66	0.55	39924.34
Goat	3.92	24381.01	3.69	18138.88	0.13	6242.13
Pig	1.74	22595.70	1.46	20845.62	0.28	1750.08

Source: End Evaluation Household Survey, 2022

Indicator 1.2: % HH intake of diversified nutritious food

The evaluation attempted to map out the extent of food security among the respondent households. From the findings it becomes apparent that the project had a good positive impact on the food security of the beneficiary households. Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (WFP, 2008). Following the WFP's universally accepted and applied definition of food security, the study team picked some of the most commonly used measures. The measures that the study team considered are: per capita caloric intake; food consumption score (FCS); household dietary diversity score (HDDS); and Food Consumption Score Nutritional Quality Analysis (FCS-N).

Around 80 percent of the beneficiary households (N=1027) produced food grains, also 98 percent of the households shared they faced no food deficiency in the last 12 months. Amongst the beneficiary households, 99 percent of them scored at least 5 on the household dietary diversity score (HDDS).

The HDDS is defined as the number of unique foods consumed by household members over a given period. In this study, the respondents were asked to recall what food items was consumed by the household members (50%) in their household over the last 7 days. The food items were then categories into different food groups for analysis. The following set of 12 food groups is used to calculate the HDDS:

A. Cereals

B. Root and tubers

C. Vegetables

D. Fruits

E. Meat, poultry, offal

F. Eggs

G. Fish and seafood

H. Pulses/legumes/nuts

I. Milk and milk products

J. Oil/fats

K. Sugar/honey

L. Miscellaneous

Scores were summed up by adding the number of food groups consumed by a household or individual respondent over a 7-day recall period. The HDDS was used in combination with the Food Consumption Score (FCS) and nutrition quality analysis (FCS-N)[89]. The Food consumption score nutrition quality analysis (FCS-N) required a minimum recall period of 7 days. For this reason, the recall period was set to 7 days. The HDDS was categorical coded into three dietary classes with the low diversity (4 or fewer foods groups), medium diversity (between 9 and 5 food groups), and high diversity (10 or more food groups).

Table 15: Respondent household dietary diversity level (N=1552)

Level of dietary diversity	Beneficiary (%)				Control (%)			
	Bandarban (n=289)	Khagrachari (n=350)	Rangamati (n=388)	Grand Total (n=1027)	Bandarban (n=200)	Khagrachari (n=189)	Rangamati (n=136)	Grand Total (n=525)
High (consume 10 or more food groups)	30.8	38.6	32.5	34	26.5	29.1	28.7	28
Medium consume (consume between 5 to 9 food groups)	69.2	60.9	66.2	65	73.5	70.4	67.6	71
Low (consume 4 or fewer food groups)	0	0.6	1.3	1	0	0.5	3.7	1

In the project intervention areas, most households (99%) consumed at least 5 food groups, which include milk, cereals, pulses, vegetables and tubers. The mean average of the HDDS was 8, which possibly reveals that most households were consuming diversified food groups.

[8] Meta Data for the Food Consumption Score (FCS) Indicator | World Food Programme. (n.d.). Retrieved 22 June 2022, from https://www.wfp.org/publications/meta-data-food-consumption-score-fcs-indicator

[9] Food Consumption Score Nutritional Quality Analysis (FCS-N)—Technical Guidance Note | World Food Programme. (n.d.). Retrieved 22 June 2022, from https://www.wfp.org/publications/food-consumption-score-nutritional-quality-analysis-fcs-n-technical-guidance-note

The Household Dietary Diversity Score (HDDS) for each household was calculated with the help of an Excel Spreadsheet. For instance, for each food group letters were assigned from A to L. The HDDS variable is calculated for each household. The value of this variable ranged from 0 to 12.

First, total number of food groups consumed by members of the household was calculated. Values for A through L will be either "0" or "1".

Sum (HDDS) = (A + B + C + D + E + F + G + H + I + J + K + L)

Second, the average HDDS indicator was calculated.

$$\text{Average HDDS} = \frac{Sum\ (HDDS)}{Total\ Number\ of\ Households}$$

The dietary diversity score varies across food groups and does not indicate the quantity of food consumed by a household. After calculating the HDDS score the household food consumption score (HFCS) was also calculated. The Food Consumption Score (FCS) is an index that was developed by the World Food Programme (WFP) in 1996. The FCS aggregates household-level data on the diversity and frequency of food groups consumed over the previous seven days, which is then weighted according to the relative nutritional value of the consumed food groups. For instance, food groups containing nutritionally dense foods, such as animal products, are given greater weight than those containing less nutritionally dense foods, such as tubers. Based on this score, a household's food consumption can be further classified into one of three categories: poor, borderline, or acceptable.

HFCS is a frequency weighted HDDS. The food items consumed by the respondents were categorized into 8 food groups for HFCS calculation. Therefore, the HFCS is calculated by using the frequency of consumption of the food groups consumed. As shown in the following equation:

FCS = (starches ×2) + (pulses × 3) + vegetables + fruit + (meat × 4) + (dairy × 4) +(fats ×0.5) + (sugar × 0.5)

In order to get a score, the weighted food groups scores were summed up, and the HFCS variable is recorded from a continuous variable into a categorical variable by using the following threshold: 0–21 (poor), 21.5–35 (borderline) and above 35 (acceptable).

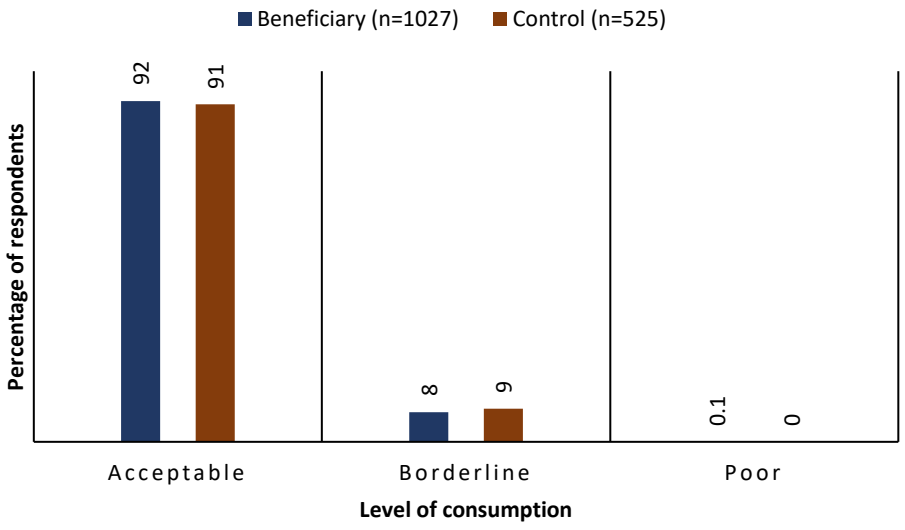

Figure 6: Food consumption level households

Results from the Household Food Consumption Score (HFCS), however, showed that the majority of the beneficiary households had adequate levels of food consumption. Most of the beneficiary household's food

security was found to be on an acceptable range (above 35) according to their food consumption score. Similar mean food consumption score was observed between the beneficiary (72) and control group (71) households.

The prevalence of households with poor and borderline food consumption provides essential information on people's current diets and is helpful in deciding the most appropriate type and scale of food security intervention as well as the right target group for the assistance. However, it remains a household level indicator and does not make the link between household access to food, individual dietary intake and nutritional outcomes - stunting, wasting and micronutrient deficiencies.

In addition to dietary diversity and food consumption level the evaluation looked into the nutritional quality of the food consumption. The analysis looks at how often a household ate foods rich in a certain nutrient. The thesis of FCS-N is that although the nutrient, for example Vitamin A, can be obtained from many foods, the number of times a household ate food particularly rich in this nutrient can be used to assess likely adequacy of that nutrient.

As the purpose of the analysis is to assess nutrient inadequacy by looking at the frequencies of consumption of food groups rich in the nutrients of interest, we first need to create the nutrient rich food groups. This is done simply summing up the consumption frequency of the food sub-groups belonging to each nutrient rich food group, following the FCS module table above:

1. **Vitamin A rich foods:** Dairy, Organ meat, Eggs, Orange veg, Green veg and Orange fruits

2. **Protein rich foods:** Pulses, Dairy, Flesh meat, Organ meat, Fish and Eggs

3. **Hem iron rich foods:** Flesh meat, Organ meat, and Fish

Some food groups appear in two of the rich food groups, because they are rich in several nutrients (i.e., eggs are rich in vitamin A and in protein). FCS-N analysis, unlike FCS, doesn't look at the diet diversity itself, but at the possible nutrient inadequacy. For this reason, double counting the foods does not hamper the analysis.

Table 16: Nutrition intake of respondent households

Food group	Treatment (n=1027)			Control (n=525)		
	Never consumed	Consumed sometimes	Consumed at least daily	Never consumed	Consumed sometimes	Consumed at least daily
Vitamin A rich foods	0%	34.3%	65.7%	0.4%	33.9%	65.7%
Protein rich foods	0.2%	41.6%	58.2%	0.2%	47.6%	52.2%
Iron rich foods	1.3%	84.3%	14.4%	1%	84%	15%

Household food consumption pattern reveals, most beneficiary households showed nutrient adequacy with daily consumption of vitamin A rich foods (65.7%), protein rich foods (58.2%), and iron rich foods consumed sometimes (14.4%). Similar pattern of food consumption was also found for the control group households.

The dietary diversity, consumption level and nutritional analysis have found similar trends in both respondents' groups. Here, the beneficiary group respondents were poor and marginal farmers. Where else the control group respondents were picked randomly from the locations. No set criteria were set for certain socio-economic status. For this reason, the control group households represented the general food consumption pattern for the CHT region. With increasing income, households switch from staple cereals to high food-value items and their consumption level increases (Mottaleb et al., 2018). Similar trend was found in this study. The below curve illustrates the rise in the income level is closely associated with increase in dietary diversity.

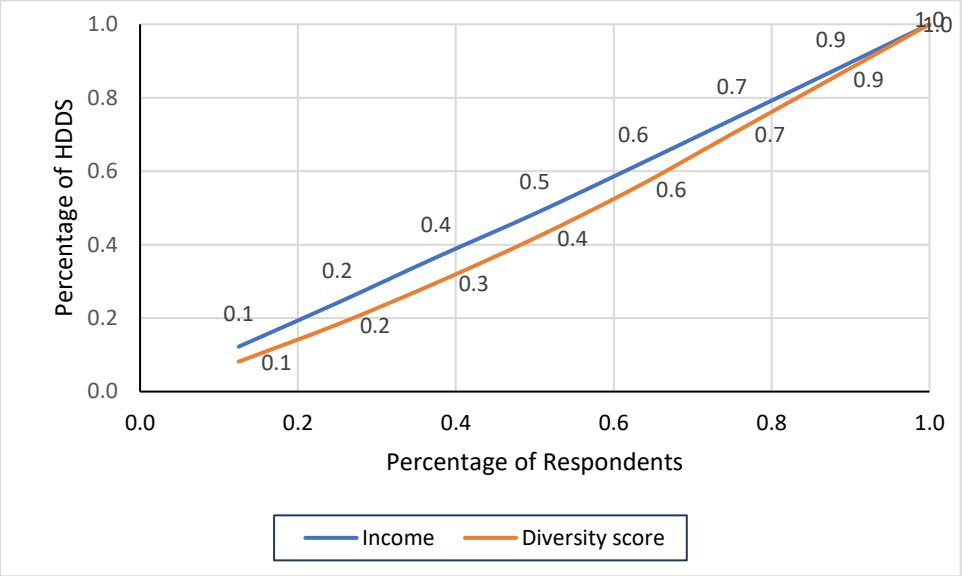

Figure 7: Curve for income against food diversity (N=1552)

The total population was divided into eight quintiles. So, each quintile contained 8 sets of data. The first quintile represents 0.1- or 10 percent-income earner, the second quintile represents 0.2- or 20 percent-income earner, the third quintile represents 0.3 or 30 percent-income earner and so on.

In addition to dietary diversity, consumption level, and consumption patter, the evaluation has looked into per capita calorie intake of the households. Per capital calorie intake reflects on individual level food security status.

The study found AFSPIII to have a good positive impact on food security of the beneficiary households. Daily Calorie intake and consumption of nutritious food of the beneficiary respondent households increased after the project. Their daily Calorie intake and consumption of nutritious food was higher that the baseline level and control group. Daily calorie intake of above 2400 increased from around 16 percent to around 32 percent among the beneficiary households and among the control households it increased from 16 percent to around 39 percent (see Table 17 and Table 18). It was found that beneficiary households consuming above 2100 Kcal is around 43 percent (n=1027) and for control households it was around 48 percent (n=525). But no significant difference was found ($p>0.05$).

According to Household Income and Expenditure Survey of 2010 the national average per capita per day calorie consumption is 2318.3 Kcal. The findings showed that the average per capita per day calorie consumption of the beneficiary households of AFSPIII was 2204 Kcal and 2336 Kcal for the control households (see Table 9).

In the context of Bangladesh, a calorie threshold of 2122 Kcal is used for determining absolute poverty, 1805 Kcal is used for hard core poverty and 1600 Kcal is used for ultra-poverty (suggested by FAO). Among the beneficiary households, about 41 percent had food consumption level over the poverty line. Where else, 39 percent of the beneficiary households fell under the ultra-poverty threshold according to their food consumption level. Around 11.8 percent of the beneficiary households fell on the absolute poverty threshold and about 8 percent fell below the hard core poverty line.

Table 17: Distribution of sample households by calorie intake level (Kcal per capita/day) (N=1027)

Kcal per capita per day	Beneficiary (n=1027)							
	Bandarban		Khagrachari		Rangamati		All	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
Below 1800	36.57	38.8	33.0	33.1	42.1	64.7	37.0	46.6
1800-2000	36.5	5.9	45.9	10.0	42.1	6.4	41.0	7.5
2001-2200	4.7	7.3	0.9	7.7	0.0	6.2	1.6	7.0
2201-2400	1.2	8.3	2.8	7.1	2.5	7.0	2.2	7.4
Above 2400	21.2	39.8	17.4	42.0	13.2	15.7	16.0	31.5

Table 18: Distribution of sample households by calorie intake level (Kcal per capita/day) (n=525)

Kcal per capita per day	Control (n=525)							
	Bandarban		Khagrachari		Rangamati		All	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
Below 1800	36.5	32.5	33.0	34.4	42.1	61.0	37.0	40.6
1800-2000	36.5	5.5	45.9	10.6	42.1	8.1	41.0	8.0
2001-2200	4.7	5.0	0.9	9.5	0.0	5.9	1.6	6.9
2201-2400	1.2	4.0	2.8	7.9	2.5	6.6	2.2	6.1
Above 2400	21.2	53.0	17.4	37.6	13.2	18.4	16.0	38.5

Dietary diversification is important in improving micronutrient nutrition. Most of the respondents' daily diet consisted of rice, some vegetables, a small number of pulses and minimal quantities of protein. Milk, milk products and meat were consumed occasionally and in very small amounts. This dietary practice has been reflected in their average daily calorie intake. Total per capita per day calorie intake for the beneficiary household was 1904 in the baseline. The end line results show 15.8 percent increase beneficiary households with average per capita per day calorie intake of 2204. The calorie intake for the control group household was 2336. Again, the beneficiary group respondents were poor and marginal farmers. Where else the control group respondents were picked randomly from the locations. In this study, the control group households represented the general food consumption pattern for the CHT region. In this context, the beneficiary group household shared similar consumption with the control group households. Taken in this context, the project was able to bring the poor and marginal households to an acceptable level of food consumption closely comparable to the general population. In addition, various underlying factors like low literacy levels, lack of suitable information services, and lack of technical competencies works as a barrier in enhancing the food security of marginalized communities (Odini, 2014). Households in environmentally endangered regions e.g. drought prone areas or river erosion affected places are more food vulnerable than those in other parts of the country (Bidisha et al., 2021).

The underlying factors must be addressed to improve the food security status of the marginalized communities. This will require a holistic approach which addresses the socio-economic barriers faced by the marginalized

communities. Any programmatic support should focus on poverty alleviation at first to ensure food security. In addition to the agricultural support, promoting alternative income generating opportunities should be considered to address underlying socio-economic condition. The Covid-19 pandemic have made the situation much worst for the poor and marginalized households. The economic consequences of lockdown for containing COVID-19 pandemic can be far reaching affecting livelihoods of millions of households. Given that the share of food consumption expenditure to total expenditure is higher in the lower income groups of Bangladesh, this shock is expected to directly affect affordability of consumption of basic food items of these households (Bidisha et al., 2021).

Table 19: Calorie intake (Kcal per capita/day) of the beneficiary respondents HH

Food item/category	Treatment (n=1027) Average Per capital Kcal/day			
	Bandarban	Khagrachari	Rangamati	All Districts
Rice	1752.0	1535.0	1342.7	1518.4
Beans and peas	134.5	115.6	58.4	99.3
Nuts and seeds	67.2	70.9	37.5	57.2
Leafy vegetables	27.1	46.8	17.1	30.0
Red/orange/yellow fruits	73.5	46.3	25.1	45.9
Red/orange/yellow vegetables	65.2	63.0	26.7	49.9
Vitamin C rich fruits	46.7	22.7	16.9	27.3
Vitamin C rich vegetables	23.4	20.7	12.9	18.5
Other vegetables	19.0	16.7	13.7	16.2
Other fruits	74.0	51.2	25.1	47.7
Eggs	17.6	21.0	11.4	16.4
Organ meat	5.1	3.3	1.4	3.1
Small fish	31.2	17.7	23.1	23.5
Large fish	24.1	27.8	15.5	22.1
Flesh meat	43.3	31.8	16.2	29.2
Dairy	7.4	12.7	4.2	8.0
Edible oil	127.0	92.4	73.8	95.1
Sugar	59.0	25.7	29.4	36.5
Spices	98.2	51.6	40.3	60.5
Total	2695.5	2272.9	1791.4	2204.8

Table 20: Calorie intake (Kcal per capita/day) of the control respondents HH

Food item/category	Control (n=525) Average Per capital Kcal/day			
	Bandarban	Khagrachari	Rangamati	All Districts
Rice	1910.9	1529.3	1268.7	1605.9
Beans and peas	147.5	121.9	61.9	116.1
Nuts and seeds	75.3	64.3	40.3	62.2
Leafy vegetables	30.6	40.4	20.7	31.6
Red/orange/yellow fruits	77.6	41.2	23.1	50.4
Red/orange/yellow vegetables	63.2	62.1	28.4	53.8
Vitamin C rich fruits	46.4	26.5	17.9	31.8
Vitamin C rich vegetables	26.9	19.8	12.5	20.6
Other vegetables	25.2	14.7	12.8	18.2
Other fruits	98.2	49.5	34.3	64.1
Eggs	20.7	20.4	12.5	18.4
Organ meat	5.0	4.0	1.8	3.8
Small fish	38.7	16.3	21.6	26.2
Large fish	30.3	26.8	20.6	26.5
Flesh meat	46.8	27.1	16.8	31.9
Dairy	9.9	12.1	3.2	9.0
Edible oil	141.4	91.7	76.2	106.6
Sugar	67.8	21.3	25.6	40.1
Spices	29.2	13.8	12.4	19.3
Total	2891.6	2203.2	1711.3	2336.5

Indicator 1.3: % of beneficiary HH in target communities with increased access to decentralized extension

Necessary support received from Government Line Departments

Table 21 presents information regarding beneficiary and control farmers on getting the necessary support from Government line departments. There are three Government extension departments: the Department of Agricultural Extension (DAE), the Department of Fisheries (DoF), and the Department of Livestock Services (DLS).

Around, 68 percent of the respondents reported to have received necessary support from the line departments. And, about 32 percent of beneficiary farmers (N= 1027) shared that they do not get necessary support from any of the Government line departments.

Beneficiary farmers from Rangamati got most of the necessary support from two departments (DoF and DLS) compared to the other two districts; 11.1 percent from DoF, and 49.0 percent from DLS. According to the

respondents, DAE provided most of the necessary support for beneficiary farmers from the Bandarban district (83.7%). It is also found that the majority of the control farmers from all three districts said that they did not get the necessary support from the three extension departments: 90.4 percent from Rangamati, 94.7 percent from Khagrachari, and 97.0 percent from Bandarban.

Table 21: Necessary support received from Government Line Departments

	% of respondents							
	Beneficiary farmers (N= 1027)			Control farmers (N= 525)			All	
	Rangamati (n= 388)	Khagrachari (n= 350)	Bandarban (n = 289)	Rangamati (n= 136)	Khagrachari (n= 189)	Bandarban (n= 200)	Beneficiary (N= 1027)	Control (N= 525)
DAE	76.5	39.7	83.7	8.1	4.8	3.0	66.0	5.0
DoF	11.1	5.1	6.9	0.7	0.0	1.0	7.9	0.6
DLS	49.0	30.6	43.6	4.4	3.7	2.0	41.2	3.2
No support received	21.9	57.1	15.9	90.4	94.7	97.0	32.2	94.5

Source: End Evaluation Household Survey, 2022

The above results indicates that, the targeted beneficiaries of the project is getting the attention of the government line departments and they are receiving necessary supports from the government line departments at a much higher rate than the non-beneficiary group. Similar results can also be seen in terms of trainings and technical support from the government line departments. This can have negative impact in the communities as it creates discriminatory practices in service delivery of the government line departments. Future programming needs to keep this in mind while project intervention, as creating linkages with government service departments has the possibility to negatively impact the community. As the government line departments are more inclined to provide their support to the project beneficiaries than to the general members of the community.

Training received from Government Line Departments

Table 22 outlines the training received by beneficiary and control farmers from the Government line departments. It is discovered that 34.8 percent of beneficiary farmers (N= 1027) did not get technical assistance from government line departments, according to the findings. To put it another way, the vast majority of respondents (65.2 percent) received technical assistance from one of the three government line departments.

DAE (63.5%) and DLS (39.4%) provided most of the technical support to beneficiary farmers among the three departments. It suggests that the agricultural extension and livestock departments contributed highly in the crop and livestock production. Also, the Department of Livestock Officer (DLO) from Rangamati stated that his department provided all the technical support that farmers required for their farming.

In comparison to the other two districts, Rangamati's beneficiary farmers received the majority of their training from two departments (DoF and DLS); 9.5 percent from DoF, and 48.5 percent from DLS. According to respondents, DAE offered the majority of training to the Bandarban district (83.7%). However, most of the respondents (95.2%) from the control group in all three districts shared that they did not receive training from Government line departments.

Table 22: Training received from Government Line Departments

	% of respondents							
	Beneficiary farmers (N= 1027)			Control farmers (N= 525)			All	
	Rangamati (n= 388)	Khagrachari (n= 350)	Bandarban (n = 289)	Rangamati (n= 136)	Khagrachari (n= 189)	Bandarban (n= 200)	Beneficiary (N= 1027)	Control (N= 525)
DAE	75.0	32.0	86.2	8.1	2.6	3.5	63.5	4.4
DoF	9.5	3.1	6.9	1.5	0.0	0.5	6.6	0.6
DLS	48.5	26.6	42.9	3.7	2.1	3.0	39.4	2.9
No support received	22.7	65.7	13.5	90.4	97.4	96.5	34.8	95.2

Source: End Evaluation Household Survey, 2022

Technical support received from Government Line Departments

The percentage of farmers that received technical support from government line departments is presented in Table 23. 31 percent of beneficiary farmers (N= 1027) opined that they did not receive support from any Government line departments. Just like necessary and training support, DAE (67.4%) and DLS (40.3%) provided most of the technical support to beneficiary farmers among the three departments. Sub-Assistant Livestock Office from Rangamati said that in terms of the amount of technical support, they have given the farmers the technical support such as harvesting techniques, modern cow fattening, modern breeding support for improved breeds of cows, etc.

Among the control group farmers, 85.3 percent from Rangamati, 94.2 percent from Khagrachari, and 96.5 percent from Bandarban indicated that they did not get technical assistance from government line departments.

Table 23: Technical support received from Government Line Departments

	% of respondents							
	Beneficiary farmers (N= 1027)			Control farmers (N= 525)			All	
	Rangamati (n= 388)	Khagrachari (n= 350)	Bandarban (n = 289)	Rangamati (n= 136)	Khagrachari (n= 189)	Bandarban (n= 200)	Beneficiary (N= 1027)	Control (N= 525)
DAE	82.2	35.4	63.5	4.4	5.8	4.0	67.4	6.9
DoF	9.8	1.7	6.6	0.6	0.0	0.5	6.1	0.6
DLS	51.5	25.1	39.4	2.9	4.2	3.5	40.3	4.6

	% of respondents							
	Beneficiary farmers (N= 1027)			Control farmers (N= 525)			All	
	Rangamati (n= 388)	Khagrachari (n= 350)	Bandarban (n = 289)	Rangamati (n= 136)	Khagrachari (n= 189)	Bandarban (n= 200)	Beneficiary (N= 1027)	Control (N= 525)
No support received	15.7	62.6	34.8	95.2	94.2	96.5	31.0	92.8

Source: End Evaluation Household Survey, 2022

Assistance received from the service providers

The local service providers promoted by AFSPIII were Nursery Growers (NG), Community Livestock Worker and Community Poultry Worker (CPW), And Community Aquaculture Resource Persons (CARP). The project organized training for community level service providers on agricultural services. This helped the community as well as created alternative livelihood for many people.

Table 24 outlines the percentages of beneficiary and control farmers that received assistance from the private sector. Overall, it is found that 89.7 percent of the beneficiary farmers (N=728) received assistance from CLW.

Beneficiary farmers from all three districts received assistance from CLW; 95.7 percent from Rangamati, 76.0 percent from Khagrachari, and 93.1 percent from Bandarban. On the other hand, control farmers from Rangamati (94.1%) and Khagrachari (68.4%) received the most assistance from CLW although Bandarban's control farmers received the most assistance from NG.

CPW provided most of their asssistance to Rangamati farmers (49.3% from beneficiary groups and 41.2% from control farmers). The assistance from CARP to beneficiary farmers is almost similar in all districts. Nevertheless, the beneficiary (2.3%) and control group (0.0%) of farmers from Rangamati district got minimum assistance from Nursery growers.

Table 24: Assistance received from the private sector

	% of respondents							
	Beneficiary farmers (N = 728)			Control farmers (N = 65)			All	
	Rangamati (n = 304)	Khagrachari (n = 192)	Bandarban (n = 232)	Rangamati (n = 17)	Khagrachari (n = 38)	Bandarban (n = 10)	Beneficiary (N= 728)	Beneficiary (N= 65)
CLW	95.7	76.0	93.1	94.1	68.4	50.0	89.7	72.3
CPW	49.3	25.5	46.1	41.2	31.6	30.0	42.0	33.8
CARP	24.0	25.0	32.8	5.9	21.1	20.0	27.1	16.9
NG	2.3	15.6	32.8	0.0	2.6	70.0	15.5	12.3
Note: CLW = Community livestock workers; CPW = Community poultry workers; CARP = Community Aquaculture Resource Persons; NG = Nursery growers								

Source: End Evaluation Household Survey, 2022

Indicator 1.4: % of HH which adapted climate resilient technology

The AFSPIII delivered over 75 agricultural technologies through FFS. Among the beneficiary farmers, 98.2 percent of them had adopted at least one of the climate resilient technology. Among the respondents, 198 farmers are involved with poultry farming and 58 of them prepared and used improved egg hatching pan for chicken, and 27 of them have used laying and broody hen management technology. As such, farmers were using technologies which were relevant to the particular farming component they were involved with. The below table provides an overall picture of the most popularly used farming technologies among the beneficiary farmers.

On the other hand, among the control group farmers, 65.2 percent of them had adopted at least one of the climate resilient technology. According to the beneficiary farmers from the FGDs, they practiced IFM technologies, and their agricultural productivity have increased. The highly preferred technologies they mentioned, were:

- Homestead space planning
- Preparation and use of Farm Yard Manure (FYM)
- Hand pollination in Cucurbits
- Use of IPM techniques in vegetables, fruits, field crops, Jhum crops
- Use of pruning, training in fruit trees
- Use of fertilizers in fruit trees
- Line sowing/transplantation in rice field
- Prepared and using improved egg hatching pan for chicken
- Laying and broody hen management
- Vaccinated chicken, duck, goat, pig, cattle etc
- Provide supplementary feed to cattle, goat, pig
- Manage good housing for cattle, goat and pigs
- Prepare the pond/creek for stocking
- Utilize the seed treatment technique in ginger and turmeric
- Storing of ginger and/or turmeric seeds
- Cultivating Vegetable in pit/bed
- Covering the roots of trees with straw, leaves, etc. to keep them moist or to control weeds
- Piglet/pig fattening
- Pig rearing
- Beef fattening
- Cattle rearing
- Use of soil health management techniques
- Preparation of ideal seed bed for rice
- Fish fingerling stocking and post stocking feed management in pond/creek
- Partial harvesting and restocking of fish/fingerling in pond/creek

Table 25: Most popular IFM technology in terms of percentage of farmers adopting these (n=887)

Technology	Beneficiary			
	Rangamati	Khagrachari	Bandarban	All
Homestead space planning	80.3%	57.3%	57.0%	63.6%
Preparation and use of Farm Yard Manure (FYM)	43.8%	27.1%	42.3%	36.7%
Hand pollination in Cucurbits	36.5%	6.8%	10.3%	16.3%

Technology	Beneficiary			
	Rangamati	Khagrachari	Bandarban	All
Use of IPM techniques in vegetables, fruits, field crops, Jhum crops	29.7%	19.1%	55.0%	33.8%
Use of pruning, training in fruit trees	30.1%	23.9%	61.5%	37.9%
Use of fertilizers in fruit trees	59.4%	35.0%	47.4%	45.9%
Line sowing/transplantation in rice field	49.4%	46.4%	25.4%	40.4%
Prepared and using improved egg hatching pan for chicken	14.1%	6.6%	10.3%	9.9%
Laying and broody hen management	4.0%	4.3%	7.9%	5.4%
Vaccinated chicken, duck, goat, pig, cattle etc	14.9%	14.2%	21.6%	16.8%
Provide supplementary feed to cattle, goat, pig	11.2%	8.5%	27.8%	15.6%
Manage good housing for cattle, goat and pigs	12.0%	27.6%	28.5%	23.6%
Prepare the pond/creek for stocking	2.8%	.6%	4.8%	2.6%
Utilize the seed treatment technique in ginger and turmeric	7.2%	2.0%	18.9%	9.0%
Storing of ginger and/or turmeric seeds	14.1%	4.3%	23.0%	13.1%
Cultivating Vegetable in pit/bed	37.8%	29.9%	19.6%	28.7%
Covering the roots of trees with straw, leaves, etc. to keep them moist or to control weeds	2.0%	2.8%	5.8%	3.6%
Piglet/pig fattening	28.5%	.9%	6.5%	10.4%
Pig rearing	5.2%	2.3%	7.9%	4.9%
Beef fattening	22.1%	4.3%	7.9%	10.4%
Cattle rearing	6.4%	14.0%	14.4%	12.0%
Use of soil health management techniques	3.6%	3.1%	17.2%	7.9%
Preparation of ideal seed bed for rice	11.6%	14.8%	15.1%	14.0%
Fish fingerling stocking and post stocking feed management in pond/creek	.4%	0.3%	1.7%	.8%
Partial harvesting and restocking of fish/fingerling in pond/creek	0.0%	0.6%	1.7%	.8%

Indicator 1.5 % of GoB Line Department offers that provided follow up support

Table 26 presents information on the follow-up support from government line departments. It is found that 35.9 percent of the beneficiary farmers did not get any follow-up support from Government line departments. In other words, it can be seen that 64.1 percent of the beneficiary farmers received follow-up from any of the three Government line departments.

All three districts received most of the follow-up support from DAE (Bandarban- 81.3%, Rangamati- 67.8%, and Khagrachari- 31.3%). DoF provided the least amount of follow-up support compared to the other two

departments in all three districts. It is also noticeable that most of the beneficiary farmers from the Khagrachari district (64.3%) did not get follow-up support from the government line departments.

Like beneficiary farmers, control farmers received the least number of follow-up support from DoF. Nevertheless, most of the control farmers (94.1%) shared that they did not get follow-up support from government line departments.

Table 26: Follow-up support from Government Line Departments

	% of respondents							
	Beneficiary farmers (N= 1027)			Control farmers (N= 525)			All	
	Rangamati (n= 388)	Khagrachari (n= 350)	Bandarban (n = 289)	Rangamati (n= 136)	Khagrachari (n= 189)	Bandarban (n= 200)	Beneficiary (N= 1027)	Control (N= 525)
DAE	67.8	31.3	81.3	2.9	4.2	3.5	59.1	3.6
DoF	9.3	1.4	6.9	1.5	0.0	0.5	5.9	0.6
DLS	50.5	26.3	43.9	6.6	4.8	3.0	40.4	4.6
No support received	25.8	64.3	15.2	91.2	94.2	96.0	35.9	94.1

Source: End Evaluation Household Survey, 2022

5.2.1.1.1 Output 1.5 Access to market linkages (Input-output) promoted and facilitated

Access and satisfaction with quality agricultural inputs

Table 27 presents the access of farmers to quality agricultural inputs. In this project, 349 FFS communities and 282 non-FFS communities were connected to 104 collection points. Around 50% of beneficiary farmers had access to quality agricultural inputs. Where else, only 6.3 percent of control farmers have access to quality agricultural inputs. Furthermore, it is noticeable that most of the beneficiary farmers from Rangamati and Bandarban have access to quality agricultural inputs. However, only 22.6 percent of beneficiary farmers from Bandarban have access. On the other hand, almost all control farmers from all three districts did not have access to quality agricultural inputs (95.6% from Rangamati, 100.0% from Khagrachari, and 86.5% from Bandarban).

Table 27: Access to any quality agricultural inputs (for example seed, fertilizer, sapling, fingerling, animal feeds, fishing net, vermi/warm supplier etc.)

Access to any quality agricultural inputs	% of respondents							
	Beneficiary				Control			
	Rangamati	Khagrachari	Bandarban	All	Rangamati	Khagrachari	Bandarban	All
Yes	68.3%	22.6%	57.4%	49.7 %	4.4%	0.0%	13.5%	6.3%
No	31.7%	77.4%	42.6%	50.3 %	95.6%	100.0%	86.5%	93.7 %

The satisfaction level of farmers with the quality of agricultural inputs is illustrated in Table 28. 71.3 percent of the farmers showed very dissatisfaction with the quality of agricultural inputs where 28.4% of them were somewhat satisfied with the quality. It is also noticeable that 74.5 percent of beneficiary farmers were very

satisfied with the quality of agricultural inputs while only 21.2 percent of control farmers showed very satisfaction with the quality. Furthermore, in all three districts, most of the beneficiary farmers were very satisfied (66.8% from Rangamati, 55.7% from Khagrachari, and 95.8% from Bandarban).

Table 28 also includes the percentages of both beneficiary and control farmers satisfied with agricultural inputs (seed, fertilizer, sapling, fingerling, animal feeds, fish feed, fishing net, bucket, vermi/warm). Top three agricultural inputs in terms of satisfaction for beneficiary farmers are seed (91.3%), fertilizer (73.2%), and sapling (39.2%). On the other hand, the highest satisfaction of control farmers come from fertilizer (100%), sapling (100%), and seed (83.3%).

Table 28: Satisfaction with the quality of agricultural inputs? (For example seed, fertilizer, sapling, fingerling. animal feeds, fishing net, vermi/warm supplier, etc.) And agricultural inputs name

Satisfaction level of the quality of agricultural inputs	% of respondents							
	Beneficiary				Control			
	Rangamati	Khagrachari	Bandarban	All	Rangamati	Khagrachari	Bandarban	All
Very satisfied	66.8%	55.7%	95.8%	74.5%	0.0%		25.9%	21.2%
Somewhat satisfied	32.8%	43.0%	4.2%	25.1%	100.0%		74.1%	78.8%
Neither satisfied nor dissatisfied	.4%	1.3%	0.0%	.4%				
Access to inputs								
Seed	91.3%	97.5%	90.4%	92.0%	83.3%		59.3%	63.6%
Fertilizer	73.2%	70.9%	95.2%	80.0%	100.0%		88.9%	90.9%
Sapling	39.2%	22.8%	84.3%	51.4%	100.0%		33.3%	45.5%
Fingerling	.4%	0.0%	19.9%	6.7%				
Animal feeds	20.8%	3.8%	27.1%	20.2%	83.3%		0.0%	15.2%
Fish feed	.8%	1.3%	1.8%	1.2%				
Fishing net	2.6%	1.3%	1.8%	2.2%				
Bucket	44.5%	1.3%	15.7%	28.4%	33.3%		0.0%	6.1%
Vermi/warm	.8%	0.0%	7.8%	2.9%				
Others	.8%	0.0%	.6%	.6%				

5.2.1.1.2 Output 1.1 Community groups and stakeholders mobilized through the establishment of IFM-FFS

Indicator 1.1.1 # of FFS formed/established, including women (50%) and men participated in mobilisation initiatives

A total of 998 IFM-FFS were formed and established, with a total of 26,505 farmers participating (M: 10,035; F:16,470). Women participated at a rate of 62%. The formation and establishment of IFM-FFS include mobilization meetings with each community's farmers, primary listing of interested farmers, resource mapping, assessing farmers' farming needs, finalizing the list of interested farmers, developing curricula, and conducting sessions for 15 months, including three months for follow-up, while maintaining a participatory, hands-on,

experiential, and discovery-based learning approach in each community. Throughout the project phase, trained Farmer Facilitators, project human resources such as Master Trainers, Upazila FFS Coordinators, and local stakeholders played a critical role in the formation, mobilization, and establishment of IFM-FFS in selected communities.

Mobilization meeting of stakeholders (UzDCC, UDCC, HDC, and GoB, among others) on FFS at the Upazila level

Stakeholder (UzDCC, UDCC, HDC, and GoB) mobilization meetings at Upazila level were organized in 2018 and respective stakeholders with their respective institutions extended cooperation and support in implementing IFM-FFS activities in all selected communities.

Training for PDC Executive Committee members

A total of 2,265 PDC executives and para/village representatives were trained on the IFM-FFS implementation process, monitoring, and the role of PDCs in 60 batches (BHDC-8, RHDC 25, KHDC-27). In turn, trained personnel provided assistance and support with mobilization, the selection of Farmer Facilitators, implementation, and monitoring of IFM-FFS activities in respective communities. Each training session averaged 38 participants, with 26 percent of participants being women.

FFS and community mobilization

AFSP III communities were selected following a rigorous screening process that included consultations and meetings with stakeholders at the para/village, union, upazila, and district levels, project team members, and government line departments. All selected communities, para/villages, and stakeholders were mobilized through a series of initiatives, which included training Para/Village and PDC executives, meetings with local communities, FFS formation meetings, and stakeholder orientation. Additionally, the existing Para Development Committee (PDC) and trained village/PDC Executive members were tasked with mobilizing farmers and establishing a Farmer Field School (FFS) in their respective communities.

Facilitators (FF) selection

A total of 336 Farmer Facilitators (112 female and 224 male) were selected using the Farmer Facilitator selection guideline. The majority of farmer facilitators were chosen in 2018 and 2019. The selection process entails identifying interested real farmers from local communities, screening, administering an aptitude test, making a preliminary selection, and enrolling them in training to demonstrate their suitability as Farmer Facilitators. A series of initiatives guided by a systematic process to identify the most qualified candidate for Farmer Facilitator. 33% of Farmer Facilitators are female.

FFS sessions at the community level

Throughout the project, 34819 FFS sessions were conducted with an average of 23 farmers per session, and approximately 60 percent of participants were women. Around 35 sessions were held at each IFM-FFS, with an average of 88 percent of farmers participating in each session. IFM-FFS farmers gained season-long knowledge of improved farming practices, including management of farm components, through conducted sessions that included participatory, hands-on, learning by doing, sharing of experience, and experimentation. These sessions resulted in sustained increases in farm productivity and profits.

Capacity building training for project staff

AFSP III trained its staff in community mobilization, supervision, and monitoring in a variety of slots to accommodate the needs and functions of different staff groups, which resulted in an effective mechanism for managing community mobilization, supervision, monitoring, and reporting requirements for project interventions. At the project's launch, a total of 56 project staff (13 female, 43 male) were trained through an orientation on AFSP III, the roles of various staff, and monitoring field activities. This provided them with a clear understanding of their roles in achieving the project's objectives.

A total of 26 staff members (19 male and 7 female), primarily Upazila FFS Coordinators, Monitoring and Reporting Officers, and District Officers, received training on community mobilization, IFM-FFS implementation, and field activity monitoring in order to provide necessary support for project implementation, including monitoring. A total of 33 project staff members (27 men and 6 women) were organized around the AFSP III's community mobilization, supervision, monitoring, and reporting mechanisms. Through this training, participants gained a firm grasp on their respective roles in community mobilization, supervision, and monitoring. Additionally, they gained practical experience with monitoring and reporting tools and techniques, data collection and quality control mechanisms, dataflow and reporting diagrams, and database data entry and maintenance.

During the COVID-19 pandemics, two virtual orientation sessions on six-monthly and annual data collection were held for data collectors and monitors. All parties involved participated in virtual orientation training. During the COVID-19 pandemic, a virtual training on quarterly reporting was held with approximately 60 participants from HDCs, NGOs, and UNDP colleagues. Female participants made up 8% of the total.

Farmers Field Day

Over the course of the project's duration, 896 festoons (14 distinct types) were designed, printed, and distributed for use in Farmer Field Day. The printed festoons have been used at all organized Farmer Field Days and have been found to be an effective method of disseminating technologies, including education, to larger farming communities. Among the total respondents, 46 percent (Treatment 68.5%, Control 1.3%) shared they have participated in the farmers field day event. Although the participation from the beneficiary group was apparent from the evaluation results, participation from the control group was not much. Only about 1 percent (n=525) of the control group respondents reported to have participated in the farmers field day events. Where else, around 69 percent of the beneficiary respondent have participated in such events. The aim with which the farmers field day events were organized may have taken a hit due to lack of participants from the communities. Also, 92 percent (n=1027) of the beneficiary respondents have shared they have encouraged their family members (90%), relatives (94%), neighbours (97%), and people from neighbouring communities (28%) to participate in the events. In this regard, it is important to encourage participation of non-beneficiary farmers in the communities for effective knowledge sharing and disseminating technology.

5.2.1.1.3 Output 1.2 IFM-FFS Curricula Developed and Promoted

Indicator 1.2.1 # of modules developed with inclusion and testing of relevant farming HH's resilience on climate change issues into FFS curriculum

IFM-FFS Curricula

There have been several rounds of consultation with various levels of stakeholders including farmers, representatives from the local community, Farmer Facilitators, project staff and local government officials, GoB line department officers and scientists from CHT research institutions to develop the FFS curricula for AFSP III. While preparing a curriculum for CHT farmers, curriculum developers looked at a variety of secondary resources, drew on their own experience with similar programs at other schools, and developed concrete recommendations for how to best implement those ideas. Over the course of the project, the Curriculum Development Team (CDT) was in charge of developing, reviewing, and updating the curriculum. As living documents, IFM-FFS curricula also address the HH's resilience.

One curriculum and 11 different types of learning modules (60 sessions) were developed which included preparatory work, vegetable gardening, fruit gardening, rice cultivation; poultry and pig rearing; cattle rearing; pond/creek fish culture; marketing; nutrition; and high-value crops. The curricula and menu modules of the IFM-FFS are living documents that are constantly updated to meet the needs of farmers. Printing and distribution of 1,750 FFS copies of registers did take place.

Each concern received 1,750 FFS copies of the registers. The register contains detailed information about FFS, such as community resources, farmer enrolment and attendance at sessions, information about study plots and farmer reactions, as well as monitoring feedbacks.

Visibility and communication materials

AFSP III developed and printed various types of visibility and communication materials, including calendars, desk calendars, and other corporate visibility materials, which were also printed and distributed to AFSP III stakeholders and beneficiaries.

A single project brochure was created and printed in 2,000 copies for distribution to stakeholders during site visits. The printed brochure summarizes the project's objectives, arrangements, implementation, and results.

5.2.1.1.4 Output 1.3 Knowledge and skills of CHT stakeholders [Master trainers, FFS Facilitators, Government of Bangladesh (GoB) Officers enhanced

Indicator 1.3.1- # of Master trainers, FFS Facilitators, Government of Bangladesh (GoB) Officers

The project strengthened the capacity of relevant stakeholders to enhance service quality, knowledge and skill development, and to increase their understanding of how to conduct project interventions smoothly. Capacity development activities include ToT for Master Trainers on IFM-FFS, season-long ToF for Farmer Facilitators on IFM-FFS, refresher ToF for Farmer Facilitators, and training for GoB line department officers on IFM-FFS implementation and monitoring, among others.

The development of 28 Master Trainers (31% women), 187 government officials, and 336 Farmer Facilitators (33% women) enabled the establishment of 998 IFM-FFSs in local communities. Through 27 days of residential training in four spells in CHT, the AFSP III developed 28 Master Trainers (female 08 and male 20) to roll out ToF sessions for Farmer Facilitators. Twenty project participants (MTs and UFFSCs) and eight GoB line department officers attended the course. The course schedule details the curriculum's contents, facilitation skill development, and extracurricular activities necessary to progress a participant to Master Trainer status. Apart from project resources, trained MTs from GoB line departments made significant contributions in implementing ToF for Farmer Facilitators and providing backstopping support for IFM-FFS implementation in local communities. Additionally, the project developed three Master Trainers who filled in for trained Master Trainers who dropped out following a 21-day Master Trainer training on IMF-FFS organized by sister component SHARIP.

Adding to that, over the course of the project's duration, a total of 336 Farmer Facilitators (female 112 and male 212) were developed through a ToF course for Farmer Facilitators on IMF-FFS. The course is 36 days long, divided into four spells (9 days each). Additionally, throughout the project's duration, a total of 170 Farmer Facilitators (61 female, 109 male, 36% female) had their knowledge and skills refreshed through a nine-day refresher ToF course on IFM-FFS for Farmer Facilitators.

Indicator 1.3.2- % of trained CHT stakeholders who believe their knowledge and skills on IFM-FFS have increased after training

A total of 187 GoB line department officers were trained in seven batches on IFM-FFS implementation and monitoring, after which they visited IFM-FFS communities for follow-up. This evaluation did not conduct a survey of GoB line department officers due to the evaluation team's difficulty in reaching all trained CHT stakeholders. There was a time constraint, and the scope of the study precluded this as well. However, the completion report of the AFSP III project suggests that. 97 percent of IFM FFS CHT stakeholders (9% of whom are women) reported that the project improved their knowledge and skills regarding IFM-FFS through comprehensive training. The following table contains information about training batches organized by HDC;

Table 29: Training batches organized by HDC

Area	# of training	Male	Female	Total
Bandarban HDC	2	50	5	55
Khagrachari HDC	2	44	5	49
Rangamati HDC	3	63	10	73
Total	7	157	20	187

5.2.1.1.5 Output 1.4 IFM-FFS implemented through participatory and' learning by doing approach.'

Indicator 1.4.1 % of IFM-FFS participants graduated (disaggregated by sex and age) with 50% women

Throughout the project's duration, a total of 26190 farmers (out of 26505 farmers) of IFM-FFS participants graduated after attending at least 25 sessions over a 12-month learning cycle. Of which 62 percent were women.

The results of the evaluation are similar. Around 92 percent of the people who took part in the IFM-FFS have graduated, with 59 percent of them being women and 41 percent being men. In addition, 92 percent of the participants of IFM-FFS shared the learnings with their family (86%), relatives (96%), neighbours (96%), other community members and friends (28%).

5.2.1.2 Outcome-2: Hill District Councils (HDC) are managing transferred agricultural services in line with CHT Peace Accord

Indicator 2.1.1 # of coordination meetings organized

During the project implementation period, a total of 335 bimonthly FF coordination meetings, 110 AFSP staff coordination meetings, 45 Project Implementation Committee meetings, and 23 District Working Group meetings were held with a total of 7960 participants (female-1771) to review and plan the project and associated activities, as well as those vested to manage the transferred agricultural services by Hill District Councils.

The bi-monthly FF Coordination meetings were organized at the Upazila level, with the active participation of 5420 field farmers (1443 of whom were female). The monthly FF Coordination meeting serves as the platform at the Upazila level for reviewing and planning the project and its associated linked activities.

Additionally, 23 District Working Group (DWG) meetings were held with the active participation of 170 Hill District Council members, district level officers from three-line departments (DLS, DAE, and DoF), and an AFSP District Officer. Apart from AFSP III-related activities, the quarterly DWG coordination meetings addressed inter-departmental coordination issues. The DWG meeting has aided in the improvement of Hill District Councils' coordination and management functions in order to manage transferred agricultural services in accordance with the 1997 Peace Accord. As a result of these initiatives, 03-line departments have formed a coordination mechanism between Hill District Councils and within line departments to investigate and extend support for one another's interconnected needs.

Indicator 2.1.2: # of consultative workshops organized

Over the course of the project's duration, 68 planning and review meetings/workshops were held in the working areas. The total number of participants was 590, with 560 males and 30 females. Participants discussed the current status of project activities and shared their lessons learned and project successes, as well as identify areas for capacity building, prepare for government visits, and determine a sustainable path forward. However, this evaluation found no evidence of consultative workshops being held as part of the project's activities.

Indicator 2.1.3: # of local resilience plans supported

Across the project's duration, 14 local resilience plans (Khagrachari-6 and Rangamati-8), covering seven Upazilas, were developed with the assistance of community members and the Climate Resilience Committee

(KHDC- 3 and RHDC-4). According to the completion report of the AFSP III project, the majority of programs are currently being reviewed and evaluated by HDC and project staff for economic and environmental viability.

Indicator 2.2: Coordination mechanism among the transferred departments related to agriculture services strengthened with functional agricultural planning Unit under the leadership of HDCs

The outcome focuses on strengthening the HDCs' capacity to manage agricultural services decentralized through the CHT Peace Accord and subsequent legal reforms - the Peace Accord transfers 33 functions and powers to the HDCs, including agricultural services. Although extension departments and other line departments have been formally transferred to Hill District Councils, head offices in Dhaka continue to manage resources. As a result, HDCs have limited institutional capacity to carry out their mandates, and cross-cutting coordination with other relevant government agencies could be strengthened. Improved coordination and management functions, including the regulatory framework for HDCs managing transferred agricultural services, are anticipated as a result of enhancing the HDCs' capacities. There were four district working group meetings held during the project period. These meetings expedite agricultural activities through a variety of decisions, including the following:

- Line Department Officers will participate in bimonthly farmer supportive coordination meetings at the Upazila level.
- Line Department Officers will participate in and advise on regular monitoring visits to Farmer Field School.
- The Department of Agricultural Extension, the Department of Livestock, and the Department of Fisheries will provide farmers with training on a variety of materials, including seeds, seedlings, fingerlings, and vaccines.
- o Through mobile phones, Farmer Assistants and Farmers will be able to seek advice from Line Department officials.

5.3 Efficiency

Efficiency is defined as "The extent to which the intervention delivers, or is likely to deliver, results in an economic and timely way" in the 'Revised Evaluation Criteria Definitions and Principles for Use' by the OECD/DAC Network on Development Evaluation. Following the guideline, the study team looked at inputs relative to the entire results chain (outputs, outcomes and impacts), in line with good evaluative practice. It is recognised that analysing the entire results chain, and in particular looking at the efficiency of inputs to impacts, is methodologically challenging. Lack of relevant information often makes the process of examining the efficiency of the project challenging in terms of financial analysis. Due to the frequent absence of benchmarking data, the study team often used the reference to effectiveness, impacts and sustainability apart from using information obtained through interviews conducted with key informants. Below SUB-section includes a discussion of cost-effectiveness related to project interventions in AFSP III. Subsequent sub-sections deal more explicitly with the implementation strategy and execution, institutional set-up and M&E system, fund availability and timeliness of AFSP III.

Cost-effectiveness

When attempting to calculate the costs of AFSP III, it was critical to first determine which costs to include. The major project costs can be grouped into three groups, according to the most frequently used categories in the reference literature: i) base costs, ii) start-up costs, and iii) recurrent costs.

Costs also vary according to the stage of development: i) as a pilot, ii) as an up-scaling effort, or iii) as a consolidation effort. The pilot phase's base costs are typically high. When FFS leveraged existing 'infrastructure' (organisation, human capacity, etc.), these costs are significantly reduced. Typically, the start-up costs are high during the pilot phase, when human capacity must be developed through training-of-trainers courses, frequently with the assistance of technical assistance. The actual costs will therefore vary according to the availability of qualified local experts and the level and intensity of training required.

Recurring costs typically decrease over time as a result of more efficient management, more experienced FFs (requiring less intensive supervision), reduced financial incentives for FFs, and/or the elimination (or reduction) of participant incentives. Additionally, scaling-up can lower input costs through potential bulk purchases and relatively low administration costs. The recurring costs of an FFS are largely determined by the salaries and transportation of the trainers/facilitators and the training venue.

Additionally, the value assigned to these costs will be highly dependent on the particular topics, the country's socioeconomic conditions, and the geographical 'density' of FFS. This will have an effect on input costs, salary and benefit costs, and transportation costs, among other things.

According to the AFSP III's completion report, the project's budget was DKK 37 million (USD 5.75 million, 468 million BDT), which was received in four stages. The project established 998 Integrated Farm Management-Farmer Field Schools (IFM-FFS) and covered 26,505 farmers (female-16,470, male- 10,035; 62% women).

Following an examination of the four-year AFSP implementation period, the average yearly gain in total income for FFS members was BDT 4596, according to the findings (from BDT 128206 to BDT 132802). The agricultural net income is increased by 9 percent last year while the income from non-agricultural sector decreased by 35 percent. Overall, the yearly net income of beneficiary farmers climbed by 4 percent, expressed as a proportion of their total annual revenue. For particular areas, it is found that crops, fruits, livestock, fish all increased significantly. More specifically, the gross income of fish and livestock all were increased.

Table 30: Costs and incomes related to agricultural and non-agricultural production in beneficiaries of AFSP III

	Beneficiary		Control	Change (Annual incremental gross income)			
	Tk/HH		Tk/HH	Baseline Beneficiary vs End line Beneficiary		Endline Treatment vs Endline Control	
	Baseline	Endline	Endline	Tk/HH	%	Tk/HH	%
Crops	90223	109521	60228	19298	21	49293	82
Fruits	74510	98894	77759	24384	33	21135	27
Livestock	36796	68672	54635	31876	87	14037	26
Fish	4356	13140	5139	8784	202	8001	156
Total Ag. gross income	205886	290227	197761	84341	41	92466	47
Total Ag. Net income	113237	123113	66710	9876	9	56403	85
Non-Ag. Income	14969	9689	15383	-5280	-35	-5694	-37
Total net Income	128206	132802	82093	4596	4	50709	62

UNDP project implementation strategy and execution

The following objectives were prioritised during drafting the implementation strategy:
(i) Collaborate with stakeholders and mobilise local communities to ensure the project's sustainability.
(ii) Develop and disseminate demand-driven curricula and modules that address the needs of CHT's marginalised smallholder farmers.
(iii) Strengthen the capacity of stakeholders, including FFS Facilitators, to facilitate and monitor implementations.
(iv) Empower marginalised small-scale farmers in local communities by implementing Integrated Farm Management-Farmer Field Schools.
(v) Promote marketing linkage initiatives for both inputs and outputs in order to expand farmers' market access.
(vi) Strengthen Hill District Councils' capacity to manage transferred agricultural services in accordance with the CHT Peace Accord, including coordination mechanisms, management functions, and regulatory framework.

The evaluation investigated that the implementation strategy was well-executed throughout the project's various phases. The project planned and executed activities on time and in accordance with the strategies outlined above. Several activities are planned by the project, including a stakeholder mobilization meeting on FFS at the upazila level (UzDCC, UDCC, HDC, and GoB, among others. PDC EC members from PDCs/paras receive training on the IFM-FFS implementation process, monitoring, and the role of PDCs. Mobilization of the Community and Formation of the FFS, Conduct FFS sessions on a community-wide basis. Training to develop the capacity of project staff (i.e., community mobilization, supervision, monitoring & reporting)., Develop and maintain curricula for IFM-FFS menu modules, ToT for Master Trainers on IFM-FFS, and other IFM-FFS-related topics, Training for project staff and GoB line department officials on AFSP III and FFS, Organize Farmer Field Days - one event per Union/year etc.

Efficiency related to institutional set-up and management

The evaluation discovered that CHT/UNDP had organised and managed institutional arrangements effectively. The activities appeared to be well-executed and supervised, and the division of roles and responsibilities appeared to be appropriate. Responsibilities have been defined clearly and have worked well in general.

The primary institutional challenge confronting AFSP III appears to be ensuring adequate capacity, coordination, and collaboration within and among three HDCs that are connected to three extension line departments (DAE, DLS and DoF). As stated in Section 3.1, representatives from these three governments Extension departments are transferred under HDCs in CHT. This presents a number of administrative difficulties when the government staffs become subject to CHT authority rather than their own corresponding department. As a result, it has been particularly difficult to encourage government extension officials to connect with the HDCs, and officials infrequently move between CHTs or outside CHTs. This scenario was confirmed through a series of interviews with key informants in three districts. For instance, an interview with a representative from DAE of Rangamati revealed that, despite the department's crucial involvement in the AFSP III project was necessary, DAE faced a manpower shortage. Each union had only three agriculture officers on the field. He continued by stating that if the DAE given the monitoring responsibility for the project, it would be more effective. Additionally, a representative from the Department of Fisheries in Khagrachari stated that his department lacked human resources to support the project's activities. He added that there is a severe shortage of fisheries officers in the CHT, particularly first- and second-class officers.

Previously, the three HDCs had established Planning Units for a project funded from the FAO. Members of the HDC staff discovered that these units contributed to a more seamless integration of work across HDCs (DANIDA, 2019). It appears necessary to develop another mechanism for improvement extension services' coordination and collaboration in relation to HDCs.

Fund availability and Timeliness of activities

According to the AFSP III project's completion report, funding was quite consistent, and the project was able to complete on time and within budget. However, the study discovered from qualitative data that a number of stakeholders indicated that there was a budget deficit and that the project's outcomes might not be sustainable within this budget (Representative from DLO in Rangamati).

According to one of the UNDP project officials for the AFSP III project in Khagrachari, it was difficult to transport materials in these areas, which increased the cost of day laborers, requiring them to spend more than the budgeted amount. He also refers to covid 19, which he believes has increased the project's cost. One of the local level stakeholders form Rangamati (UP Chairman) also believes that the fund for project activities decreased because of the COVID 19 situation. However, according to the completion report, the project has received 4.30 million USD in total to implement the project, which includes 522,564 USD COVID 19 expenditure. According to Upazilla Agricultural Officer from Khagrachari, the project's duration should be increased. He added that because this project benefited farmers, it would be more effective if the duration were increased. Additionally, he stated that the project's funding was insufficient, and that additional funding is required. Additionally, a representative of the HDC of Bandarban stated that there is a funding issue, as they do not receive funds on time.

Concerning the project's timeliness, the study's findings indicate that the majority of the project's activities, as mentioned previously in this section, were completed on time. With the exception of a few incidents, the project has been successful in managing time and funds efficiently. One example of such exceptions was stated by one of the representatives from DAE in Rangamati. He stated that agriculture has sophisticated issues, if seeds are not planted on time, there will be no production. However, he mentioned that while implementing the project there were some funding challenges. They had to delay some activities for two to three months because of funding issues. However, he widely praised the project's timely execution of planning; for example, he stated that without AFSP trainings prior to seed planting, farmers would have been unable to resolve any planting-related issues.

One of the implementing partner staffs of AFSP from Khagrachari said that this project was effective for increasing income of the farmers. For example, previously annual income of a farmer was 20-30 thousand but now their annual income increased to 2 lakh which have significant effect in our economy. Besides, their livelihood is improved as well as social status has changed.

Monitoring and evaluation

AFSP III established a systematic monitoring and evaluation mechanism in all sites, including the FFS community, Upazila, District, and regional level, by leveraging previous learnings (Phase II). AFSP III's core staff received training on the monitoring and reporting mechanism, data collection tools and techniques, and database. Each month, an offline data management system is in place to track process and progress monitoring data.

At the field level, monitoring visits were conducted by project and implementing partners (HDCs) staff, GoB line department officials, union representatives, and Upazila Parishad representatives. They took part in staff planning and coordination meetings with stakeholders to identify critical accomplishments and areas for improvement. The AFSP III collects and analyses this data before making specific recommendations for resolving field challenges.

The study observed that the project had its own monitoring system, which enabled rapid assessment and monitoring at various points throughout the project. Additionally, monitoring has been conducted through the UNDP Country Office, simultaneously, DANIDA has been monitoring the project's activities as well. At the district level, the monitoring was conducted by DAE, DLS, and DoF, as well as the heads of the three departments and members of the Hill District Council. Thus, this project has always been a balance of internal and external monitoring and evaluation. According to one of the AFSP's implementing partner staff (HDC) in Khagrachari, he was responsible for monitoring the project's activities as an implementing partner. Additionally, the master trainer was responsible for monitoring all technical issues that the farmers encountered. The master trainer had a specific goal regarding the number of fields he needed to visit in a month. He added that he was in charge of producing monthly monitoring reports. Additionally, three government line departments participated in monitoring visits.

UNDP Project Officials from Rangamati stated that every aspect of the AFSP III project was constantly monitored, including the project's cost of implementation. Along with UNDP, this work has been assisted by government line departments. He stated that by implementing this project, they were able to complete it for less than half the cost. As an example, he mentioned that if the cost of any other project was one lakh taka, they were able to complete it in only 50 to 60 thousand. He added that the project incurred no costs apart from human resources and implementation. Over 70% of the project's total budget was spent on implementation, with less than 30% on human resources. According to him, the project's value for money is always commendable.

The evaluation found that the monitoring and evaluation mechanisms appeared to be well-planned and implemented. However, difficulties in overcoming the physiographic barrier have been identified. Similarly, the absence of coordinated supervision of monitoring activities by the HDCs had reduced the effectiveness of monitoring. This could be addressed by increasing joint supervision, for example, by establishing a monitoring committee comprised of representatives from HDCs and all line extension departments (DAE, DLS and DoF).

5.4 Sustainability

Sustainability refers to the continuation of benefits from a development intervention after major development assistance has been completed.

A goal of FFS in AFSP III has been to significantly increase training support for diverse crops and farming practices. Because of requirement of diversified and high value inputs, high-value crops frequently become high-investment crops and high-risk productions. Because the majority of these crops are more susceptible to pests and diseases than rice, the conventional response is to use pesticides to 'protect' the young crop. This has a high probability of eventually resulting in the emergence of similar problems that previously posed a threat to rice's food security: the emergence of 'secondary pests' that become gradually more resistant to pesticides, resulting in increased pesticide use, which may eventually render the pest completely unmanageable. In vegetables and other high-value crops, the threat is more to income than to food security. Investments in these crops are substantial, and failure or partial failure can have a severe impact on a household's resources.

5.4.1 Financial, Institutional and economic sustainability

As illustrated in the preceding chapters, the FFS approach is found to produce highly relevant results in a cost-effective manner. Simultaneously, the AFSP III closely align with GoB policies. Moreover, the AFSP component is implemented by the UNDP in collaboration with HDCs under the umbrella of the MoCHTA, with GoB line departments, including DAE, providing trainers, technical support, and some monitoring of FFS activities. Additionally, partner NGOs assisted the FFS in providing follow-up technical assistance and training in new target Upazilas. The project as a whole involved a diverse range of stakeholders in a variety of activities and interventions. Apart from involving them, a critical component of fostering sustainability among stakeholders is instilling a sense of ownership. The act or degree to which relevant actors and beneficiaries adopts ownership and responsibility for any initiatives or activities done within the stakeholders can be referred to as Stakeholders' ownership. Sense of ownership entails taking ownership of and accountability for any programs that eventually empower relevant actors and beneficiaries. This evaluation found that, the AFSP III project has succeeded in instilling a sense of ownership in many project beneficiaries and institutions.

Relevant stakeholders endorsed the finding as well. One of the Upazila Parishad Chairman from Rangamati thinks that the project has created a sense of ownership in the Upazila Parishad regarding this project. So, even if these projects are closed, they will be responsible for follow-up from their office or to solve any major problem. Because above all the common people are benefiting from it. According to a Karbari in Rangamati, the project's positive outcomes will last longer. They are now able to put the lessons they learned from this project into practice. However, cultivation-related support such as irrigation and seed supply should be maintained. In the absence of continuous support from relevant line departments of government, the situation may revert to past situation.

One of the representatives of UNDP Project Officials of AFSP III from Rangamati said that, although this project is already over, he is expecting that the results of this project will continue to impact the relevant stakeholders for a long time. He stated

> *Usually after the completion of donor funded projects, the government no longer provides funding there. But in the case of this project, it is different. Even after the project was completed in June 2021, UNDP has been paying only the staff of the project but has been receiving all the funding from the government for the implementation of the program. This is a big aspect of sustainability point.*
>
> *-UNDP Project Official from Rangamati*

He also added that, as FFs have been trained very well, even if there is no project exists now, they will be able to do their work and the farmers will benefit from them.

However, there were a few alternative points of view. In an interview, a representative from the Rangamati Department of Livestock stated that his department did not develop a sense of ownership over the project's activities and outcomes. He added that UNDP had only requested that he attend a few classes. This is insufficient for the livestock department to properly own and support the project. As a result, coordination must be improved.

5.4.2 Community ownership

The evaluation conducted a few focus group discussion sessions with Farmer Facilitators in three districts of CHT. Overall, this project was able to develop the sense of owner ship in the community people. Participants expressed their gratitude for the project activities and the benefit they got. They learned modern farming methods and how to adopt climate resilient technologies. According to them, they developed a sense of ownership as they are getting financial benefits from the project. However, participants expressed concern about a few points, including the fact that, despite the project's length, they believe farmers have not yet learned much. In that case, if the project is completed now, they may forget the majority of the lessons learned. They added that farmers now have a better understanding of their own work, but in order to see long-term benefits from the project, farmers should be better connected to the line department, so that if they encounter any issues, they can immediately contact the line department and resolve the issue. The evaluation concluded that, while the project was largely successful in instilling a sense of ownership in the communities, an excessive reliance on direct supervision by government institutions and non-governmental organizations (NGOs) may jeopardize the project's long-term success.

Many FFS programs around the world are beginning to work more directly with community-based organizations and training and supporting local farmers to act as FFS facilitators, rather than relying on NGOs and professional extension agents who are highly reliant on external funding. Simultaneously, this has resulted in the exploration of self-financing mechanisms, in which the FFS's operation covers the costs of facilitation.

Women's empowerment has increased in AFSP III project areas as a result of the intervention. These results are likely to be sustainable as women acquire increasing negotiating power in communities and households, and it is unlikely that they will relinquish it once acquired. Increased income has enabled women to pay for school fees and expand their production activities. While progress has been made in terms of mobility, there is still a long way to go, and this is a significant barrier to women receiving the full benefit of the project outcomes. These constraints must be addressed further in order to ensure that women receive the full benefit of the project and that the results are sustainable.

5.4.3 Risks regarding legal frameworks, policies, and governance structures, and processes

Project interventions in Chittagong Hill Tracts carries unique risks due to the local context and post-conflict situation. Programmatic risks included the possibility that FFS participants in the CHT will be compelled to leave their homesteads despite the Peace Accord. Such threats were assessed during FFS group formation, and connections with local institutions and leaders was maintained to ward off such risk. The UNDP collaborated with both government and traditional CHT institutions to mediate in such instances.

There was also a risk of institutional capture of Farmer Organizations by local elites operating in their communities. This has been addressed through supervision and follow-up by the project. Apart from that, farmers participating in the CHT may be impacted by nearby illegal logging, which results in increased erosion from denuded slopes, lowering the quality of cultivated lands downhill. Improved communication among community members, commercial operators, and community leaders, as well as vulnerability assessments for such threats, helped to mitigate such risks.

Most of the stakeholders suggested that they did not see any risks regarding legal frameworks, policies, and governance structures, and processes.

5.4.4 Existence of mechanisms, procedures and policies

The Country Policy provide critical context for the decisions made during the design phase of the AFSP III regarding focus areas and engagements.

The Country Programme 2016-2021 was developed as part of a larger collaborative effort between the Government of Bangladesh and its development partners under the auspices of a Joint Cooperation Strategy. Under this umbrella, development partners provided significant and strategic assistance in the form of financial and technical assistance to assist the Government in implementing key priorities in its plans.

Besides the country program, as discussed in 3.1.1, this project was largely relevant to national development policies and priorities. The project's relevance to national policies and priorities, as well as its alignment with related GoB line departments, indicate that the project's outcome may be sustainable in the long run.

5.4.5 Exit strategies

The representative from DLO's Rangamati office expressed concern about how the project is progressing, and he speculated that the outcome may not be sustainable in the long run because the FFSs are not permanently constructed. He proposes to construct physical infrastructure to represent the FFSs, including meeting and discussion spaces for farmers and community members. He believes that it is highly improbable that community members will pick up on these technicalities and technologies and remember how to apply them without assistance. According to Upazilla Livestock Officer from Khagrachari, increasing market linkages is necessary to sustain the project's positive outcomes. As discussed earlier, to avoid an excessive reliance on direct supervision by government institutions and non-governmental organizations (NGOs) which may jeopardize the project's long-term success, FFS program should still run but communities should be empowered, and farmers direct involvement must be increased. Community-based organizations might be developed to train and support local farmers through these FFSs. This will result in the exploration of self-financing mechanisms, in which the FFS's operation shall cover the costs of facilitation.

In this process, Cost savings during the scaling-up and consolidation phases will be achieved by increasing the use of local Farmer Facilitators, who charge low fees and do not require. FFS graduates can be partnering with supermarket chains as recognized producers of preferred traditional crop varieties, with supermarkets investing in FFS expansion to ensure guaranteed volume purchases. Following this model, significant progress has been made in recent years in Eastern and Southern Africa (Kenya, Tanzania, and Uganda) in assisting farmers in running semi-self-financed and self-financed FFSs. (DANIDA, 2019)

The FFS includes a commercial plot of land for production in the self-financed model. The group's own bank account is used to sell and reinvest the proceeds. After that, the funds can be used to finance farmer led FFS. This model of self-financing is based on revolving funds. The operational costs are pre-funded, and the group recovers them at the end of the season through proceeds from the sale of the group study plot and education fees levied on participants. Funds "leakage" issues, crises caused by drought or flood, and a lack of physical security for money holders in some areas are all problematic, but they are not unique to FFS. Given that development assistance for FFS programmes is also declining in Bangladesh, it will be necessary to delve deeper into other countries' experiences with self-financed models and determine whether they can be re-calibrated for the Bangladeshi context.

5.5 Coherence

The usage of country systems is planned for the Bangladesh country program, which is being developed in collaboration with the Department of Agricultural Extension. A different sort of treatment is used in the Chittagong Hill Tracts. Due to the specific circumstances, it is necessary to develop a comprehensive UNDP project implementation unit. Additionally, the sector receives support from a variety of development partners.

NATP (National Agricultural Technology Project), the largest project, is a World Bank effort aimed at increasing agricultural productivity and access for smallholder farmers in selected regions (57 districts and 270 Upazilas). The last phase of NATP has concluded, and a new phase has begun. SCDP (Second Crop Diversification Project), another key ADB-funded initiative, attempts to alleviate poverty by raising farmer earnings in 27 districts across Northern and Southern Bangladesh.

Danida cooperated with the DFID (currently FCDO) and Switzerland's SDC on a scheme named Katalyst aimed at encouraging Markets for the Poor (M4P). The third phase of the initiative finished in 2017. Coordination of agricultural operations has been attempted via the Local Consultative Group and its working subgroups, but progress has faded. The Department of Agriculture has convened a nationwide conversation on the most effective methods of extension, which has gained considerable traction with the assistance of Danida.

UNDP has developed a programming framework to assist with the CHT's implementation. It brings the United Nations system and development partners together around a common mission and vision for their future involvement in CHT. Additionally, it combines the UN's capabilities with the Government's continuous assistance. The framework aspires to be inclusive of all communities while addressing CHT's ongoing development difficulties. It also encourages sustainability across the CHT, with a focus on good governance. Finally, it maximizes support efficiency by striving to utilize the entire spectrum of UN and development partner capability.

Three pillars constitute the framework's framework: 1) Ensuring livelihoods and food security; 2) Ensuring efficient and equitable access to key services and activities, and 3) Strengthening governance and cohesiveness. Agriculture and Food Security Project III (AFSP III) is a component of pillar 1 (Sustainable Livelihoods and Food Security) of the Programmatic Framework (DANIDA, 2016).

The DAE representative in Rangamati endorsed the process outlined above. He also stated that to ensure the coherence of all stakeholders, they organized an introductory program and met with all stakeholders at the start of the project and again at the conclusion. They encountered a variety of issues throughout the project's development phase, such as land disputes and political issues, but they were concerned during the implementation phase (KII with DAE Representative, Rangamati).

5.6 Impact

5.6.1 changes in the lives of the people and their communities

The output level findings indicated that the project had a beneficial impact on the lives of individuals and communities. From the quantitative findings, it was found that most of the farmers got necessary support, technical support, and training support from the government line departments. As a result, the production of crops, fruits, livestock, and others has increased. Also, the earlier estimated quantitative findings observed significant changes in the production of crops, fruits, livestock, and others after the baseline survey. On the other hand, one of the stakeholders from Rangamati (KII with DAE) stated that this project had an impact such as many farmers who got training from Farmer Field School could learn about organic compost, vermin compost, and learn about latest technology in

poultry turn, especially technology in increasing laying chicken eggs. Moreover, the livestock department introduced a local service provider who gives support to poultry farming and vaccination program which were new to the farmers. Findings from both quantitative and qualitative findings hinted that the lives of the people and their communities have changed significantly.

5.6.2 positive/ negative change in target beneficiaries, their communities, and duty bearers

As the project initiates, it offers lots of positive and few negative changes to target beneficiaries, their communities, and duty bearers. In the identification and solution of problems regarding food production, the farmers are now developing the decision-making skills through the initiative of the project. As a result, food production has increased, and the wastage of foods has decreased.

> *Farmers are trying to develop the decision-making capacity of the farmers to manage a farm like how they can produce food, how they can preserve their produced food, and how they can sell their products at a fair price, and how they can develop their livelihood. Now a farmer can identify his problems and he can decide to solve these problems.*
>
> *-UNDP Project Officials from Bandarban*

Initially, we found the increased production of vegetables, fruits, and others. From the qualitative findings, it is found that farmers are utilizing unused or vacant land by using different types of seeds. One of the respondents (Person 3, FGD with farmer facilitators in Bandarban) expressed that they can use their unused/vacant land for farming now which they didn't imagine before and they are now cultivating vegetables, and fruits in their backyard. In addition, Person 2 from FGD refers that the GoB line department provides farmers with different types of seeds that inspire them to use their unused/vacant land.

For cultivating and sustaining the production, it is crucial to understand the importance of climate change, and how it is changing, so that we can prepare for the future. Awareness regarding the climate helps us predict how much rain the next winter might bring, or how far sea levels will rise due to warmer sea temperatures. In CHT hill tracts, people are becoming aware of climate change. UP Chairman from Khargrachari opined that people are now aware of climate change because of this project and they know that climate change is an important issue. He believes that such programs provide his department with the chance to promote awareness among members of the community, which would not have been possible in earlier years.

Along with some beneficial adjustments, there are some concerns highlighted as well. Farmers did not show up for training sessions in large numbers, which was not expected. As a result, the spread of new technology in agriculture, and others was not successful expectedly. DAE from Rangamati stated that monitoring should be done more properly to make the project more effective. He added that when the meeting was arranged in Farmer Field School, the attendance of the participants was low.

As evidence of positive changes, the study has collected a few success stories from project intervention areas. The case studies are described in detail below.

Nikunti Tripura, IFM-FFS learning scaled up a helpless to become helpful in Khagrachari

Nikunti Tripura, a hardworking farmer woman who made the impossible possible. "The Khagrachari Hill District Council will appoint some farmers as Farmer Facilitators, informed the Para Karbari. After hearing this, I expressed interest in the position, but many neighbors advised me not to apply due to my illiteracy. However, I applied with mental courage with a great support from the karbari. And subsequently, I was chosen as a Farmer Facilitator "Nikunti Tripura, 36 years old, expressed herself.

Nikunti is a resident of Mantri para in the Bhibonchara Union of Khagrachari Sadar Upazila, and she has resided in this village for generations. Alongside the Panchari road, Mantri para is located approximately 8 kilometers from Khagrachari town, at a distance of approximately 8 kilometers. With the support of her husband, two children, and mother, she plays a leading role in her five-member family. Her daughter is in the fourth grade at a local government primary school, while her son is in the ninth grade currently live outside of Khagrachhari.

Nikunti Tripura only completed the schooling up to 5th grade, while her husband did not attend school. She had only one Kani of homestead land. There were only a few fruit trees surrounding the house, and they did not produce much fruit. Poultry also used to die after being raised. As there is no alternative, both the husband and wife performed daily labor to support the family. She was paid 150 takas per day, while her husband was paid 200 takas per day. Moreover, the work was not guaranteed every day. Therefore, they earned approximately 5,000 to 6,000 takas per month. Because of insufficient money supply, they were forced to consume only two meals per day. They struggled to buy books and pay school fees for their children. Every month they had to borrow money to cover the family's expenses. Thus, there was a time when, the total debt owed to local Mohajon amounted to 150,000 Tk. On the one hand, Nikunti Tripura's life was made miserable by the size of his debt, and on the other, by the cost of his children's education and other family expenses.

In March 2018, she was selected as a Farmer Facilitator under the Agriculture and Food Security Project, which is being implemented by Khagrachhari Hill District Council in partnership with SID-CHT, UNDP. She received 36 days of in-depth residential training on "Integrated Farm Management" via the farmer field school approach. She learned how to grow vegetables and fruit around the house in a planned and year-round manner, how to benefit from poultry rearing, cow rearing, and pig rearing, how to use a balanced fertilizer, how to use organic pesticides on vegetables, and how to make organic fertilizer from FFS sessions. She utilizes every inch of land, including sheds, on her farm. Then she achieved great success in agriculture by cultivating vegetables and fruits

in a planned manner around his homestead and by raising chickens, pigs, and goats, which resulted in a significant transformation in her life.

She began cultivating Karla (sweet & bitter gourd), bean, squash, Cucumber, Kangkong, Brinjal, Kayda (snake gourd), Sweet pumpkin, Red Spinach, Kalmi (Bindweed), Indian Spinach, Lemon, Papaya, and Banana around the house after receiving training. She planned to produce and sell vegetables and fruits throughout the entire year. Now, she sells vegetables in the shop twice per week for 1,000 to 1,500 Tk each time. Each month, she earns between 5,000 and 6,000 Tk from the sale of vegetables. Now, traders pre-order plants, and vegetables that can be sold for 5 to 10 takas more than those of other farmers because their green appearance is fresh and appetizing. In addition, there were some Mango, Jackfruit, Plum, and Grapefruit trees, but none of them were producing fruit. After receiving training, she pruned and fertilized the fruit tree. After pruning, this tree is loaded with Jackfruits. Previously, she received 600 TK for selling Jackfruit, but in the year 2020 she earned 2900 TK. That year, it appeared that the Jackfruit has dropped and rotted less, and its size had grown significantly. Additionally, she earned 300-400 TK by selling three to four bunches of bananas for two consecutive weeks. And she earned 500 TK from the sale of plums as well. Now, she grows more than just vegetables and fruits in her garden. In addition, she began raising poultry, pigs, and goats. She started with three chickens and two pigs, and then increased the number to a total of 131 small and large chickens. She sold 116 chickens for a total of 91,400 TK a month ago. She earned 23,000 TK from the sale of two large pigs. Twelve piglets are raised for two months; two are kept by them, while the remaining ten were sold. Each pig sold for 5,000 taka and brought in a total of 50,000 taka. She currently has 115 chickens, 5 pigs, and 2 goats. With farm profits, she repaid Mohajan TK 120,000 in debt and became a loan-free employee. Now she is considering leasing some land and purchasing some cattle for rearing.

Vegetable cultivation is very low cost investment. In addition, the husband always encourages and supports her. She begins producing farm fertilizers for use as organic vegetable fertilizers. Up to this point, she has produced 300 kilograms of farm fertilizers. Currently, she only uses farm fertilizers and organic fertilizers on her plants, as well as organic pesticides (Sex pheromone and ash) on insects. She provides a balanced diet and better housing for her chickens, pigs, and goats. In addition, he now routinely vaccinates chickens. As a result, there is no chicken mortality, and the produce is ready for sale within two to three months; she stores seeds to improve the method and cultivates high yielding and hybrid vegetables.

Mrs Shely Akter's vegetables and papaya cultivation

Mrs. Shelly Akter, age 35, resides in the Taracha Mukh bazar para of the Taracha Union of Rowangchari Upazila with her husband Jamal Uddin. On the Bandarban to Ruma upazila river road, it is situated in the western portion of the Bandarban hill district, approximately 5 kilometers from the Bandarban Sadar Upazila Headquarter. She is a member of Farmers Field School and a genuine farmer. She cultivated papaya in 10-decimal-acre plots. She has one son and two daughters, for a total of five family members. She received information from the Agriculture & Food Security project's Farmer Facilitator, Thuisaprue Marma, on a variety of topics in the first year of the project. Mrs. Shelly Akter's family does not deviate from the prevailing occupation of the villagers, which is farming. Due to a lack of fruit cultivation knowledge, the last four-five years have yielded meager returns. Profit was minimal due to the prevalence of virus diseases in his orchard and the small size of the papaya. Upon receiving sessions on the cultivation of papaya, vegetables, and vermicompost, she began to implement session knowledge in his farmning and added learned cultivation techniques to his field, such as vegetable beds and pits. She obtained an extraordinary quantity of papaya from the papaya orchard by utilizing session-specific knowledge. She reported that the profit was satisfied.

She is selling ripe papaya from her orchard for 30 taka per kilogram and made a net profit of 60,000 Taka in 2020. In the previous year, she sold bottle gourd for 20 taka per piece and made a profit of 5,000 taka, and she sold beans for 50 taka per kilogram and made a profit of 8,000 taka. She creates vermicompost manure and applies it to papaya and vegetable cultivation. The cultivation of vegetables such as bottle gourd, bean, and papaya utilized a total of 400 kilograms of vermicompost fertilizers during the previous winter season. She is happy because she no longer needs to purchase chemical fertilizers from the market.

Now, her success inspires other families in the village, and Shely Akter is pleased with papaya and vegetable cultivation, as well as grateful to Bandarban HDC and SID-CHT-UNDP for their inclusion in the project.

Mr. Milon's success story with his fellow land

Mr. Milon Chakma, a member of Bangalkata Headman para IFM-FFS, and his four family members lived in a remote area one hour away from the Bilaichari Upazila sadar in Bangalkata Headman para. Mr. Milon Chakma stated,

"I begin cultivating my winter vegetables in November, but I have never done so properly due to a lack of water in the stream. But after joining FFS in September 2019, under the direction of Farmer Facilitator Mr. Mitu Chakma, I began to cultivate in September, which yields a substantial profit. Even FF and UFFSC inspired and assisted me in maximizing the use of my 40 decimals of neighboring land."

After joining FFS, he began growing cucumbers, bottle gourds, red pumpkins, red amaranth, brinjals, and radishes on his community land. He employs FFS knowledge such as ideal pit and bed, bio fertilizer, hand pollination, and IFM techniques. He added,

"After cultivation, I earned Tk 24,000 from my fellow land after spending Tk 5,000 on land preparation, seed, and fertilizer. I used my fellow land income to acquire two piglets, ten chickens, and for various family activities. The sow gave birth to six piglets, sold them for Tk18,000, and used the proceeds to purchase one bull calf. Through this fellow land, I was able to increase the number of my farm animals and vegetable garden. Currently, I have one bull, two pigs, and forty chickens with a total market value of approximately Tk 67,000/=. Before joining FFS, I owned seven chickens, one pig, and six goats."

In addition to growing red amaranth, cabbage, and bottle gourd on the same land this year, he is also preparing to grow brinjal, potato, tomato, and bitter gourd. The environment inspired him to observe the utilization and profit of his peers. In addition to increasing production, this enhanced his nutritional supply and knowledge of livestock farming. He intends to increase the size of his farm to increase profits.

Shimpru Para Market Collection Point- an alternate market access for farmers at remote

Shimpru Para is 60 kilometers from the Sadar district headquarters in Batnatali union, Manikchari Upazila, Khagrachari hill district. Farmers in this region cultivate vegetables (Gourd, Sweet Gourd, Brinjal, Sweet Bitter Gourd, and Balsam Apple) and fruits (Jackfruit, Pineapple, Mango, and Litchi). Most farmers produce and sell their own goods. Due to individual selling, farmers were previously unaware of the market value of their products and were therefore deprived of fair compensation. With the assistance of SID-CHT, UNDP, the Khagrachari Hill District Council established a market collection point in 2019 as part of the Agriculture and Food Security Project. It is protected and managed by a five-member committee comprised of agricultural commodities.

Through the project intervention, connection with merchants in Khagrachari and the surrounding district have been established with this Collection Point. Approximately 10 to 15 villages are covered under this collection point, where produces are sold daily. All seasonal vegetables are purchased from the farmers, and farmers readily receive their profit.

Md. Forkan Ali, president of the collection committee, stated that farmers received good prices for seasonal vegetables and fruits. Now that traders are aware of the collection point and have increased their buying price. Because traders from outside of Khagrachari can easily access the collection point, farmers are receiving a reasonable price.

Member secretary Md. Robiul hossain stated that buyers from Tintahari, Guimara, and Khagrachari sadar, as well as Chittagong, Feni, Comilla, Chadpur, Dhaka, and Narshindi, purchase agricultural products at wholesale prices. Following this, raw sales of approximately 80 metric tons of vegetables, 1.2 tons of Jackfruit, 75 metric tons of mango, and 1,000 pineapples with a market value of approximately 1.5 crore taka were completed.

In 2020, vegetable sales were 40 taka per kilogram, raised from 35-36 taka per kilogram. Compared to 30-35 tk per kg, mangoes were sold for 40-50 tk per kg, and jackfruit for 50-60 tk per pieces.

Md. Saidul islam, the purchaser, stated,

"In this season, I have purchased vegetables and seasonal fruits with a value of 20 to 30 lack and distributed them to a large market. Both I and the farmers are receiving higher prices, and we are all pleased."

Adam Ali, a buyer, stated,

"In this season, I have purchased vegetables worth approximately 10 to 15 percent less than their market value and distributed them to a large market. Historically, farmers received varied prices for vegetables. Now that traders are aware of the collection point, they have increased the price due to their easy access from outside of Khagrachari, while farmers are receiving a reasonable and expected price."

Mongpaipru Marma, a member of the Batnatali UP, stated that Collection Point plays a vital role by selling farmers' products, such as vegetables. Previously, farmers had to travel approximately 15 kilometers to the market to sell their produce. In addition to physical labor, they were required to pay for transportation and food. Moreover, they must pay tolls/taxes in the Bazar region in addition to wasting time. Due to the establishment of Collection Point, they no longer need to go to the market, which has brought them relief. Farmers gathered their goods at Collection Point, which then invited buyers to its location and sold the goods collectively, resulting in fair prices for farmers. Farmers also benefited from the elimination of unnecessary expenses such as tolls/taxes, transportation, manual labor, and harassment. They can also save time when producing agricultural products. According to him, if this type of collection point becomes more prevalent in these regions, farmers' fortunes will change.

5.6.3 Changes in policy

The project has an impact on the lives of farmers and members of the community. However, there were no significant changes in policy as a result of this. Since the beginning of the project, DAE officer in Rangamati has not discovered any changes in institutional policy and practice, such as changes in the manner in which services are provided, changes in the organizational structure, and so on.

Nevertheless, this project has resulted in a linkage with the line department which was not the case before. Just as farmers can take various problems to the field level staff of the line department, they can now come to the district-Upazila level as well. It was revealed by a Sub-assistant Plant Protection Officer from Rangamati that the Department of Agricultural Extension previously provided services in a top to bottom fashion but now they are servicing the community via a bottom-down approach.

5.6.4 Gender and human right based approach

Respect for universal human rights continues to be a priority in Bangladesh. In its eighthfive-year strategic plan for 2016–2020, the National Human Rights Commission identified a number of challenges in the areas of civil, political, social, and cultural rights, including "Women Empowerment and Discrimination Against Women, Gender-based Violence"; "Occupational Safety, Wages, and Welfare, including Trade Union Rights of Garment Workers"; and "Full and Prompt Implementation and Compliance with the CHT Accord Focusing on Land Rights" (NHRC, 2016).

Failure to address basic development needs and ethnic minorities' rights, for example, in the CHT, has left the region behind the rest of the country. Only 7.8% of people living in CHT complete primary education, and absolute poverty and extreme poverty are prevalent in ethnic communities at rates of 65% and 44%, respectively [10]. The CHT Peace Accord, signed in 1997, brought an end to years of insurgency in the region, but it has not been fully implemented. One area that requires additional attention is resolving land disputes that arise as a result of common-law and traditional land use patterns. Without clearly defined property rights, this is a delicate issue that requires informed resolution.

While gender inequality has improved in general in Bangladesh, gender-based violence and equal access to health, education, and employment remain unaddressed (UN, 2014). Continued efforts in this area will also contribute to increasing women's economic participation, which is necessary for growth to accelerate.

FFS as a concept incorporates a Human Rights-Based Approach in its application to improve livelihoods, expand and diversify sustainable production, increase income and productivity, and connect small scale and marginal farmers to markets. Direct measures to strengthen the government extension services' inclusive, participatory, and experience-based learning approaches, as well as the fact that trainers and facilitators are selected by farmers and their organizations, are both transparent and participatory. Women and marginalized and ethnic minority groups are included in the TP's intervention to ensure non-discrimination. Rural areas and decision makers face exclusion barriers based on income, gender, and ethnicity. The program is designed specifically to address these issues. Gender equality is ensured through a focus on female-headed households and women's selection for FFS. (DANIDA, 2016) Throughout the duration of the project, 998 IFM-FFS were formed with the participation of 26,505 farmers where there were 10,035 male members and 16,470 (62%) female members.

[10] Government of Bangladesh (2015): "7th Five-Year Plan (FY2016-FY2020) – Accelerating Growth, Empowering Citizens", pp. 12 and 680

5.6.5 Cross-cutting issue

Based on the achievements to the date, this evaluation provided forward-looking programmatic recommendations to the UNDP for its course correction and future programming.

Overall, the final evaluation assessed the results achieved in terms of policy support and institutionalization through interventions over the years. It has identified value additions in terms of knowledge /skill enhancement and sharing towards facilitating national resilience focusing on climate change. It also explored the gaps and areas of focus, which need further attention for promoting national resilience. Additionally, this evaluation followed a strategic approach to identify potential sectoral collaboration, and areas of scaling up that should be taken forward to build resilient Bangladesh. In addition to this, 62% of women beneficiaries involved in the IFM-FFS activities for improving gender empowerment.

5.6.6 Risk assumption analysis

#	Risk	Impact(s)	Risk Treatment
1	Impede the regular project activities due to Rohingya influx in Bandarban	The Rohingya influx in the southern part of country may adversely affect livelihoods of the people in project areas particularly in southern Upazilas of Bandarban Hill District.	The project tried to avoid the Rohingya influx union.
	Contextual risk for land tenure	Land tenure security of common and private resources remains a contextual risk that is beyond the control of the Development Engagement (DE)	The DE worked with both government and traditional institution of CHT.
	Natural disaster may destroy the life and livelihood of local farmers	Participant's farmers may be affected by illegal logging in the vicinity, leading to increased erosion from denuded slopes, affecting the quality of cultivated lands downhill.	Better interaction within the community members, commercial operators, community leaders and vulnerability assessment of such threats helped to reduce such risks.
	Language barrier	The smaller indigenous groups, particularly who live in remote places, practice distinctive own languages and hardly understand mainstreaming Bengali language, which is the main language for the training of Farmer Facilitators. There is a risk of identifying qualified farmer facilitators who will be able to learn and facilitate FFS learnings properly.	The project applied flexible approaches for selecting the right facilitators and also during training. Extra training session with more practical demonstrations approach also applied to train the Facilitators and also to the farmers to gain high quality results of the project.
	Fund transfer	Fund transfer to beneficiaries in cash is a difficult since the way of transfer and actual beneficiaries may not reach.	The project made a beneficiary list and verified physically whether the person was available in the location. Before sending fund, phone number, Bkash number and NID card collected from them and transferred the fund accordingly. Cash transfer was also arranged hand to hand

			since some beneficiaries residing in remote areas did not have alternate way to receive fund.
	Engagement in various COVID 19 response	High workload of the Government officials/ representatives due to their engagement in various COVID 19 response	Repurposing of AWP and budget, defined new strategy

6 Conclusions

The agriculture and food security (AFSP III) project significantly impacted the lives of poor and marginalized farmers of CHT in terms of improved livelihood, increased food security and increased use of modern agricultural technology. Farmers are now using modern and climate resilient crop production technology, which they learned from the farmer field school. They know how to do hand pollination, pruning and training fruit trees, and prepare vermicompost and farmyard manure. Thanks to this project intervention, they also understand which seasons are suitable for cultivating which crops. Besides agriculture, this project also increased farmers' knowledge of fisheries and livestock sectors. Now they are involved in cattle rearing, pig rearing, fish cum duck production, using improved hatching pan, etc. A significant problem in the hilly area is that it is challenging to sell agricultural products due to transportation problems. As a result, farmers cannot sell their products in time and at a reasonable price. As a solution, the project has introduced collection points in different Unions where traders/buyers buy the agriculture products at a fair price. Consequently, people are getting involved in the agricultural sector to meet their food demands and improve their financial conditions through agribusiness.

This project has increased the relationship between the government line departments and the poor and marginalized farmers. According to one of the UNDP project officials from Rangamati, at least 82% of the beneficiaries are connected to the government line departments through the activity, training or follow-up services. One Sub-Assistant Agriculture Officer from Rangamait said their contact with the community has dramatically increased because of this intervention. For example, he received daily 15/16 calls on his mobile phone about various problems with animals and birds, which was not the case before.

The project has contributed to ensuring gender equality and women's empowerment. In the farmer field schools, at least 50% of members were women, and among the farmer facilitators, 50% were women. The project has increased women's knowledge and skills in agriculture. Women's contribution to their families has increased, thus increasing their ability to make personal and mutual decisions in the family. The project taught women various modern methods of raising chickens and producing offspring from eggs. They are now rearing chickens, producing chicks from eggs, and making an economic profit by selling chickens, hens, and eggs.

Although the project has performed well in fulfilling the targets according to its log frame, there were notably lacking in some sectors. This project focused more on agriculture, with lesser priority on fisheries and livestock. But according to this region's people and government officials, fisheries and livestock are equally necessary for CHT's context. According to the Upazila Fisheries Officer of Bandarban, there are many opportunities for fisheries in this region. He urged emphasizing the fisheries sector, but the project didn't consider it. Moreover, the study team didn't find any specific plan/activities related to youth and persons with disabilities (PWD) from this project.

Overall, the project successfully changed the livelihood of the farmers and agricultural growth in line with the CHT Peace Accord. The project activities also aligned with the national policy/guidelines. The project's positive outcomes may sustain longer as the farmers shared their learnings of FFS with the other farmers who were not the project's beneficiaries. Consequently, social harmony and the economy should improve.

7 Recommendations

Key theme	Findings	Recommendations
Institutional set-up and management	Representatives of the government's Extension departments have been transferred under HDCs in CHT. This transfer presents many administrative difficulties when the government staff become subject to CHT authority rather than their corresponding department. As a result, it has been challenging to encourage government extension officials to connect with the HDCs, and officials infrequently move between CHTs or outside CHTs.	✓ Earlier, Hill District Councils (HDCs) had established Planning Units for a project funded by the Food and Agriculture Organization. The HDC staff noticed that these units facilitated a more streamlined integration of work across HDCs (DANIDA, 2019). It seems necessary to develop another mechanism for improving extension services' coordination and collaboration in relation to HDCs.
Monitoring and evaluation	The absence of coordinated supervision of monitoring activities by the HDCs had reduced the effectiveness of monitoring.	✓ This could be addressed by increasing joint supervision, for example, by establishing a monitoring committee comprised of representatives from HDCs and all line extension departments (DAE, DLS and DoF).
Community ownership	Farmers now have a better understanding of their own work, but in order to see long-term benefits from the project, farmers should be better connected to the line department, so that if they encounter any issues, they can immediately contact the line department and resolve the issue.	✓ Many FFS programs around the world are beginning to work more directly with community-based organizations and training and supporting local farmers to act as FFS facilitators, rather than relying on NGOs and professional extension agents who are highly reliant on external funding. As a result, farmers will be familiar with the overall activities which will increase the productivity.
Exit strategy	The outcome may not be sustainable in the long run.	✓ To avoid an excessive reliance on direct supervision by government institutions and non-governmental organizations (NGOs), which may jeopardize the project's long-term success, the Farmer Field School program should still run, but communities should be empowered, and direct involvement of farmers must be increased.
Collection point	Farmers bring their products to the collection point, and these products are bought by local traders and sold to big traders. Farmers cannot sell their products directly to the big traders. The number of collection points in remote areas is small.	✓ Existing collection centres should be improved to support large storage facility to be able to store enough volume for considerable benefits for the farmers. ✓ Increasing the number of collection points in remote areas would make it easier for farmers to sell their goods. ✓ Linkage with supply market for quality agricultural inputs should be strengthened.

	Large storage facilities are also missing.	Collection points could be linked with the supply market to make the process more effective and efficient. ✓ Collection points should be regularly monitored so that the farmers get a fair price for their produces. UzDCC and UDCC can monitor the collection points with assistance from relevant government departments. The project can develop and hand over a monitoring mechanism with proper guidelines to the HDC.
Remote areas	Farmer field schools which are located in the remote areas were difficult to run. Line departments could not attend in a number of meetings in the remote areas.	✓ Government line departments should arrange farmer field days at least twice a year. The project should advocate the HDC to facilitate this arrangement. Representatives from different government line departments shall attend these events. These farmer field day events will generate synergies among farmers and the government line departments providing extension support services. ✓ Government line departments can further strengthen their reach in providing extension support services by a cluster-based approach. ✓ Separate clusters could be formed with the farmer field schools located in nearby paras, villages or communities. ✓ Facilitators from these clusters will visit the government line departments in regular interval to receive trainings and other support services that they require. It will enable the government line departments to strengthen their service delivery in the remote areas.
Future programming		✓ In future programming, people with disabilities should be considered. As UNDP emphasizes "leave no one behind" notion, it is important to ensure the participation of disabile people in the upcoming project and keep a record of it.
Overall recommendation		✓ Government subsidy on the use of climate resilient technologies for farmers ✓ To encourage adoption and use of climate adaptation technology in agriculture, produced agricultural produces using such technology should be offered a premium price. The Ministry of Environment, Forest and Climate Change should be fully engaged in this initiative via crop inspections along with the Ministry of Agriculture who will carry out crop yield assessment and supervise harvesting practices and delivery to maize buyers. ✓ The project provided 75 technologies. But there are other technologies that have the potential to help farmers in increasing their

		yields and production. Use of other technologies such as thrashers and harvesters, which have immense potential to contribute to improved food security, including through reducing pre and post-harvest losses. Project partners should consider continuing support for agricultural mechanization. ✓ There is need to develop, distribute and incorporate technical methods for sustainable management of crop residues. Diversified uses of crop residue for various purposes primarily for recycling and also other purposes such as animal fodder, power generation, as industrial raw material for production of bioethanol, packing material for fruits and vegetables, and glassware, utilization for paper/board/panel industry, biogas generation/composting and mushroom cultivation in Public Private Partnership (PPP) mode need to be promoted.

8 Lessons learned

Several challenges emerged during the course of the project's implementation. Diverse activities and actions have been planned and implemented to overcome those obstacles. The following are some of the challenges encountered and actions taken by the project:

- CHT is a melting pot of ethnic groups, each of which speaks its own language. Occasionally, language diversity creates difficulties when the facilitator and participants in an FFS session do not communicate comfortably in the other language. The project took a hands-on and learning-by-doing approach, which was found to be effective in overcoming language barriers.
- The process of selecting and mobilising communities took longer than anticipated. However, mobilisation of communities, including farmers, has been found to be beneficial in implementing FFS.
- Mature and capable farmers have been identified for development as Farmer Facilitators, with the participation of local communities and other stakeholders. It took time but was found to be beneficial in terms of developing the skills of Farmer Facilitators, reducing dropout rates, and ensuring the smooth implementation of the plan and the quality of FFS.
- The concept of the Farmer Facilitator as a model farmer works well for developing their confidence and demonstrated skills, establishing trust with larger communities, sustaining themselves as resource persons and securing livelihoods from farming.
- Local political unrest hampered the project's mobilisation and monitoring activities in a few areas of Naniachar, Baghaichari, Jurachari, Mahalchari, Panchari, Laxmichari, and Rowangchari Upazila. However, with the assistance and participation of local leaders and stakeholders, it was possible to overcome the obstacles and continue with planned regular activities.
- COVID-19 pandemic lockdown and restrictions on mobility and mass gathering hampered the organisation of a few planned events, which were eventually held once the situation improved and the government lifted the restrictions. Additionally, urgent events were organised with fewer participants and/or smaller groups.
- Initially, it was planned to establish 1200 IFM-FFS. Due to the COVID-19 pandemic, CHT farmers were required to provide immediate food assistance; therefore, in consultation with the donor, the target of 200 IFM-FFS was reduced and funds were allocated to support farmers through solidarity food and seed baskets. Food baskets immediately aided farmers in coping with food crises, while seed basket support contributed to long-term food security and income.
- Between April and July 2020, regular monitoring and continued planned activities were significantly hampered. To overcome the situation, extensive planning, distance monitoring, and door-to-door resources were utilised. In a few instances, virtual platforms were also used to continue meetings, orientations, and organising staff-level training during the country's extreme lockdown period.
- The third component of the project's impact assessment required earlier processing, which aided in capturing and stating the results of the intervened project.
- A real-time data collection and web-based monitoring system may alleviate staff documentation burdens.

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