



care® Where the Rain Falls (WtRF) Phase-III Final Evaluation Report



Project Implementing Organization:

**CARE Bangladesh in partnership with
Eco Social Development Organization (ESDO)**

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ABBREVIATIONS

BADC	Bangladesh Agriculture Development Corporation	GPS	Government Primary School
BBS	Bangladesh Bureau of Statistics	HFA	Hyogo Framework for Action
BCCSAP	Bangladesh Climate Change Strategy and Action Plan	HR	Human Resources
BMD	Bangladesh Meteorological Department	KAP	Knowledge Attitude and Practice
BRRRI	Bangladesh Rice Research Institute	KII	Key Informant Interview
BINA	Bangladesh Institute of Nuclear Agriculture	LGED	Local Government Engineering Department
CAREBD	CARE Bangladesh	LGI	Local Government Institution
CARE France	CARE France	MHRA	Multi-Hazard Risk Assessment
CSO	Civil Society Organization	M&E	Monitoring and Evaluation
CCA	Climate Change Adaptation	MDG	Millenium Development Goal
CBO	Community Based Organization	MoV	Means of Verifications
CVCA	Climate Vulnerability and Capacity Analysis	NAP	National Agriculture Policy
DAE	Department of Agriculture Extension	NAPA	National Adaptation Program of Action
DC	Deputy Commissioner	NAEP	National Agriculture Extension Policy
DoE	Department of Environment	NGO	Non-Government Organization
DRR	Disaster Risk Reduction	OVI	Objectively Verifiable Indicators
DDMC	District Disaster Management Committee	PIO	Project Implementation Officer
ESDO	Eco-Social Development Organization	PMT	Project Management Team
EKTA	Empowerment Knowledge Transformative Action	PNGO	Partner Non-Government Organization
EVAW	Ending Violence Against Women	RSTP	Road Side Tree Plantation Project
EC	European Commission	SAAO	Sub-Assistant Agriculture Officer
ECHO	European Commission Humanitarian Aid Office	SDG	Sustainable Development Goal
FGD	Focus Group Discussion	SETU	Social and Economic Transformation of the Ultra Poor
FFS	Farmers Field School	SHABGE	Strengthening Household Access to Bari Gardening Extension
FFD	Farmers Field Day		
GoB	Government of Bangladesh		
GO	Government Organization		
Go-Interfish	Greater Options for Integarted Rice and Fish		

SHIFT	Strengthening Poorest and Vulnerable Household Capability to Improve Food Security	UDC UzDMC	Union Disaster Centre Upazila Disaster Management Committee
SHOUHARDO	Strengthening Household Ability to Respond to Development Opportunities	UDMC	Union Disaster Management Committee
SuPER	Sustainable, Profitable, Equitable and Resilient Agriculture Approach	UNO UP UN/ISDR	Upazila Nirbahi Officer Union Parishad United Nations International Strategy on Disaster Reduction
SMART	Specific, Measurable, Achievable, Realistic and Time-bound	VGD	Vulnerable Group Development
ToR	Terms of Reference	VGF WtRF	Vulnerbale Group Feeding Where the Rain Falls

GLOSSARY OF TERMS

Thana/Upazila- A Government administrative unit under a district comprised of several unions

Union- The lowest local government structure

Village- A community comprised of one or several cluster of households

Community- A neighborhood, cluster of households within a village or urban slums

Vulnerability- The characteristics and circumstances of a community, systems or asset that make it susceptible to the damaging effects of climate change and other hazards.

SuPER is a set of principles that guides CARE's work in small-scale agriculture in a changing climate. For more information, please see <https://careclimatechange.org/our-work/super/>

Decimal-1 decimal equals 40 square meter

Hectare-1 hectare equals to 10,000 square meter or 247 decimal

Seasonal Calendar - Calendar which is filled out with different hazard season, school activities e.g. monsoon, exams etc.

Climate Change Adaptation (CCA) - The adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Climate Resilience (CR) - People will make themselves more prepared to respond to the changing climate patterns so that they can overcome the negative effects caused by climate change and variability on their agricultural production, living and economic capability i.e., the capacity of people or any element e.g., crop to recover from shock e.g., flood.

Acknowledgements

The Project “Where the Rain Falls” (WtRF)-Phase-III started in January 2017 and will end in February 2019. WtRF project was designed building on Phase I & II. In Phase I, a research was conducted in Panchgachi and Holokhana unions of Kurigram Sadar Upazila by CARE International and the United Nations University in 2011. Based on the research findings, Phase II started in 2014 and finished in December 2015. The overall goal of the project is “to improve resilience of communities, especially women, from Kurigram district against increasing vulnerability of rainfall patterns by promoting SuPER agriculture through community based adaptation”. In order to make this final evaluation a success, a team of four resource persons was fully dedicated to assess the project under the guidance of a team leader. The team facilitated the study during the period of November through December 2018. In facilitating this study, the consultant team received excellent support from several resource persons of ESDO and CARE Bangladesh, both at the field sites and Dhaka level. The consultant team is indebted to a number of professionals for their continuous support and guidance. The evaluation team is grateful to Mr. Anwar Hosen, Project Manager,

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(On-Behalf of the WtRF project Final Evaluation Team)

**Dr. Syed Samsuzzaman,
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Executive Summary

1. Introduction

1.1 Background

Bangladesh is frequently cited as one of the most vulnerable countries to climate change (Huq and Ayers, 2007). According to a scientific study in Kurigram (Samsuzaman et al 2015), early flood occurs in June –August and late flood occurs during September-October. Mass damages occur for agricultural crops mainly rice and vegetable crops during flooding period. A research study was conducted in Panchgachi and Holokhana unions of Kurigram by CARE International and the United Nations University in 2011 and the findings showed that “the overall rainfall in this area has increased but, its micro pattern has changed and farmers have faced difficulties to adapt with their crop production system”. Considering these scenarios of climate change risks and as an initiative to address the effects of climate change, CARE International in Bangladesh implemented the project “Where the Rain Falls (WtRF)”. Generously funded by the Prince Albert II Foundation, WtRF Phase III aimed at improving the resilience of targeted vulnerable and marginalized communities to the impacts of increasing variability of rainfall patterns by promoting CARE’s SuPER (Sustainable, Profitable, Equitable and Resilient) agriculture approach through community based adaptation. This intervention was designed building on earlier phases of Where the Rain Falls project (Phase I & II). The current phase of the project started in January 2017 and ends in February 2019. The project targeted 6,500 vulnerable and marginalized smallholder farmers in 20 villages of Holokhana, Panchgachi and Jatrapur union in Kurigram sadar upazlia under Kurigram

district. Participants were categorized as primary, secondary and tertiary based on the nature of support from the project. Primary participants received inputs and training while 50-60% of secondary and tertiary farmers only received seeds but all of them received information/learning on good agriculture practices from demonstration farmers or other famers through Farmers Field Day (FFD). CARE Bangladesh has implemented this project through its partner NGO named Eco Social Development Organization (ESDO).

1.2 Objective of the final evaluation

The main objective is to critically review program performance based on the indicators set out in the logical framework. The project is also keen to know how it is helping communities (especially those who are rain fed farmers) to address climatic vulnerabilities in a gender friendly manner. As the project will come to its end in February 2019, CARE Bangladesh planned to have an independent evaluation to see the results in comparison with the baseline.

2. Methodology

Data was collected through quantitative and qualitative methods. Review of project documents and secondary information, meeting, household survey, Focus Group Discussion (FGD), Key Informant Interview (KII) and individual interview through household survey generated adequate information to answer the questions as outlined in the ToR. Household survey was conducted at 350 households in the project area using a structured questionnaire. A total of 5 Focus Group Discussions (FGDs) were conducted in 5 villages out of 20 villages randomly. A total of 15 Key Informant Interviews (KIIs) were conducted with the representatives of different stakeholders. Predesigned checklist/guideline was used while conducting FGD and KII. **Specifically, the final evaluation has been done using**

standard evaluation matrix/review criteria (relevance, efficiency, effectiveness, and sustainability).

3. Findings of the evaluation

3.1 Relevance of the project

From the findings of the final evaluation it can be concluded that the project has rightly targeted a majority of woman participants (70%), and the target group was mostly vulnerable and marginalized smallholder farmers owning land up to 141 decimal (0.57 hectares). It implies that the project has created the scope for a significant proportion of vulnerable women in the rural areas to be involved in community based adaptation to manage climate change through SuPER agriculture approach. The average yearly income from agriculture increased significantly compared to the baseline data, from initial BDT 21,211 to BDT 32,599 for primary group members, BDT 31,669 for secondary group member and BDT 31,000 for tertiary group members due to SuPER agriculture interventions. The project was quite aligned with the policies of Bangladesh Government such as National Adaptation Program of Action (NAPA) 2005, Bangladesh Climate

Change Strategy and Action Plan (BCCSAP) 2009, National Agriculture Policy (NAP) 2013, Seed Policy and National Agriculture Extension Policy (NAEP) 2012. These policies identify crop failure due to climatic hazards, lack of knowledge on climate resilient agricultural practices and lack of access to seeds and inputs as some of the main factors for climate vulnerability in Bangladesh, which are all issues that WtRF project aimed to address.

3.2 Efficiency of the project

A vast majority of households (100% primary, 96% tertiary and 89% secondary group members) implemented all the activities as per schedule. The assessment also revealed that 98% of the total budget allocated was spent at the end of the project, of which the budget for field activities was fully spent. This status of budget expenditure was quite coherent with the implementation of almost all activities as per schedule. Hence, the project efficiently represented value for money, made an efficient use of resources (funding, people and other resources) and implemented activities in time with the resources available.

3.3 Effectiveness of the project

Summary findings of effectiveness

Name of Indicator	Baseline	End line	Increase/decrease
Indicator 1: % of households with increased knowledge on climatic risks and adaptive options	29.71 %	80 %	50.29 % increased over baseline
Indicator 2: Average month with insufficient food at households	3.35 months	2.0 months	1.35 months with insufficient food reduced over baseline
Indicator 3: % increase in adaptive capacities of households	23.4 %	84 %	60.6 (%) increased over baseline

Summary findings of effectiveness

Name of Indicator	Baseline	End line	Increase/decrease
Indicator 4: % increase in agricultural productivity	<p><u>Aman rice (rainy season)</u> Local variety) – 2.5 MT/hectare</p> <p><u>Aman rice (rainy season)</u> BRRIdhan 11 – 3.5 MT/hectare</p> <p><u>Rabi (winter season)</u> Targeted households kept land fallow</p>	<p><u>Aman rice (rainy season)</u> BRRIdhan 52 – 4.6 MT/hectare BINA 11- 3.6 MT/hectare</p> <p><u>Rabi (winter season)</u> Mustard variety BINA 4 and 10 – 1.1MT/hectare</p>	<p><u>Aman rice</u> 2.1 MT/hectare rice of BRRIdhan 52 increased over local rice variety (baseline)</p> <p>1.1 MT/hectare rice of BRRIdhan 52 increased over modern rice variety, BRRIdhan 11 (baseline)</p> <p><u>Rabi (winter season)</u> 1.1 MT/hectare of mustard – additional harvest in the year over baseline</p>
Indicator 5: % of farmers practising at least three adaptive agricultural technologies	4.28%	50% each of primary and secondary level	45.72% increased over baseline
Indicator 6: % of women increased their mobility and took part in family decision	14.1%	50%	35.9% increased over baseline
Indicator 7: % of women who are able to equally participate in household financial decision making	16.9%	49%	32.1% increased over baseline
Indicator 8: Number of Union Parishad (UP) allocated budget in their annual plan considering climate vulnerabilities and risks	01 UP	03 UP	02 UP increased over baseline

Indicator 1: Households with increased knowledge on climatic risks and adaptive options

Major findings are a) 98% of the targeted households know about climate risks compared to only 29.71 % households over the baseline b) more than 80% participants knew that major drivers of climate change risks were flood, hail storm and heavy rainfall as the causal factors that affected crop production compared to the baseline (20%), and c) About 90% of all categories of households received an adaptive option through early warning about excess flood,

advance flood, early winter, no rain when growing rice, and tolerant crops compared to the baseline (37.14%). **As 98% knew about climate risks, more than 80% knew the major drivers of climate change and around 90% received early warning, it can be concluded that at least 80% households knew about climate risks and adaptive option.**

Indicator 2: Average month with insufficient food at households

Overall, the project has reduced the food insecurity of its participants from 3.35 average

food insecure months in baseline to 2 food insecure months at the end of the project.

Indicator 3: Increase in adaptive capacities of communities

Major findings are a) 84% households across primary, secondary and tertiary levels have adaptive capacities receiving information and other services related to crop production from the staff of public and private organizations compared to only 23.4 % households having that capacity during baseline, b) the farmer-to-farmer extension approach contributed significantly to the diffusion of adaptive capacities by receiving access to services from government stakeholders as more than 80% of secondary and tertiary participants acquired this capacity learning from primary groups.

Indicator 4: increase in agricultural productivity (crop)

Overall, yield of flood tolerant aman rice variety BRR1 dhan 52 increased from 2.5 MT/hectare of local varieties and also from 3.5 MT /hectare of BRR1dhan 11 to 4.6 MT/hectare despite continuous submergence during flood for 15 days and also an additional crop mustard was introduced with an acceptable level of yield (1.1 MT/hectare).

Indicator 5: Farmers practicing at least three adaptive agricultural technologies

Overall findings indicate that a) 50% each of primary and secondary farmers practiced at least four adaptive agriculture technologies namely: changing cropping time, cultivation of flood tolerant aman rice, sack gardening of vegetable adapted to flood and mustard cultivation in fallow land to compensate crop loss due to flood, and b) almost half of women farmers were directly involved in practicing flood tolerant aman rice and mustard crop putting them in the driving seat.

Indicator 6: women increased their mobility and took part in family decision

Overall, a) around 50% households experienced increased mobility of their women and participation in family decision over the baseline (only 14.1% households), and b) women mobility was significant in agriculture field (83% primary, 90% secondary and 60% tertiary households), and even more remarkable is women in one-third households went to the market despite social barriers and insecurity.

Indicator 7: Women are able to equally participate in household financial decision making

Overall, women of at least 49% households of primary, secondary and tertiary groups were able to equally participate in household financial decision making over the baseline (only 16.98% households).

Indicator 8: Number of Union Parishad allocated budget in their annual plan considering climate vulnerabilities and risks

Overall, all the three targeted Union Parishad (Holokhana, Panchgachi and Jatrapur) in Kurigram allocated budget (BDT 150,000) in their annual plan last year (2017-2018) considering climate vulnerabilities and risks compared to only one Union Parishad (Holokhana) during the baseline (BDT 200,000 for the financial year (2016-2017).

3.4 Sustainability of the project

The majority households (>90%) have gained a sense of ownership and responsibility for continuation of the learning after the project ends and the majority households (>75%) can afford the tested technologies/learning after the project support is withdrawn. However, according to majority households (>85%), no legal frame-work e.g., by-law existed in their group for management in the longer run. About half of the households have received services from the Department of Agriculture Extension (DAE) and more than 15%

households received services from agriculture research institutes while more than 50% households received services from NGO and vast majority of households (>70%) received access to private agriculture input sellers at the locality indicating a strong informal linkages of targeted households with different stakeholders. However, it is evident from FGD and KII that neither any household nor government officials knew about the national policies on climate change adaptation and DRR like NAP 2013, NAEP 2012, Seed Policy, NAPA 2005 and BCCSAP 2009. So, neither duty bearers nor rights holders knew about the opportunities, roles and responsibilities clearly. This eventually created inadequate ownership of these stakeholders to this informal linkage with the households. It is evident that only 6-10% households across primary, secondary and tertiary category were represented as a member of Union Disaster Management Committee (UDMC), 2-4% households as a member of UP standing committee and 30-38% households as a member of Community Risk Assessment (CRA). These findings indicate poor access of targeted households to the local power structures particularly to the Union Parishad for ensuring their rights/entitlement.

3.5 Review of project management

3.5.1 Gender equality

Gender equality was enhanced as spouses of more than 50% households regardless of primary, secondary and tertiary category helped each other for their work in agriculture, cattle rearing, poultry rearing, child rearing and children education. It would have been better for impact on gender equality, if the project could have recruited more female staff than the current proportion of 25% in its team.

3.5.2 Analysis and learning

The project technical staff facilitated group members to conduct learning and analysis of results and prepared progress report of the project. However, no in depth analytical report with economic potential of the tested technologies was made available.

3.5.3 Financial management procedures

A total of BDT 7,731,733 was the multi-year budget. ESDO part for 22 months was 20,000 EURO @ Tk. 84.50 per EURO. Almost cent percent budget (98%) was spent by 22 months. A total of BDT 259.41 was spent per beneficiary, which was too low compared to management/overhead cost. This was due to high management cost (36%) compared to relatively low project activity cost (64%).

3.5.4 Management and HR structure of the project team

The project had a total of 16 staff of which 12 were males and 4 were females. Each staff had to supervise at least 400 households to cover 6,500 households by 16 staff. This coverage of households seems very high to implement such a technical project.

4. Recommendations

The following recommendations from the evaluation may be considered as crucial to get the best practices scaled-up to the locality and to the other areas of the country:

4.1 Policy advocacy

The evaluation team highly recommends that a national level workshop be organized, inviting senior officials of different stakeholders such as Department of Agriculture Extension (DAE), Bangladesh Rice Research Institute (BRRl), Bangladesh Institute of Nuclear Agriculture (BINA), Bangladesh Agriculture Research Institute (BARI), Bangladesh Agriculture Development Corporation (BADC), Rural Development Academy (RDA), Bangladesh Multipurpose Development Authority (BMDA), Local Government and Rural Development Ministry, National and International NGOs having climate change adaptation programs and private agro-based companies, **so that the best agricultural practices of this project can be mainstreamed in policy and scaled**

up to the other areas through the respective stakeholders using either e-agriculture (electronic Agriculture) or direct service delivery mechanisms.

A policy brief may be prepared based on the findings and obligations of different government line agencies to disseminate adaptive agriculture technologies. This policy brief should be disseminated across different ministries and agencies, NGOs, private sector as well as donors. Second, a brief summary of the study process and findings along with policy brief may be posted in the website of all alliance members of CARE International for wider dissemination beyond Bangladesh.

Policy documents such as National Agriculture Policy (NAP) 2013, National Agriculture Extension Policy (NAEP) 2012, Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009, National Adaptation Program of Action (NAPA) 2005 should be translated in easier language so that local officials and farmers understand clearly.

4.2 Mainstreaming women in agriculture

Participation of women in agriculture should be encouraged through developing women farmer groups, encouraging women SME development in agri-business, developing confidence for raising voice through grass root level women farmers' organization, creating gender awareness in both women and male farmers as per NAEP 2012.

Women farmers in agriculture should be given highest priority in any sort of training programs and input support from DAE, Union Parishads and other stakeholders in future in order to promote climate change adaptation and disaster preparedness in Bangladesh using women as facilitators as per NAEP 2012.

4.3 Strengthening functional linkage of the farmers groups with government

Formal and functional linkage of the farmers groups with different government stakeholders such as DAE, BRRI, BARI and BINA for technical assistance, and **with the Meteorology Department for early warning information through mobile network** should be strengthened through their orientation on relevant policies of the country.

As per policy statement of NAEP 2012 and NAP 2013, it is mandated to mobilize inclusive farmers groups and their apex organizations, and link them with Farmers Information and Advice Center (FIAC) housed in Union Parishad where the field extension personnel provide one stop integrated services for all categories of farmers. **So, DAE should be sensitized to strengthen FIAC and build linkages of the established farmers groups with FIAC through training of lead farmers particularly women farmers**

The farmer-to-farmer extension approach should be strengthened through quality control and legal framework of the farmers group e.g., by-law and registration of the Social Welfare Department.

All the best practices of the project should be piloted in other districts of the country involving farmer groups and their apex organizations in partnership with different government agencies like DAE, RDA and Bangladesh Rural Development Board (BRDB) utilizing their IPM club and village-based groups respectively.

4.4 Promotion of seed bank

The respective Union Parishad should be sensitized to implement seed banks (one of the best practice) in a large scale with different varieties of climate adaptive crops to meet diversified demands of the farmers. It is also important to renovate infrastructure to make the store room clean and cool using bamboo made platform under the roof of corrugated iron sheet so that seed viability for good germination is maintained.

Large farmers should be involved in the seed production of climate resilient rice crops, and then they should be supported for storing their seeds in the Union Parishad seed banks with branding through DAE and Seed Certification Agency of the Government.

4.5 Alternative technology

To avoid flood, late varieties of aman rice, BINA dhan 7, BU dhan 1, BRRI dhan 46 etc. should be grown. Farmers should be trained on the cultivation of these late varieties so that they can grow these rice varieties after flood and can also harvest these crops by December to catch up rabi season winter crops.

Under severe flooding conditions, when lands go under water for most time of the year, **farmers should be encouraged to practice sorjan system (alternate raised bed and furrow). Shallow depth sorjans are suitable for monsoon rice.** This alternative cultivation system should be tested in the flood prone areas of NorthWest Bangladesh under severe and continuous flooding condition.

4.6 Alternative research

The existing flood tolerant varieties of rainy season aman rice, BRRI dhan 52, and BINA 11 cannot sustain if the land goes under flood water for more than 15 days. **Thus, alternative submergence tolerant varieties**

of rice during aman season should be developed through research, which can survive under flood water for longer time. It is reported that BINA 12 variety of aman rice can survive under flood water for 24 days, which should be explored for future on-farm trial.

Chapter1: Introduction

1.1 Background

Bangladesh is frequently cited as one of the most vulnerable countries to climate change (Huq and Ayers, 2007). The production of crops in Bangladesh is constrained by too much water during the wet season and too little during the dry season (Rahman, et al., 2007). Flood damage in Bangladesh is most extensive when the four major rivers (Brahmaputra, Padma, Meghna and Jamuna) are in peak stage at the same time. It is evident that snowmelt in the Himalayas makes a significant contribution to river flooding in Bangladesh (UNDP, 1989). The project areas in Kurigram district is affected by the mighty river Brahmaputra. Most of the floodplains in Bangladesh are subject to riverine floods during Monsoon. Floods become a regular feature in riverine Bangladesh. Every year, around 21 % of land is flooded during monsoon season. However, in severe situation this figure is increased to more than 60 % of total land (Dewan, et al., 2003). According to a scientific study in Kurigram (Samsuzaman et, al 2015), early flood occurs in June –August and late flood occurs during September-October, while normal flood occurs during July – August. Sometimes flash flood (both early & late) occurs from North (India) during July-August when heavy rainfall occurs. River erosion is common phenomenon and happens during August-September. Mass damages occur for agricultural crops mainly aman rice and vegetable crops during flooding period. Livestock mobility is affected. Veterinary and animal husbandry services are disrupted due to flood. Adaptation to climate change refers to

the initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. Adaptation options could be resettlement, livelihood diversification, new varieties of crops tolerant to floods and droughts, new technologies, significant infrastructural modifications, as well as change in management and lifestyle practices. Adaptive measures involve research and development initiatives too. Kurigram has one of the highest poverty rates in Bangladesh, with 44% of the population (917,001) living in extreme poverty compared to a national mean value of 17.6% (World Bank, 2016). Poor and extreme poor families living in the chars have very limited income ranging from 1,500-2,000 BDT per month, which is insufficient to meet basic needs (Concern WorldWide, 2016). The principal source of income for poor char households is selling labour and the demand for labour fluctuates throughout the year. As a result, some non-poor households fall below the extreme poverty line during lean seasons and consequently the male members of households migrate to urban areas for selling labour leading to increased insecurity of women members. Food security and nutrition for poor and extreme poor households are also a significant challenge in the char areas (Concern WorldWide, 2016).

Considering the above scenarios of climate change risks and as a part of initiative to address the effect of climate change, CARE Bangladesh has started implementing the project “Where the Rain Falls (WtRF III)”. Generously funded by Prince Albert II Foundation, the project aimed to improve the resilience of targeted vulnerable and marginalized communities to the impacts of

increasing variability of rainfall patterns by promoting SuPER (Sustainable, Profitable, Equitable and Resilient) agriculture approach through Community Based Adaptation. The project began in 2011 in 8 countries with a research phase on migration, food security and climate change. The results were published in end of 2012 and community based adaptation (CBA) projects were then implemented in 5 countries including Bangladesh. In Bangladesh, the project (Phase II) started in 2014 and finished in December 2015. A project end evaluation revealed significant impact of the project activities on the lives of project beneficiary household level and beyond. Hence, the same donor Prince Albert II of Monaco Foundation allocated a small bridging fund to continue the project initiatives in Bangladesh for additional period until December 2016. Based on the performance of the phase II project, the same donor has again supported the project phase III for a period of 2 years from January 2017. The project ended on 28 February 2019. The project was designed and piloted from the observations of a research study conducted in Panchgachi and Holokhana unions of Kurigram Sadar by CARE International and the United Nations University in 2011, to understand how the changes of rainfall pattern influence food security and migration (Phase I). The research findings showed that “the overall rainfall in this area has increased but, its micro pattern has changed and farmers facing difficulties to adapt with their crop production system”. These changes have direct impact on the crop production of farmers and their food security. On this research, a 2 year model project (Phase II - 2014-2015) was designed and implemented in 5 villages in Kurigram district.

The project Where the Rain Falls is helping smallholder farmers to **adapt** to the impact of recurrent floods, droughts and colds in the Northern part of Bangladesh. The project is **connecting** farmers with agro-climate service providers and with the provision of capacity building on **Sustainable, Productive, Equitable and Resilient (SuPER)** agriculture practices. The project has also adopted a **‘farmer to farmer’** learning approach to promote community cohesion, up-taking adaptive varieties and technologies by putting **women** in the driving seats. The project has targeted 6,500 vulnerable and marginalized smallholder farmers in 20 villages of Holokhana, Panchgachi and Jatrapur union in Kurigram sadar upazlia under Kurigram district for the last two years through an implementing partner NGO named Eco Social Development Organization (ESDO).

The overall goal of the project is to improve resilience of 20 communities, especially women, from Kurigram district against increasing vulnerability of rainfall patterns by promoting SuPER agriculture approach and community based adaptation. The specific goals and corresponding outputs are:

Goal 1: 20 communities are more resilient to climate risks and change

Output 1.1: Community plan integrated climate risks and climate change issues

Output 1.2: Increased practice of Super Agriculture Approach

Output 1.3: Women are more empowered and feel confident to respond to variable climate condition

Output 1.4: Enhanced capacity of service providers to support community to adapt to the impact of climate variability.

Specific Goal 2: Local, regional and/or national policies and civil society organizations better integrate climate risks and change

Output 2.1: Integrated CBA activities in annual plan of Union Parishad

Output 2.2: Functional linkage established between relevant stakeholders and community to adapt to the impact of climate variability.

1.2 Rationale of the final evaluation

The fundamental reason for this final evaluation study is to examine impacts of this particular climate resilient project on the lives of project beneficiary households and beyond. As mentioned earlier, the project is mainly based on Community Based Adaptations. The project adopted a rights-based approach and focused its advocacy and mobilization efforts in empowering women, enabling vulnerable groups to participate in local decision-making/governance, and ensuring equitable access to resources and services vital to adaptations. The project in phase II has demonstrated substantial results which encouraged local authorities (UP) to make provision in their annual plans and allocate budget to establish seed banks with adaptive variety seeds in their respective unions. Under this project BINA dhan 11 has been identified as the most suitable flood tolerant rice for monsoon while BRRI dhan 28 & 58 have been identified as the most suitable adaptive rice for summer. Baseline survey was done before the project interventions and this baseline survey has provided a starting point from which a comparison can be made with results or intended outcomes of the project as per its log-frame. As the project will come to its end in February 2019, CARE Bangladesh planned to have an independent evaluation to see the results in comparison with the baseline and the evaluation was implemented by a team of consultants led by Dr. Syed Samsuzzaman,

Climate Adaptation and Rights based Development Specialist.

1.3 Objective of final evaluation

The purpose of the study is to critically review program performance based on the indicators set up in the logical framework (*Annex 1*). The project is also keen to know how it is helping communities (especially those who are rain fed farmers) to address climatic vulnerabilities in a gender friendly manner. The specific objectives include:

- To assess how WtRF implemented its activities and achieved its specific goals at the end of the project.
- To measure the impact of “Where the Rain Falls” project on the lives of small and marginal rain fed farmer.
- To assess intended and unintended results of the initiatives / project at beneficiary household level and beyond (community and union).
- To assess which activities and approaches worked well with whom (male & female) and why that organization may use for future scaling up.
- To identify adoption/scaling challenges of the good practices and mitigation strategies
- To document to extent which project has achieved women empowerment through gender-sensitive adaptive practices.
- To evaluate to extent which results of the project are sustainable and provide recommendation how the sustainability can be improved for scale up for next phase.

Chapter 2: Methodology

2.1 Approach of the Assignment

The Final Evaluation will provide stakeholders with the information they need to analyze whether the project is meeting its planned goals and objectives. So, in line with the nature, data was collected through quantitative and qualitative methods. Review of project documents and secondary information, meeting, household survey, Focus Group Discussion (FGD) and Key Informant Interview (KII) generated adequate information to answer the questions as outlined in the ToR (Annex II).

2.2 Limitations of the Study

The project has tried to address climate change risks mainly through the Community Based Adaptations (CBAs) in Bangladesh and aims at improving the resilience of targeted vulnerable and marginalized communities to the impacts of increasing variability of rainfall patterns by promoting SuPER (Sustainable, Profitable, Equitable and Resilient) agriculture approach and Community Based Adaptations. However, due to time constraints the study could not cover the entire project areas to generate information in details. Another limitation was that the participation of local government institutes/representatives, particularly Union Parishad (UP), was not adequate enough to grasp the actual situation in terms of the current efforts of UP on community resilience to climate change risks and vulnerabilities. These limitations were tackled through participatory learning and cross checking of information from different stakeholders such as farmers, representatives of government, NGO and private sectors to minimize bias.

2.3 Description of evaluation methods

2.3.1 Planning Meeting

A planning meeting was held with the project personnel regarding the objective, scope, and methodology of the Final Evaluation.

2.3.2 Literature Review

After planning, consultants reviewed available literature and project documents/materials to get in-depth understanding. Relevant documents being reviewed were project proposal, project Log frame, project implementation strategies and guidelines, baseline report, progress and monitoring reports, project implementation guidelines, relevant policy and strategy.

2.3.3 Sampling for quantitative survey

The WtRF Phase III project focuses on climate resilient agriculture and has targeted 6,500 small and marginalized farmers in 20 villages (2500 from previous phase in 5 villages and an additional 4,000 small and marginalized farmers from additional 15 villages). Project has used farmer to farmer extension approach and targeted small and marginal farm holders (poor and extreme poor household) depending on rain-fed agriculture practices and in particular women. According to the nature of the project, the targeted farmers have been categorized as primary, secondary and tertiary participants. There are about 15% (1,000) primary, 46% (3,000) secondary and 38% (2,500) tertiary participants of the project. Primary participants receive inputs and training while 50-60% of secondary and tertiary farmers receive only seeds but all of them receive information through Farmers Field Day (FFD). Using farmer to farmer extension approach, each primary farmer replicates project outcomes among at least 3

secondary farmers and each secondary one replicates outcomes among at least 3 tertiary farmers through diffusion of learning. There are 40 Farmers Field School (FFS) with primary participants of which 38 with mixed male & female farmer FFS and 2 with only women farmer FFS as platform of informal learning and sharing. The 40 FFS consists of 1,000 farmers (25/FFS) of which 76% are women. Similarly, there are 40 secondary groups consisting of 3,000 farmers (75/group) and 40 tertiary groups consisting of 2,500 farmers (63/group). A desired sample household is needed complying with the statistical rules for collecting the study information. During the baseline study, 4,000 new households taken under the project were selected as the population and thus the same number of households ie, 4,000 is considered as the population for the final evaluation of the project to make the sampling consistent with the baseline study. The sample size for data collection was determined by the following formula:

$$n = \frac{Z^2 * p * q * N}{e^2 * (N - 1) + Z^2 * p * q}$$

Where,

n = the desired sample size, Z = the standard normal deviate = 1.96

p = the portion in the population estimated to have a particular characteristics

(i.e. the probability in percentage) = 0.5 (maximum variability)

q = 1.0 – p = 1 - 0.5 = 0.5, N = Population size = 4,000 (targeted Households in 15 Villages)

e = Degree of desired error level (suppose we desire 95% confidence level and +_5% precision = 0.05

$$1.96 * 1.96 * 0.5 * 0.5 * 4,000$$

$$\text{Therefore, } n = \frac{1.96 * 1.96 * 0.5 * 0.5 * 4,000}{0.05 * 0.05 * (4,000 - 1) + 1.96 * 1.96 * 0.5 * 0.5} = 3841.6 / 10.9579 = \mathbf{350.58} \text{ (samples)}$$

The same number of households was considered for baseline survey. However, same households may not be necessarily needed for the final evaluation purpose.

Out of 350 samples, 52 samples were taken from primary targeted households, 161 samples from secondary households and 137 samples from tertiary households of the

project randomly using proportion of 15%, 46% and 38% respectively. The respondents of the households were the adult household members selected for the project e.g., households head or other member (husband/wife). Household survey was conducted at 350 households in the project area using a structured questionnaire (Annex III). All selected respondents were available during the interview except two respondents were replaced by the other participants of the project on the spot due to their unavailability.

2.3.4 Qualitative data collection

Focus Group Discussion (FGD) - was done with the smallholder farmers groups and the project team to capture information from the target community on the various aspects of the interventions being promoted by the project. A guideline (Annex IV) was used while discussing with the participants and a separate guideline was used for the project team (Annex V). A total of 6 FGD was conducted taking 5 farmers from 5 villages out of 15 villages randomly – 2 FGDs from Pachgacchi, 2 FGDs from Jatrapur and 1 FGD from Holokhana Union, and 1 from project team. Each FGD session was conducted with at least 25 members of beneficiary group. Considering the proportion of primary (FFS), secondary and tertiary groups as described in the section 2.2.3, out of 5 FGDs one was taken from FFS groups and 2 each from secondary and tertiary groups.

Key Informant Interview (KII) - was done with the local institutes (Union Parishad, Department of Agriculture Extension, Research Institute, and Meteorological Department) including CSOs to assess their views on the existing situation of the specific issues of the study. A total of 15 KIIs was conducted and the respondents are given below:

- Department of Agriculture Extension (Deputy Director, Kurigram -1, Upazila Agriculture Officer, Kurigram Sadar – 1, Sub-Assistant Agriculture Officer one each in 3 unions – 3): Total 5
- Union Parishad – 3 Union Chairman, 3 Commissioners (2 female and 1 male): Total-6
- Agriculture Research Institution (BINA, BRR) – BINA (1), BRR (1): Total (2)
- Metrological Department, Kurigram- 1
- Private sector (Seed Company) - 1

The KII interviewees were interviewed as per pre-designed checklist/guideline (Annex VI).

2.3.5 Mobilization of data collectors/enumerators

A total of 10 enumerators including one field supervisor was mobilized from among the qualified and experienced staff having master's degree with a minimum of three- five years' of relevant experience.

2.3.6 Orientation of data collectors

Training on data collection is the most fundamental component of an evaluation. A comprehensive training was imparted to the survey enumerators to make them efficient in their respective jobs. The field enumerators were oriented for 1.5 days (including half day for field practice). The orientation was aimed at developing a uniform understanding on the concepts of sample selection, data collection, uniform understanding of the terminologies used in the tools/questionnaire etc.

2.3.7 Collection of quantitative & qualitative data

A total of nine (9) enumerators and 1 field supervisor were engaged for field level data collection and based on sample size they stayed in the field for 10 days including orientation and field test. On average, each

enumerator filled up 4-5 questionnaires (through interviews) per day. In this way, 9 enumerators completed 350 questionnaires within 8.5 days. FGD and KII were conducted by the Consultants. The consultants took part in field level activities, to ensure in-depth authentic and realistic data collection taking sufficient time. Moreover, necessary quality control measures were taken at the data collection stage.

2.3.8 Data processing and analysis

A data entry package was developed and used for data entry. This helped to check wrong data entry. Data were entered through Microsoft Excel 2010 software which was subsequently be transformed to graphs and tables using the same software. Inconsistencies and out of range errors was checked before analysis of data.

2.3.9 Quality Control

The Consultants visited some study areas and conducted meeting with data enumerators at the end of the day after household interview. In this meeting, the consultants, and the concerned ESDO and CARE field staff verified the data and scrutinized errors, if any, for correction during the following day. This meeting for verification of data and correction of errors was conducted almost every day during the whole field study. Due to this verification in the meeting, data collection errors were found very insignificant. Since the quality of the survey data is of utmost importance, sufficient care was taken to ensure quality of data collection at different stages of the survey, such as development of questionnaire/tools, recruitment and training of interviewers, field management, supervision and monitoring and data processing.

2.4 Description of Evaluation Matrix and Scope of Work

Specifically, the final evaluation has been done using standard evaluation matrix/review criteria (relevance, efficiency, effectiveness, sustainability and outcomes/impacts). Although indicator for impact may not be fully realized at this stage of the project, indicative information on the impacts was collected.

Relevance: Assess the extent to which the project was appropriate and coherent with Bangladesh Government policies & procedures in addressing climatic vulnerabilities. Document the appropriateness of project strategies to address context specific climatic dynamics.

Efficiency: Highlight the extent to which WtRF project represents value for money and the efficient use of resources (funding, people and other resources) and how effectively it implemented activities and managed risk.

Effectiveness: Document the extent to which the activity has achieved its clearly stated project objectives; highlighting any unintended outcomes, positive as well as negative. Consider the extent to which the activity has produced positive or negative changes (directly or indirectly, intended or unintended) assessed against Log Frame indicators.

Sustainability: Provide opinion on the extent to which results of WtRF are sustainable after closure of the project. Provide recommendations, if appropriate, of how sustainability can be enhanced.

In addition to the above five analytical measures, the end of project review has provided a commentary on the following issues:

Gender Equality: The extent to which WtRF project has achieved gender equality and women empowerment (including household decision making and increased mobility).

Analysis & Learning: the extent to which activities was based on sound technical analysis and continuous learning.

Review of Financial Management

procedures: review of a) budget spent against plan, b) most recent audit recommendations.

Review of management and HR structure of the project team: extent to which the project has formed a coherent team that was able to carry out the project activities properly.

Cross Cutting Issues: The extent to which activities addressed cross cutting issues such as participation of extreme poor and poor people in UP as well as local development process, disability, strategy to cope with shocks.

Chapter 3: Findings of the Final Evaluation

3.1 Relevance of the project

The evaluation has covered a total of 350 respondents under primary, secondary and tertiary groups. Table 1 show that primary group represented 37% males and 63%

females while secondary represented 28% males and 72% females and tertiary represented 24% males and 76% females. Overall across three groups, the highest number of respondents (70%) were females. It is shown in Table 1 that the highest number of respondents (74%) were also female while the lowest was male (26%) out of the same number of samples taken during the baseline survey.

Table 1: Status of gender of the project participants by category of groups

Category	Female (%)	Male (%)
Primary	63	37
Secondary	72	28
Tertiary	76	24
Average of all	70	30
Baseline	74	26

This finding indicates that the targeting of project participants complies with the overall goal of the project as “to improve resilience of 20 communities, *especially women*, from Kurigram district”. It also implies that the project has created the scope for a significant proportion of vulnerable women in the rural areas to be involved in community based adaptation to climate change through SuPER agriculture approach.

Table 2 reveals that the project has mostly targeted small farmers, particularly males owning land up to 141 decimals (0.57 hectares) and females owning land up to 73 decimals (0.30 hectares). Out of the total primary participants, male members belonged to marginalized farmers owning land up to 119 decimals and female members belonged to

marginalized farmers owning land up to 16 decimals. The situation is even worse when land ownership excluding lease, share and khash land is considered for primary group members and in that case a male member owned 70 decimal and a female owned only 16 decimal. The data reveals that secondary and tertiary group members mobilized more lands on lease and sharecropping basis compared to primary group members. It is also evident from the baseline data that the vast majority of respondents (95.4%) belonged to marginalized and small farmers category. The findings indicate that the targeting of project participants complies with the project goal which requires capturing small and marginalized farmers to be involved in SuPER agriculture approach for adapting to climate change risks and vulnerabilities.

Table 2: Land ownership pattern of project participants by category of groups (end line)

Category	Owned (Decimal)		Lease (Decimal)		Shared cultivator (Decimal)		Khas land (Decimal)		Total land (Decimal)	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Primary	16	70	0	20	0	27	0	2	16	119
Secondary	62	145	32	130	41	76	0	18	75	155
Tertiary	85	105	20	120	20	73	0	0	128	149
Average of all	54	107	17	90	20	59	0	7	73	141

Table 3 reveals that among the three groups, tertiary group members' annual income is the highest amounting to Tk. 127,431 of which 99,304 for males and 28,127 for females. The second highest is the secondary group's annual income amounting to Tk. 104,685 and the minimum is reported for primary group as Tk. 102,239. The main reason for this difference is that primary group members are marginalized as shown in Table 2, compared to secondary and tertiary groups. In all the cases, the lion share of income was owned by males. The end line data correlates well with that of the baseline where the total household yearly income of the project participants was BDT 106,572 of which the lion share of income (84%) i.e. BDT 89,304 was owned by male (see baseline report).

The average yearly income from agriculture was significantly raised from the baseline data

(BDT 21,211) to 32,599 for primary group members, BDT 31669 for secondary group member and BDT 31,000 for tertiary group members (Table 3). Income of homestead gardening was reduced compared to baseline, so there was no visible effect in this area but income from agriculture as a whole was significantly increased mostly due to enhancement of field crops i.e. climate adaptive crops. It implies that this increase in income from agriculture could be attributed to the project intervention particularly through the introduction of climate resilient crops and an additional harvest of cash crop – mustard (please see testimony of Sakhina Begum below).

Testimony of Sakhina Begum

Sakhina Begum – a member of clinic para FFS in Holokhana Union of Kurigram Sadar upazila, Kurigram district said that she cultivated mustard crop (Variety BINA 4) in Rabi season 2017. She added that generally farmers in that area keep their land fallow after harvest of aman crop due to late recession of flood water and lack of suitable crop varieties. Upon suggestion from the project staff, she cultivated BINA 4 variety in her 20 decimal of land and received 160 kg of mustard as an additional harvest in the year with income TK. 8,000 (Tk. 5/kg) against production cost Tk. 2,500. So, her profit margin was Tk. 5,500. She stated that she got a significant benefit through cultivation of mustard (variety BINA 4) and many other farmers started cultivating improved varieties (BINA 4, 9 and 10) of mustard after observing her benefit. Many farmers are highly convinced to grow these varieties of mustard in their fallow land after aman harvest this year and so on.



Sakhina Begum on her land of mustard crop

Table 3: Sources of income (End line)

Category	Primary (BDT/year)			Secondary (BDT/year)			Tertiary (BDT/year)		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
Agriculture	8553	24046	32599	4235	27434	31669	1150	29850	31000
Day labor	255	15128	15383	1704	25846	27550	1461	32002	33463
Service	0	15702	15702	2346	3721	6067	2553	6200	8753
Business	106	7426	7532	562	12583	13145	0	16876	16876
Rickshaw/ van/ Auto	0	2213	2213	0	2051	2051	0	10690	10690
Livestock/ Poultry	4951	6511	112462	3685	3272	6957	4773	885	5658
Fish culture	6	691	697	99	296	395	92	7	99
Homestead garden	255	28	283	569	574	1143	408	224	632
Handicraft	1319	0	1319	432	278	710	465	0	465
Loan	5513	6727	12240	12394	1302	13696	17226	1489	18715
Others (specify)	0	2809	2809	0	1302	1302	0	1080	1080
Grand Total	20958	81281	102239	26026	78659	104685	28128	99303	127431

Available literature indicates that this income level of the project participants (both baseline and end line of the project) is very poor compared to the average yearly household income of the rural people in Bangladesh (BDT 220,188) and far below the national average (BDT 381,756) in 2015 (PPRC 2016). Moreover, the access of women to yearly household income was very insignificant (BDT 20,960 for primary group, BDT 26,026 for secondary group, BDT 28,127 for tertiary group during end line and BDT 17,262 during baseline), which poses an extra challenge for the project to bring these women out of this vicious situation and therefore could require more time and access to support from the relevant stakeholders. It is noted that during baseline no project support was provided to the target participants and so all participants were treated as one category. Hence, data disaggregation of primary, secondary and tertiary was not needed.

Available literature reveals that in response to combating the challenges of climate change, the Government of Bangladesh has adopted action plans, particularly the National Adaptation Plan of Action (NAPA) in 2005, followed by the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2009 (MoEF 2009). Adaptation to climate change is mainstreamed in different sectorial plans and programs, such as National Water Management Plans, National Agricultural Policy (2013), and National Agricultural Extension Policy (2012). Therefore, the project was appropriate and coherent with Bangladesh Government policies & procedures in addressing climatic vulnerabilities. **Vast majority of participants (100%, 98% and 94% of primary, secondary and tertiary level, respectively) said that WtRF project has addressed their problems (Figure 1).**

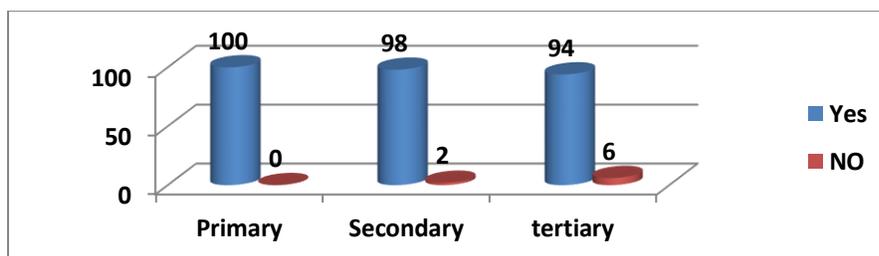


Figure 1: The project has addressed problems of participants

Figure 2 reveals that the vast majority of participants i.e. 88-89% at all levels of primary, secondary and tertiary, mentioned the problem of **'crop failure due to climatic hazards'** was addressed by the project over the last two years. Another problem **'lack of access to seeds and agricultural inputs'** has been addressed by the project according to majority participants (67-68% at all levels). In addition, the project has addressed the other pertinent problem as lack of knowledge on alternative and

climate resilient practices which most of primary (55%) and secondary (69%) participants agreed upon. Hence, it is quite evident that this project highly addressed three major issues of **'crop failure due to climatic hazards'**, **'lack of knowledge on alternative and climate resilient agricultural practices'** as per country policies such as NAPA (2005), BCCSAP (2009), National Agriculture Policy (2013, and **'lack of access to seeds and agricultural inputs'** as per Seed Policy and

National Agriculture Extension Policy (2012). Lack of farmer's connection with local authorities and decision instances usually increases the degree of the above three problems and this problems has also been addressed by the project according to 52-55% of the participants regardless of primary, secondary and tertiary level. The project did not provide support to farmers for general

preparedness of households during floods and thus the problem regarding vulnerability of households to floods was not addressed. The findings in general indicate that farmer to farmer extension approach was quite functional from primary to secondary level.

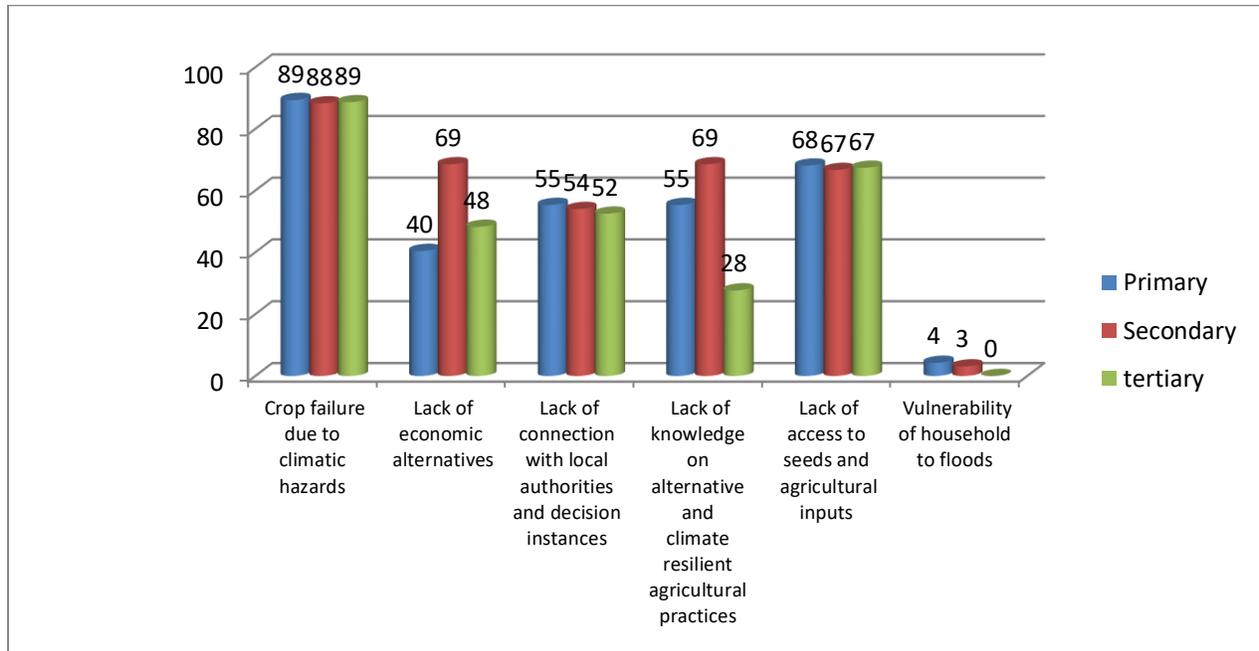


Figure 2: Types of problems addressed by the project

Major findings are a) the project has targeted a majority woman participants (60%), b) the target group was mostly small and marginalized farmers owning land up to 141 decimal (0.57 hectare), c) The average yearly income from agriculture was significantly raised from the baseline data BDT 21,211 to 32,599 of primary group members, BDT 31669 of secondary group member and BDT 31,000 of tertiary group members, which could be due to project intervention through climate smart agriculture, d) the project was quite relevant to the policies of Bangladesh Government viz, NAPA (2005), BCCSAP (2009), National

Agriculture Policy (2013), Seed Policy and National Agriculture Extension Policy (2012) because the problems like crop failure due to climatic hazards, lack of knowledge on climate resilient agricultural practices and lack of access to seeds and inputs were addressed as per these policies, and e) the project was also relevant to the local context of northern Bangladesh addressing climatic vulnerability.

3.2 Efficiency of the project

Figure 3 reveals that 100% primary, 96% tertiary and 89% secondary group members implemented all the activities such as sack gardening of vegetables, cultivation of flood tolerant rice, mustard cultivation in the fallow

land, floating garden, eco-hole vegetable gardening, vermin-compost, green manuring, line sowing of boro rice, dry seed bed, balance fertilizer application, use of sex pheromone trap, and Alternate Wetting and Drying (AWD) in boro rice as per schedule. Only 11% and 4% participants in secondary and tertiary groups could not implement activities in time.

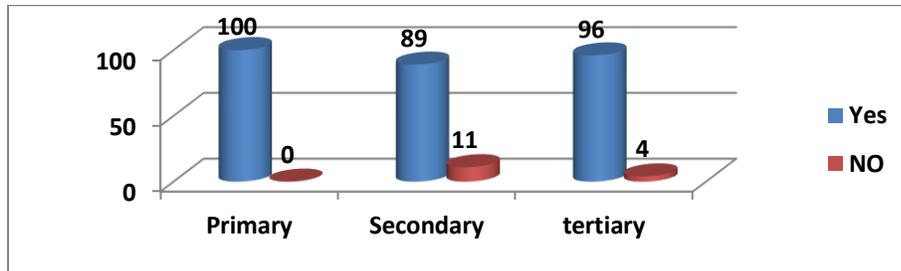


Figure 3: Activities supported from the project are implemented as per schedule

Based on the survey data, Figure 4 shows that input and training support was delayed according to 38% and 43% secondary members respectively out of the households who did not receive support as per schedule. Similarly, 17% and 33% tertiary members did not receive input and training respectively in

due time. None of the primary respondents reported about delay in any support, as they were the direct participants of the WtRF project meaning the project was efficient in terms of implementing activities of the project as per schedule.

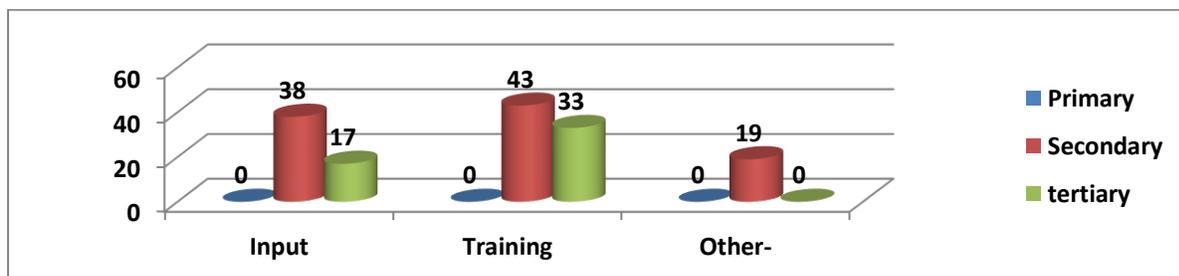


Figure 4: Type of support is delayed

The training to secondary and tertiary groups was not the direct support from the project. But the project followed farmer to farmer extension approach and group based spot training was conducted in secondary group by primary members and in tertiary group by secondary members. Nevertheless, farmer to farmer extension from primary to secondary and

secondary to tertiary group members in terms of technology transfer through spot training was not done timely to some extent. Due to this delay in technical support from primary group members, secondary and tertiary members might not have understood on the proper time for relevant input collection. As a result, input mobilization was delayed and

consequently the respective agriculture activity could not be established in proper time. With this effect in secondary groups, 60% households said that activity was partially damaged, 20% termed that activity was fully damaged and another 20% reported that activity could not be established (Figure 5). These secondary households, who experienced partial damage of their activity,

was out of 11% secondary households (Figure 3) who did not receive support in due time but not out of all secondary households of the project. Similarly, in tertiary groups 17% households reported that the activity was partially damaged, 33% said that activity was fully damaged and 34% could not establish the activity.

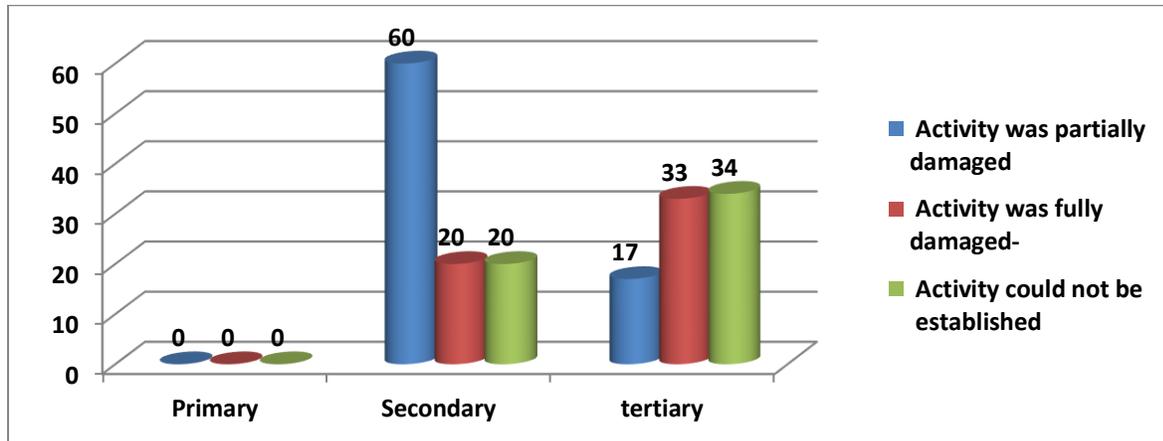


Figure 5: Negative effects encountered due to delayed implementation of activities

According to budget utilization statement, it was evident that 98% of the total budget allocated was spent at the end of the project of which budget for field activities was fully spent i.e., 100%. This status of budget expenditure was quite coherent with the implementation of almost all activities as per schedule.

Hence, the project efficiently represented value for money and made the efficient use of resources (funding, people and other resources) and implemented activities in time with the resources available.

3.3 Effectiveness of the project

This section documents the extent to which the activity has achieved its clearly stated project objectives; highlighting any unintended outcomes, positive as well as negative. The

findings of the evaluation under effectiveness matrix are provided here as per indicators set in logical framework, which were compared with the findings against the same indicators of the baseline survey. The summary comparative findings of the baseline and end line information is given in Table 4.

Table 4: Summary findings of baseline survey as per indicators set in logical frame work

Name of Indicator	Baseline	End line	Increase/decrease
Indicator 1: % of households with increased knowledge on climatic risks and adaptive options	29.71 %	80 %	50.29 % increased over baseline
Indicator 2: Average month with insufficient food at households	3.35 months	2.0 months	1.35 months with insufficient food reduced over baseline
Indicator 3: % increase in adaptive capacities of households	23.4 %	84 %	60.6 (%) increased over baseline
Indicator 4: % increase in agricultural productivity	<u>Aman rice (rainy season)</u> Local variety) – 2.5 MT/hectare <u>Aman rice (rainy season)</u> BRRI dhan 11 – 3.5 MT/hectare <u>Rabi (winter season)</u> Targeted households kept land fallow	<u>Aman rice (rainy season)</u> BRRI dhan 52 – 4.6 MT/hectare BINA 11- 3.6 MT/hectare <u>Rabi (winter season)</u> Mustard Var BINA 4 and 10 – 1.1MT/hectare	<u>Aman rice</u> 2.1 MT/hectare rice of BRRI dhan 52 increased over local rice variety (base line) 1.2 MT/hectare rice of BRRI dhan 52 increased over modern rice variety, BRRI dhan 11 (baseline) <u>Rabi (winter season)</u> 1.1 MT/hectare of mustard – additional harvest in the year over baseline
Indicator 5: % of farmer's households practising at least three adaptive agricultural technology.	4.28%	50% each of primary and secondary level	45.72% increased over baseline

Indicator 6: % of women increased their mobility and took part in family decision	14.1%	50%	35.9% increased over baseline
Indicator 7: % of women who are able to equally participate in household financial decision making	16.9%	49%	32.1% increased over baseline
Indicator 8: Number of Union Parishad (UP) allocated budget in their annual plan considering climate vulnerabilities and risks	01 UP	03 UP	02 UP increased over baseline

The detail of the above comparison of end line and baseline information is presented in the sections given below:

3.3.1 Percent of households with knowledge on climatic risks and adaptive options

Fig 6 reveals that cent percent of the primary respondents know about climate change/risk. Also, 98% secondary and 99% tertiary group respondents reported that they know about the

climate change. During baseline, it was only 29.71 % households know about climate risks. Thus, it clearly indicates that the WtRF project has brought a remarkable improvement of its participants in knowledge on climate risk and vulnerabilities from 29.71% households to almost cent percent (98-100%) households and farmer to farmer transfer of this knowledge was effective as nearly 98% secondary and 99% tertiary households adopted this knowledge.

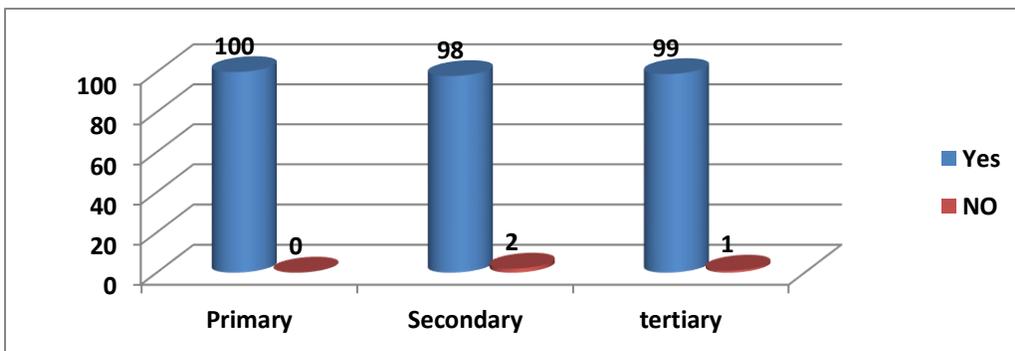


Fig 6: Participants with knowledge of Climate risk

Table 5 shows that 94% respondents of primary group defined climate change as frequent floods, 89% said it as weather change, 83% perceived it as change of rainfall patterns and 38% termed it as river erosion. In the case of secondary group, 95% defined it as change of rainfall patterns, 84% as frequent flood, 80% as prolong drought, 79% as weather change, 54% as increase in intensity

of coldness and 34% termed it as short duration of winter season. It reveals from the tertiary group that 95% defined climate change as change of rainfall pattern, 84% as frequent flood, 80% as prolong drought, 79% as weather change, 57% as increase in foggy weather during winter and the lowest one was 34% as short duration of winter season. Overall, it indicates that the concept of climate

change is much clearer at all levels/groups of primary, secondary and tertiary, which can be considered as major achievement of the WtRF project since vast majority is now clear about it, which is very much related to their day-to-day livelihoods, food security, nutrition, health, etc. in many respects. Whereas, baseline survey showed a small proportion (around 20%) of project participants know about

different indicators of climate risks. Moreover, their conceptual clarity were not in depth compared to end line as very few people knew about the main drivers of climate change events like prolonged drought, shorter winter season, frequent cold wave in winter, increase in foggy weather, epidemic outbreak of minor diseases like blast of boro rice, etc.

Table 5: Knowledge on different indicators of climate change (End line)

Category	Weather change	Change of rainfall pattern	Increase in hail storms	Prolong drought	Frequent flood	Decrease in intensity of coldness during	Increase in Intensity of coldness during	Short duration of winter season	Increase in foggy weather during winter season	Increase in frequency of storm/cyclone	River erosion
Primary	89	83	70	87	94	34	51	38	43	62	38
Secondary	79	95	71	80	84	43	54	34	57	52	39
Tertiary	76	89	81	88	93	40	52	26	58	43	23

Therefore, it implies that the project has contributed to a significant increase of its participant's knowledge about the current drivers of climate change and the corresponding risks created thereby. Due to

this increase of knowledge, participants were found able to practice adaptive agriculture and got benefit of resilience to climate change risks and vulnerabilities as discussed in the section given below (3.6.5 and 3.6.6).

3.3.2 Knowledge of the targeted households on adaptive options through early warning and shelter during disaster

and 89% of the tertiary group received early warning about climate change induced disaster. It indicates that as a result of WtRF project implementations in the area, vast majority people of all direct and indirect participants are well aware about the receipt of early warning on the climate induced disaster.

Figure 7 shows that 94% respondents of the primary group, 91% of the secondary group

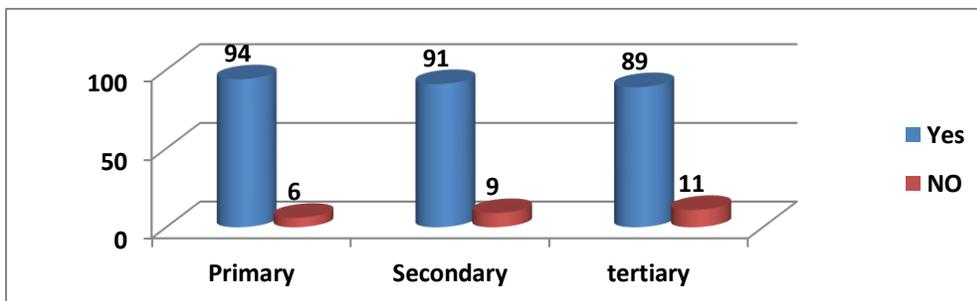


Figure 7: Households with status of receiving early warning (End line)

It is revealed in Figure 8 that majority participants (60% primary, 70% secondary and 51% tertiary) received early warning message through FFS session while the Department of Meteorology, Kurigram played a key role to deliver early warning to the people including the project participants through SMS i.e., there is a phone number and any one can contact this number to get the early warning message. **Majority FFS/primary group members (60%) established good contact with the**

Department of Meteorology, Kurigram through cell phone using a specific call number and received early warning message. With this effect 30% secondary and 25% tertiary participants utilized this channel of early warning. Apart from these channels, about one-third (32-34%) of participants at all levels got early warning message from wall publication i.e., poster or flip charts hanged on the wall of different offices and public places.

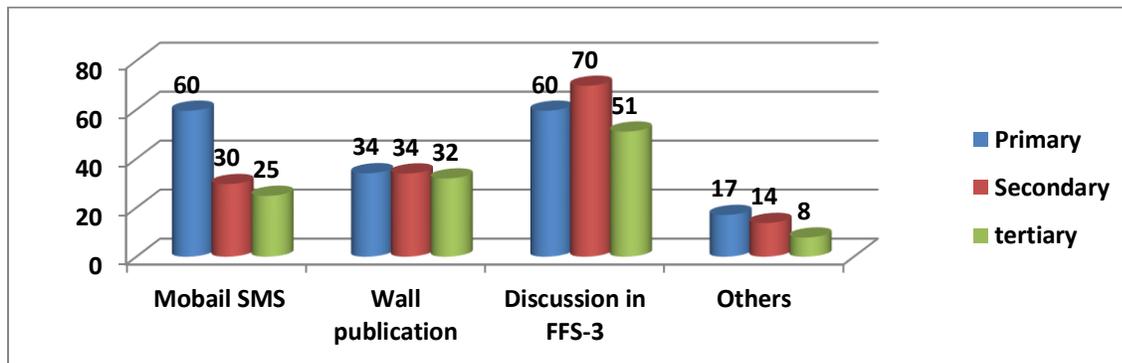


Figure 8: Households (%) with channels of receiving early warning

Regardless of primary, secondary and tertiary households, they generally received early warning on the forecast of excess flood (80-85% households), advance flood (50-70% households), early winter (45-54% households), no rain when growing rice (30-39% households) and tolerant crops (25-35%

households) (Figure 9). Receiving the above early warning message, project participants reacted positively and prepared themselves for practicing adaptive agriculture through adjustment of cropping pattern, use of tolerant crops/alternate crops and tuning of cropping time as discussed in the section below (3.3.6).

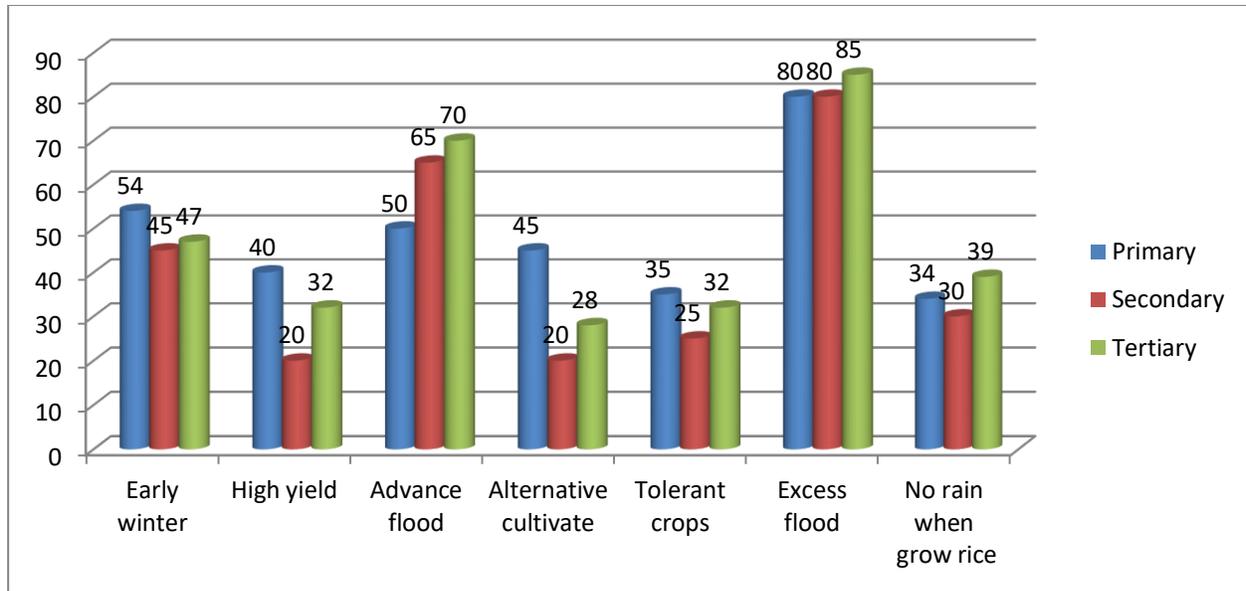


Figure 9: Types of early warning message

There is significant improvement in this knowledge of early warning over the baseline as only 37.14% households received early warning about climate change induced disaster at the start of this project despite many national policies and plans of Bangladesh that obligates government agencies to ensure this early warning to disaster prone areas. **Bangladesh Climate Change Strategy and Action Plan 2009** mentions in its 2nd pillar - community disaster management that cyclone, storm surge and flood early warning systems will be strengthened to enable more accurate short, medium and long term forecast. **National Agriculture Policy (2013)** in its clause 4.3 prioritizes research focus on the weather forecast in the context of climate change and crop production. **National Agriculture Extension Policy (2012)** in its clause 48 emphasizes on **Innovative Improvements for e-Agriculture** through use of mobile based text messages and voice messages for early warning on pest and disease outbreak, natural disasters as well as to disseminate critical information. **National Plan for Disaster Management**

(2016-2020) in its **Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction** emphasizes on strengthening the national forecasting and early warning system, to provide support for community-based early warning systems and to give special attention to developing an early warning system for floods.

Major findings are a) 98% of the targeted households know about climate risks compared to only 29.71 % members over the baseline b) more than 80% participants knew that major drivers of climate change risks were flood, hail storm and heavy rainfall as the causal factors that affected crop production compared to the baseline (around 20%) d) About 90% of all categories of households received an adaptive option through early warning about excess flood, advance flood, early winter, no rain when growing rice and tolerant crops compared to only 37.14% households over the baseline, e) Majority

FFS/primary group members (60%) received early warning from local metrological department through mobile SMS, and with this effect 30% secondary and 25% tertiary participants utilized this channel. Overall in all categories of

households, 98% know about climate risks, more than 80% know the major drivers of climate change and around 90% received early warning it can be concluded that at least 80% households know about climate risks and adaptive option.

3.3.3 Average month with insufficient food at households

Figure 10 reveals that October and March were the lean months when 85% primary, 82% secondary and 82% tertiary households experienced insufficient food in March while 87% primary, 57% secondary and 60% tertiary experience same problem during October indicating two food insecure months the year. The situation of food insecure months has decreased compared to baseline as September, October and March were the lean months when 45.7%, 77.4% and 68.9% households respectively experienced insufficient food and also 40% households faced food deficiency during July indicating at least 3.35 food insecure months in the year

during baseline. This finding indicates that there was 2 food insecure months in the year after the project compared to 3.35 food insecure months during baseline. It implies that the project has reduced the food insecurity of its participants from 3.35 average food insecure months of baseline to 2 food insecure months at the end of the project. It also implies that farmer to farmer extension approach worked well as the secondary and tertiary participants were able to reduce food insecurity learning from primary group who was directly supported by the project. Food insufficiency in September was not noticed due to sack gardening and eco hole gardening of vegetable providing vegetable production in September and thereby cash income for buying food items.

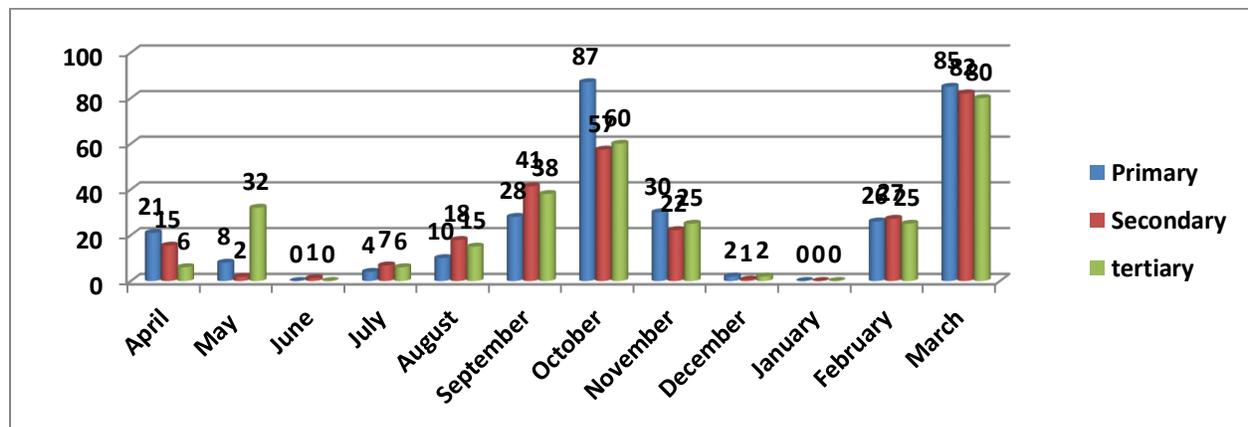


Figure 10: Households with insufficient food in different months (End line)

Overall, the project has reduced the food insecurity of its participants from 3.35 average food insecure months of baseline

to 2 food insecure months at the end of the project.

3.3.4 Increase in adaptive capacities of targeted households

It is to be noted that different government agencies/departments are mandated to provide services, information and resources to the poor people. The **Ministry of Local Government, Rural Development and Cooperatives, and its associated organizations (e.g., Union Parishad)** are responsible for building roads, bridges and culverts for communication to flood/cyclone shelters; ensuring availability of drinking water at times of need; providing assistance for rescue and relief operations, etc. **Bangladesh Rice Research Institute (BRRI) and Bangladesh Institute of Nuclear Agriculture (BINA)** are responsible for carrying out research on the development of different crop varieties resilient to different climate stresses while **Department of Agriculture Extension (DAE)** is responsible

for transferring research proven technologies, facilitating information and skills training, enhancing distribution of seeds and fertilizers; and implementing post disaster relief to farmers. The **Bangladesh Meteorological Department (BMD)** is responsible for watching over weather conditions, and ensuring improvement of natural disaster forecast procedures and supply of information on regular basis. Now-a-days, communities are also receiving services from NGOs, and dealers or retailers of private seed and pesticide companies. It is revealed from the Figure 11 that 87% primary, 84% secondary and 88% tertiary households **have adaptive capacities receiving information and other services related to crop production from the staff of public and private organizations**. This access of households to information and services eventually helps them to increase their adaptive capacities to climate vulnerabilities and risks.

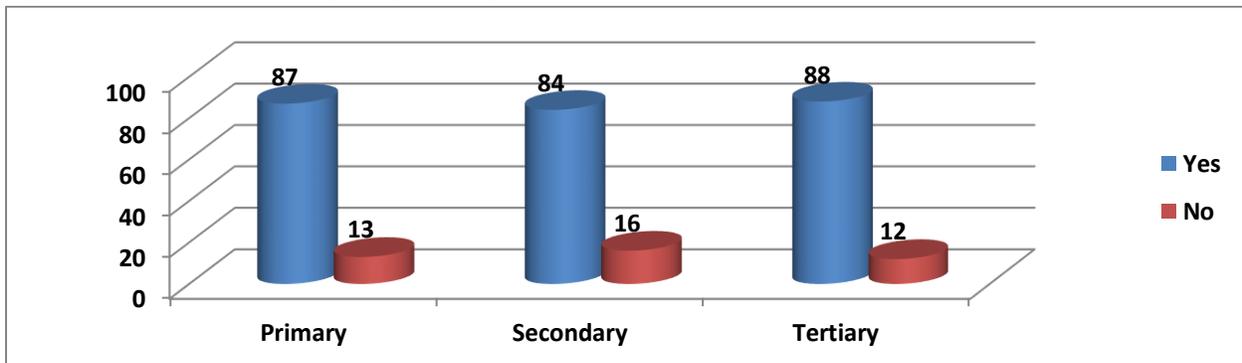


Fig 11: Communication status of Households with public and private organization (end line)

The situation was very poor at the start of the project (baseline) when **only 23.4 % households had adaptive capacities receiving information and other services related to crop production from the staff of public and private organizations**.

Figure 12 shows that about half of the households (45% primary and 65% tertiary)

have received services from the Department of Agriculture Extension (DAE) – the government agency and more than 15% of all category of households received services from agriculture research institutes while more than 50% households of all category received services from NGO and vast majority of households (70% primary and 72% tertiary) received access to private agriculture input

sellers at the locality. The situation of access to services from government agencies, NGOs and private sectors has been improved compared to baseline when only 26.03% households received services from the Department of Agriculture Extension (DAE) while 22% households received services from NGOs, 2.6% from private sectors and only 0.30% from government agriculture research

organizations. The project has built linkages of the targeted households through involving staff of DAE and research institutions in the workshops, farmers training, and farmer field days and also facilitated lead farmers of the Farmer Field Schools in particular for visiting the relevant offices of agriculture at union, upazilla and district level.

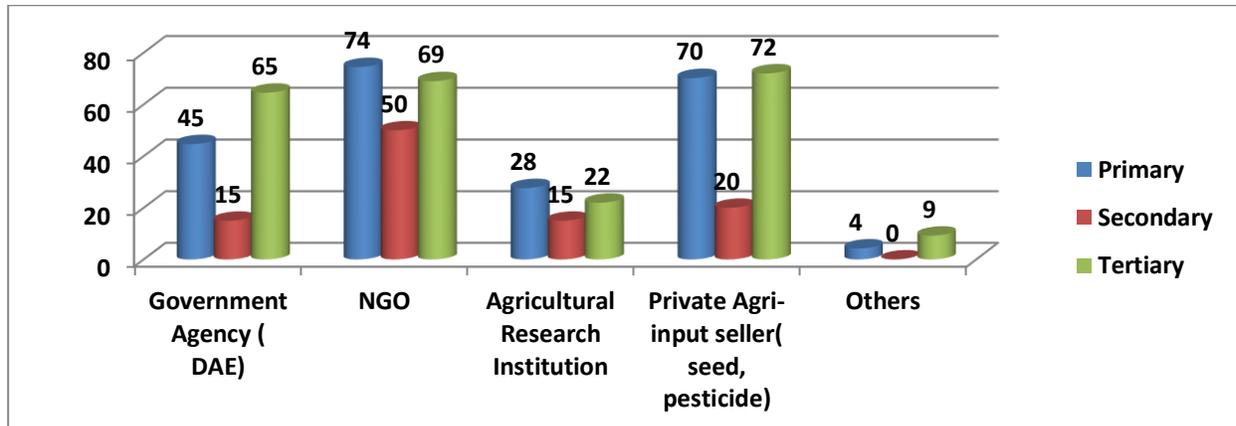


Figure 12: Types of organizations offering adaptive services to households

FGD reveals that despite increase in access of the farmers to technical information, they were not sufficiently able to demand for more services and resources from the government agencies primarily due to lack of network among farmers groups and the relevant other stakeholders. Therefore, the network of small and marginal farmers organization should be promoted through different government organizations and NGOs working with group approach to foster coordination between agencies administering climate resilient programs.

Major findings are a) 84% households across primary, secondary and tertiary levels have adaptive capacities receiving information and other services related to crop production from the staff of public and private organizations compared to only 23.4 % households having that capacity during baseline, b) the farmer-to-farmer extension approach contributed significantly to the diffusion of adaptive capacities receiving access to services from government stakeholders as more than 80% of secondary and tertiary participants acquired this capacity learning from primary groups.

3.3.5 Increase in agricultural productivity (crop)

The project provided support to primary target groups for production of climate resilient crops

like flood tolerant aman rice crops (BINA 11 and BRRI dhan 52) and short duration new varieties of mustard crop to cultivate between aman and boro season when most of the lands in that area remains fallow. Mustard or other

rabi crops could not be planted in time due to delay in recession of flood water. Figure 13 reveals that the participants regardless of primary, secondary and tertiary groups received 4.4 to 4.6 MT/ hectare of BRRIdhan 52 and 3.6 MT/hectare of BINA 11 of aman rice on an average despite submergence in flood for continuous 12-18 days while they

received 1.1 to 1.2 MT/hectare on an average from the new varieties of mustard (BINA 4 and 10). It is noted that the activity was damaged only in 11% secondary households, so this effect was not true for the rest 89% households and hence the above yield performance was the outcome of these major segments of households.

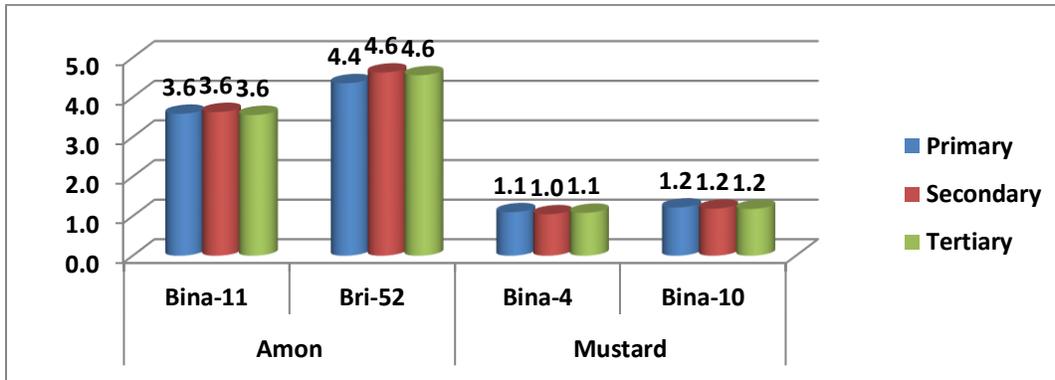


Figure 13: Varieties and yields of adaptive crops (End line)

Testimony of Ranjina Begum

Ranjina Begum – a member of clinic para FFS in Holokhana Union of Kurigram sadar upazila, Kurigram district said that she cultivated BINA 11 rice in aman season 2018. She added that generally farmers in that area grow local variety of aman rice or modern variety –BRRIdhan 11, which are generally damaged by flood. Upon suggestion from the project staff, she cultivated BINA 11 rice variety in her 20 decimal of land and received 380 kg rice with income TK. 7,600 (Tk. 8/kg) against production cost Tk. 4,500. So, her profit margin was Tk. 3,500. She stated that she is not only women but also a farmer and she got a significant benefit through cultivation of BINA 11. The other farmers who grew BR 11 or local variety got only 50% of my benefit due to flood damage. We can also cultivate other flood tolerant varieties eg, BRRIdhan 51, 52 and BINA 12, 79 etc.



BINA 11 rice fully submerged



BINA rice regrow after flood



BINA rice continue growing

It is evident from the baseline result that due to risk of flood farmers' generally cultivated local varieties of aman rice eg, Ganjila, Goti etc, with an average yield of 2-2.5 MT/hectare and very few farmers cultivated the modern variety BRRIdhan 11 with average yield of 3.5 MT /hectare. Hence, the end line result indicates that the yield of flood tolerant aman rice variety BRRIdhan 52 was 4.6 MT/hectare and it was increased from 2.5 MT/hectare of local varieties by 2.1 MT/hectare usually grown to avoid flood risk and also from 3.5 MT /hectare of BRRIdhan 11 by 1.1 MT/hectare despite continuous submergence of BRRIdhan 52 for 15 days during flood. An additional crop mustard was also introduced with an acceptable level of yield. Similarly, another flood tolerant variety BINA 11 provided higher yield (3.6 MT/hectare) compared to the local varieties (average 2.5 MT/hectare) by 1.1 MT/hectare despite continuous submergence of BINA 11 for 18-20 days. However, FGD reveals that in 2017 flood water stayed more than 20 days in some of the medium low lands where BRRIdhan 52 and BINA 11 were totally damaged due to long term submergence and thus the farmers demanded more flood resilient varieties than the existing ones. So, late varieties of aman rice viz, BINA dhan 7, BU dhan 1, BRRIdhan 46 etc. should be grown to avoid flood damage. Farmers should be trained on the cultivation of these late varieties so that they can grow these rice varieties after flood and can also harvest these crops by December to catch up rabi season winter crops. Alternative technologies available so far indicate that under severe flooding conditions, when lands go under water for most time of the year, farmers should be encouraged to practice sorjan system (alternate raised bed and

furrow). Shallow depth sorjans are suitable for monsoon rice. This alternative cultivation system should be tested in the flood prone areas of northwest Bangladesh under severe and continuous flooding condition. Moreover, alternative submergence tolerant varieties of rice during aman season should be developed through research, which can survive under flood water for longer time. It is reported that BINA 12 variety of aman rice can survive under flood water for 24 days, which should be explored for on-farm trial.

Nonetheless, the above finding implies that the project has contributed significantly to help its participants get good harvest of the climate risk aman rice and also help them to increase cropping intensity by introducing new short duration varieties of mustard. It also implies that secondary and tertiary groups are benefited through learning from farmer to farmer extension approach and also FFDs. Moreover, this result indicates that there are opportunities to increase cropping intensity and crop yield with adjustment of crops and alternate varieties to be grown in fallow period replacing local varieties with flood or drought tolerant modern varieties.

Overall, yield of flood tolerant aman rice variety BRRIdhan 52 was increased from 2.5 MT/hectare of local varieties and also from 3.5 MT /hectare of BRRIdhan 11 to 4.6 MT/hectare despite continuous submergence during flood for 15 days and also an additional crop mustard was introduced with an acceptable level of yield (1.1 MT/hectare).

3.3.6 Percent of targeted households practicing at least three adaptive agricultural technologies

Figure 14 reveals that 78% primary, 65% secondary and 53% tertiary households changed cropping time by early planting to avoid flood while 58% primary, 61% secondary and 34% tertiary households cultivated additional mustard crop (short duration) in their land which was kept fallow due late recession of flood water.

also revealed that 61% primary, 54% secondary and 53% tertiary households practiced sack gardening of vegetable crops during flood while 66% primary, 61% secondary and 34% tertiary households cultivated additional mustard crop (short duration) in their land which was kept fallow due late recession of flood water.

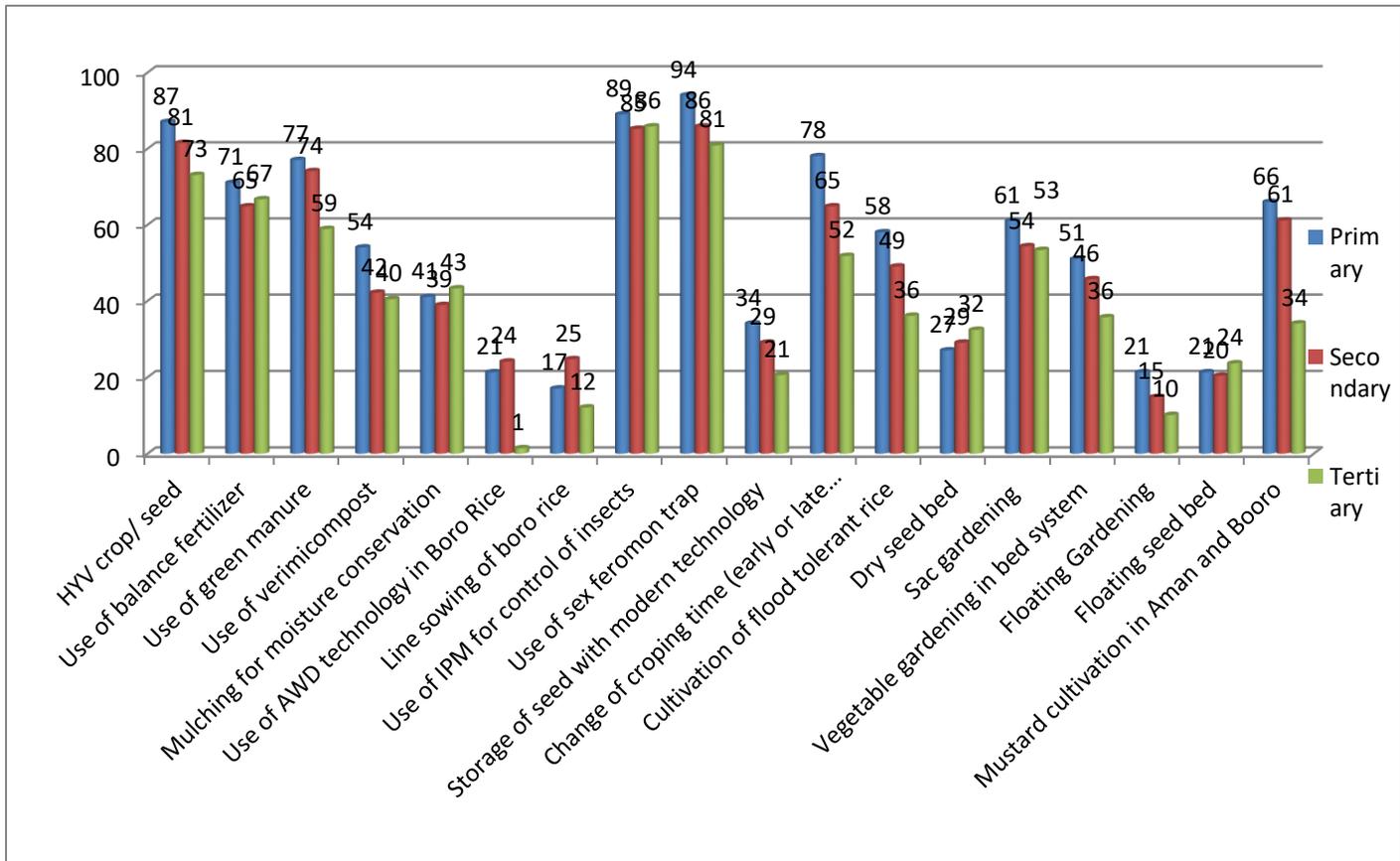


Figure 14: Practice of new agricultural technologies to cope with adverse climate change

Figure 15 reveals that women farmers in 58% primary household practiced cultivation of flood tolerant rice compared to male farmers in 42% primary households while women farmers in 70% households practiced mustard cultivation between aman and boro compared to male farmers in 58% households. This result indicates that women farmers were advanced to work in the crop field even better

than the male farmers that brought the women farmers to the driving seat for adapting climate resilient flood tolerant rice and mustard. However, this effect could have been influenced because primary groups received the direct support from the project.

Figure 16 reveals that women farmers in 66% secondary household practiced cultivation of

flood tolerant rice compared to male farmers in 55% secondary households while women farmers in 68% households practiced mustard cultivation between aman and boro compared to male farmers in 56% households. This result indicates that women farmers of secondary groups were also advanced to work in the crop field even better than the male

farmers that brought the women farmers to the driving seat for adapting climate resilient flood tolerant rice and mustard. The effect is more visible as secondary groups are the indirect participants of the project, so women farmers of the secondary groups were found competent to put them in the driving seat for adaptive agriculture practices.

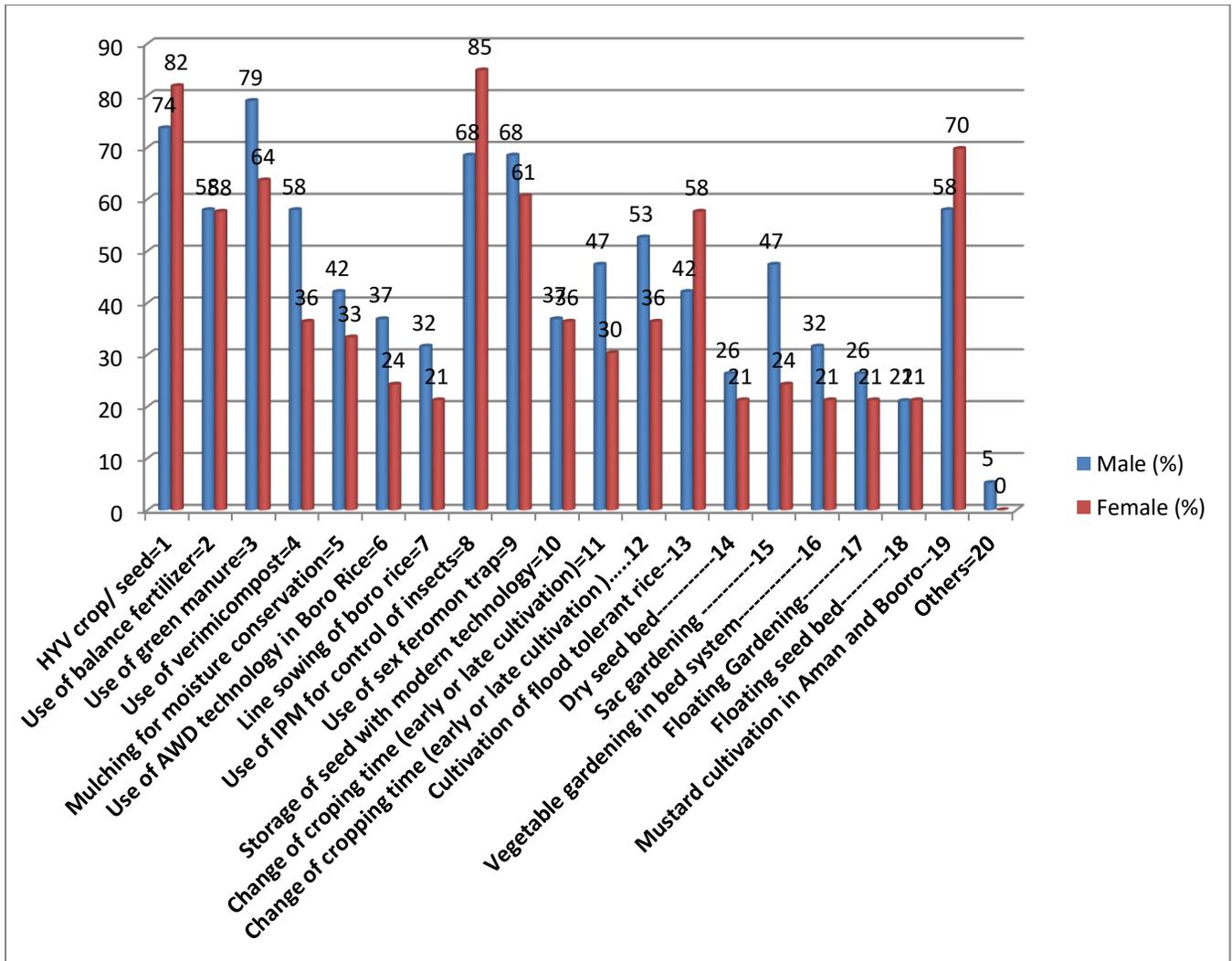


Figure 15: Performance of male and female farmers of primary groups in practicing adaptive agriculture activities

Figure 17 below reveals that women farmers in 47% tertiary household practiced cultivation of flood tolerant rice compared to male farmers in 34% tertiary households while women

farmers in 30% households practiced mustard cultivation between aman and boro compared to male farmers in 38% households. This result indicates that women farmers of tertiary

groups were also advanced to work in flood tolerant rice cultivation in the field even better than the male farmers that brought the women farmers to the driving seat for adaptive climate resilient flood tolerant rice. Here the effect is

more visible as tertiary groups are the indirect participants of the project, so women farmers of tertiary groups were found competent to put them in the driver's seat for adaptive agriculture practices.

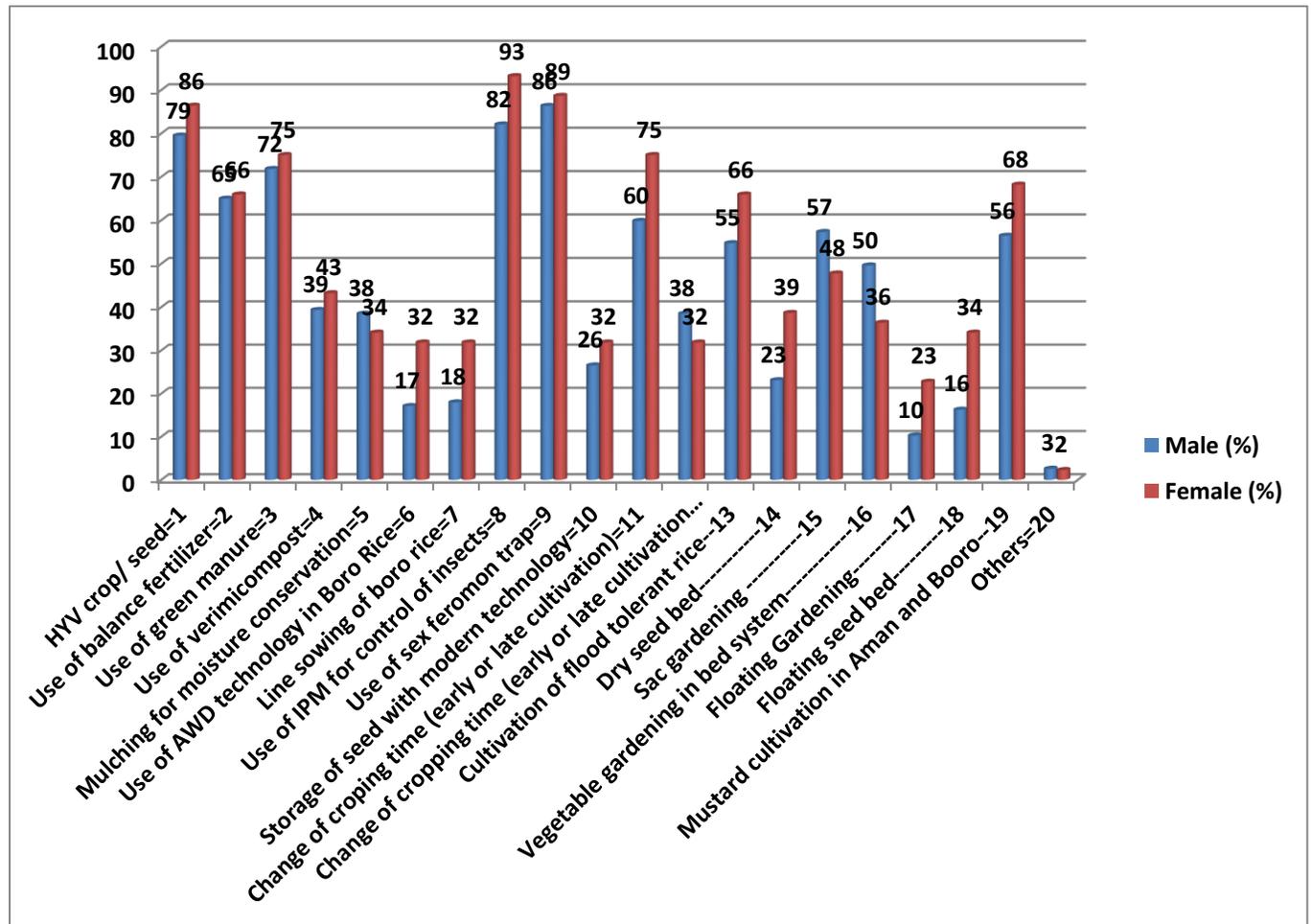


Figure 16: Performance of male and female farmers of secondary groups in practicing adaptive agriculture activities

The overall finding indicates that 50% each of primary and secondary farmers practiced at least four adaptive agriculture technologies namely changing cropping time, cultivation of flood tolerant aman rice, sack gardening of vegetable adapted to flood and mustard cultivation in fallow land to compensate crop loss due to flood. **Almost half of female farmers have become the main actors in**

practicing flood tolerant aman rice and mustard crop putting them in the driver's seat. Tertiary groups were behind in practices of adaptive agriculture technologies compared to primary and secondary farmers. It could be due to insufficient access to technical and relevant inputs from the respective stakeholders and farmer to farmer extension approach takes time to diffuse practices as the

farmers observed first the results of the primary and secondary adopters. It is evident from the baseline findings that there were only 4.28% farmers who practiced at least three adaptive agricultural technologies. The project has facilitated some alternative options in

support of continuation of the above alternative agriculture practices e.g., seed bank in the Union Parishad, alternative pesticides, vermi compost, pit compost, eco hole vegetable gardening and floating seedbed.

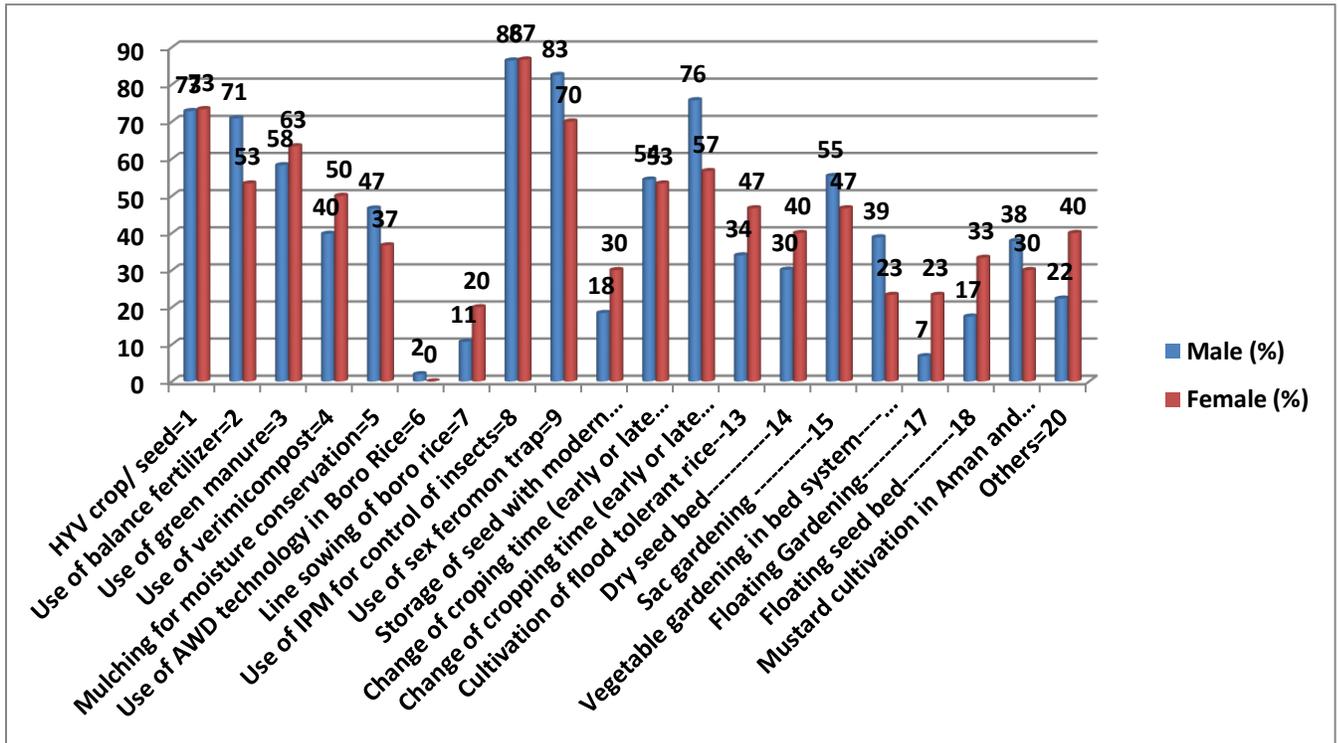


Figure 17: Performance of male and female farmers of tertiary groups in practicing adaptive agriculture activities

National Agriculture Policy (NAP) 2013 through its clause 4.3 emphasizes research support on emerging issues, like biotechnology, plant genetic research, hybrid, climate change, disaster and flood, waterlogging, drought, cyclone and salinity. National Agriculture Extension Policy (NAEP) 2012 through its clause 43 mainstreams Disaster Preparedness and Adaption to Climate Change approach to combat with disasters, the farmers group will be trained to adopt short duration varieties, late varieties, flood/salinity tolerant varieties, drought tolerant varieties and other available technologies. It is recognized that farmers of

Bangladesh have adjusted their cropping pattern by growing a range of indigenous and high yielding varieties of rice and other crops. The climate change adaptation in agricultural extension may include but not limited to: (i) integrated approach involving concerned ministries and departments; (ii) resilient extension practices for different climatically stressed and saline conditions; (iii) strengthen capacity of NAES organization as a whole and (iv) documenting and promoting indigenous farmer practices against disasters and vulnerabilities. NAEP 2012 in its Article 59 emphasizes on mainstreaming women in agriculture. Participation of women in

agriculture will be encouraged through developing women farmer groups, encouraging women SME development in agri-business, developing confidence for raising voice through grass root level women farmers' organization, creating gender awareness in both women and male farmers. In addition women farmers are encouraged to lead and occupy decision making positions in

higher level farmer organizations. So, women farmers in agriculture should be given highest priority in any sort of training programs and input support from DAE, Union Parishads and other stakeholders in future in order to promote climate change adaptation and disaster preparedness in Bangladesh using women as facilitators.

Seed Bank in Union Parishad

Figure 18 reveals that majority *households* (70% primary, 69% secondary and 57% tertiary) benefited from seed bank established in 3 targeted Union Parishads and they received seeds of flood tolerant aman rice and mustard from this bank. KII findings reveal that not only 3 unions established seed banks but Holokhana Union Parishad was in discussion with neighboring unions to encourage them to replicate the model. A good strategy was followed to ensure the banks were able to keep supplying seeds to farmers through maintaining renewal of storage as each farmer returned during crop harvest with double the amount of seeds s/he received from the bank. In this way, the seed bank is replenished every year and is able to provide seeds to new farmers. However, it was observed that seed quality was not up to the mark as seeds collected from many small and marginal

farmers were of different size and grade that consequently would affect seed vigor and germination capacity. So, in order to maintain the standards of seed size and grade, several large farmers should be trained and involved for production of truth full level (TLS) or certified seeds of the climate resilient rice crops involving DAE and Seed Certification Agency. Then they should be facilitated for storing their seeds in the Union Parishad Seed Bank and in other government store house called Sogorib with branding through DAE and Seed Certification Agency of the government. Moreover, store room of seeds should be made resistant to high heat and humidity with hanging bamboo made platform under the roof of corrugated iron sheet to maintain seed quality. Seed fairs should be held at each union in every year at the compound of UPs with the supports of farmers, GO and NGOs as available.

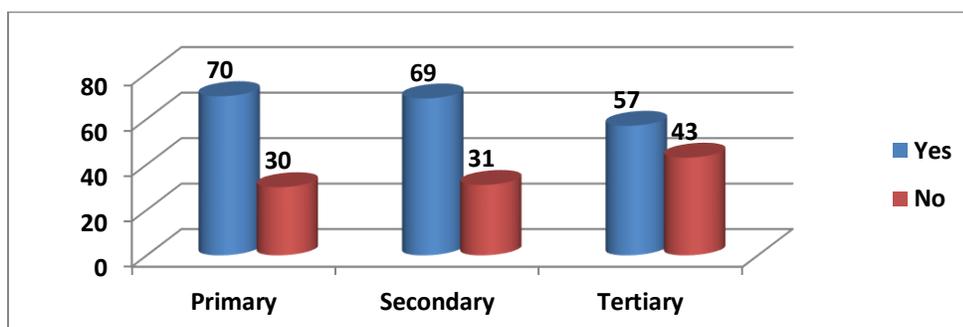


Figure 18: Household benefited from seed bank to mitigate effects of climate change

Table 6 reveals that vast majority households (85% primary, 60 % secondary and 72% tertiary) practiced perching (an integrated pest management option) letting birds sit on twigs of bamboo or tree in crop field and eat on insects. A small proportion of households ranging 12-25 % across primary, secondary and tertiary groups practiced another IPM

option – pheromone trap and similarly only 5-17% across all category practiced herbal pesticide. This finding indicates that out of three alternative IPM options perching was practiced by majority households and the practice was significantly diffused to secondary and tertiary households due to efficient farmer to farmer extension.

Table 6: Households practiced alternative option to chemical pesticide (End line)

Category	Integrated pest management- (perching)	Pheromone trap	Herbal pesticide	None
Primary	85	17	17	11
Secondary	60	25	13	2
Tertiary	72	12	5	4

Figure 19 shows that a vast majority households (>60%) regardless of primary, secondary and tertiary groups practiced alternative to pesticide i.e., IPM to reduce cost of pesticide and soil degradation while the half

of households (53-64%) stated the reason of practicing IPM to reduce health impact. This finding indicates that most of the households knew about the main drivers of practicing alternative option to pesticide.

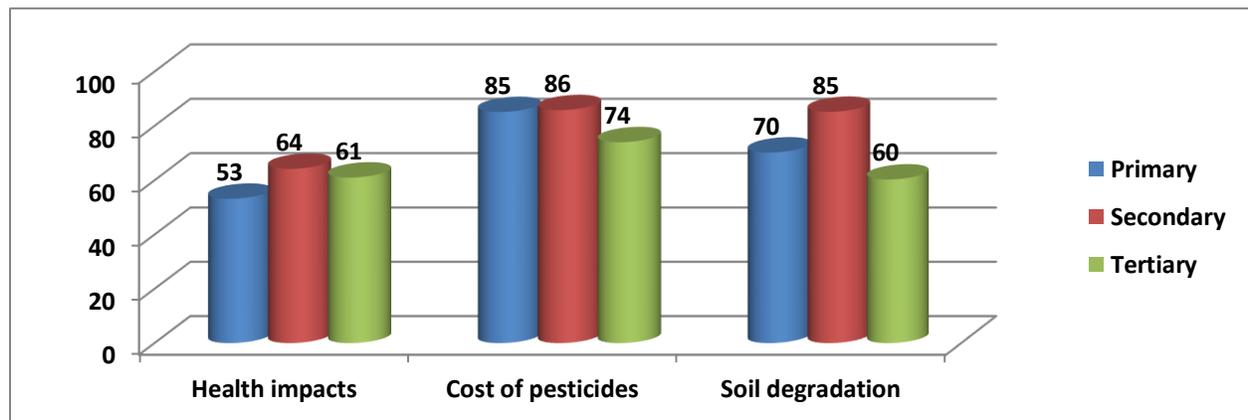


Figure 19: Households know about main drivers for practicing alternative option to pesticide (End line)

Figure 20 reveals that 66% primary, 57% secondary and 49% tertiary households enjoyed an increased food availability by harvesting climate adaptive crops although tertiary groups were behind in this opportunity

compared to primary and secondary groups. This benefit could be due to increase in knowledge and access of households to information and technical services from the government and private sectors. It implies that

the project has brought this improvement through facilitation of alternate technologies and relevant inputs among the households.

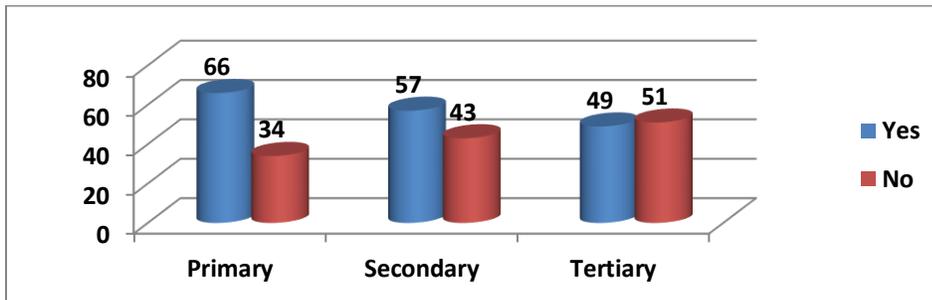


Figure 20: Household food availability increased by harvesting adaptive crops (End line)

Figure 21 reveals that a total of 1826 new farmers adopted the above climate adaptive agriculture through observing the effects during demonstration, field days and farmers rally out of which 195 new farmers among primary groups, 1005 new farmers among secondary and 626 new farmers among

tertiary groups adopted these climate adaptive agriculture. This finding indicates a huge diffusion of the climate adaptive agriculture due to demonstration effects on the good practices and thereby impact on household food security.

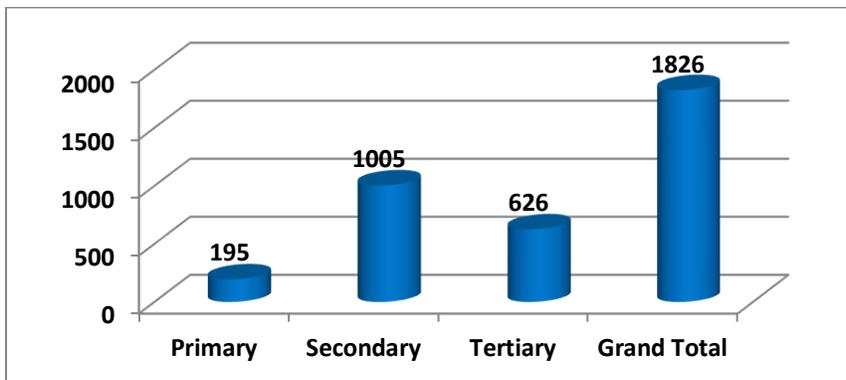


Figure 21: Number of new farmers adopted climate adaptive agriculture

FGD with project staff reveals that there are 38 mixed FFS and only 2 female FFS out of 40 total FFS. FGD with FFS opined that mixed FFS performed better than female FFS, which was primarily due to interaction effect of male and female working together.

practiced at least four adaptive agriculture technologies namely: changing cropping time, cultivation of flood tolerant aman rice, sack gardening of vegetable adapted to flood and mustard cultivation in fallow land to compensate crop loss due to flood, and b) almost half of women farmers were directly involved in practicing flood

Overall, the finding indicates that a) 50% each of primary and secondary farmers

tolerant aman rice and mustard crop putting them in the driving seat.

**3.3.7 Women increased their mobility
And took part in family decision**

Women’s mobility has great influence on their empowerment. Figure 22 reveals that 49% primary, 65% secondary and 50% tertiary households did not face any problem for their women to go outside the house indicating women of majority households moved easily outside their houses and took part in family decisions. This was not the case in the

baseline that only 14.1 % households moved easily outside their houses and took part in family decisions while the majority households (80%) could not to go outside their houses due to family and social barriers. The end line finding indicates that around 50% households experience increased mobility of their women and participation in family decisions over the baseline (only 14.1% households).

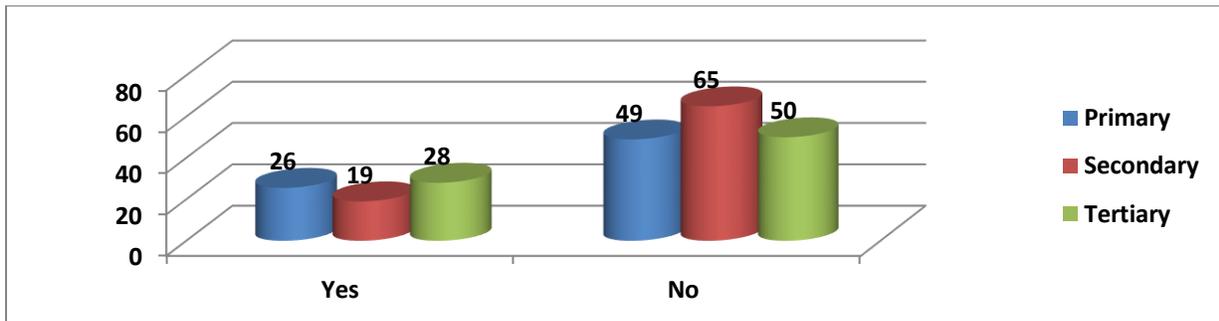


Figure 22: Households faced problems for women to go outside the house

Figure 23 shows that women in vast majority household (83% primary, 90% secondary and 60% tertiary) worked in the agriculture field while 72% primary, 68% secondary and 40% tertiary households attended meeting or training of NGO offices and 40% primary, 48% secondary and 30% tertiary households go to the market.

tertiary households attended meeting or training of NGO offices and 40% primary, 48% secondary and 30% tertiary households go to the market.

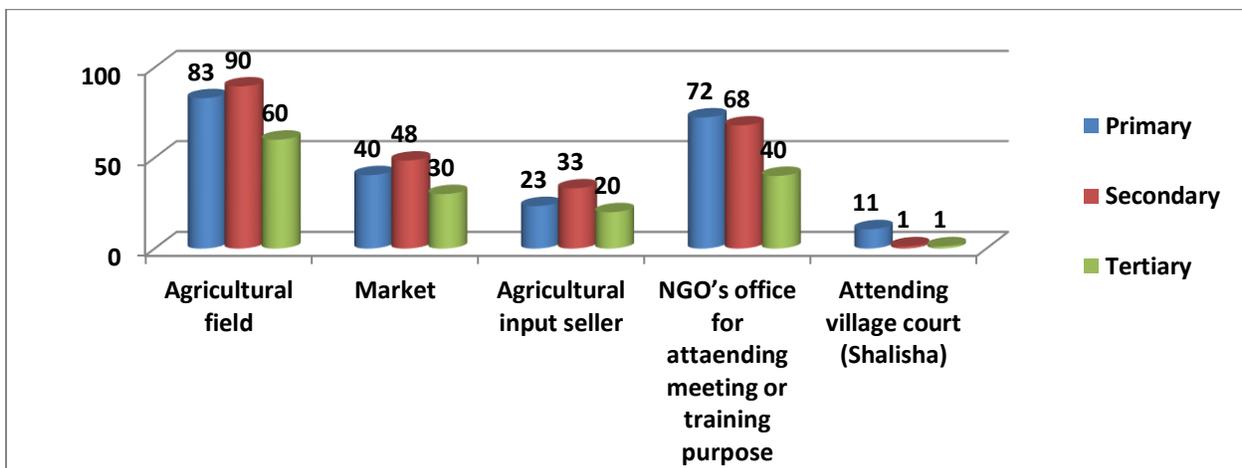


Figure 23: Household experienced mobility of their women to different places outside house

This finding indicates that women mobility was significant in agriculture field and NGO offices while it was even remarkable when women in one-third households used to go to the market despite social barriers and insecurity. It implies that the project has instigated the spirit of gender equality through mobilization of women in the mixed group of farmer field schools which enhanced interaction with male farmers of the society and also involvement in gender friendly agriculture activities in the crop field.

Overall, a) around 50% households experience increased mobility of their women and participation in family decision over the baseline (only 14.1% households) and b) women mobility was significant in agriculture field (83% primary, 90% secondary and 60% tertiary households), and even remarkable when women in one-third households able to go to the market despite social barriers and insecurity.

3.3.8 Status of women who are able to equally participate in household financial decision making

Table 7 shows that highest proportion of households in primary groups involved both male and female in participation of household financial decision in buying and selling of trees

(49%), receiving loan and use of loan (70%) and buying food for family members (57%) compared to male and female alone.

Table 7: Gender disaggregated decision-making about household financial affairs

Category	Gender	Buying and selling of lands	Buying and selling of trees	Receiving loan and use of loans	Buying food for family members.	Applying innovative technology in agriculture.
Primary	Male	43	26	13	43	47
	Female	0	13	0	0	6
	Both	38	49	70	57	30
Secondary	Male	20	15	2	15	30
	Female	4	14	6	16	15
	Both	72	66	70	54	37
Tertiary	Male	35	40	8	5	40
	Female	4	13	3	18	15
	Both	72	70	80	54	40

In case of secondary groups, both male and female took household financial decision in

highest proportion of households regarding buying and selling of land (72%), buying and

selling of trees (66%), receiving loan and use of loan (70%), buying food for families (54%) and applying innovative agriculture technology (37%) compared to male and female alone. In tertiary groups, highest proportion of households involved both male and female in participation of household financial decision making regarding buying and selling of land (72%), buying and selling of trees (70%), receiving loan and use of loan (80%) and buying food for families (54%) compared to male and female alone. This finding indicates that women were able to equally participate in household financial decision making across primary, secondary and tertiary households regarding buying and selling of trees, receiving loan and use of loan and buying food for families. In these three decision making areas, the lowest proportion of households was 49% where both male and female took decision in buying and selling of trees and the highest proportion of households was 80% where both male and female took decision regarding receiving loan and use of loan. So, it can be concluded that women of at least 49% households of primary, secondary and tertiary groups were able to equally participate in these three household financial decision making. FGD with project staff reveals that the sessions on gender analysis and gender action plans has contributed to make significant improvement in women's empowerment through decision making on household financial decision and participation in implementing the decision being taken equally with men. Nevertheless, women are still behind in decision making regarding applying of innovative agriculture technology compared to other decision making areas regardless of primary, secondary and tertiary

groups. It seems to be a major weakness of the project as it was not able create environment for women to equally participate with men in the family in financial decision making on applying innovative agriculture technology. This situation could be primarily due to traditional mindset and behavior of the farm families as men possess historic experience in agriculture and women thus depend on men for making decision on new technology/idea in agriculture. Although mindset and behavior of the farm families is changing in favor of participatory decision making, it needs more and more gender analysis session in the mixed group of men and women. Increasing women involvement in agriculture being a crucial issue in Bangladesh, further initiative needs to be taken to enhance ability of women to equally participate with men in decision making on applying innovative agriculture technology. However, there is a significant improvement in this indicator compared to the baseline where on an average, women in only 16.98 % households were able to equally participate in household financial making decisions like receiving loan and use of loan, and buying and selling land or property, trees, food, groceries.

Overall, women of at least 49% households of primary, secondary and tertiary groups were able to equally participate in household financial decision making over the baseline (only 16.98% households).

3.3.9 Number of Union Parishad allocated budget in their annual plan considering climate vulnerabilities and risks

The project has implemented its activities covering three unions of Kurigram district – Holokhana, Pachgachhi and Jatrapur. It is evident from interview of the respective chairman and women councilors that they have limitation of budget and policy gaps in their local government authority although they have planned and implemented some activities to reduce disaster risks. As per mandates of the Local Government Ministry, and Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009, Union Parishads have activities like a) Taking preparation for floods by UDMC committee b) Preparing voluntary group for helping flood affected people c) Announcing through mike of the mosque to provide early warning for people to take shelter in safe place before disaster d) sharing and coordinating with the work of NGOs, e) providing life jacket during flood, relief etc. There is Union Disaster Management Committee (UDMC), which select the climate affected people to receive the services from the above activities. But the major constraints these Union Parishads faced were fund crisis despite approved budget, lack of proper training for the staff, lack of skilled manpower, lack of proper instruction from the higher authority, lack of required tools, shortage of transport during flood etc. Some UP members heard about DRR and Gender policies but they did not know the details and they did not know about BCCSAP 2009. They said that there was no training or orientation provided by any organization on these policies. Despite all these limitations, all Union Parishads (UP) allocated Tk. 150,000

each during 2017-18 while they have Tk. 100,000 each during 2018-19 in their annual plan considering climate vulnerabilities and risks. In addition, all Union Parishads allocated Tk. 100,000 for seed bank in 2017-18 and 50,000 in 2018-19 except Jatrapur Union Parishad allocated Tk. 100,000 in the current year. The above information were cross-checked with the documents of approved budget and was found correct. This budget allocation will continue for a period of 5 years. UP chairman and members said that each and every ward committee conducts budget planning meeting and incorporate suggestions/demands from the community people while finalizing budget that considers climate vulnerabilities and risks. The budget is then declared openly in the community meeting and even expenditure status of budget allocated with activities is shared in the open meeting with the community people. This achievement of UP was cross checked with the community people through FGD and most of the FGD participants confirmed about the participatory budget meeting including allocation of budget in climate risk areas while they said UP could not implement all activities that were required mostly to mitigate climate risks due to minimal allocation of budget from the government authority. UP chairman and members during interview said that they were not prepared for future hazards if sufficient budget is not allocated and thus this requires policy dialogue with the relevant authority so that they are sensitized and convinced in favor of sufficient budget allocation. However, there is an improvement in budget allocation over the baseline when only one Union Parishad (Holokhana) out of three targeted unions of the project allocated budget Tk. 200,000.00 in their annual plan (2016-2017) considering climate vulnerabilities and risks.

Overall, all the three targeted Union Parishad (Holokhana, Panchgachi and Jatrapur) in Kurigram allocated budget (BDT 150,000) in their annual plan last year (2017-2018) considering climate

3.4 Sustainability

Sustainability relates to the likelihood of a continuation in the stream of benefits produced by the program. It is in fact early to speculate on the sustainability of the activities undertaken by the beneficiaries but the evaluation would provide an idea on the trend of sustainability. Figure 24 reveals that the vast majority of households (96% primary, 94% secondary and 90% tertiary) were interested to continue practicing adaptive agriculture technologies/learning after the project support is withdrawn. This finding indicates that the majority households (>90%) have created a sense of participation, ownership and responsibility for continuation of the technologies/learning due to the benefit accrued from results of the tested technologies, which is likely to be sustained after the project. The striking force here is that the best practices/technologies have been diffused from primary or direct participants to the secondary and tertiary group members due to efficient farmer to farmer extension

vulnerabilities and risks compared to only one Union Parishad (Holokhana) during the baseline (BDT 200,000 for the financial year 2016-2017).

approach. As mentioned in the methodology section, primary/FFS members are the direct participants of the project receiving seeds, training, demonstration and other support as provisioned while secondary and tertiary members receive only seeds (50-60% HHs) and technical information through FFD, exposure visit, etc. In the farmer to farmer extension approach, one primary farmer is motivated to transfer his/her learning to at least three other secondary farmers and in turn one secondary farmer does the same to another three tertiary farmers, which was found quite effective as narrated in the effectiveness section of this report. So, the transfer of technology/learning is supposed to continue without systematic project support. This exit strategy is quite clearly spelled out in the project proposal but the question still remains who else after the project will monitor whether this farmer to farmer extension approach continues without undermining the quality. It is feared that there are possibility of eroding the quality of learning/technology upon diffusion of the same from one farmer to another and so one.

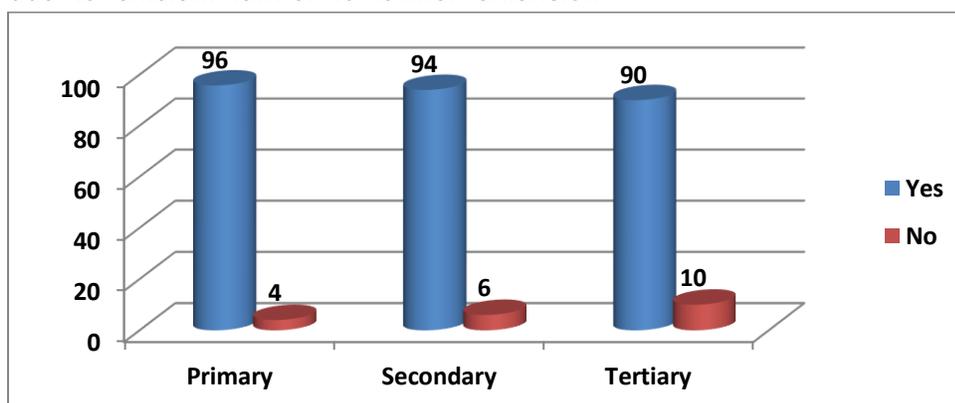


Figure 24: Households interested to continue practicing technology/learning after the project support is withdrawn

It is also imperative to ascertain whether the products or services involved in the project interventions are affordable for the beneficiaries after project support is withdrawn. Figure 25 reveals that 77% primary, 83% secondary and 85% tertiary households have the ability to afford the tested technologies/learning after the project support

is withdrawn, which could be due to cost effectiveness of these technologies. Sustainability also lies in the institution the households belong to i.e. what is the likely contribution to sustainability of institutions created by the project, such as farmers groups and how these institutions are run with governance and legal framework.

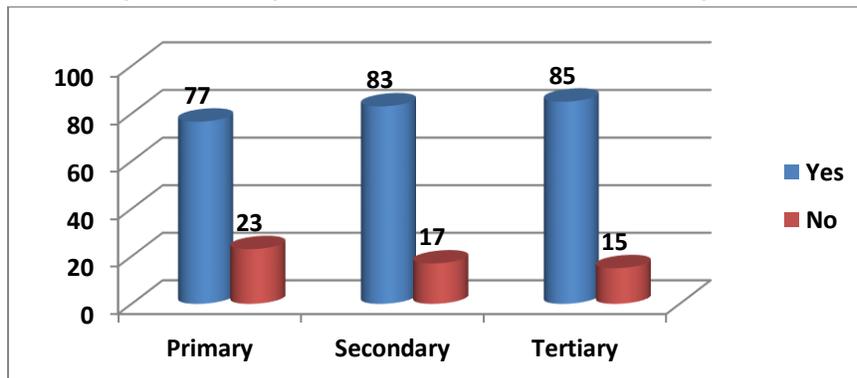


Figure 25: Households with ability to afford the products or services involved in the project interventions after project support is withdrawn

Figure 26 shows that no by-law existed in the group of the vast majority households (87% primary, 89% secondary and 92% tertiary) indicating most of the groups do not have legal frame-work for their management in the longer run. It is evident from FGD with the project staff

that no intervention/initiative was taken to facilitate the groups to prepare group by-law and hence, it can be a grey area of the project from the view point of sustainability for the groups to work together in a group.

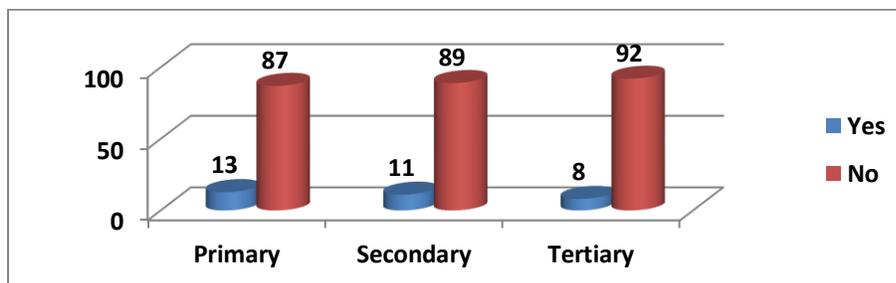


Figure 26: Groups have by-law for its management in the longer run

In general sustainability depends on whether the collective benefits created by the project (increased skills, awareness of rights, enjoying essential services of the government, linkages etc.) are sufficient. The effects so far generated in terms of knowledge, skills, awareness of rights and entitlement through access to information and services and linkages with government agencies are likely to be sufficient to sustain the outcomes of the project as described in the effectiveness section. However, access of households to power structure as a committee member of the government/local government i.e. Union Parishad is a challenge ahead of

sustainability. Figure 27 reveals that only 6-10% households across primary, secondary and tertiary category represented as a member of UDMC, 2-4% households as a member UP standing committee and 30-38% households as a member of community risk assessment while 45-70% households did not have any membership of power structure. This finding indicates a very poor access of targeted households to the local power structures particularly to the Union Parishad and hence possess poor ability to raise voice and ensure rights/entitlement in favor of their community to sustain adaptive agriculture practices.

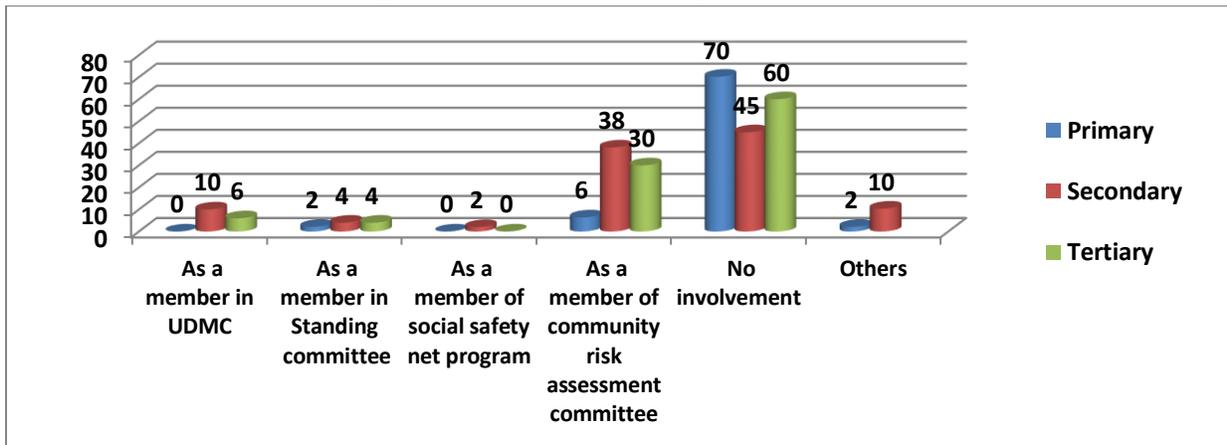


Figure 27: Involvement status of households in Union Parishad

It is worth mentioning that a strong informal linkages of the targeted households with the government agencies like the Department of Agriculture Extension (DAE), Bangladesh Rice Research Institute (BRRI) and Bangladesh Institute of Nuclear Agriculture (BINA) for technical assistance regarding demonstration of adaptive agriculture and with the Meteorology Department for early warning information through mobile network were developed during the project period. KII with DAE officials reveals that they were highly impressed at the quality of work and relationship the project has developed through

CARE Bangladesh in collaboration with ESDO that was also supported by UP Chairman and members. They gratefully acknowledged the facilitation of the project and its target groups to put forward their demands, and the ensured participation of the government officials in training, demonstration, field days, and exposure visits. Many of the KII respondents said that seed bank approach through Union Parishad will help sustain the activities of adaptive agriculture due to preservation and distribution of seeds among the farmers for continuation of the technologies. During ocular observation, it is evident that seed bank was

maintained in a small scale and the quality of the infrastructure in UP building was not up to the mark as narrated in the earlier section (3.6.6). So, the respective Union Parishad should be sensitized to implement seed bank in a large scale with varieties of different climate adaptive crops and to renovate infrastructure to make the store room clean and cool. It is quite obvious in the policy statement of National Agriculture Policy (NAEP) 2012 under the clause 44 and 45 that DAE is

mandated to mobilize inclusive farmers groups and their apex organizations and link them with Farmers Information and Advice Center (FIAC) housed in Union Parishad where the field extension personnel provide one stop integrated services for kinds of farmers. So, DAE as per NAEP can continue to reach out. Testimony of the concerned Deputy Director – a district level DAE administrator and policy maker of the project area in this regard is given below:

Testimony of Deputy Director, DAE, Kurigram

The Deputy Director of DAE, Kurigram confirmed that the seed bank approach through Union Parishad is one of the best practices of WtRF project that should be replicated in other UPs in Bangladesh. He said that the other organization did this type of seed bank at village level but it could not sustain as there was no mechanism of replenishing seeds in the storage after distribution. Here in this approach, seeds are replenished by taking double the amount of seeds the farmers get back. He also added that Farmers Information and Advice Centers (FIAC) is housed within the UP complex or UP office under the leadership of DAE. Field extension personnel and local service providers of extension agencies (at least DAE) provide one stop integrated services for all kinds of farmers as per roaster schedule. He further added that DAE is mandated to mobilize inclusive farmers groups at village level and also their apex organization at union or at higher level, and link all of these farmers organizations with FIAC housed in Union Parishad. He is, therefore, hopeful for continuation of providing technical services to the established groups of the project and also to the seed bank of UP without CARE support

Bangladesh Meteorological Department can also reach out to these groups through their mobile network and the farmers can continue receiving early warning message through SMS in their cell phone.

However, challenge is immense as to how the informal linkage of the groups with the relevant government agencies will continue to persist beyond the project period. It is sharply evident from FGD and KII that neither households nor government officials in the project area knew about the national policies on climate change adaptation and DRR. Moreover, the respective policy documents like National Agriculture

Policy 2013, National Agriculture Extension Policy 2012, Seed Policy, National Adaptation Program of Action (NAPA) and Bangladesh Strategy for Climate Change Adaptation (BSCCA) 2009 were not available at their reach and none of them was oriented about these policies. So, neither duty bearers nor rights holders knew about the opportunities, roles and responsibilities clearly that eventually created inadequate ownership to this informal linkage with the project households.

It could be mentioned here that the project should have oriented the respective

government officials and targeted households on the above policy documents. It is highly recommended that these policy documents should be translated in to the legible language so that local officials and farmers understand clearly on what the opportunities, roles and responsibilities are in these documents and that these trained people owned the policies by implementing the activities and advocating with policy makers to ensure opportunities as per policy documents.

Overall, main findings are a) the majority households (>90%) have created a sense of ownership and responsibility for continuation of the technologies/learning after the project, b). the majority households (>75%) can afford the tested technologies/learning after the project support is withdrawn, c) the majority households (>85%) mentioned that no legal frame-work e.g., by-law existed in

3.6 Review of project Management

3.6.1 Gender Equality

This section looks at the performance of project on gender equality at the targeted households as per perception of project team and its relationship with gender balance of the project team. The extent to which WtRF project has achieved gender equality as per perception of project team is evaluated. Through FGD with the project staff it was reported that gender training was provided from the project and with this effects males and females in the targeted households helped each other in their work. They also added that gender in agriculture was increased and women framers cultivated

their group for management in the longer run, d) the households have poor access to the local power structures (eg, Union Parishad) and hence poor ability to ensure their entitlement to practice adaptive agriculture, e) a strong informal linkages of the households were developed with the government agencies viz, Department of Agriculture Extension (DAE), Bangladesh Rice Research Institute (BRRI) and Bangladesh Institute of Nuclear Agriculture (BINA) for technical assistance, and with the Meteorology Department for early warning information through mobile network, and f) neither households nor government officials in the project area knew about the national policies on climate change adaptation and DRR meaning poor knowledge on opportunities, roles and responsibilities to sustain the informal linkages with the households

vegetables through bed. Due to gender training, males supported women for participation at the village level savings and loan associations, called VSLA. Also they are now making savings through DPS at the local Banks. Statements of project staff indicate that gender equality was enhanced among the project participants, which was supported by the results shown in Figure 28 and 29. The result in Figure 28 reveals that husband and wife of vast majority households (> 90%) helped each other for their work due to their learning from gender training from the project. It indicates that the targeted households provided equal importance of both male and female to work for each other as and when needed implying gender equality in terms of division of labor is enhanced.

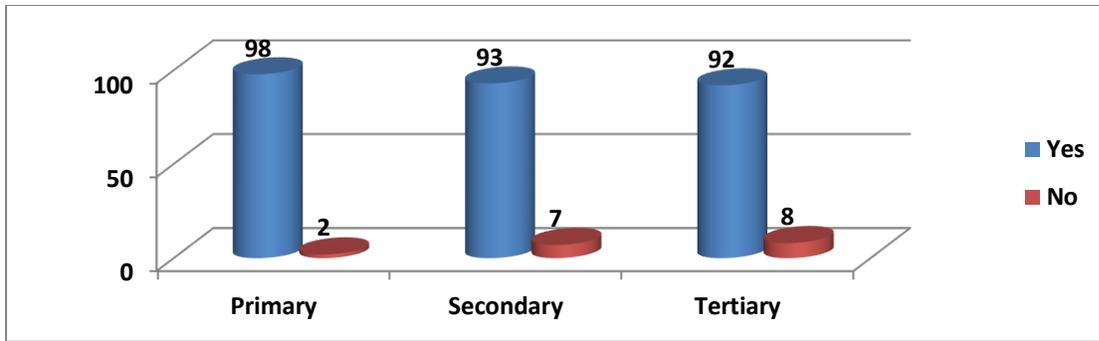


Figure 28: Households (%) with husband and wife helping each other for their work

Figure 29 reveals that the highest support was provided by husband and wife to work for each other in agricultural work (87% primary, 89% secondary and 90% tertiary households) and the lowest was reported in poultry rearing (74% primary, 50% each of secondary and tertiary households). The results also reveals that husband and wife of more than 50% households regardless of primary, secondary and tertiary households helped each other for their work in agriculture, cattle rearing, poultry rearing , child rearing and children education. It means that gender equality in terms of division of work was enhanced in more than

half of the targeted households. However, the gender equality was practiced more in primary households (more than 70%) regardless of agricultural work, cattle rearing, poultry rearing, child rearing and children education compared to secondary and tertiary (> 50%). This difference could be primarily due to the direct support of training on gender provided to primary households while the secondary and tertiary households were motivated by the primary households and the diffusion of learning among the later would generally take time.

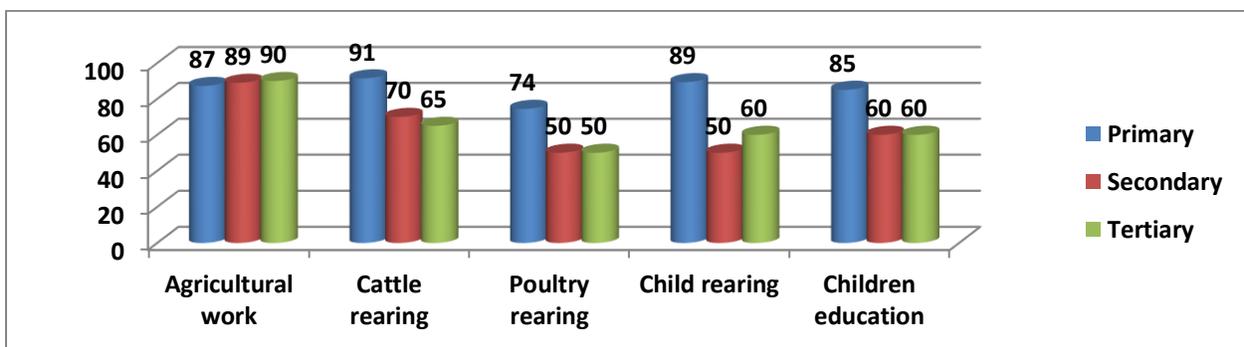


Figure 29: Types of work husband and wife of the households (%) helped each other

It is evident from the staff profile of the project that out of 16 staff, 4 staff are female which is only 25%. If there was more gender balance in the project team particularly in the field staff, there would have more impact on the gender equality in division of work among the targeted

households compared to the current situation. The project has enhanced gender equality among the targeted households while it is also true that female staff get more and easy access to rural households of Bangladesh for rapport building particularly with women that

eventually help produce more impact compared to male staff. So, it would have been better for impact on gender equality, if the project could have recruited about 40% female staff in its team.

Overall findings are a) gender equality was enhanced as husband and wife of more than 50% households regardless of

3.6.2 Analysis & Learning

The extent to which activity was based on sound technical analysis and continuous learning is evaluated. FGD with project staff reveals that with technical analysis, per acre production was increased. Majority group members conducted technical analysis to understand the result of their demonstrations. FFS continuously conducted learning exercises particularly on mustard and flood tolerant rice production. The project technical staff facilitates group members to conduct learning and analysis of results and prepares progress report of the project. For example, the project staff facilitated Sakhina Begum to cultivate BINA 4 variety of mustard in her 20 decimal of land and also trained her to analyze production and income. Sakhina analyzed that she received 160 kg of mustard as an additional harvest in the year with income TK. 8,000 (Tk. 5/kg) against production cost Tk. 2,500. So, her profit margin was Tk. 5,500. She stated that “I got a significant benefit through cultivation of mustard (variety BINA 4) and many other farmers started cultivating improved varieties (BINA 4, 9 and 10) of mustard after observing my benefit”. **However, no in depth analytical report with economic potential of the tested technologies was made available.**

primary, secondary and tertiary helped each other for their work in agriculture, cattle rearing, poultry rearing, child rearing and children education, and b) it would have been better for impact on gender equality, if the project could have recruited about 40% female staff instead of the current 25% in its team.

3.6.3 Review of Financial Management procedures

This included review of a) budget spent against plan, b) most recent audit recommendations. A total of Tk. 77,31,733/- was the multi-year budget. ESDO part for 22 months was 20,000 EURO @ Tk. 84.50 per EURO. Almost cent percent budget (98%) was spent by 22 months. A total of Tk. 259.41 was spent per beneficiary, which was too low compared to management/overhead cost. This was due to high management cost (36%) compared to relatively low project activity cost (64%). **The project management cost should have been within 25% of the total budget instead of 36%.** The last audit report indicates a high level of transparency and efficient finance team in ESDO. However, the review team agreed to the audit observation and recommendation that **recruitment of project staff should not be done through head hunting process** rather it should follow the set rules in the personnel manual of ESDO.

3.6.4 Management and HR structure of the project team

The review team has evaluated the extent to which the project has formed a coherent team that was able to carry out the project activities properly. The project had a total of 16 staff of

which 12 were males and 4 were females, including ED and Focal Person for this project. Each staff had to supervise at least 400 households to cover 6500 households by 16 staff. This coverage of households seems very high to implement such a technical project and also the project does not have technical officer. The project manager has to look after all kinds of administrative and technical matters and thus it could have been better to recruit one related technical officer.

Chapter 4: Conclusions and Recommendations

The findings of the WtRf project final evaluation provided in this report would help to stimulate a valuable and productive exchange of ideas and lessons learned and promote the replication and adaptations of some of the practices which have been proved successful in this context. Lessons learned from the best practices emerged from demonstrations can then be integrated into subsequent phases eg, piloting and up-scaling. Further, to improve the sustainability of outcomes of the project and increase the resilience of livelihoods and food production systems, long-term planning must complement the short-term need for demonstrable results. A key principle for up-scaling best practices is local adaptation – recognizing that no technology or practice will be universally successful, and that solutions must be tailored to local conditions. Solutions that simultaneously address both the long-term need for local adaptation and the immediate needs for food and livelihood security are more likely to yield positive results. In the local process of identification, prioritization and selection of best practices, effective mechanisms for stakeholder engagement are especially important.

Climate variability has always made agricultural planning difficult, but the effects of climate change are making it increasingly important to enhance disaster risk reduction in agriculture, through measures such as agricultural diversification, crop rotation and new technologies, and seed varieties. For example, planting flood tolerant and short-cycle rice varieties namely BRRIdhan 52, BINA 11 etc., and introduction of cash crop namely mustard (variety BINA 4, 9 and 10) between aman and boro rice have been found effective for ensuring a good harvest despite flood.

The study recognizes several specific recommendations as given below and in the light of these recommendations the strategy and ultimately, policy of any such program, project or organization can be modified.

Policy advocacy

The evaluation team highly recommends that a national level workshop be organized, inviting senior officials of different stakeholders such as Department of Agriculture Extension (DAE), Bangladesh Rice Research Institute (BRRI), Bangladesh Institute of Nuclear Agriculture (BINA), Bangladesh Agriculture Research Institute (BARI), Bangladesh Agriculture Development Corporation (BADC), Rural Development Academy (RDA), Bangladesh Multipurpose Development Authority (BMDA), local Government and Rural Development Ministry, national and International NGOs having climate change adaptation programs and private agro-based companies, **so that the best practices on SuPER agriculture of this project can be mainstreamed in Government agencies in particular and scaled up to the other areas through the respective stakeholders** using either e-

agriculture (electronic Agriculture) or direct service delivery mechanisms

A policy brief may be prepared based on the findings and obligations of different government line agencies to disseminate adaptive agriculture technologies. This policy brief should be disseminated across different ministries and agencies, NGOs, private sector as well as donors. Second, a brief summary of the study process and findings along with policy brief may be posted in the website of all alliance members of CARE International for wider dissemination beyond Bangladesh.

Policy documents such as National Agriculture Policy (NAP) 2013, National Agriculture Extension Policy (NAEP) 2012, Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009, National Adaptation Program of Action (NAPA) 2005 should be translated in to the legible language so that local officials and farmers understand clearly

Mainstreaming women in agriculture

Participation of women in agriculture should be encouraged through developing women farmer groups, encouraging women SME development in agri-business, developing confidence for raising voice through grass root level women farmers' organization, creating gender awareness in both women and male farmers as per NAEP 2012.

Women farmers in agriculture should be given highest priority in any sort of training programs and input support from DAE, Union Parishads and other stakeholders in future in order to promote climate change adaptation and disaster preparedness in Bangladesh using women as facilitators.

Strengthening functional linkage of the farmers groups with government

Formal and functional linkage of the farmers groups with different government stakeholders such as DAE, BRRI, BARI and BINA for technical assistance, and **with the Meteorology Department for early warning information through mobile** should also be strengthened through their orientation on relevant policies of the country.

As per policy statement of NAEP 2012 and NAP 2013, it is mandated to mobilize inclusive farmers groups and their apex organizations, and link them with Farmers Information and Advice Center (FIAC) housed in Union Parishad where the field extension personnel provide one stop integrated services for all categories of farmers. **So, DAE should be sensitized to strengthen FIAC and build linkages of the established farmers groups with FIAC through training of lead farmers particularly women farmers.**

The farmer-to-farmer extension approach should be strengthened through quality control and legal framework of the farmers group e.g., by-law, registration of the Social Welfare Department etc. All the best practices of the project should be piloted in other districts of the country involving farmer groups and federations in partnership with different government agencies like DAE, RDA and Bangladesh Rural Development Board (BRDB) utilizing their IPM club and village-based groups respectively.

Promotion of seed bank

The respective Union Parishad should be sensitized to implement seed banks (one of the best practice) in a large scale with different varieties of climate adaptive crops to meet diversified demands of the farmers. It is also important to renovate infra-

structure to make the store room clean and cool using bamboo made platform under the roof of corrugated iron sheet so that seed viability for good germination is maintained.

Large farmers should be involved in the seed production of climate resilient rice crops, and then they should be supported for storing their seeds in the Union Parishad seed banks with branding through DAE and Seed Certification Agency of the government.

Alternative technology

To avoid flood, late varieties of aman rice such as BINA dhan 7, BU dhan 1 and BRRI dhan 46 should be grown. Farmers should be trained on the cultivation of these late varieties so that they can grow these rice varieties after flood and can also harvest these crops to catch up rabi season winter crops.

Under severe flooding conditions, when lands go under water for most time of the year,

farmers should be encouraged to practice sorjan system (alternate raised bed and furrow). Shallow depth sorjans are suitable for monsoon rice. This alternative cultivation system should be tested in the flood prone areas of northwest Bangladesh under severe and continuous flooding condition.

Alternative research

The existing flood tolerant varieties of rainy season aman rice such as BRRIdhan 52, BINA 11 etc., cannot sustain if the land goes under flood water for more than 15 days. **Thus, alternative submergence tolerant varieties of rice during aman season should be developed through research**, which can survive under flood water for longer time. **It is reported that BINA 12 variety of aman rice can survive under flood water for 24 days, which should be explored for future on-farm trial.**

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