

Baseline Study Report

for the Project

“Where the Rain Falls (WtRF) - Phase III Project”

Executive Summary

Background

Bangladesh is frequently cited as one of the most vulnerable countries to climate change (Huq and Ayers, 2007) because of its disadvantageous geographic location; flat and low-lying topography; high population density; high levels of poverty; reliance of many livelihoods on climate sensitive sectors, particularly agriculture and fisheries; and inefficient institutional aspects (CCC, 2006). 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 Foundation. The project is mainly based on Community Based Adaptation (CBA) 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. CARE has been implementing the WtRF project in Kurigram district since January 2014 and WtRF Phase III which started from January 2017 has built on the earlier phase of the project. The WtRF Phase III project focuses on climate resilient agriculture and targets 6,500 small and marginalized farmers in 20 villages (2,500 from previous phase in 5 villages and an additional 4,000 small and marginalized farmers from additional 15 villages in Kurigram).

Objective

The overall objective is to establish a baseline for the project as per the approved project proposal and log-frame so that project can establish a SMART (Specific, Measurable, Achievable, Realistic and Time-bound) monitoring and evaluation (M&E) system. The specific objectives are to create baseline information to measure the progress of indicators set for achieving the outputs, specific goals and overall objectives of the project with those of the end line survey.

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. **A total of 350 targeted households of the project from 15 new villages were randomly selected for data collection using structured questionnaire.**

Results

The summary finding of the baseline information is given in the Table below:

Name of Indicator	Baseline information
% of FFS members with increased knowledge on climatic risks and adaptive options	29.71
Average month with insufficient food at households	3.35

% increase in adaptive capacities of communities	23.4
% increase in agricultural productivity	<u>Boro rice</u> BRRIdhan 28 – 2.5 MT/hectare <u>Aman rice</u> Local variety) – 2.0 MT/hectare <u>Aman rice</u> BRRIdhan 11 – 3.5 MT/hectare <u>Mustard</u> BINA 4, BARI 14 – 1.35 MT/hectare
% of farmers practising at least three adaptive agricultural technology.	4.28
% of women increased their mobility and took part in family decision	14.1
% of women who are able to equally participate in household financial decision making	16.9
Number of Union Parishad allocated budget in their annual plan considering climate vulnerabilities and risks	01

Targeted participants of the project

Major findings are a) the project has targeted majority woman participants (73.7%), b) the target group was mostly (>95%) small and marginalized farmers owning land up to 100 decimal (0.40 hectare), c) the household yearly income was BDT 106,572 far below that of the rural people in Bangladesh (BDT 220,188) and the national average (BDT 381,756) in 2015, and d) the yearly household expenditure in 2016 was BDT 108,617, which is also far below that of the rural people in Bangladesh (BDT 225,204) in 2015.

Knowledge base of the targeted communities on climate risks and adaptive options

Major findings are a) only 29.71 % FFS members of the targeted households know about climate risks, b) only few households (13.4%) participated in training /meeting/workshop on climate change issues, c) Out of the FFS members (29.71%) with knowledge of climate risks, major drivers of climate change risks were flood, hail storm and heavy rainfall as the causal factors that affected crop production, d) only 37.14% households received early warning about climate change induced disaster

Status of households/family having average month with insufficient food

Major findings are a) the targeted households had insufficient food in 3.5 months on an average throughout the year b) October and March were the lean months when 77.4% and 68.9 % households respectively faced difficulty of taking 3 meals a day c) in normal period majority households(61.1%) took two time meals per day but during disaster period the majority households (65.71%) took only one meal per day, d) majority households (96.6%) experienced malnutrition related problems and in effect almost all households (96.3%) faced problem in their health and working efficiency, e) majority households (71.1%) took less food to adapt to food insecurity and 63.10% households took loan from local institutions or local elite person to cope with food insecurity, f) During disaster time, 40.4% households provided two time meals for their male members while only 18.7 % households provided two time meals for their female members,

Increase in adaptive capacities of targeted communities

Major findings are a) only 23.4 % households have adaptive capacities receiving information and other services related to crop production from the staffs of public and private organizations, b) out of the households which communicated with organizations, only 26.03% households received services from the Department of Agriculture Extension (DAE) – the government agency, c) most of the households (86.9%) who communicated with different organizations were not satisfied as the services they received were not sufficient, d) majority households (73.4%) of the targeted communities were not the member of any farmer organization and most of the households (95.7%) did not adopt any technology in group approach, and e) the agricultural knowledge remained stagnant as only few households (23.1%) of the targeted communities shared their knowledge with other farmers.

Status of agricultural productivity (crop)

Major findings are a) most of the targeted farmers kept their land fallow during May to June and cultivate local varieties of aman rice, b) Crop yield in general was very low compared to their recommended yield (Boro rice: BRRIdhan 28 – 2.5 MT/hectare, Aman rice Local variety – 2.0 MT/hectare, Aman rice: BRRIdhan 11 – 3.5 MT/hectare, Mustard: BINA 4, BARI 14 – 1.35 MT/hectare).

Farmers practicing at least three adaptive agricultural technologies

Major findings are a) Only 4.28% farmers practiced at least three adaptive agricultural technologies, and b) only 13.7% households brought changes in cultivation to adapt to climate change.

Women increased their mobility and took part in family decision

Major findings are a) women in only 14.1 % households moved easily outside their houses and took part in family decision, b) women of only 1.34% households got information from government organizations and 9.14% households got information from private organizations or NGOs, c) according to majority households (56.9%) no measures were taken yet for women by GO or NGOs to address climate change risk, d) Male members of 35.4% households migrated to other places for searching work and out of these households, women in 54% households faced problem in mobility due to social insecurity, and

Women are able to equally participate in household financial decision making

On an average, women in only 16.98 % households were able to equally participate in household financial decision making like receiving loan and use of loan, and buying and selling land or property, trees, food, groceries etc

Capacity of relevant service providers to support community to adapt to the impact of climate variability

Major findings are that the organizations like Union Parishads, DAE, BINA, BRRRI, BADC, BMD, Seed companies (Lal Teer, ACI) encountered capacity gaps/constraints in terms of fund crisis, lack of proper training for the staff, lack of skilled manpower, lack of proper instruction from the higher authority, poor coordination among GO/NGOs/private sectors, lack of proper planning and centralized decision making especially in Government sectors, lack of specific budget for adaptation to climate change and absence of formal/institutional bindings or accountability to follow the policies, lack of orientation on the policies related to climate change etc.

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

Only one Union Parishad (Holokhana) out of three targeted unions of the project has allocated budget Tk. 200,000.00 in their annual plan (2016-2017) considering climate vulnerabilities and risks, and

Functional linkage established between relevant stakeholders and community to adapt to the impact of climate variability

Poor functional linkage among stakeholders due to communication gap, lack of collaborative efforts, poor fund and management, disparity in implementation strategy, lack of formal/institutional bindings to follow the policies, lack of proper planning and centralized decision making especially in the Government sectors etc

Major Recommendation

- The target communities possess very poor knowledge on the climate risks primarily due to poor sources of information channel and hence the project requires strengthening linkages of target communities with the relevant information and service providers (government and private) in the project area.
- The project should integrate the capacity and participation of the government agencies particularly in the delivery of early warning to the people through community based adaptation.
- To reach the goal of the project, the targeted communities especially women should be provided with or should be made capable of making innovative ways of adaptation to climate change through SuPER agriculture approach, and through improved information channels and decision making process so that their food insecurity is reduced significantly.
- The project needs sensitizing DAE to be involved in the project interventions following SuPER agriculture approach and to create an enabling environment so that the targeted communities receive services sufficiently even after the project is over (ie, sustainability).
- The project should take care of farmer's capacity development in a group to disseminate innovative knowledge and technologies among neighboring farmers
- Existing cropping patterns should be adjusted with alternate crops and varieties to be grown in fallow period using the benefit of early monsoon and replacing local varieties with flood or drought tolerant modern varieties in consultation with local communities to increase cropping intensity and crop yield of the project participants
- The project should tap the alternate adaptive technologies and build capacity of farmers to practice them to address climate change. This requires linking the targeted communities with government and private organizations having activities for adaptation to climate change risk and vulnerabilities
- The project should facilitate family and social counseling inviting husband or male members of family and village elite persons for creating participatory environment so that women can be freely involved in income generating activities outside the house so that women mobility is increased
- The project should sensitize government organizations in particular so that they integrate women friendly activities in their annual program and consequently women mobility is increased due to these activities.

- The project should consider implementing some capacity development programs like training of respective staff, orientation on the relevant policies, conducting advocacy workshop/seminar involving policy makers, and facilitation on participatory planning among different stakeholders on community based adaptation to climate change risks.
- The project needs sensitizing UP committees so that all targeted Union Parishads allocate budget in their annual plan considering climate vulnerabilities and risks ensuring participation of target communities in bottom up planning
- To improve functional linkages, the project should organize more training of trainers, workshop/seminar involving staff of relevant organizations like Union Parishad, DAE, research organizations, metrological department, NGOs, private seed companies etc,

1. Introduction

1.1 Drivers of climate change risks in Bangladesh

Bangladesh is frequently cited as one of the most vulnerable countries to climate change (Huq and Ayers, 2007) because of its disadvantageous geographic location; flat and low-lying topography; high population density; high levels of poverty; reliance of many livelihoods on climate sensitive sectors, particularly agriculture and fisheries; and inefficient institutional aspects (CCC, 2006). The production of crop in Bangladesh is constrained by too much water during the wet season and too little during the dry season (Rahman, et al., 2007). Various studies indicate that a temperature rise of 1 to 2°C in combination with lower solar radiation causes sterility in rice spikelet. It is feared that moisture stress would be more intense during the dry season, which might force the Bangladeshi farmers to reduce the area for boro cultivation. Shortfall in food grain production would severely threaten food security of the poverty-ridden country (Rahman, et al., 2007).

1.2 Initiatives of the Government and NGOs of Bangladesh in general

In response to the threat, Government of Bangladesh has adopted action plans, particularly National Adaptation Program of Action (NAPA) in 2005 followed by Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2009 (MoEF 2009) for combating the challenges of climate change. Adaptation to climate change is mainstreamed in different sectoral plans and programs, such as National Water Management Plans, Agricultural Policy etc. Besides, NGOs and donor agencies also have their own plans and programs for saving life and property of people from the emerging calamity. To understand the threat of climate change and its coping up processes in different sectors, CARE Bangladesh has undertaken an initiative to investigate the presumed impact of existing adaptation options in the backdrop of changing climatic conditions in future.

1.3 Adaptation is a solution to address climate change in Bangladesh

Adaptation to Climate Change means the initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. This is distinct from the mitigation. It is inevitable because even if the global warming is restricted to projected temperature rise of 2 °C, it will have various local impacts on different communities (IPCC, 2007). 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.

1.4 Rationale for the baseline survey

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 Foundation. Where The Rain Falls 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) project were then implemented in 5 of the countries including Bangladesh. In Bangladesh, the CBA project 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 HH level and beyond. Hence, the same donor Prince Albert II of Monaco Foundation has 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 Where the Rain Falls project phase III for a period of 3 years from January 2017.

The project is mainly based on Community Based Adaptation (CBA) 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. The project will adopt a rights-based approach and focus its advocacy and mobilization efforts on empowering women, enabling vulnerable groups to participate in local decision-making/governance, and ensuring equitable access to resources and services vital to adaptation. CARE has been implementing the WtRF project in Kurigram district since January 2014 and WtRF Phase III, which started from January 2017, has built on the first phase. The project in phase I 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, BRRI dhan 28 & 58 have been identified as the most suitable adaptive rice for summer.

The WtRF Phase III project focuses on climate resilient agriculture and has targeted 6500 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 in Kurigram). 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 as follows:

Specific Goal 1: 20 # of communities are more resilient to climate risks and change and corresponding **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 and **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 and corresponding **output 2.1:** Integrated CBA activities in annual plan of Union Parishad and **output 2.2:** Functional linkage established between relevant stakeholders and community to adapt to the impact of climate variability.

Baseline survey provides a starting point from which a comparison can be made; and ideally, a baseline is conducted prior to the beginning of the project or at a stage of the program intervention and it becomes the point of comparison for monitoring and evaluation of data; and the bulk of baseline survey focuses on the intended outcomes of the program. In this context CARE Bangladesh has decided to conduct this baseline survey and the survey was implemented by a team of consultants led by Dr. Syed Samsuzzaman, Agricultural, Climate Adaptation and Rights based Development Specialist.

1.5 Objective of the survey

The overall objective is to establish a baseline for the project as per the approved project proposal and log-frame so that project can establish a SMART (Specific, Measurable, Achievable, Realistic and Time-bound) monitoring and evaluation (M&E) system.

To this end, this survey identifies baseline information which will allow the project to measure the progress of indicators set for achieving the outputs, specific goals and overall objectives of the project by comparing the indicators' values of the baseline with those of the end line survey.

The specific objectives of this survey are:

- i. To assess the adaptive capacities of the targeted communities**
- ii. To measure food insecure months of climate victims**
- iii. To identify the status of women empowerment in household financial decision making**
- iv. To measure the ability of community people to build resilience to the effects of climate change and variability**
- v. To know the knowledge base of the targeted communities on climate risks and adaptive options**
- vi. To know the status of practice in adaptive agriculture and corresponding productivity by the targeted communities**
- vii. To know the status of mobility of women and their participation in family decision making**
- viii. To know the capacity of relevant service providers to support community to adapt to the impact of climate variability**
- ix. To know the number of Union Parishad which allocated budget in their annual plan considering climate vulnerabilities and risks**
- x. To map out status of functional linkage between relevant stakeholders and community to adapt to the impact of climate variability**

2. Methodology

Given the complex nature of the project that entails a wide range of issues, the methodology of the study was developed based on project documents including the Terms of Reference (Appendix I), logical frame work (Appendix II) and M & E planning matrix (Appendix III). The project mainly improves the resilience of the targeted communities to the effect of climate change ie, how communities will make themselves more prepared to adapt to the changing climatic patterns affecting agricultural production, living and economic capability. It is, therefore, important to increase adaptive capacities of the communities so that they are more resilient to the effects of climate change. Hence, to increase adaptive capacities the communities require gaining knowledge to adapt to climate change and in particular the capability of farmers to

cultivate various flood tolerant and drought tolerant agricultural varieties and technologies. Increased adaptive capacities will eventually help farmers to follow the techniques and measures in cultivating adaptive varieties. If the adaptive capacities of farmers are increased and consequently adaptive techniques and measures are practiced, their agricultural productivity will be increased. The project gives priority to increase women mobility ie, their movement to various places they need for economic, educational purposes and family maintenance and make them equally able to participate in households financial decision making. Increased agricultural productivity and economic involvement of women in addition to men will increase food secure period throughout the year. The project also gives effort to motivate Union Parishads so that they allocate budget in their annual plan considering climate vulnerabilities and risks so that communities will increase their adaptive capacity to the changing climate. In the context of above expected results of the project as per logical frame work and based on definition of M & E matrix, the indicators for this baseline survey/research are designed. The assumption is that the finding of the baseline indicators in comparison with that of the same indicators in the end line survey will meet the expected outputs while several outputs will meet the specific goals and in turn the specific goals will meet the overall goal of the project.

Data was collected through quantitative and qualitative methods. Review of project documents and secondary information, household surveys, Focus Group Discussions (FGD), Key Informant Interviews (KII) and individual household interviews generated adequate information as per measurable indicators of the project log-frame. The government and private organizations relevant to the project provided necessary assistance during the field work and collection of information for the study. Structured questionnaires were used to collect the quantitative data through household survey, while for qualitative data, Focus Group Discussion, Key Informant Interview and field observations methods were followed.

Specific tools, sample size and nature of participants to meet the objectives of the survey as mentioned above are given below (Table 1):

Table 1: Specific tools, sample size and nature of participants

Objective of the survey	Tools	Sample Size	Nature of participants
i. To assess the adaptive capacities of the targeted communities ii. To map-out food insecure months of climate victims iii. To identify the status of women empowerment in household financial decision making	Households survey (HHS) and Focus Group Discussion (FGD)	350 HHS in three unions (Holokhana, Pachgachi and Jatrapur) of Kurigram Sadar Upazila 5 FGD in three unions – one in Holokhana, 2 each in Pachgachi and Jatrapur Union	Participants of WtRF – phase –III (small holders farmers 50% men and 50% women) Each FGD session was conducted with 20-25 members
iv. To measure the ability of community people to build resilience to the effects of climate change and variability v. To know the knowledge base of the targeted communities on climate risks and adaptive options vi. To know the status of practice in adaptive agriculture and corresponding productivity by the targeted communities vii. To know the status of mobility of women and their participation in family decision making	HHS and FGD	350 HHS in the above three unions 5 FGD in the above three unions	Participants of WtRF – phase –III (small holders farmers 50% men and 50% women) Each FGD session was conducted with 20-25 members
viii. To know the capacity of relevant service providers to support community to adapt to the impact of climate variability ix. To know the number of Union Parishad allocated budget in their annual plan considering climate vulnerabilities and risks x. To map out status of functional linkage	Key Informant Interview (KII)	17 KII	Department of Agriculture Extension (Deputy Director, Kurigram – 1, Upazila Agriculture Officer, Kurigram Sadar – 1, and Sub-Assistant Agriculture Officer- 3 (1/union) – Total 5) Union Parishad – 3 union chairman, 3 Mohila Ward Commissioner (Total-6) Agriculture Research

<p>between relevant stakeholders and community to adapt to the impact of climate variability</p>			<p>Institutes: Bangladesh Institute of Nuclear Agriculture (BINA) -1 and Bangladesh Rice Research Institute (BIRRI) – 1, Total (2)</p> <p>Bangladesh Metrological Department(BMD), Rangpur – 1</p> <p>Government Seed Sector: Bangladesh Agricultural Development Cooperation (BADC), Deputy Director (Seed Marketing) - 1</p> <p>Private sector (Seed Company): Lal Teer – 1, ACI – 1, Total - 2</p>
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2.1 Quantitative method: Household Survey

The quantitative data were collected through door to door survey on sample basis of the randomly selected respondent from the project working area. The questionnaire was developed on goals and outcomes of the project logical framework. The data were collected mainly on the status of targeted participants on their socio-economic characteristics, knowledge on climate change, adaptive practices, crop productivity, family food security, mobility of women and gender disaggregated decision making in household affairs. However before finalization, the questionnaire was field-tested and fitted accordingly. Based on the selection criteria agreed with CARE Bangladesh, 15 new villages taken under the project were selected as sample area to conduct the survey. A desired sample household is needed complying with the statistical rules for collecting the study information. So, exact sample size for data collection was determined by the following formula:

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

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

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

(samples)

Hence, a total of 350 sample households were randomly selected out of 4,000 targeted households from 15 new villages of the project for data collection. These sample households were selected based on the proportion of targeted households in each village to the total targeted households of 15 new villages (Appendix IV). The random selection was carried out among the total targeted households of each village. The data were collected from the sample households using structured questionnaire (Appendix V: Household survey questionnaire).

2.2. Qualitative method

The qualitative methods/techniques, termed as participatory methods, have allowed to capture relevant information from project participants, relevant organizations, the local Institutes, and Civil Society Organizations (CSOs) as deemed appropriate through semi-structured guidelines. The qualitative method has included Participatory Rapid Appraisal (PRA) exercises for FGD, Key Informant Interview (KII) etc.

2.2.1 Focus Group Discussion (FGD) – was done with the marginal and smallholders farmers groups to capture information from the target community on the various aspects of the interventions to be promoted by the project. A guideline was used while discussing with the participants (Appendix VI: FGD guideline). A total of 5 FGD was conducted taking 20-25 farmers in a group from 5 villages out of 15 villages randomly. The size of FGD was determined based on the proportionate sampling (12-15%) of 163 members of the Farmers Field School (FFS) taking at least 70% women participants as the majority of the project participants were women. The FGD size was kept in such a small fragment of the FFS primarily to ensure effective participation of each and every member in discussion.

2.2.2 Key Informant Interview (KII) – was done with the local institutes (Union Parishad, Department of Agriculture Extension, Research Institutes, Meteorological Department and private seed companies) to assess their views on the existing situation of the specific issues of

the study. A total of 17 KII was conducted depending on their availability of the respondents. The KII interviewees were selected representing the above local institutes and were interviewed as per the pre-designed checklist (Appendix VII: KII checklist).

2.2.3 Team composition - The study team was formed with most experienced and committed consultants working in the research and development sector. There were two operational teams for the study. A four member consultant team was engaged in this survey. This team was comprised of *Team Leader cum* Agricultural, Climate adaptation and Rights based Development *Specialist Dr. Syed Samsuzzaman*, Institutional development and Agricultural specialist, Mr. Md. Rajab Ali, Community Development and Agricultural Specialist Mr. Shahid Hossain, *Gender and Women Empowerment Specialist Ms. Zarin Yesmin Chaity*, Lecturer, Department of Women and Gender Studies, Begum Rokeya University, Rangpur.

Field Operation Team was comprised of 10 (5 former project staff of CARE Bangladesh – 2 female and 3 male, and 5 senior undergraduate students – 1 female and 4 male) experienced and adequately qualified Data Enumerators for conducting the household survey work. In addition, 2 Data Entry Operators and one Data Analyst (Statistician) were employed for data entry and analysis. This field operation team was headed by the Team Leader and other Consultants. To avoid any sort of biasness, the enumerators collected information from the selected households as per the list supplied by the implementing organization on random basis.

2.2.4 Reporting - Statistical analysis was done in SPSS package. A large number of data was analyzed using cross tabulation techniques of the SPSS Computer Application using the coding process of the various respondents. Multivariate analysis was done to figure out the mean, median, ranges that contribute to social and economic vulnerability of disaster matters of the population of surveyed area. Qualitative information was compiled based on the commonalities and differences in opinions of the various respondents.

3. Findings of the survey

3.1 Socio-economic status of the targeted participants

The project is designed in such a way that only the marginalized and smallholders farmers, especially women, who really need assistance for adapting to climate change risks and vulnerabilities, will choose to participate in the program.

The following information collected from the baseline survey will qualify the basic parameters of the above targeting criteria followed in the project:

3.1.1 Targeted project participants by gender

The proportion of project participants by gender is shown in Table 2. It is evident that the project has targeted majority female participants (73.7%).

Table 2: Status of gender of the project participants

Sex and Religion	Number of respondent	Percent
Sex		
Male	92	26.3
Female	258	73.7
Total	350	100.0

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.

3.1.2 Targeted project participants based on land ownership

Table 3 reveals that the project has mostly targeted (>95%) small and marginalized farmers owning land up to 100 decimal (0.40 hectare) as per the declaration of targeted households during the survey. In this context, farmers were categorized as marginalized owning up to 50 decimal of land (0.20 hectare), small farmers owning from 51 to 100 decimal (0.21-0.40 hectare), medium farmers owning from 101 to 250 decimal (0.41-1.0 hectare) and large farmers owning more than 250 decimal (>1.0 hectare) according to common classification widely used in Bangladesh. Out of the total participants, 74.2 % participants are categorized as marginalized farmers owning land up to 50 decimal (0.20 hectare). 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 3: Land ownership pattern of the project participants

Total lands (decimal)	Number of participants	Percent of participants	Cumulative percent
0-20	88	25.1	25.1
21-50	172	49.1	74.2
51-100	74	21.2	95.4
101-120	16	4.6	100
Total	350	100.0	

3.1.3 Targeted participants based on income and expenditure

3.1.3.1 Income level

It is evident from Figure 1 that 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. Available literature indicates that this income level of the project participants 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 17,262), which poses an extra challenge for the project to bring these women out of this vicious situation.

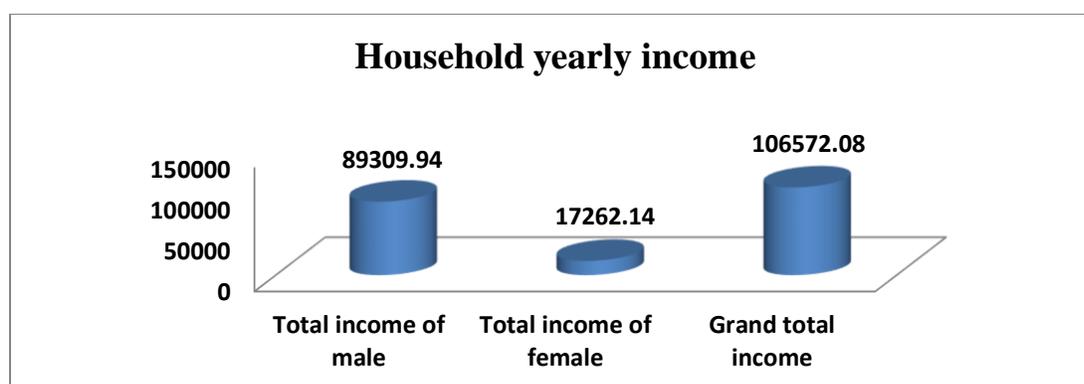


Fig 1: Household yearly income by gender

The pattern of yearly household income is shown in Table 4. This table reveals that only 7% project participants possessed the yearly household income (BDT >200,000), which is closure to the average rural household income of Bangladesh (BDT 220,188) and far below the national average (BDT 381,756) in 2015 (PPRC 2016). Table 5 also reveals that one third of the participants fall under very poor income group as their yearly household income ranges only from BDT 40,000 - 80,000. It eventually indicates that the project has targeted the resource poor

people who are marginalized having minimal access to income. It is implied that this baseline status of poor income would be of potential platform to the project to bring the significant impact of the SuPER agriculture approach on income.

Table 4: Pattern of yearly household income

Household yearly income (BDT)	Number of project participants	Percent of participants	Cumulative percent
0-40000	18	5.2	5.2
40000-80000	109	31.1	36.3
80000-120000	131	37.4	73.7
120000-160000	46	13.1	86.8
160000-200000	21	6.0	92.8
200000+	25	7.2	100.0
Total	350	100.0	

Income data also shows considerable variation across income sources of the project participants (Fig 2). Highest average yearly household income was derived from the services (BDT 92,498), which was followed by the income from the business (BDT 63,796), selling day labor (BDT 52,607), driving rickshaw/van/auto (BDT 46,935) and agriculture (BDT 21,211) among the major specific areas of income. Other segments of agriculture like homestead gardening, livestock and poultry rearing and fish culture provided very poor income to the project participants ranging from BDT 2,775 to 14,023. This finding indicates that the project has targeted the participants having poor income from the agricultural sectors as affected by climate change-induced disaster, and there are ample opportunities to increase income from the agriculture sector by promoting SuPER agriculture programs that adapt to climate change risks and vulnerabilities.

Figure 2: Income sources of the project participants

3.1.3.2 Expenditure level

Table 5 examines how much and on what items the project participants spend money to support their livelihoods. Survey data in Table 6 shows that an average yearly household expenditure of participants in 2016 was BDT 108,450. Available literature indicates that this expenditure level

of the project participants is very poor compared to the average yearly household expenditure of the rural people in Bangladesh (BDT 225,204) in 2015 (PPRC 2016).

Table 6 reveals that one third of the participants fall under a *very poor capacity of expenditure* group as their yearly household expenditures range only from BDT 40,000 - 80,000. It eventually indicates that the poor expenditure capacity of the project participants was mainly due to their poor income level as shown in Table 3 and Table 4. The findings of PPRC (2016) also corroborates well with this survey report as the average yearly household income (BDT 220,188) and corresponding expenditure (BDT 225.204) of rural households in Bangladesh in 2015 also showed a deficit balance. So, the project has captured very poor households having potential to increase their income level with the practice of adaptive agriculture.

Disaggregation by types of expenditure is likely to reveal variation across such items as for example in the relative share of food in the expenditure basket and 51% of total yearly expenditure was spent for food (Table 5). There were five dominant expenditure items: food, cultivation and loan interest repayment whereas some basic requirement for example education, health/medical, cloths/wearing got a tiny share of expenditure (4-5% only).

Table 5: Types of expenditure incurred yearly by the households

Types of expenditure	Average Expenditure (BDT)	Per cent of yearly total average expenditure
Food purchasing	55525	51
Cultivation	14987	14
Loan interest repayment(Bank, middle man, NGO)	11635	11
Health/Medical expenditure	5701	5
Cloths/wearing	4921	4.92
Education	4122	4
Construction and repairing of house	3091	3
Entertainment including gift/festival	2026	2

Marriage (if any)	1625	1.5
Dowry (if any)	1276	1
Electricity/solar	1261	1
Firewood/ Kerosene	820	0.8
Cosmetics	880	0.8
Others	747	0.7
Total average expenditure	108,617	100

Table 6: Pattern of yearly household expenditure

Yearly household expenditure	Number of project participants	Percent of project participants	Cumulative percent
0-40000	14	4.0	4.0
40000-80000	109	31.1	35.1
80000-120000	128	36.6	71.7
120000-160000	52	14.8	86.5
160000-200000	24	6.9	93.4
200000+	23	6.6	100
Total	350	100.0	

Major findings in this section are a) the project has targeted majority woman participants (73.7%), b) the target group was mostly (>95%) small and marginalized farmers owning land up to 100 decimal (0.40 hectare), c) the household yearly income was BDT 106,572 far below that of the rural people in Bangladesh (BDT 220,188) and the national average (BDT 381,756) in 2015, and d) the yearly household expenditure in 2016 was BDT 108,617, which is also far below that of the rural people in Bangladesh (BDT 225,204) in 2015.

3.2 Resilient capacities of communities to climate risks and changes

This section mainly provides findings of the baseline survey as per indicators set in logical frame work, which will be compared with the findings against the same indicators of the end line survey. The summary finding of the baseline information is given in Table 7.

Table 7: Summary findings of baseline survey as per indicators set in logical frame work

Name of Indicator	Baseline information
% of FFS members with increased knowledge on climatic risks and adaptive options	29.71
Average month with insufficient food at households	3.35
% increase in adaptive capacities of communities	23.4
% increase in agricultural productivity	<u>Boro rice</u> BRRIdhan 28 – 2.5 MT/hectare <u>Aman rice</u> Local variety) – 2.0 MT/hectare <u>Aman rice</u> BRRIdhan 11 – 3.5 MT/hectare <u>Mustard</u> BINA 4, BARI 14 – 1.35 MT/hectare
% of farmers practising at least three adaptive agricultural technology.	4.28
% of women increased their mobility and took part in family decision	14.1
% of women who are able to equally participate in household financial decision making	16.9
Number of Union Parishad allocated budget in their annual plan considering climate vulnerabilities and risks	01

The detail of the above baseline information is presented in the sections given below:

3.2.1 Knowledge base of the targeted communities on climate risks and adaptive options

3.2.1.1 Percent of FFS (Farmer Field School) members with knowledge on climatic risks and adaptive options

Fig 3 reveals that the majority members of FFS households (70.29%) did not know about climate risks, indicating that they could not understand the risks due to climate change although they receive some information and assistance from the government and NGOs. **Thus, only 29.71 % FFS members know about climate risks.**

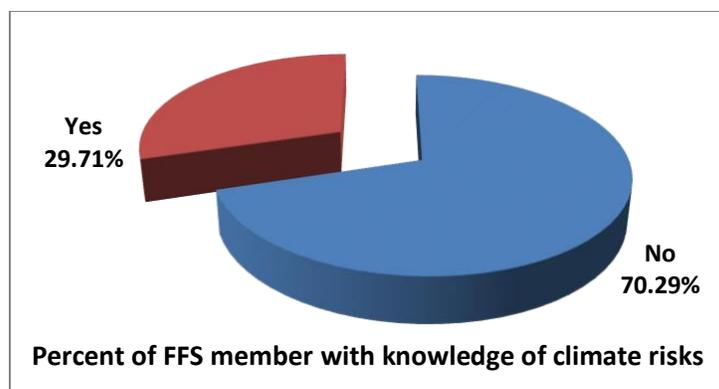


Fig 3: FFS member with knowledge of climate risks

3.2.1.2 Concept of FFS members on the indicators of climate risks

The survey findings in Fig 4 show that the project participants who know about climate risks (29.71% in fig 4) have some concepts regarding the indicators of climate change. According to the respondents, the major drivers of climate change risks were the change of rainfall pattern (22% respondents), frequent flood (21% respondents) and increase in hailstorms (20 % respondents). R. Selvaraju et al, FAO (206) showed in their survey conducted in Bangladesh that people perceived that the seasonal cycle and rainfall pattern were changed, droughts became more frequent, pest and disease incidences were increased and the average temperature was increased in the summer while winter was shortened. The present survey findings, however, shows a small proportion of project participants know about different indicators of climate risks. Moreover, their conceptual clarity were not in depth as very few people know about the recent climate change events like prolong drought, shorter winter season, frequent cold wave in winter, increase in foggy weather, epidemic outbreak of minor diseases like blast of boro rice etc. Therefore, it implies that the project participants require in depth knowledge about the current drivers of climate change and the corresponding risks created thereby.

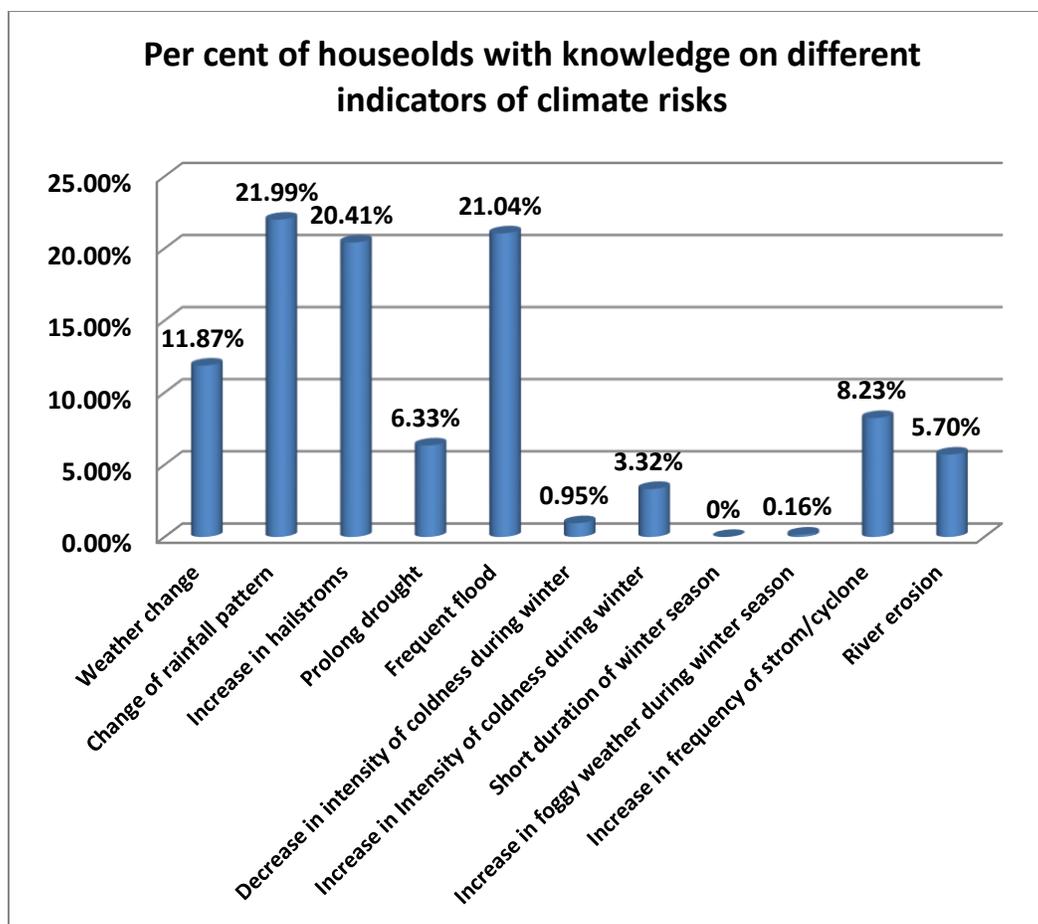


Fig 4: FFS members with knowledge on different indicators of climate change risks

It is also evident from the discussion with farmers in a group (FGD) that some of them were able to explain the drivers of climate change risks such as prolong drought, insufficient rainfall during rainy season, untimely rainy season, increase in intensity of cold during winter, delayed winter season, severe flood, unseasonal flood, prolong flood, recurrent flood (3 or 4 times), unevenly hailstorm etc.

3.2.1.3 FFS members with sources of information about climate change

Figure 5 reveals that less than one-third of the FFS households received information about climate change from NGOs (32.57%) and Television (23.14%) while very few households receive information from other sources. The findings also reveals that very negligible proportion of project participants (0.57%) received information from the government agencies about climate change. So, the target communities possess very poor knowledge on the climate risks primarily due to poor sources of information channel and hence the project requires

strengthening linkages of target communities with the relevant information and service providers in the project area.

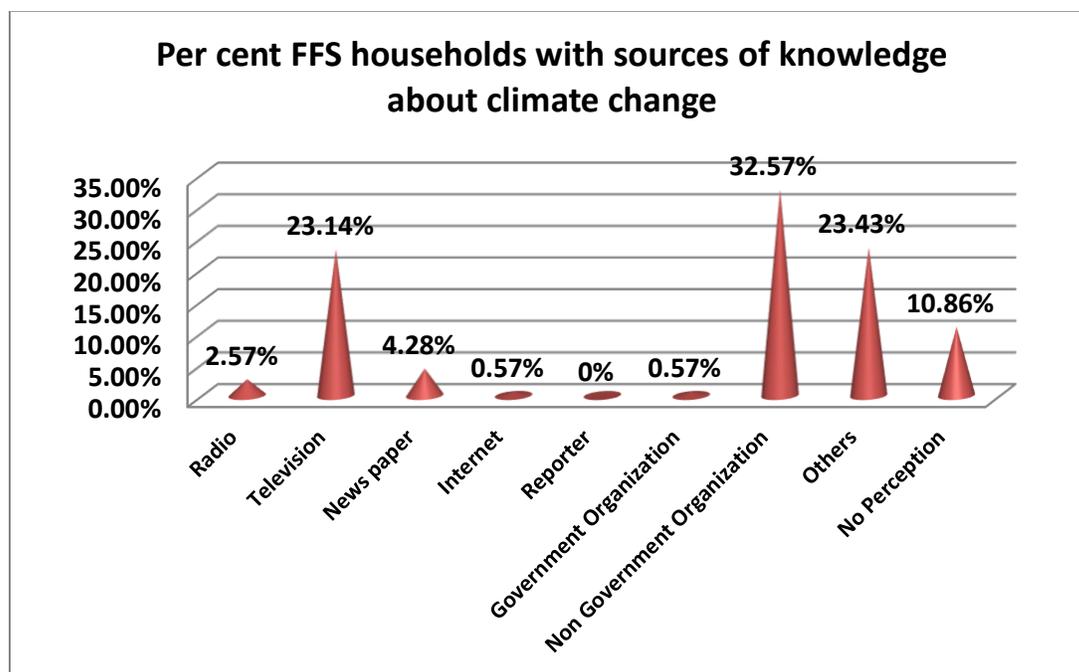


Fig-5: FFS Households with sources of knowledge about climate change

3.2.1.4 Participation of FFS members in training/meeting/workshop on climate change issues

It is revealed in Table 8 that only few households (13.4%) participated in training /meeting/workshop on climate change issues. It indicates that the target group was not exposed to the access of Government programs—the main service providers for training/meeting/workshop on climate change, which can also be validated with the findings presented in Figure 5 that very few respondents (0.57%) received information from the Government. However, it is revealed from the Table 8 that almost all project participants (96.4%) expressed their interest for participation in training/meeting/workshop on climate change issues.

Table 8: Status of participation of households in any training /meeting / workshop related to climate change

Status of households	Yes (%)	No (%)
Households participated in any training/workshop/seminar	13.4	86.6

related to climate change		
Households were interested for participation in any such kind of training/workshop/seminar related to climate change	96.4	3.6

While discussing with a group of farmers (FGD), it was evident that they did not receive enough training related to climate change adaptation issues, except what they received was mainly how to prepare seedbed during the time of flood. Upon an open question, all of them expressed their interest to receive the training on the following subject areas:

- Alternate technologies for adaptation to climate change, particularly how to cultivate crops to cope with drought, flood, untimely winter season etc.
- Timely access to early warning information on flood and thunderstorm,
- Harmful effect of climate change on agriculture and how to cope with these harmful effects
- Livestock and poultry rearing
- Disaster risk reduction and preparedness
- Pest and disease management of crops, livestock and fisheries
- Preservation of seed, dry food and child food

Therefore the project should take care of the interest of project participants so that they receive new knowledge through training on the above subjects.

3.2.1.5 Knowledge of the targeted communities about the effect of climate change on crop production

The survey recognized major drivers of climate change risks that affected crop production in the project area. Figure 6 shows that out of the households (29.71%) with knowledge of climate risks as shown in Fig 3, almost all households (94.6%) perceived flood as the major driver of climate risks that affected crop production. Next to flood, about half of the households (58.30%) recognized hail storm and about one-third (28.30%) reported heavy rainfall as the causal factors that also affected crop production. Drought, river erosion, Tornado/Cyclone and excessive fogginess were not noticed as critical factors that affected crop production according to the vast majority of households (>90%).

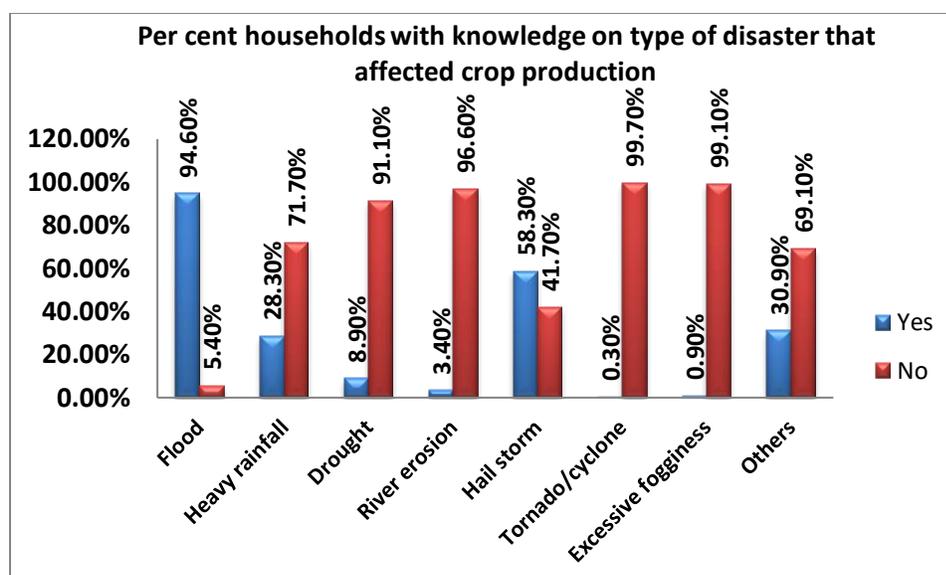


Figure 6: Households with knowledge on types of disaster that affected crop production

Table 9 also shows that the above drivers of climate risks differed by different scale of intensity. Flood, river erosion and tornado/cyclone contributed to scale of severe damage while heavy rainfall, drought and excessive fogginess had the medium scale of damage according to majority households of the project.

Table 9: Households with knowledge on the intensity of disaster that affected crop production (out of the participants who know about climate risks)

Drivers of climate risks	Per cent households with knowledge on the intensity of disaster that affected crop production (out of the participants who know about climate risks)		
	Minimum damage (below 25%)	Medium damage (26-50%)	Severe damage (more than 50%)
Flood	5.70	29.90	64.40
Heavy rainfall	8.50	74.50	17.00
Drought	40.00	53.30	6.70
River erosion	11.10	0	88.90
Hail storm	29.50	40.50	30.00
Tornado/cyclone	0	50	50
Excessive fogginess	0	100	0
Others	9.90	27.00	63.10

Out of the households (29.71%) with knowledge about climate risks, a majority of households (57.7%) perceived that crops were fully damaged due to flood while one-third participants (31.40%) reported that crops were partially damaged with reduced yield (Table 10). It is revealed from a farmer group discussion that flood damaged planted aman rice partially or fully and inundated homestead making it unfit for vegetable gardening. Due to negative effects of climate change, production of all crops was damaged by early and unseasonal flash flood. Pulse crops got destroyed by attack of insects and diseases after flood. Farmers also expressed that rice production was decreased due to unseasonal rain, and early and long time flood. They further added that crop production cost was increased and agricultural laborers did not get work as crops were fully damaged by flood.

Table 10: Households with knowledge on nature of damage by climate induced disaster

Nature of damage by climate induced disaster	Per cent households know about nature of damage		
	Flood	Hail Storm	Heavy Rainfall
Crops were fully damaged	57.70	71.40	3.10
Crops were partially damaged with reduced yield	31.40	28.60	35.40
Crops were not planted timely	7.60	0.00	58.40
Fish farms/resources were damaged	0.60	0.00	2.10
Others	2.70	0.00	1.00

In the recent past hail storm became the significant factor affecting crop production. Out of the households (29.71%) with knowledge about climate risks, majority households (71.4) perceived that crops were fully damaged due to hail storm while the rest perceived that crops were partially damaged with reduced yield (Table 10). It is also evident from the Table 10 that more than half of the households (58.4%) recognized that crops could not be planted timely due to heavy rainfall and next to this problem about one-third (35.40%) perceived that crops were partially damaged with reduced yield. Farmers in a group discussion (FGD) expressed that in general rice production was decreased due to unseasonal rain, attack of insecticides, increase in propensity of hail, early and longtime flood, high and increased temperature. A recent fine-scale study noted the potential for climate change to weaken monsoon overall across the sub-continent, an average decline in summer rainfall, a delay in the onset of monsoon and more monsoon break periods, but also potentially increased rainfall in Bangladesh, which would lead to more flooding (Ashfaqet al. 2009).

3.2.1.6 Knowledge of the targeted communities on adaptive options through early warning and shelter during disaster

The survey data presented in figure 7 shows that only 37.14% households received early warning about climate change induced disaster despite there are many national policies and plans of Bangladesh that obligates government agencies to ensure this early warning to the disaster prone areas. This scenario of poor early warning systems was also supported by farmers in a group discussion (FGD) when almost none of them received early warning before disaster. The data in figure 8 reveal that out of the households who received early warning (37.14% as in Fig 7) about half of the households (51%) received early warning from the source other than any organization (eg, neighbors, local people, relatives etc,) while 21% received early warning from Television and 19% from NGOs.

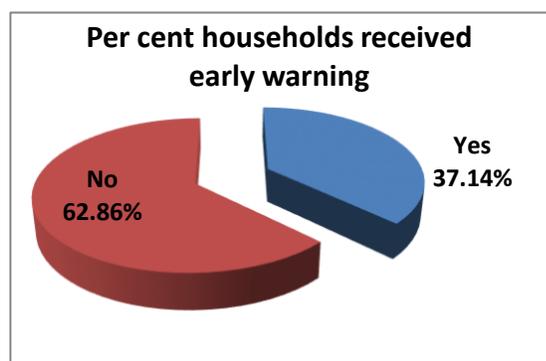


Fig 7: Households with status of receiving early warning

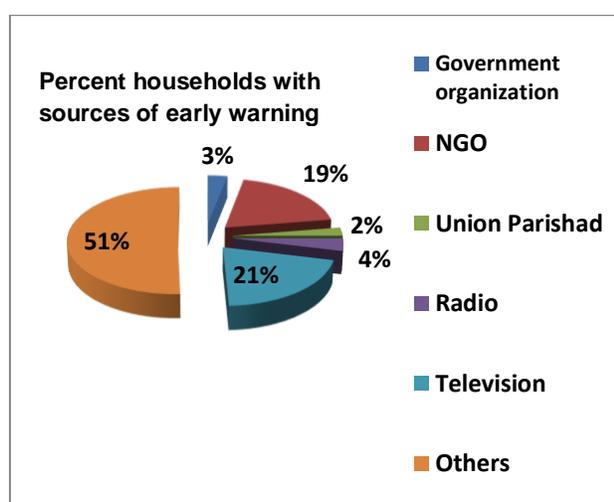


Fig 8: Households with sources of receiving early warning

It is clearly spelled out in the National Plan for Disaster Management in Bangladesh 2010-2015 (Disaster Management Bureau, 2010) that the relevant government agencies will ensure early warning well ahead to the people before any disaster is about to happen. Therefore, there is a serious gap in the capacity of government agencies to fulfill this obligation and hence the project can integrate the capacity and participation of the government agencies in delivering early warning to the people through community based adaptation.

The government organization and Union Parishad played a very poor role in disseminating early warning as a very small proportion of targeted communities (2-3%) were brought in to their systems of early warning (Fig 8). It therefore implies that despite the obligations as per existing

national policies/plan of Bangladesh, government organizations and local government (Union Parishad) were not able to provide early warning before disaster to the mass people in the project site. Thus, the project should create the space for building capacity and coordination in and among relevant government organizations and Union Parishads. Further, there are disaster management committees at different administrative tiers of the government from national to union level, and at union level there is Union Disaster Management Committee (UDMC) as per National Disaster Management Plan 2010-2015. However, UDMC does not have representative from the climate victims. So, the project should develop the voicing capacity of the targeted communities in such way that they are able to create pressure to include their representative in UDMC and in turn, they can activate the committee to reduce climate risks through early warning. It is very unlikely that out of the households who receive early warning (37.14%) about three-fourth of the households (73.70%) did not go to the flood rehabilitation center (Table 11). It is worth mentioning that the targeted households were so aware on the importance of early warning to reduce the risks of climate induced disaster as almost cent percent (97.7%) of the households showed interest to receive early warning (Table 11).

Table 11: Status of households who went to flood rehabilitation center after receiving early warning and who were interested to receive early warning

Status of Households	Yes (%)	No (%)
Households went to flood rehabilitation center after receiving early warning	26.3	73.7
Households were interested to receive early warning	97.7	2.3

This finding indicates that the targeted households are reluctant to go to the flood shelter even they receive early warning and know its importance. The main reason for their reluctance is evident from the data presented in figure 9 that the flood rehabilitation centers were not available in their vicinity according to majority households (76.22 %) out the households who received early warning but did not go to the shelter. Apart from this, stealing of family assets, scarcity of sufficient space, unhygienic environment, far away from home and others were the minor reasons as mentioned only by few households (1.75-7.69%). This finding indicates that the targeted areas of the project did not receive assistance neither from the government nor from the NGOs to build flood rehabilitation center in the vicinity of households and hence the question of receiving early warning by the communities was useless. Therefore, the challenge is

ahead of the project as to how the early warning system is made operational by the government agencies and at the same time how the communities can make best use of this early warning for adapting to climate induced disasters.

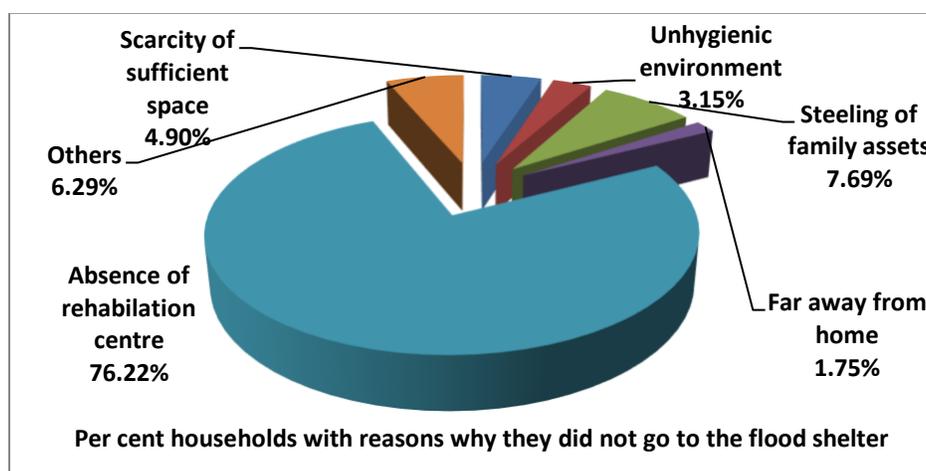


Fig-9: Targeted households with reasons why they did not go to the flood rehabilitation center even after receiving early warning

Major findings in this section are a) only 29.71 % FFS members of the targeted households know about climate risks, b) only few households (13.4%) participated in training /meeting/workshop on climate change issues, c) Out of the FFS members (29.71%) with knowledge of climate risks, major drivers of climate change risks were flood, hail storm and heavy rainfall as the causal factors that affected crop production, d) only 37.14% households received early warning about climate change induced disaster

3.2.2 Status of households/family having average month with insufficient food

End hunger, achieve food security and improve nutrition is at the heart of the sustainable development goals. At the same time, climate change is already impacting agriculture (Ahammad et al, 2015) and food security, and will make the challenge of ending hunger and malnutrition even more difficult. Multiple aspects of food security were explored by the survey, including food insecure months of households.

3.2.2.1 Average month with insufficient food at households

Table 12 reveals that the targeted households had insufficient food in 3.5 months on an average throughout the year. About one-third households (33.14%) encountered difficulty due to food deficiency in 4 months while one-fourth (26 %) households had food deficiency in 3 months and a similar proportion of households experienced insufficient food respectively in 5 months (12.86%) and 2 months (12.57%). A small proportion of households noticed food deficiency in 6 months (4.57%) and in 1 month (7.43%) while a very negligible proportion of households (3.43%) did not have food insufficient month throughout the year.

Table 12: Average month with insufficient food per household

Number of month with insufficient food	Households (number)	Households (%)	Total food insecure months
Six months	16	4.57	96
Five months	45	12.86	225
Four months	116	33.14	464
Three months	91	26.00	273
Two months	44	12.57	88
One month	26	7.43	26
No month	12	3.43	00
Total	350	100	1172
Average month with insufficient food/household	01	01	3.35

3.2.2.2 Status of households with insufficient food in different months

The figure 10 reveals that October and March were the lean months when 77.4% and 68.9 % households respectively faced difficulty of taking 3 meals a day and nearly 36 to 45% households also faced food deficiency during June, July and September. This scenario of food insecure months was also supported by the farmers in a group discussion (FGD) that they faced food scarcity two times a year, one during March and the other in October i.e one during the later part of boro season and the other is the pre harvesting of aman rice. This finding indicates some sort of reversal of seasonal famine like situation called “monga”, which was eradicated from northwest Bangladesh 8-10 years back simply by introducing alternate crops and cropping pattern with short duration rice varieties like BRR1 dhan 33 and BINA 7.

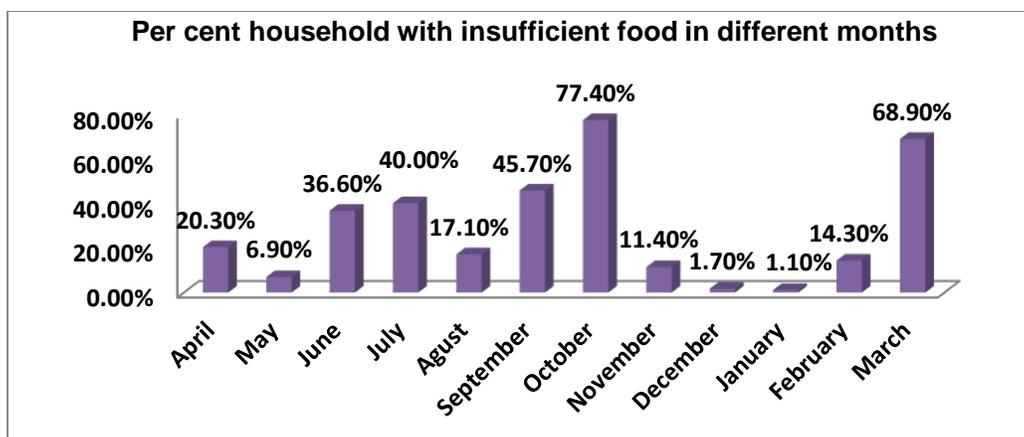


Fig 10: Households with insufficient food in different months

3.2.2.3 Status of households with number of meals taken per day during normal and disaster time

The figure 11 reveals that in normal period 38.6 % households took three time meals per day while 61.1% household took two time meals per day. However, this scenario of food intake by households was drastically changed during climate induced disaster period when only 3.15 % households took three meals per day, 31.14 % households took two meals and the majority households (65.71%) took only one meal per day. All the above data indicate that during climate induced disaster period targeted communities were fallen into serious food insecurity situation.

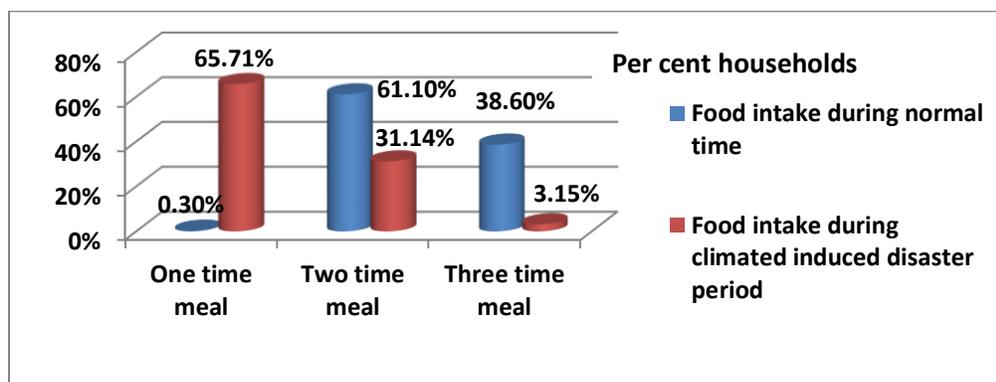


Fig 11: Households with number of meals taken per day during normal and disaster time

3.2.2.4 Status of households with malnutrition

The surveyed data also revealed that family members of majority households (96.6%) experienced malnutrition related problems and in effect almost all households (96.3%) faced problem in their health and working efficiency (Table 13). This situation of malnutrition and thereby reduced working efficiency of the targeted communities could be attributed to the poor number of meals taken by the family members during climate induced disaster as shown in figure 11.

Table 13: Status of households faced malnutrition and with its effect on health or working efficiency

Status of Households	Yes (%)	No (%)
Households faced malnutrition due to climate change induced disaster	96.6	3.4
Households with effect of malnutrition on health or working efficiency	96.3	3.7

3.2.2.5 Coping strategies of households to meet food insecurity

Figure 12 provides the information on coping mechanisms of households to meet food insecure period of the year. The survey findings show a very high instance of taking less food as a coping strategy when majority households (71.1%) took less food to adapt to food insecurity meaning going towards hungry. On the other hand, about two-third of the households (63.10%) took loan from local institutions or local elite person to cope with food insecurity meaning becoming indebted. About one-third of Households (37.4%) purchased less expensive food items to adapt to food insecurity meaning going malnourished. A smaller proportion of households (10-20%) took help from relatives, selling their household's assets like poultry and livestock, migrating outside for selling labor and doing more work as a coping strategy against food insecurity.

Farmers in a group discussion (FGD) narrated that they cope with food insecurity by selling of rice to village middle man, taking loan from either elite person or NGO, purchasing commodities on credit basis from local shop, migrating temporarily for working outside their place, working in other's house or rice mill, taking less food than normally they took. All these strategies are considered as the only options to survive but not the way of getting out of this vicious cycle.

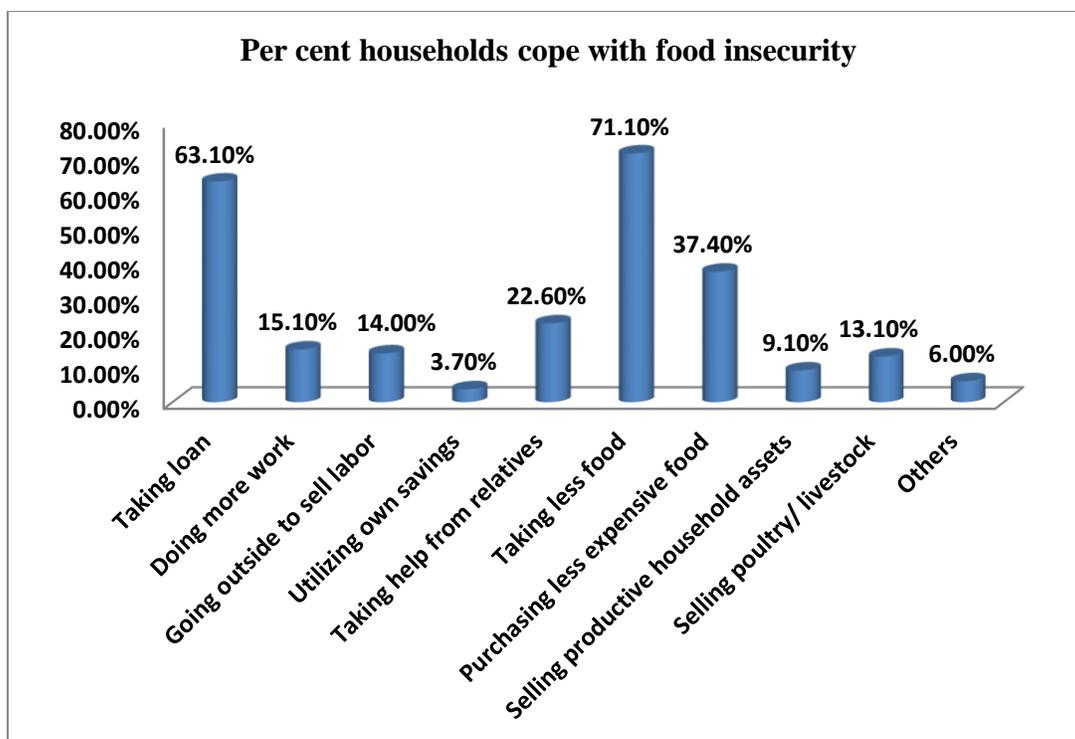


Fig 12: Coping strategies of households to meet food insecurity

3.2.2.6 Food security of women in particular as affected by climate change

It is clearly evident from the Table 14 that there was a significant disparity between men and women while taking food regardless of normal and disaster time, which is a common scenario in our society happening generation to generation. Nevertheless, the situation of women regarding food security during the time of disaster was quite alarming among the target communities of the project. During normal time 40.4 % households provided three time meals for their male members while only 24.8% households provided three time meals for their female members. On the other hand during disaster time, despite a general decline of food intake across the gender 40.4% households provided two time meals for their male members while only 18.7 % households provided two time meals for their female members. They mainly tried to feed their children so the children of 77.2% households ate food three times a day during disaster. It was also evident from the discussion with the farmers in a group (FGD) when they expressed that normally they took food three times a day but during flood they took food only one time a day due to damage of crops. They further narrated that women took food two times per day when they were busy with postharvest work and however, they admitted that women took less amount and poor quality of food than men due to the traditional practice in the society. So, it is clear from this survey data that during disaster time food security was greatly hampered in general

and in most of the cases women became the worst victim of food scarcity that ultimately affected their health and nutrition.

Table 14: Status of food intake by household family members during normal time and climate change induced disaster

Status of food intake	By sex	Per cent households with food intake of family members		
		One time	Two time	Three time
During normal time	Men	0.30	59.30	40.40
	Women	1.10	74.10	24.80
	Children	3.60	2.30	94.10
During climate change induced disaster	Men	53.10	40.40	6.50
	Women	78.40	18.70	2.90
	Children	1.00	21.80	77.20

It is, therefore, worth mentioning that to reach the goal of the project the targeted communities especially women should be provided with innovative ways of adaption to climate change through SuPER agriculture approach so that their food insecurity is reduced significantly.

Major findings in this section are a) the targeted households had insufficient food in 3.5 months on an average throughout the year b) October and March were the lean months when 77.4% and 68.9 % households respectively faced difficulty of taking 3 meals a day c) in normal period majority households(61.1%) took two time meals per day but during disaster period the majority households (65.71%) took only one meal per day, d) majority households (96.6%) experienced malnutrition related problems and in effect almost all households (96.3%) faced problem in their health and working efficiency, e) majority households (71.1%) took less food to adapt to food insecurity and 63.10% households took loan from local institutions or local elite person to cope with food insecurity, f) During disaster time, 40.4% households provided two time meals for their male members while only 18.7 % households provided two time meals for their female members,

3.2.3 Increase in adaptive capacities of targeted communities

It is to be noted that different government agencies/departments are mandated to provide services, information and resources to the poor people. Now-a-days, communities are also receiving services form NGOs, and dealers or retailers of private seed and pesticide companies.

It is revealed from the Figure 13 that **only 23.4 % households have adaptive capacities receiving information and other services related to crop production from the staffs 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.

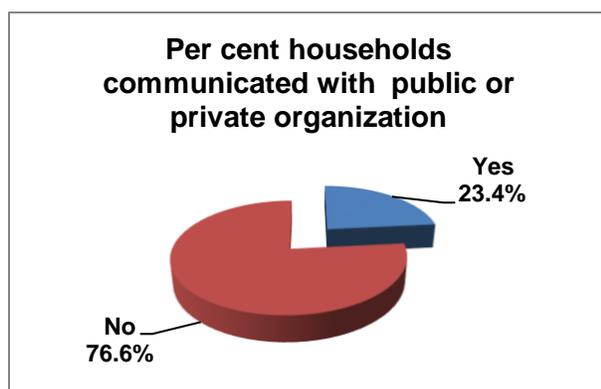


Fig 13: Communication status of Households with public and private organization

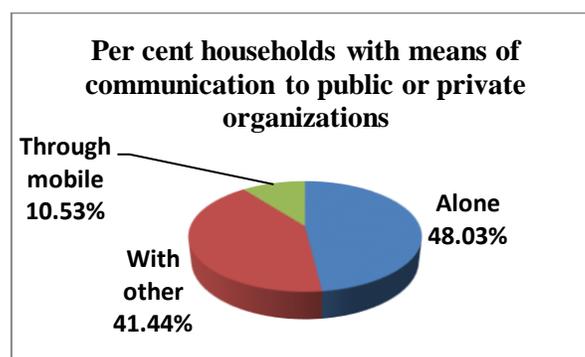


Fig 14: Means of communication for households to get access to public or private organization

Among the households who have communicated with public and private organizations, 48.03% households contacted them alone, 41.44% households were accompanied with others and only 10.53% households communicated through mobile phone (Fig 14). This result indicates that majority households did not have communication with the relevant organizations and thus they were deprived of the latest information, services and resources for adapting to climate change.

The surveyed data in figure 15 shows that among the households who have communicated with public and private organizations about half of the households (52.63%) received training, 29.6% households received technical advices for crop production, each of 23% households received supports for technology and variety demonstration, and only 9.21% households received support for agricultural inputs. Figure 16 reveals that the husband in 31.7% households received services while wife in only 8% households received services from the organizations. Other categories of family members were not involved much in receiving services from the organizations.

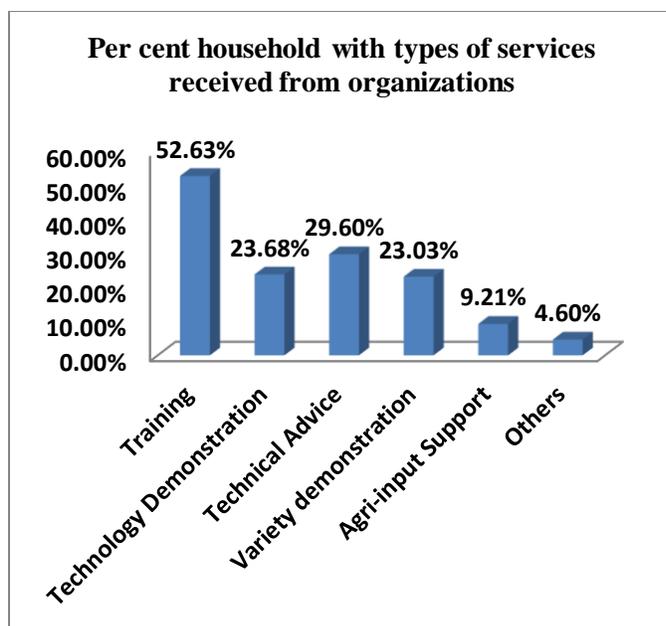


Fig 15: Types of services received by the targeted Households from the organizations

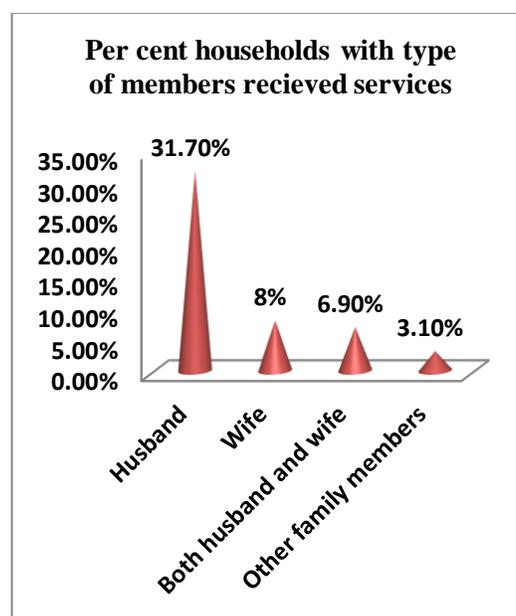


Fig 16: Type of family members from households received services from the organizations

Households were asked from which organizations they have received services. It is revealed from Table 15 that only 26.03% households received services from the Department of Agriculture Extension (DAE) – the government agency while 22% households received services from NGOs. Others like private agricultural input sellers and agriculture research organizations were not available in the vicinity of the project site and hence very few households (0.3-2.6%) received services from them. The surveyed data in Table 16 revealed that most of the households (86.9%) were not satisfied as the services they received from the above organizations were not sufficient.

Table 15: Types of organizations communicated by the households to receive services

Types of organization provided services	Number of households	Per cent
Department of Agriculture Extension (DAE)	91	26.30
NGO	77	22.00
Agricultural Research Institution	01	0.30
Private agriculture input sellers (seed, pesticides)	9	2.60
Others	14	4.00

Table 16: Status of services received by households from organizations

Status of services	Number of households	Percent
Sufficient	0	0
Fair	36	13.1
Not sufficient	239	86.9

The above findings imply that DAE being the largest service providers in agriculture with presence of staff at union level could not reach the targeted communities with services the organization is mandated to provide as per New Agriculture Extension Policy (NAEP). According to NAEP, DAE is mandated to cover all farming communities through group based extension services (NAEP 1996). So, the project has the challenge ahead as to how DAE is sensitized to be involved in the project interventions following SuPER agriculture approach and to create an enabling environment so that the targeted communities receive services sufficiently even after the project is over.

Table 17 reveals that majority households (73.4%) were not the member of any farmer organization and most of the households (95.7%) did not adopt any technology in group approach. This finding indicates that the targeted communities were almost unattended by NGOs and relevant government organization like DAE. So, they could not have organized groups despite many NGOs are working in Kurigram and DAE is obligated to provide services through farmers group as per New Agriculture Extension Policy (NAEP). The results also show that the agricultural knowledge remained stagnant as only few households (23.1%) shared their knowledge with other farmers (Table 17). Farmers although disseminate their acquired knowledge with neighbors since time immemorial but the quality of knowledge they share with others is not updated and scientific to address the current crisis due to climate change as shown in the previous section. So, the project should take care of farmer's capacity development in a group to disseminate new and innovative knowledge and technologies among neighboring farmers.

Table 17: Status of household's membership in farmer organization, technology adoption in group approach and sharing knowledge with other farmers

Membership of households in farmers' organization (%)	Households adopted technology in group approach (%)	Households shared agricultural knowledge with other farmers (%)

Yes	No	Yes	No	Yes	No
26.6	73.4	4.3	95.7	23.1	76.9

From the above results/findings it can be concluded that the ability of target communities to build resilience to the effects of climate change and vulnerabilities is minimal primarily due to their poor communication with relevant organization, receiving inadequate services from the organizations, weak linkages with the government organization like DAE in particular for addressing climate effects on crop production and the absence of organized farmers group.

Major findings in this section are a) only 23.4 % households have adaptive capacities receiving information and other services related to crop production from the staffs of public and private organizations, b) out of the households communicated with organizations only 26.03% households received services from the Department of Agriculture Extension (DAE) – the government agency, c) most of the households (86.9%) who communicated with different organizations were not satisfied as the services they received were not sufficient, d) majority households (73.4%) of the targeted communities were not the member of any farmer organization and most of the households (95.7%) did not adopt any technology in group approach, and e) the agricultural knowledge remained stagnant as only few households (23.1%) of the targeted communities shared their knowledge with other farmers.

3.3 Increased practices of SuPER Agriculture approach

3.3.1 Status of agricultural productivity (crop)

Farmers in a group discussion provided the following crops and cropping pattern they practiced in the last 5 years:

Existing Cropping pattern

High land : Fallow - Seedbed - Vegetable

Medium high land : Fallow - Aman rice - Boro rice

Low land : Fallow –Mustard - Boro rice

Table 18 reveals that farmers generally cultivated rice variety BRRIdhan 28 during boro season and received 2.5 MT /hectare yield. Due to the risk of flood, they cultivated local varieties of aman rice eg, Ganjila, Goti etc, with an average yield of 2-2.5 MT/hectare. Very few farmers cultivated BRRIdhan 49, BRRIdhan 11 and BRRIdhan 52 (submergence tolerance) with

average yield of 3.5 MT /hectare. Mustard was cultivated with varieties eg, BINA 4 and BARI 14 by a few farmers receiving average yield of 1.35 MT per hectare.

Table 18: Status of crop yield received by the target communities during Kharif season in 2016 and Rabi season in 2017

Crop	Season	Variety	Yield (MT/hectare)	Remarks
Boro rice	Rabi	BRRIdhan 28	2.5	Many farmers cultivated but crops were affected by blast disease
Aman rice	Kharif II	Gonjila, Goti	2.0	Many farmers cultivated local varieties to avoid risk of flood but yield was low
Aman rice	Kharif II	BRRIdhan 49, BRRIdhan 11, BRRIdhan 52	3.5	Few farmers cultivated but crops were affected by prolong flood
Mustard	Rabi	BINA 4, BINA 14	1.35	Few farmers cultivated but crops were affected by delayed planting due to flood

It is evident from the above practices of farmers that the most of the targeted farmers kept their land fallow during May to June after boro harvest and before t.aman rice, and cultivate local varieties in t.aman rice season but crop yield in general was very low compared to their recommended yield. Crop harvest in the recent boro rice season was seriously affected by blast disease and yield was significantly reduced. Prolong flood affected high HYV aman rice and the farmers cultivated local varieties, which gave lower yield. Mustard or other rabi crops could not be planted in time due to delay in recession of flood water and consequently yield was low. This 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 using the benefit of early monsoon and replacing local varieties with flood or drought tolerant modern varieties.

3.3.2 Farmers practicing at least three adaptive agricultural technologies

3.3.2.1 Targeted farmers practicing at least three adaptive agricultural technologies

Table 19 reveals that a very few targeted farmers (18%) practiced different adaptive agricultural technologies within a range of 1-8 in numbers out of which the highest proportion of households (8.86%) practiced only one technology and the lowest proportion (0.29%) of households practiced five technologies. Within the range of 3-8 technologies there were 4.28% farmers who practiced at least three adaptive agricultural technologies out of which 0.57 % farmers practiced 8 technologies, 1.14 % farmers used seven technologies, 0.86% with 6 technologies, 0.29% with 5 technologies, 0.57 % with 4 technologies and 0.86% with 3 technologies.

Table 19: Status of farmers practicing at least three adaptive agricultural technologies

Adaptive agricultural technology (number)	Households (number)	Households (%)	Cumulative households (number)	Cumulative households (%)
Eight	2	0.57	2	0.57
Seven	4	1.14	6	1.70
Six	3	0.86	9	2.56
Five	1	0.29	10	2.85
Four	2	0.57	12	3.42
Three	3	0.86	15	4.28
Two	17	4.86	32	9.14
One	31	8.86	63	18
Total	63	18		

The results indicate that majority farmers of the targeted communities did not bring any change in their cultivation to adapt to climate change risks and vulnerabilities, which can be validated with the findings given below.

3.3.2.2 Households with changes in cultivation to adapt to climate change

Study findings presented in the figure 17 shows that only 13.7% households brought changes in cultivation to adapt to climate change while majority farmers (86.3%) did not bring any change in their cultivation system due to climate change.

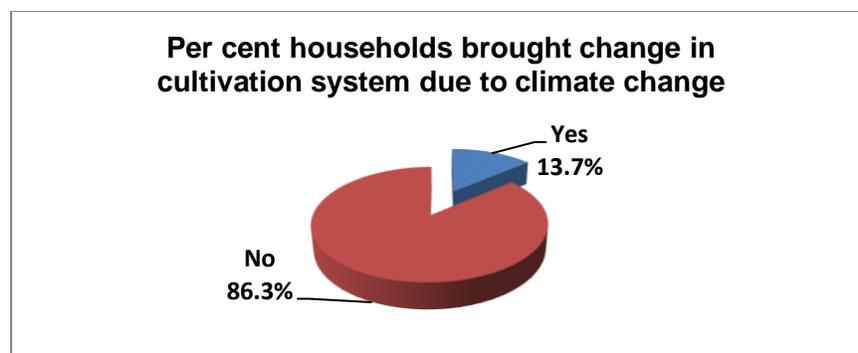


Figure 17: Status of households with change in cultivation due to climate change

The farmers who brought change in cultivation due to climate change were asked about what type of adaptive agricultural technologies were practiced to cope with adverse climate change. Multiple responses came out against the question (Fig 18). Only 9.7% responses practiced line sowing of boro rice, 9.4% cultivated HYV crops and seed, 7.7% practiced integrated pest management (IPM) for control of insects and diseases, 4.9% used balance fertilizer, 4% used green manure, 2.3% changed cropping time i.e early sowing or late planting, 2% used vermi-compost, 1.1 % practiced mulching for moisture conservation, 1.1% practiced alternate wetting and drying technology (AWD) technology in boro rice for mitigation of irrigation cost, and less than 1% followed storage of seed with modern technology.

Fig 18: Status of new agricultural technologies adopted by the households who brought change in cropping to cope with adverse climate change

During FGD, few participants opined that they cultivated flood tolerant rice such as BRRI dhan 52 and drought tolerant rice variety eg, BRRI dhan 7 and 33. They also discussed that due to prolonged flood duration flood tolerant variety BRRI dhan 52 could not give significant result. They also told that during the last flood they cultivated late variety of local rice like Naijarshail and Ganjila in September but did not give significant result in yield. In FGD it was also understood that every year flood damaged their amon rice and as a coping mechanism they cultivated Maskalai (Black gram) and mustard. Due to lack of knowledge about proper variety and cultivation technologies sometime Black gram was totally damaged by virus diseases. A few farmers cultivated BINA-4 mustard variety which gave significant yield. Besides these adaptive crop production strategies farmers also cultivated vegetable in homestead, used pheromone traps for insect control, provided irrigation for jute cultivation and stored seed at home with modern technology. Few people also used natural Neem spray and ashes to get rid of insects. It implies that a vast majority of targeted farmers were devoid of capacity and skills for practicing adaptive agricultural technologies in crop production to reduce climate risks.

Therefore, the project has an ample opportunity to tap the alternate technologies and build capacity of farmers to practice them to address climate change. This requires linking the targeted communities with government and private organizations related to agriculture.

Major findings in this section are a) most of the targeted farmers kept their land fallow during May to June and cultivate local varieties of aman rice, b) Crop yield in general was very low compared to their recommended yield (Boro rice: BRRIdhan 28 – 2.5 MT/hectare, Aman rice Local variety) – 2.0 MT/hectare, Aman rice: BRRIdhan 11 – 3.5 MT/hectare, Mustard: BINA 4, BARI 14 – 1.35 MT/hectare), c) Only 4.28% farmers practiced at least three adaptive agricultural technologies, and d) only 13.7% households brought changes in cultivation to adapt to climate change.

3.4 Women empowerment and confidence to respond to variable climate conditions

3.4.1 Status of women mobility

3.4.1.1 Women increased their mobility and took part in family decision

Women's mobility has great influence on their empowerment. Figure 19 reveals that women in only 14.1 % households moved easily outside their houses and took part in family decision while the majority households (80%) could not to go outside their houses due to family and social barriers. They needed to take permission of male member of the family or take any other person along with them. This finding also corroborates with a study in Bangladesh conducted by Dasgupta et al., (2010) who found out that women had limited access to resources in social networks, transportation, information, skills (including literacy), control over land and other economic resources, personal mobility, secure housing and employment, free from violence and decision making power when these are essential in disaster preparedness, mitigation and rehabilitation.

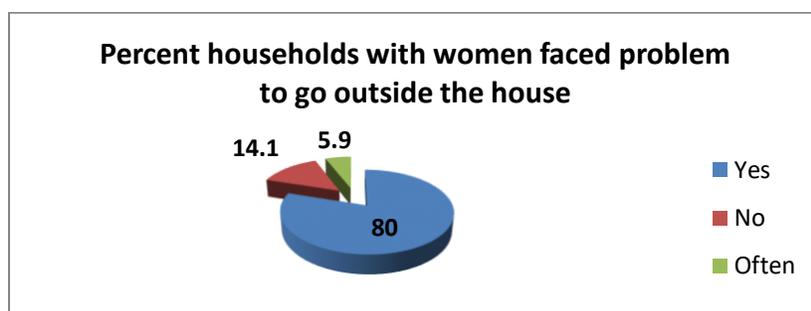


Fig 19: Households with problem faced by women to go outside the house

3.4.1.2 Access to information and women mobility

Information is crucial for women mobility to respond to climate change effect and reduce disaster risk and mitigate any possible loss. Majority respondents from FGD shared that women received very few advance information and training regarding disaster and climate change. It can be seen from the figure 20 that women of only 1.34% households got information from government organizations and 9.14% households got information from private organizations or NGOs. Women's access to media was not easy or available as only 6.45% households got information from radio and TV.

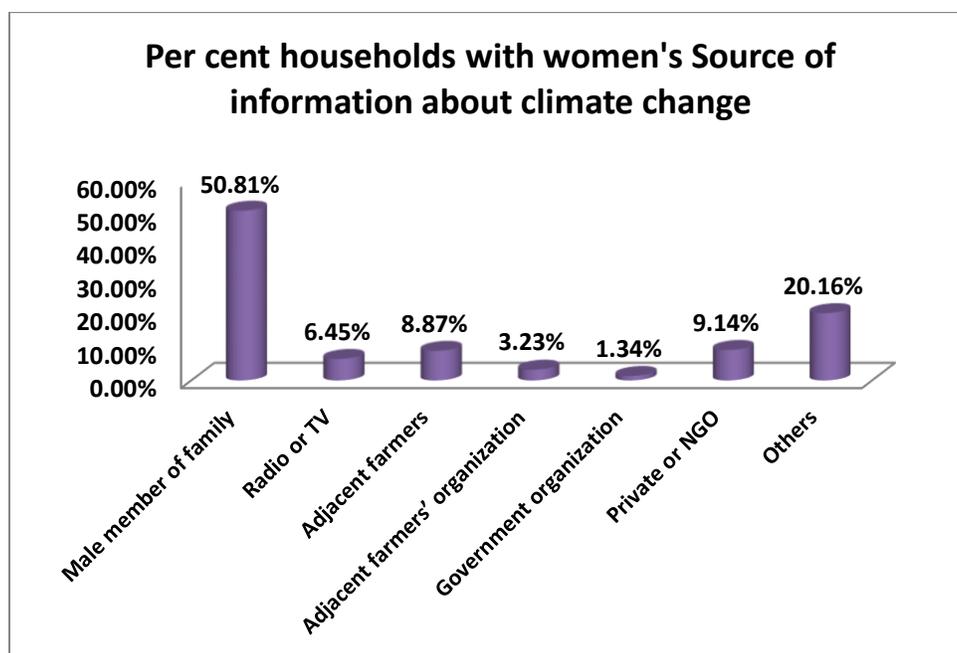


Fig 20: Households with women's sources of information about climate change.

3.4.1.3 Status of measures taken by Government and private sectors involving women in activities outside their houses

The figure 21 shows that according to majority households (56.9%) no measures were taken yet for women by GO or NGOs through activities outside their houses to address climate change. Only 9.0% households referred GO and NGOs who took important measures for women. So a huge number of women were remained unreached as GO and NGOs were not targeting specifically women considering their gender role and adverse situation during disaster. The project therefore should sensitize government organizations in particular so that they integrate women friendly activities in their annual program and consequently women mobility is increased due to these activities.

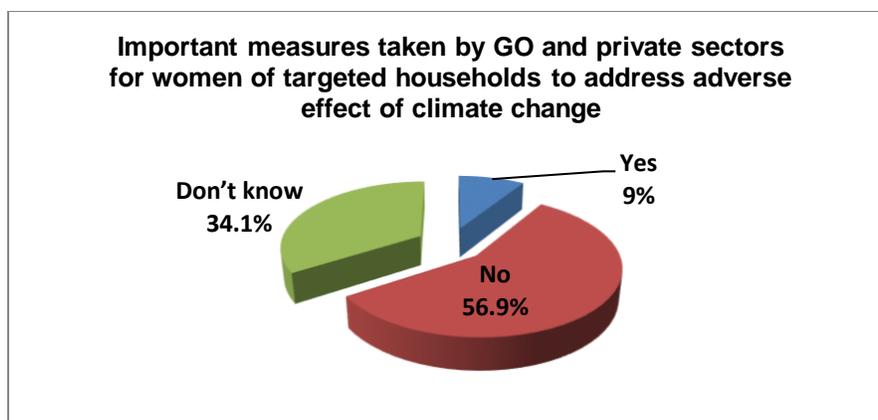


Fig 21: Important measures taken by GO and private sectors for women of targeted households to address adverse effect of climate change

3.4.1.4 Outmigration of male members and women mobility

The figures 22 reveal that the family members of one-third households (35.4%) migrated to the other places for searching work and the figure 23 reveals that out of the migrating households, more than half of the households (54%) faced problems when male stayed outside due to migration. When male member of family migrated to other area after any disaster due to climate change, women were insecure and became victim of eve teasing and sexual harassment. It was supported by famers in a group discussion as they said that many people migrated to others areas in search of work but their family members faced many problems like security, poverty, health service, marketing, communication and transportation problems during their absence. The above results indicate that women mobility outside the house was significantly reduced primarily due to the social insecurity when their husband migrated to other place. Therefore, the project should create opportunities for men to get involved in crop cultivation and income generating activities in their village all round the year and during disaster in particular.

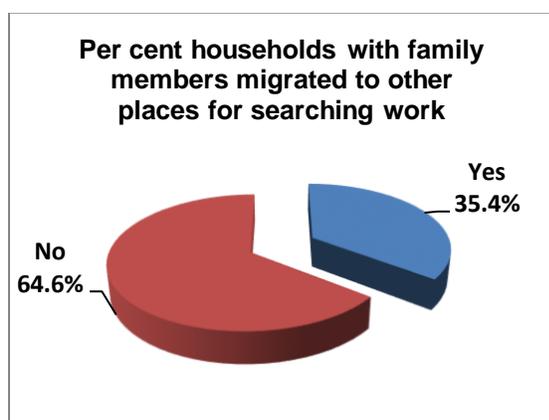


Fig 22: Status of households with migration

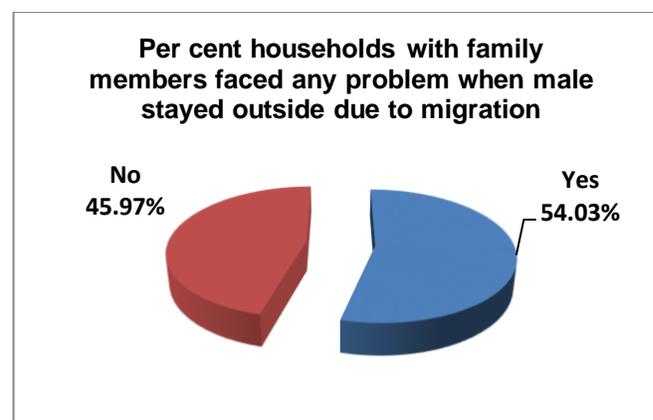


Fig 23: Households with problems faced by family members when male stayed outside due to climate change

**of family members to other places for
searching work**

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

The Table 20 clearly shows that men were main decision maker regarding buying or selling any land or property. In majority households (80.40%), men solely took decision while buying and selling land or property where only in 5.70% households women took decision in the same regards. Only 13.10 % respondents said that both male and female member of the family equally took decision for buying and selling any land or property. In case of buying and selling trees, men in majority households (82%) took decision while women in only 6.6% households took decision in this regard. However, women in only 10.8% households took decision equally with men for buying or selling trees. Men in majority households (81.8%) took decision for buying and marketing groceries while women in only 6.3 % households took decision in this regard. However, only women in 10.7% households took decision equally with men for buying and marketing groceries. In 48.10% households, men singularly handled borrowing money and managed where and how to spend it, in contrary in only 15.40% households, women borrowed money individually and used money. About one-third (30.90%) respondents mentioned that both male and female equally took decision on receiving loan and spending the money. In case of buying food for family, men in majority households (66.4%) took decision alone while women in only 13.3 % households took decision in this regards. However, both women and men in only 19.4% households equally took decision for buying food. The overall results indicate that, on an average, women in only 16.98 % households were able to equally participate in household financial decision making like receiving loan and use of loan, and buying and selling land or property, trees, food, groceries etc.

Table 20: Gender disaggregated decision-making about household financial affairs

Decision-making about household affairs	Male (%)	Female (%)	Both (%)
Buying and selling land	80.4	5.7	13.1
Buying and selling of trees	82.0	6.6	10.8
Buying and marketing groceries	81.8	6.3	10.7
Receiving loan and use of loans	48.1	15.4	30.9

Buying food for family members	66.4	13.3	19.4
Average	71.74	9.46	16.98

Major findings in this section are a) women in only 14.1 % households moved easily outside their houses and took part in family decision, b) women of only 1.34% households got information from government organizations and 9.14% households got information from private organizations or NGOs, d) according to majority households (56.9%) no measures were taken yet for women by GO or NGOs to address climate change risk, e) Male members of 35.4% households migrated to other places for searching work and out of these households, women in 54% households faced problem in mobility due to social insecurity, and f) on an average, women in only 16.98 % households were able to equally participate in household financial decision making like receiving loan and use of loan, and buying and selling land or property, trees, food, groceries etc

3.4.3 Capacity of relevant service providers to support community to adapt to the impact of climate variability

The Government of Bangladesh has developed a number of policies, plans and programs related to adaptation to climate change risks, for example, National Adaptation Program of Action (NAPA), Bangladesh Climate Change Strategy and Action Plan (BCCSAP), Disaster Risk Reduction Policy, National Disaster Management Plan etc. Climate change is now a multi-disciplinary and multi-ministerial issue within the government (Huq and Ayers, 2008). A practical break in mainstreaming climate change adaptation issues came in the form of the Comprehensive Disaster Management Program (CDMP), which started off being a very traditional disaster management program and into which climate change components were incorporated. Disaster risk reduction offers opportunities for “bottom-up” strategies for adaptation to current climate variability and climate extremes (BCAS 2010). According to the above policies and plans, specific responsibilities are assigned to the relevant government line ministries of Bangladesh and the responsibilities of some of these ministries/Departments relevant to the project are briefly given below:

3.4.3.1 Mandates of the organizations relevant to the project

The **Ministry of Local Government, Rural Development and Cooperatives, and its associated organizations (eg, Union Parishad)** are responsible for building roads, bridges and culverts for communication to cyclone shelters and growth centers; advising people to keep the foundations of their residence above flood level; preparing maps showing population concentration and deep wells, protected pond and other sources of drinking water; ensuring reserve stock of tube wells and spare parts; ensuring availability of drinking water at times of need; providing assistance for rescue and relief operations; ensuring availability of repair workers for emergency repair of damaged tube wells in affected areas and sending technicians from unaffected areas to the affected areas. **The Ministry of Agriculture, Department of Agriculture Extension, Bangladesh Rice Research Institute (BRRI), Bangladesh Agricultural Research Council (BARC) and Bangladesh Agricultural Research Institute (BARI)** are responsible for carrying out research on the development of different crop varieties resilient to different climate stresses, allocation of funds for the purchase and distribution of seeds and fertilizers; and implementation of post disaster relief operations. **Bangladesh Agricultural Development Cooperation (BADC)** is to arrange for keeping stocks of seeds, fertilizers and insecticides. The **Bangladesh Meteorological Department (BMD)** is responsible for watching over weather conditions, and ensuring improvement of cyclone forecast procedures and supply of information on regular basis.

In Bangladesh all government line agencies and local government (Union Parishad) are considered are obligated to provide services relevant to their areas of responsibility to the duty holders ie, the people of the country as per constitution down to the above policies, rules and regulations. Nevertheless, these obligations are not usually met by the relevant organizations either due to lack of commitment and capacities, and also lack of accountability. Hence, this section mainly investigates the present capacity of the organizations through the Key Informant Interview (KII) conducted during the survey. It will eventually helps the project to find the capacity gaps as per above policies and to work on capacity enhancement of these organizations to support communities to adapt to climate change risks.

3.4.3.2 Current capacities and relevant constraints/capacity gaps of the organizations

3.4.3.2.1 Union Parishads (Holokhana, Pachgachhi and Jatrapur), Kurigram Upazilla

These Union Parishads have activities like a) Taking pre preparation on flood 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 take shelter in safe place before

disaster d) sharing and coordinating with the work of NGOs, but they do not have any specific activities of their own 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. Major constraints they faced were fund crisis, lack of proper training for the staff, lack of skilled manpower, lack of proper instruction from the higher authority, lack of required tools, poor communication with NGO officials, shortage of transport during flood etc. Some members heard about DRR, Gender and SEED policies, and also New Agriculture Extension Policy (NAEP) but they did not know the details. They said that there was no training or orientation provided by any organization on these policies.

3.4.3.2.2 Department of Agriculture Extension (DAE)

In DAE there are activities like: new variety extension, changing cropping pattern, increase soil fertility, mechanization of cultivation, supply power tiller among co-operatives/ farmers group, provide training like seed production, seed storage, fruits gardening, demonstration of alternate varieties in Aus season, training (in house, spot training through IPM club etc.), demonstration of flood tolerant rice varieties, provided training on vermi compost, low water requiring crops for cultivation such as wheat, maize, demonstration of floating seed bed and preservation of dry seed in plastic bag. DAE provides information and other activities through assigned staff. From Upazilla level to Block of every union, they provide information to the Sub Assistant Agriculture Officer (SAAO) and in turn SAAO provide information and spot training to the farmers. Moreover, field day, fair, workshops are conducted at community level. They select contract farmers (marginal, small and medium), follow group based extension and conduct about 8,000 demonstrations per season. Farmers having 1 hectare of land and directly involved in agriculture are selected for demonstration. Group discussion is done as per DAE's guideline. Personal communication, group formation and mobile apps are also followed. Modern training facilities are unavailable, lack of skilled person and shortage of field staff, lack of sophisticated laboratory facilities, poor budget for training/ less staff training, poor communication due to river, poor coordination among GO/NGOs/private sectors are the major constraints of DAE. Number of extension staffs (SAAO) is insufficient, each SAAO is responsible for 1200 farmers but this ration was not maintained, Each SAAO provided services among 3000 to 5000 farmers.

3.4.3.2.3 Bangladesh Institute of Nuclear Agriculture (BINA)

In general BINA has the activities like a) genetic breeding of blast tolerant varieties of rice, flood and drought tolerant varieties, b) demonstration of BINA 14 as late boro or BRAUS, BINA 11

and 12 as flash flood tolerant in aman and BINA 17 as drought tolerant (green super rice requiring 30% less fertilizer) in aman, water saving variety BINA 19 in Aus (recently released) as drought tolerant and direct seeding c) Farmers training on the above climate resilient rice varieties. BINA disseminate technology and information through demonstration and training, distribute truthful level seeds to farmers. However, farmers training and demonstration were organized through DAE personnel who select farmer's community, target area and participants. The Scientists know the relevant plans/policies but not in depth. However, major constraints they face to implement the above activities are lack of manpower, lack of sophisticated laboratory facilities, shortage of fund. Apart from these, poor fund and management constraints affect proper communication for varietal demonstration and farmers training because DAE staff do not receive training on varieties to be demonstrated.

3.4.3.2.4 Bangladesh Rice Research Institute (BRRI)

In general, BRRI implements varietal development through genetic improvement (stress, flood, disease tolerant etc) and participatory variety selection for submergence and drought tolerance through demonstration. They disseminate information on modern knowledge and technologies generated in BRRI and also disseminate flood and drought tolerant varieties through demonstration and distribute seeds to farmers. They conduct demonstration through individual and community based farmers organization, disseminate technologies through NGOs on demand basis and make close collaboration with DAE for technology transfer. However, major constraints they face to implement the above activities are shortage of field staff, poor budget, poor coordination among GO/NGOs/private sectors, lack of proper planning and centralized decision making especially in Government sectors leading to poor coordination among the stakeholders.

3.4.3.2.5 Bangladesh Agriculture Development Corporation (BADC)- Seed Marketing

BADC (Seed Marketing) has the activities like farmers training, workshop/seminar with dealers, elite farmers and DAE officers, motivation of elite farmers to do block cultivation of alternate varieties to adapt to climate change etc. They motivate farmers for marketing of seeds based on their demand, and share results through dealers and elite farmers with other stakeholders. Activities are mainly implemented through dealers and elite farmers. They strictly follow SEED policy, SEED act and rules. New Agriculture Extension Policy (NAEP) and other policies were not instructed from BADC. Grass roots coordination for sharing of relevant policies is very poor.

However, major constraints they face to implement the above activities are shortage of staff, less staff training, no specific budget for adaptation to climate change and no formal/institutional bindings or accountability to follow the policies

3.4.3.2.6 Bangladesh Metrological Department (BMD), Rangpur Station

BMD has web site and mobile apps to reach weather forecasting to people. They only record data on weather related issues about Rangpur region and subsequently send these data to their head office in Dhaka and then Dhaka office forecast weather news through TV or Radio. The role of Rangpur office is only to record and send data to the head office and it is their role to implement the activities related to the data being sent. No specific training was given to staff of BMD Rangpur office on adaptation to climate change. Major constraints they face are the shortage of fund and equipment like RADAR. It was recommended that BMD should establish a faculty of Agro-metrology, which will provide agriculture related metrological data. There was no orientation on the policies related to climate change in Bangladesh. Shortage of fund was considered as the main constraint in the coordination mechanisms to integrate climate change risks in the policies relevant to climate change. Due to this lack of fund, there is no activity to provide training and awareness among different stakeholders.

3.4.3.2.7 Seed company (Lal Teer, ACI limited)

These seed companies are the private companies, which generally have activities like a) seed production (breeder and foundation) of different crop varieties through their Research and Development Farm (R and D), b) Production of certified and truthful level seeds through contract growers at different agro-ecological zones of Bangladesh with verification tagging from BADC, c) Seed marketing (procurement from contract growers and sale through distributor and dealers), d) Import of hybrid seeds from other countries and their multiplication (in some cases) and selling in the country and e) training of staff and contract growers on quality seed production etc. They conduct demonstration of new varieties of crop and produce seeds through contract growers in a block plantation and the seeds being produced are sold through distributor and dealers on demand basis. Apart from this, there is no other specific program either in ACI and Lal Teer for adaptation to climate change and they are not much aware on the climate change related policies of Bangladesh except Seed policy.

Major findings in this section are that the organizations like Union Parishads, DAE, BINA, BRRI, BADC, BMD, Seed companies (Lal Teer, ACI) encountered capacity

gaps/constraints in terms of fund crisis, lack of proper training for the staff, lack of skilled manpower, lack of proper instruction from the higher authority, poor coordination among GO/NGOs/private sectors, lack of proper planning and centralized decision making especially in Government sectors, lack of specific budget for adaptation to climate change and absence of formal/institutional bindings or accountability to follow the policies, lack of orientation on the policies related to climate change etc.

The project, therefore, should consider implementing some capacity development programs like training of respective staff, orientation on the relevant policies, conducting advocacy workshop/seminar involving policy makers for sensitization, and facilitation on participatory planning among different stakeholders on community based adaptation to climate change risks.

3.5 Local, regional and /or national policies and several civil society organizations better integrate climate risks and changes

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

The project will implement its activities covering three unions of Kurigram district viz, 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 narrated earlier. **Only one Union Parishad (Holokhana) out of three targeted unions of the project has allocated budget Tk. 200,000.00 in their annual plan (2016-2017) considering climate vulnerabilities and risks (against disaster risk reduction activities).** The other Union Parishads (Pachgachi and Jatrapur) do not have specific budget on this climate change issue. Major constraints they face are fund crisis/ no specific budget /scarcity of resource, lack of skilled manpower, no direction from higher authority, lack of required tools etc.

Hence, the project needs sensitizing UP committees so that all targeted Union Parishads allocate budget in their annual plan considering climate vulnerabilities and risks ensuring participation of target communities in bottom up planning.

3.5.2 Functional linkage established between relevant stakeholders and community to adapt to the impact of climate variability

It is revealed from different organizations through Key Informant Interview (KII) that different NGOs work in this area and they inform the targeted communities about their activities. Apart from this, there is no other networking or coordination among different organizations. However, divisional coordination meeting in agriculture is conducted (1/month) among the GOs, NGOs and companies. But the quality of network in terms of participation and activities is poor and can be considered as informal way of communication. Major constraints are a) communication gap between government organization (GO) and NGOs b) lack of collaborative efforts of the stakeholders c) Poor fund and management constraints affecting proper communication d) NGOs run with single technology and deals with marginal/landless farmers while DAE run with multiple technologies and deals with all categories of farmers e) no formal/institutional bindings or accountability to follow the policies f) lack of proper planning and centralized decision making especially in the Government sectors g) irresponsibility of elected public representative such as chairman of Union Parishad etc. The organizations provided some specific recommendations for effective coordination to integrate climate change risks, which are a) coordination among different stakeholders needs to be strengthened especially with DAE b) effective monthly coordination meeting should be conducted at Union level with the participants of GOs and NGOs c) Other stakeholders should give proper value to the Union Parishad members and committee, d) NGOs should take advice of Union Parishad, as they are permanent body in this area, before initiating any activity e) to avoid duplication of activities, NGOs need to coordinate among themselves f) Other stakeholders should give proper value and priority to the government officers of agriculture department and work in coordination with them g) More training of trainers, workshop/seminar involving staff of relevant organizations like DAE, NGOs, private seed companies should be organized etc, h) NGOs should share their activities with Govt. Departments i) farmers should be brought under digital systems with data base j) organizational monitoring and sharing of results/information should be ensured k) decentralization of decision making and planning at grass roots level etc.

Major findings in this section are a) Only one Union Parishad (Holokhana) out of three targeted unions of the project has allocated budget Tk. 200,000.00 in their annual plan (2016-2017) considering climate vulnerabilities and risks, and b) poor functional linkage among stakeholders due to communication gap, lack of collaborative efforts, poor fund and management, disparity in implementation strategy, lack of formal/institutional bindings to follow the policies, lack of proper planning and centralized decision making especially in the Government sectors etc

4 Conclusion and Recommendation

From the findings of the baseline survey it can be concluded that the project has rightly targeted majority woman participants, small and marginalized farmers and resource poor people with low income, expenditure and asset base. It is evident that the targeted communities are seriously affected by climate change risks and vulnerabilities in terms of poor knowledge base and practices on adaptive options, reduced crop yield and food security, poor ability to build resilience, and very poor women mobility and their involvement in household financial decision. These vulnerabilities of targeted communities are further intensified due to capacity gaps/constraints of and poor functional linkages among different stakeholders relevant to the project (eg, Union Parishad, Department of Agriculture Extension, Research Institutions, Metrological Department, private seed companies etc.). To address these vulnerabilities of communities and capacity constraints of the service providers, a comprehensive and sustainable approach is essential so that targeted communities are able to build resilience to the effects of climate change risks with continuous supports from the public and private agencies. The project has, therefore, challenges ahead as to how to make best use of the positive impacts of its intervention/activities by the communities through the public and private service providers. However, the following recommendations being emerged from the survey findings may be considered as crucial to get better results in reducing the effects of climate risks and vulnerabilities of the targeted communities.

Recommendation

- The target communities possess very poor knowledge on the climate risks primarily due to poor sources of information channel and hence the project requires strengthening linkages of target communities with the relevant information and service providers (government and private) in the project area.
- The project should integrate the capacity and participation of the government agencies particularly in the delivery of early warning to the people through community based adaptation.
- To reach the goal of the project, the targeted communities especially women should be provided with or should be made capable of making innovative ways of adaptation to climate change through SuPER agriculture approach, and through

improved information channels and decision making process so that their food insecurity is reduced significantly.

- The project needs sensitizing DAE to be involved in the project interventions following SuPER agriculture approach and to create an enabling environment so that the targeted communities receive services sufficiently even after the project is over (ie, sustainability).
- The project should take care of farmer's capacity development in a group to disseminate innovative knowledge and technologies among neighboring farmers
- Existing cropping patterns should be adjusted with alternate crops and varieties to be grown in fallow period using the benefit of early monsoon and replacing local varieties with flood or drought tolerant modern varieties in consultation with local communities to increase cropping intensity and crop yield of the project participants
- The project should tap the alternate adaptive technologies and build capacity of farmers to practice them to address climate change. This requires linking the targeted communities with government and private organizations having activities for adaptation to climate change risk and vulnerabilities
- The project should facilitate family and social counseling inviting husband or male members of family and village elite persons for creating participatory environment so that women can be freely involved in income generating activities outside the house so that women mobility is increased
- The project should sensitize government organizations in particular so that they integrate women friendly activities in their annual program and consequently women mobility is increased due to these activities.
- The project should consider implementing some capacity development programs like training of respective staff, orientation on the relevant policies, conducting advocacy workshop/seminar involving policy makers, and facilitation on participatory planning among different stakeholders on community based adaptation to climate change risks.
- The project needs sensitizing UP committees so that all targeted Union Parishads allocate budget in their annual plan considering climate vulnerabilities and risks ensuring participation of target communities in bottom up planning
- To improve functional linkages, the project should organize more training of trainers, workshop/seminar involving staff of relevant organizations like Union

Parishad, DAE, research organizations, metrological department, NGOs, private seed companies etc,

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Appendices

Appendix I: Terms of Reference (ToR)

Baseline study for Where the Rain Falls (WtRF) – Phase III Project, CARE Bangladesh

Background of Consultancy: Generously funded by Prince Albert Foundation, the Where the Rain Falls (WtRF II) – Community Based Adaptation (CBA) project in Bangladesh 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 Adaptation. The project will adopt a rights-based approach and focus its advocacy and mobilization efforts on empowering women, enabling vulnerable groups to participate in local decision-making/governance, and ensuring equitable access to resources and services vital to adaptation. CARE has been implementing the WtRF project in Kurigram district since January 2014 and WtRF Phase III has built on the first phase which started from January 2017.

The WtRF Phase III project will focus on climate resilient agriculture and will target 6500 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 in Kurigram). CARE Bangladesh will implement the project through its partner organization- 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.

Specific Goal 1: 20 # of communities are more resilient to climate risks and change.

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

Rationale and objective of the study

As mentioned above, the WtRF Phase II project is built on the first phase and replicate the approach in 15 new villages: from climate vulnerability analysis and adaptation plans to the implementation of the best practices. Baseline study will be conducted in extended 15 communities only. Now the statistical data of the new communities is needed to have clear idea about the current situation as per agreement of the proposal and log frame with donor. This will help to monitor and evaluate the project success within the project time frame.

The overall objective is to establish a baseline for the project as per the approved project proposal and log-frame so that project can establish a SMART (Specific, Measurable, Achievable, Realistic and Time-bound) monitoring and evaluation (M&E) system.

The specific objectives of the baseline survey –

- a) To know how climate change affects small-holder farmers' agriculture in terms of cropping system i.e variety (both adaptive and traditional), technology (e.g., alternate dry and wet method, green manure, water management etc) and pattern (for low, medium and high land) etc.
- b) To identify current Knowledge, Attitude and Practice (KAP) of small holder farmers in relation to climate change, climatic risk, adaptive option & community participation on agricultural technology practices.
- c) To know the capacity of local institute (Union Parishads, Department of Agriculture Extension (DAE), Research Institute, and Meteorological Department) in relation with Community Based Adaptation i.e financing, planning and skill in adaptation, and recommendations to develop their capacity.
- d) To assess gender impacts considering above three points and in addition family level decision making as well as mobility of women.
- e) To assess mechanism of integration of climate change risks in local, regional and national levels in the line of fiscal framework.

This baseline data will provide key references to assess the extent to which the project has achieved the expected outcomes and impacts during an independent evaluation at the end of the project.

Methodology

The consultancy firm /individual will develop detailed methodology focusing on project indicators detailed out in the logical framework and will support to add relevant result indicators to the existing logframe. The methodology should propose how to use existing resilience/adaptation frameworks to improve those result indicators¹. The study should combine qualitative and

quantitative methods. The quantitative survey should be statistically logical and reinforced by qualitative information gathered. Baseline indicators will be selected through community consultation in the inception period and will focus on people's behaviors and response to climate change and to track climate –resilient livelihood strategies. In brief, the Baseline will be done in 15 new communities, Union Parishad and technical departments (DAE, Research Institute, Meteorology department etc.) that are relevant to the project. Worth mentioning, we would complement the end-line of the 5 existing communities to make sure that we have coherent data between all villages.

Specific Tasks, Outputs and Time Frame

Tasks	Outputs	No. Days/ Time Frame
<ul style="list-style-type: none"> - Review the project documentations i.e Project proposal, Log frame, Draft M&E framework and assess the secondary data related to demographic information, socio-economic analysis, existing agro cropping patten on vulnerable rain fed farming households and water resource management. - Prepare the core methodology of the assessment and after rewarding the assignment finalize it in consultation with CARE team and partner. - Conduct survey at field level both Climate change impact on agriculture in chosen area - KAP study of current mitigation strategies adopted by chosen group - Develop a small index on adaptive capacities in the light of 5 pillars of adaptation (level of assets, knowledge and information, ability to innovate, flexible and forward looking planning and access/entitlements to resources) - Institutional Capacity assessment of local government institutes - Gender disaggregated data and analysis of aforementioned 	<ul style="list-style-type: none"> - Draft methodology to be submitted during the proposal submission. - Secondary Literature Review illustrating available information and information gaps to be addressed by field data gathering. - Final methodology needs to be submitted to CARE 3 days after signing the contract. This must include detail of method and tools used for each indicators and research plan. CARE Team will provide necessary guidance and focus at this stage. - Gather data from fields using agreed tools and methods - Initial Findings Brief 3 days after end of Field Survey - raft Report for CARE Bangladesh feedback - Power point presentation on baseline survey in English presented to CARE Bangladesh and crucial stakeholders to validate findings and propose last rounds of updates. - Final report in English and to be submitted after CARE has provided comments. 	<p>Consultant will provide the schedule in the technical proposal. The duration of baseline survey including final report submission is 20 (twenty) person days. Agreed time line should be strictly followed.</p>

Note: Methodology and indicators will have to be finally agreed by the Country Office PEARL Team.

1 Different framework/methodology should be reviewed: ACCRA local adaptive capacities framework, ODI-Measuring subjective resilience, We expect the consultant to include indicators around adaptive capacities, agriculture productivity, food security (number of meals per day / duration of lean seasons /...) / forced migration etc. HHS survey should ideally include questions on the perception of resilience by community members.

Guideline for Application

The proposal of interest (duly signed) should comprise with the following section and given page limit. Proposal will be accepted preferably in hard copy and also through email in soft copy form (signed scanned copy).

Topic	Maximum page limit
Technical Proposal	
Cover Page	1 Page
Table of Content	1 Page
Understanding of the Assignment and proposed methodology (Not just copy and paste from the ToR content)	3 Page
Work Schedule	1 page
Team Composition, Roles & Responsibilities of team members	2 pages
Organization/Team Strength and Relevant experience	3 pages
Any other relevant information (if required only)	2 pages

Appendix II: Logical Framework: Where the Rain Falls (WtRF)-Phase III

Narrative summary	Measurable indicators	Means of verification	Assumptions/risks
<p>Goal: 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.</p>	<ol style="list-style-type: none"> 1. % increase in their adaptive capacities 2. Average month with insufficient food at households 3. % of women who are able to equally participate in household financial decision making 	<p>-Baseline and Endline survey</p> <p>-Baseline and Endline survey</p> <p>-Baseline and Endline survey</p>	<ul style="list-style-type: none"> • UP, DAE, BINA, BARI, BRRI, Meteorological Department and other relevant service providers will extend their cooperation and support • Community people will actively participate in the program • The targeted areas are not affected by any serious or extreme natural disasters and political unrest during project period
<p>Specific Goal-1: 20 # of communities are more resilient to climate risks and change</p>	<ol style="list-style-type: none"> 1. Number of people better able to build resilience to the effects of climate change and variability. 	<p>-Baseline and Endline survey</p> <p>- Baseline and Endline survey</p>	<ul style="list-style-type: none"> • Community people will come forward to empower

	<p>2. % of FFS members with increased knowledge on climatic risks and adaptive options</p> <p>3. Number of farmers practising at least three adaptive agricultural technology.</p>	- Baseline and Endline survey	women and minimize violence against women
Specific Goal-2: Local, regional and/or national policies and several civil society organizations better integrate climate risks and change.	1. Number of Union Parishad allocated budget in their annual plan considering climate vulnerabilities and risks	- Baseline and Endline survey	
Output-1.1: Community plan integrated climate risks and climate change issues.	1. Number of Community Adaptation Action Plan addressing climate risks and climate change issues.	-Half-yearly report -CAAP -	
Output-1.2: Increased practise of SuPER agriculture approach.	<p>1. Number of farmers practising at least three adaptive agricultural technology.</p> <p>2. % increase in agricultural productivity</p>	-Baseline and Endline survey - Baseline and Endline survey	
Output-1.3: Women are more empowered and feel confident to respond to variable climate conditions.	<p>1. Number of gender adaptive plan developed through FFS</p> <p>2. % of women increased their mobility and took part in family decision</p>	-Report/Plan -Baseline and Endline survey/Case study	
Output-1.4: Enhanced capacity of relevant service providers to support community to adapt the impact of climate variability.	<p>1. Number of awareness session on climate change facilitated by relevant service providers</p> <p>2. Number of adaptive demo plot established through</p>	-Attendance sheet/Report/Photo -Report/Demo Register	

	union parishad		
Output-2.1: Integrated CBA activities in annual plan of Union Parishads (UPs)	1. Number of Union Parishads (UPs) integrated CBA activities in the annual plan	-Progress Report	
Output-2.2: Functional linkage established between relevant stakeholders and community to adapt the impact of climate variability	1. Number of events held with relevant stakeholders to share knowledge and practices on the impact of climate vulnerability	Attendance sheet/Report/Press coverage	
Activity-1.1.1: Stakeholder consultations with community people on existing climate vulnerabilities, cropping pattern and adaptive practices.			
Activity-1.1.2: Refresher workshop and review Community Action Plan in 5 old villages.			
Activity-1.2.1: Identification and selection of groups and form FFS (15 new FFS) and arrangement of FFS Meeting			
Activity-1.2.2: Awareness session on climate change in presence of facilitator from Met Dept, FFWC, DAE, UP			
Activity-1.2.3: Establishing Demonstration plot-and follow ups: 10 different interventions in 20 villages(4000 farmers will practice adaptive varieties or technologies)			
Activity-1.2.4: Organization of Farmers' Field days – 6 field days			
Activity-1.2.5: Arrange			

capacity building training for FFS by UP information centre's members and project Field Officer for collecting weather related information in 20 villages			
Activity-1.3.1: Organize adaptive gender analysis sessions (15 sessions will be organized engaging men as well for new 15 villages)			
Activity-1.3.2: Undertake assessments: and prepare /draft gendered adaptation plans through FFS (New 15 villages)			
Activity-1.4.1: Stakeholder consultation with Union Parishad (new and old union parishad) to include CBA activities in UP plan and budget. With Department of Agricultural Extension DAE in presence of the facilitators from Research institutes & Met Dept.			
Activity-1.4.2: Capacity building training (TOT) for Union Parishad's members and Project's Field Officers at Union Information centre by meteorological department's staff from District level.			
Activity-1.4.3: Train and mobilize extension officers to design and monitor local adaptation strategy (1 training program, 25 participants)			
Activity-1.4.4: Establish demonstration plot with adaptive variety through union parishad in different strategic			

location			
Activity-1.4.5: Organize public gathering to share results of adaptive demo plots by Union Parishad			
Activity-1.4.6: Arrange learning visit for union parishad members and FFS leaders to research institute and BMD (local office) to establish professional relationship and adaptive services			
Activity.2.1.1: Disaster Risk Reduction/Disaster Preparedness community based DRR plans and Meeting (UDMC,UZDMC meeting and DRR plan at community level)			
Activity.2.1.2: Capacity building workshop on CBA-stakeholder and community (3 UPs 3 workshops)			
Activity.2.1.3: Capacity building training with UP, DAE, Research Institutes, BMD and Private sector to making match & ensure adaptive services			
Activity.2.2.1: UP level lessons learnt workshop			
Activity.2.2.2: Organize, dissemination and sharing meeting at district level (1 workshop)			

Appendix III: M&E Planning Matrix: Where the Rain Falls (WtRF)-PhaselIII

Narrative summary	Measurable indicators	Definition	Means of verification	B L	Target		Achievement		Reporting Frequency
					2017	2018	2017	2018	
Goal: To	4. %	1.Resilience	-Baseline						-

<p>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.</p>	<p>increase in their adaptive capacities</p> <p>5. Average month with insufficient food at households</p> <p>6. % of women who are able to equally participate in household financial decision making</p>	<p><u>to the effects of climate change and variability-</u></p> <p>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. Women have more access to every sphere of agricultural tasks.</p> <p><u>2.Adaptive Capacities-</u></p> <p>Farmers will gain the knowledge and capability to cultivate various flood tolerant and drought tolerant agricultural varieties and technology</p>	<p>and Endline survey</p> <p>-Baseline and Endline survey</p> <p>-Baseline and Endline survey</p>						<p>Baseline and Endline</p> <p>- Baseline and Endline</p> <p>- Baseline and Endline</p>
<p>Specific</p>	<p>4. Number of</p>	<p>1.Climatic risks- The</p>	<p>-Baseline and Endline</p>						<p>- Baseline</p>

<p>Goal-1:20 # of communities are more resilient to climate risks and change</p>	<p>people better able to build resilience to the effects of climate change and variability.</p> <p>5. % of FFS members with increased knowledge on climatic risks and adaptive options</p> <p>6. Number of farmers practicing at least one adaptive agricultural techn</p>	<p>environmental hazards that local people are facing like flood, river erosion, changing rainfall patterns, storms etc. Adaptive options- Various agricultural varieties that can cope up with and survive in extreme weather condition and natural hazards such as BRR1 Dhan 51, BRR1 dhan 52, Bina 4 (mustard) and other existing new varieties invented and marketed by BADC and research organizations</p> <p>2. Adaptive agricultural technology- The techniques and measures applied in cultivating adaptive varieties</p>	<p>survey</p> <p>- Baseline and Endline survey</p> <p>- Baseline and Endline survey</p>						<p>e and Endline</p> <p>- Baseline and Endline</p> <p>- Baseline and Endline</p>
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	ology.								
Specific Goal-2: Local, regional and/or national policies and several civil society organizations better integrate climate risks and change.	2. Number of Union Parishad allocated budget in their annual plan considering climate vulnerabilities and risks		- Baseline and Endline survey						- Baseline and Endline
Output-1.1: Community plan integrated climate risks and climate change issues.	2. Number of Community Adaptation Action Plan addressing climate risks and climate change issues.	Community Adaptive Action Plan-The plan set and prepared by the community people (FFS members) to be better prepared and respond to climate change and risks specially in terms of agricultural practices	-Half-yearly report -CAAP -	0	20	20			-Half-yearly
Output-1.2: Increased practise of SuPER agriculture approach.	3. Number of farmers practising at least one adaptive agricultural technology. 4. % increase in agricultural productivity		-Baseline and Endline survey - Baseline and Endline survey						- Baseline and Endline - Baseline and Endline
Output-1.3: Women are more	3. Number of gender	1.Gender adaptive plan- Plan	- Report/Plan		?				Half-yearly

empowered and feel confident to respond to variable climate conditions.	<p>adaptive plan developed through FFS</p> <p>4. % of FFS women increased their mobility and took part in family decision</p>	<p>that implies and focuses on the women engagement in agricultural practices, family decision making and other spheres of social and economic life. It also puts emphasis on the women safety and security in their daily life.</p> <p>2.Mobility- Women's movement to various places they need for economic, educational purposes and family maintenance</p> <p>. Gender sensitive- Male will help ensure the due dignity of women, their engagement in various daily activities and decision making.</p>	-Baseline and Endline survey						- Baseline and Endline
Output-1.4: Enhanced capacity of relevant	3. Number of awareness session on	Service providers- UP, DAE, BADC, BINA,	-Attendance sheet/Report/Photo						Annually

service providers to support community to adapt the impact of climate variability.	climate change facilitated by relevant service providers 4. Number of adaptive demo plot established through union parishad	BARI, Meteorology Dept. Demo Plot-Farmer's land cultivated to justify the suitability and productivity of adaptive varieties and shown during Farmers Field Day (FFD) to disseminate the message and motivate nearby people concerning these.	- Report/Demo Register						Half-yearly
Output-2.1: Integrated CBA activities in annual plan of Union Parishads (UPs)	2. Number of Union Parishads (UPs) integrated CBA activities in the annual plan	CBA-Community Based Adaptation. This includes the activities, measures, techniques and strategies applied by the community people themselves to be better prepared to respond to climate changes, risks and hazards.	-Progress Report						Annually
Output-2.2: Functional linkage	1.Number of events held with relevant		Attendance sheet/Report						Annually

Organize adaptive gender analysis sessions (15 sessions will be organized engaging men as well for new 15 villages)									
Activity-1.3.2: Undertake assessments and prepare /draft gendered adaptation plans through FFS (New 15 villages)									
Activity-1.4.1: Stakeholder consultation with Union Parishad (new and old union parishad) to include CBA activities in UP plan and budget. With Department of Agricultural Extension DAE in presence of the facilitators from Research institutes & Met Dept.									

<p>Activity-1.4.2: Capacity building training (TOT) for Union Parishad's members and Project's Field Officers at Union Information centre by meteorological department's staff from District level.</p>									
<p>Activity-1.4.3: Train and mobilize extension officers to design and monitor local adaptation strategy (1 training program, 25 participants)</p>									
<p>Activity-1.4.4: Establish demonstration plot with adaptive variety through union parishad in different strategic location</p>									
<p>Activity-1.4.5: Organize</p>									

stakeholder and community (3 UPs 3 workshops)									
Activity.2.1.3: Capacity building training with UP, DAE, Research Institutes, BMD and Private sector to making match & ensure adaptive services									
Activity.2.2.1: UP level lessons learnt workshop									
Activity.2.2.2: Organize, dissemination and sharing meeting at district level (1 workshop)									

Appendix IV: Union and village wise distribution of household samples

Union	Serial Number	Village /Para	Sample households (number)	Total targeted households
	1	Baraibari	36	414
	2	Gachbari	29	326
	Sub Total		65	740
Jatrapur	3	Chakendarpara	29	326
	4	Uttar Ghonshampur	29	326
	5	Khan para	29	326
	6	Nowali para	29	326

	7	Garuhara	42	489
	Sub Total		158	1793
Pachgachi	8	Beparipara	14	163
	9	Telipara	14	163
	10	Sadarpara	14	163
	11	Maulovi para	14	163
	12	Nawani para	14	163
	13	Panatipara	14	163
	14	Morsialpara	14	163
	15	Baniapara	29	326
	Sub Total		127	1467
	Grand Total		350	4000

Appendix V: Household survey questionnaire of Where the Rain Falls (WtRF)- Phase III Project, Kurigram

SECTION 1: HOUSEHOLD AND FAMILY DETAILIS

	Household serial No		
1	Name of Answeree		
2	Sex		Male=1, Female=2
3	Religion		Muslim=1, Hindu=2, others/indigenous=3
4	Father/Husband/ Wife's Name		
5	Village/Para/Ward		
6	Union		
7	Upzila		
8	Zilla		
9	Mobile number		
10	Name of the data collector		

11. Land ownership pattran and Livelihood assisted fixed assets

Type of Land	Code	Own (Decimal)		Lease (Decimal)		Share cultivator (Decimal)		Khas land(Decimal)		Total land (Decimal)	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Homestead	1										
Agricultural land	2										
Pond	3										
Fallow land	4										
Others	5										

12. Status of livelihoods assisted household assets

SI.	Description of Assets	Quantity of Assets	Approximate Present value (Tk.)
	Number of Cattle		
	Number of goat		
	Number of poultry		
	Sewing machine		
	Solar panel		
	Boat		
	Fishing net		
	Stock of crops		
	Fish culture		
	Richshaw/ Van		
	Others (specify)		

13. What are the source of your income?

SI #	Source of Income	Annual Income (Tk.)		
		Male	Female	Total
	Agriculture			
	Day labour			
	Service			
	Business			
	Rickshaw/van/boat/Auto			
	Livestock and poultry rearing			
	Fish culture			
	Homestead gardening			
	Handicraft			
	Loan			
	Others (specify)			

14. What are areas of your expenditure?

SL #	Type of expenditure	Annual expenditure (TK.)
	Food purchasing	
	Education	
	Health/Medical expenditure	
	Cloths/wearing	
	Construction and repairing of house	
	Cultivation	
	Marriage (if any)	
	Dowry (if any)	
	Loan interest repayment(Bank, middle man, NGO)	
	Entertainment including gift/festival	
	Cosmetics	
	Firewood/Kerosene	
	Electricity/solar	
	Others (specify)	
	Total expenditure	

Section 2: Knowledge and understanding about the concept of weather and climate change:

SL #	Question	Answer	Answer Code
15	Do you know about climate change?		Yes-----1 No.-----2
16	What do you mean by climate change?		Weather change---1 Change of rainfall pattern (untimely high or low rainfall)--- 2 Increase in hailstroms –3 Prolong drought-----4 Frequent flood-----5 Decrease in intensity of coldness during winter---6 Increase in Intensity of coldness during winter---7 Short duration of winter season -----8 Increase in foggy weather during winter season-9 Increase in frequency of strom/cyclone-----10 River errosion ---11
17.	How do you know about climate change?		Radio---1 TV---2 News paper—3 Internet-----4 Reporter---5 Government organization—6 Non Government organization—7 Others-----8 No perception----9
18.	Did you participate in any training /meeting / workshop related to climate change?		Yes-----1 No.-----2
19.	If yes, in which subject did you participate?		
20.	If you did not participate, are you interested to participate in any such kind of training/workshop?		Yes-----1 No.-----2

Early warning and shelter during disaster

SL #	Question	Answer	Answer Code
21	Do you receive any early warning about climate induced disaster?		Yes-----1 No.-----2
22	If yes, how do you receive this early warning?		Government organization—1 NGO-----2 Union Parishad-----3 Radio-----4 Television---5 Others (If any)----6
23	If you do not receive early warning, are you interested to know the information through early waring ?		Yes-----1 No.-----2
24	If you receive early warning, do you go to flood rehabilitation centre?		Yes-----1 No.-----2

25	If you do not go to the flood rehabilitation centre, why not?		Scarcity of sufficient space—1 Unhygienic environment----2 Steeling of family assets -----3 Far away from home—4 Absence of rehabilitation centre—5 Others (if any)-----6
26	Do you think that female are more affected than male due to climate induced disaster in the society/family?		
27	If yes, what are the reasons behind this difference ?		
28	What are the other professions do you take rather than agriculture due to climate change ?		

Section :3 Practices to adapt to climate change and disaster risk

SL #	Question	Answer	Answer Code
29	Do you have any communication with the staff of public or private organization?		Yes-----1 No.-----2
30	How do you get access to those offices?		Alone ----1 With other---2 Through Mobile ---3
31	Which types of organizations do you have communication to receive agricultural related services or information?		Government Agency (DAE)---1 NGO-----2 Agricultural Research Institution---3 Private Agri-input seller(seed, pesticide)-4 Others---5
32	If you have communication, which types of services did you receive ?		Training---1 Technology Demonstration—2 Technical Advice---3 Variety demonstration—4 Agri-input Support---5 Others---6
33	Who received the services from public or private organization?		Husband----1 Wife-----2 Both Husband and Wife---3 Other family members----4
34	Are you member of any farmers' organization?		Yes-----1 No.-----2
35	Are you adopting any agricultural technology in a group?		Yes-----1 No.-----2
36	If yes, please tell the name of the technology		
37	Do you share the acquired knowledge of agriculture with other farmers?		Yes-----1 No.-----2
38	Is the information/services you receive from public and private organizations sufficient?		Sufficient-----1 Fair-----2 Not sufficient ---3

Section 4: Effect of climate change on crop production

39. What crops did you cultivate in your land last year ?

Types of land	Name of cultivated crops		
	Kharip -1(March-June)	Kharip-2(July – October)	Rabi (November – March)
High land			
Medium High land			
Low land			
Homestead			

40. Please tell the name of varieties and yield of those cultivated crops?

SI #	Name of Crop	Name of Varieties	Yield(Kg/ Biga, 33 decimal)

41. What was the production cost to cultivate those crops(Taka/Biga,33 decimal)?-----

42. Name of important items of production and expenditure of the above cultivated crops?

SI #	Name expenditure items	Name of Crops					Expenditure (Taka/Biga, 33 decimal)
		Boro rice	Amon Rice	Wheat	Jute	Others	
1	Seed purchase						
2	Land ploughing						
3	Fertilizer Purchase						
4	Seedling planting						
5	Crop harvesting						
6	Irrigation						
7	Insecticides						
8	Others						
Total expenditure							

43. Did you face the following types of climate induced disaster in the last five years? If yes, what type of damage in crop cultivation did you encounter?

Yes-----1 ,No.-----2

Types of disaster	Disaster code	Answer	Affected area/damage (code)	Intensity of damage
Flood	1			
Heavy rainfall	2			
Drought	3			
River erosion	4			
Hail storm	5			
Tornado/cyclone	6			
Excessive fogginess	7			
Other(If any)	8			

Affected area/ damage code:

Crops are fully damaged due to flood---1, Crops are partially damaged with reduced yield due to flood---2, Crops are not planted timely or in due time due to recurrent heavy rainfall / flood.....3, Crops are fully damaged due to drought ---4, Crops are partially damaged with reduced yield due to drought -----5, Weed/irrigation management cost is increased due to drought -----6, Damage of fish farm /resource-----7, Crops are damaged due to hail storms -----8, Other----9

Intensity of damage code:

No damage-----0, Minimum damage (below 25%)-----1, Medium damage (26-50%)-----2, Severe damage (more than 50%)-----3

Section 5 : Adjustment of crop cultivation to adapt to climate change

SI #	Question	Answer	Answer code
44	Did you bring any change in your cultivation system due to climate change?		Yes-----1 No.-----2
45	Did you cultivate any drought or flood tolerant crops or varieties which could give good yield adapting to adverse climate? if yes, please tell the name of new crops with their varieties.		Name of crops with varieties.
46	Did you practice any new agricultural technologies to cope with adverse climate change?		HYV crop/ seed---1 Use of balance fertilizer---2 Use of green manure -----3 Use of verimicompost -----4 Mulching for moisture conservation---5 Use of AWD technology in Boro Rice-----6 Line sowing of boro rice-----7 Use of IPM for control of insects-----8 Use of sex feromon trap -----9 Storage of seed with modern technology-----10 Change of cropping time (early or late cultivation)-----11 Others-----12

Section :6 Family food security as affected by climate change

SI #	Question	Answer	Answer code
47	How many meals do your family take per day with full stomach?		One time—1 Two time-2 Three time-3
48	During climate change induced disaster how many meals with full stomach did		One time—1 Two time-2 Three time-3

	your family take per day?		
49	Which months of the years did your family generally face food deficiency? (Mention the Months)		1= Baisakh, 2= Jaisthya, 3=Ashar, 4= Sraban, 5= Bhadra, 6= Aswin, 7= Kartik, 8= Agrahayan, 9= Poush, 10= Magh, 11= Falgun, 12= Chaitra
50	How do you meet up this food deficiency?		1= Taking loan, 2= Doing more work, 3= Going outside to sell labour (Temporary migration), 4= Utilizing own savings, 5= Taking help from relatives, 6= Taking less food, 7= Purchasing less expensive food, 8= Selling productive household assets, 9= Selling poultry/ livestock, 10= Others (specify)
51	Are your family members facing any malnutrition related problems due to climate change induced disaster?		Yes-----1 No.-----2
52	Do you have any effect of that malnutrition on your health or working efficiency ?		Yes-----1 No.-----2

Section 7: Forced migration due to climate change

Seasonal Migration:

SI #	Question	Answer	Answer code
53	Do your family members migrate to other places for searching work?		Yes-----1 No.-----2
54	If yes, why do you migrate and how long do you stay outside? Please indicate the name of months		Answer code
55	If yes, please tell the types of migration		Short duration (regular) 2 / 3 times per yea-----1 Short duration (irregular) 2/3 times per year-----2 Long duration (regular)-----3 Long duration (irregular)-----4 Daily-----5
56	Did your family members face any problem when you stayed outside due to migration?		Yes-----1 No.-----2
57	If yes, what types of problems did they face?		

Section : 8 Gender disaggregated decision making and food security

58. Who decides about personal affairs?

Subject	Code	Answer	Answer code
Child bearing	1		How many members participate in decision making process.
Saving	2		
New economic activity initiation	3		

Engagement in productive activities	4		(Male-1,female-2,Both—3,Female take minimal responsibilities----4, Members of other family----5, Do not know-----6
Proper use of services	5		
Vote casting	6		

59. Decision-making about household affairs?

Subject	Code	Answer	Answer code
Buying and selling land	1		How many members participate in decision making process. (Male-1,female-2,Both—3,Female take minimal responsibilities----4, Members of other family----5, Do not know-----6
Buying and selling of trees	2		
Buying and marketing small food items, groceries.	3		
Receiving loan and use of loans .	4		
Sending children to school.	5		
Arranging child marriage.	6		
Buying food for family members.	7		
Daily family activities (Cooking, cloth washing, agricultural work, carrying water, cattle rearing, toilet clearing, child bathing etc.)	8		
Others (if any)	9		
Appling innovative technology in agriculture.	10		
Cattle rearing (Cow & goat).	11		
Did you help your husband/ wife for their activities/work?	12		Yes-----1 No.-----2
If yes, What types of work did you help?	13		Agricultural work-----1 Cattle rearing.-----2 Poultry rearing---3 Cooking---4 Child rearing-----5 Cloth washing-----6 Crop harvest and storage-----7 Children education-----8 Others-----9

Food Security of women during climate change induced disaster

60. How many meals do your family members take per day during climate induced disaster?

One time -1, Two time—2, Three times---3

Family members	Food intake during normal time (#)	Food intake during disaster period (#)
Male		
Female		
Children		

Section 9: Mobillity of women (both men and women participants of the project to be asked)

SI #	Question	Answer	Answer code
------	----------	--------	-------------

61	What is your (female) income source?		Agriculture-1 Business-2 Service-3 Other (Specific)--4 No income-----5
62	Do you have any savings?		Yes-----1 No.-----2
63	If yes, how and where do you have savings?		Earthen pot—1 NGO ---2 Local cooperative society—3 Bank (DPS)-4
64	What type of problems does female normally face due to climate change?		
65	Do you face any problems to go outside the house?		Yes-----1 No-----2 Often-----3
66	If yes, what type of problems do you face?		
67	Normally where does female go outside the house?		Agricultural field—1 Market—2 Agricultural input seller-3 Neighbour house -4 NGO's office for attending meeting or training purpose---5 Union Parishad----6 Medical ceter---7 Attending village court (Shalisha)-- --8 Other (Specific)--9
68	From where does female get information related to different technics and strategies about climate change adaptation?		Male member of family—1 Radio or TV—2 Adjacent farmers----3 Adjacent farmers' organization----4 Government organization-----5 Private or NGO-----6 Other-----7
69	Do you think, public and private organizations have undertaken important measures for female to address the adverse effect of climate change?		Yes-----1 No.-----2 Do not know-3
70	If yes, What are the measures taken?		

71. Participation of male in gender sensitive attitude

Question	Answer	Answer code
Should female have equal opportunities as per male?	<input type="checkbox"/>	Yes-----1, strongly yes---- --2 No-----3, strongly no----- -4
Should female also take equal amount of food as per other members of the family during the time of food shortage?	<input type="checkbox"/>	
Should female go outside the house as and when needed?	<input type="checkbox"/>	
Is the role of female in crop production important?	<input type="checkbox"/>	
Should the female be given recognition officially due to their contribution in agriculture?	<input type="checkbox"/>	

Do you help your wife/husband in their work?	<input type="checkbox"/>	Yes-----1 No-----2
If yes, in which activities/work do you help?	<input type="checkbox"/>	Agricultural work-----1 Cattle rearing.-----2 Poultry rearing---3 Cooking---4 Child rearing-5 Cloth washing-6 Crop harvest and storage-7 Children education-8 Others-9

**Appendix VI: Focus Group Discussion (FGD) checklist of Where the Rain Falls
(WtRF)- Phase III Project, Kurigram**

Serial Number of the Questionnaire:			Date of data collection:	Month	Date	Year

Area Identification:

District		Code:
Upazila		Code:
Union		Code:
Village		Code:

1. Perception on climate change and disaster risk reduction
2. Do you know about the different policies about Climate change (). If yes, Explain.
3. Please identify any climate induced disaster, which have occurred in your area in the last five years and what was the adverse effects of those climate induced disasters
4. Do you receive any early warning about climate change? How have you known that early warning please explain?
5. Have you received any trainings related to coping mechanism with climate change effect, if yes please explain and will you have any desire to receive climate change effect or coping mechanism with adverse effect of climate change?
6. What measures or initiatives have been undertaken by public and private organizations to cope with of those adverse effects of climate change? If yes how you are benefited from those initiatives?
7. Are you members of any farmers organization? If yes, how did you form of those farmers' organization? What measures or initiatives have you been undertaken to enroll huge amount of women members or included women friendly planning of those farmers' organization? What are the benefits of farmers' organization?

8. Are you member of standing committees of Union Parishad or any other committees formed by public or private organizations? If yes, Please explain your role and responsibilities of those committees.
9. Which crops you have cultivated in the last 12 months? Please tell those cultivated crop names with their varieties and yield?
10. What constraints or problems did you face to cultivate crop due to adverse effect of climate change(Crop fully or partially damaged due to flood or drought, infestation of insects and diseases, increase of production cost, decrease of yield, crop cannot planted timely due to water logging or drought etc.)? Who are the most effected in your family or society? Please explain.
11. What strategies you have yourselves under taken to cope with adverse climate change effect particularly crop cultivation with other sides(Drought tolerant crops or varieties, Flood tolerant crops or varieties, adaptive crops and different types of adaptation technologies) ? Please explain.
12. Which months of the years did you face food shortage? What are the reasons of that food shortage and how did you cope with that food shortage? Please explain.
13. Did you migrant other areas of the country? If yes, in which months of the year did you migrant? What are the advantages and disadvantages of your family due to migration? Please explain.
14. What problems did you face if men are outside of the home due to migration?
15. Please tell the role and responsibilities of female and male members of your family regarding decision making for personal and family affairs (Child bearing, adoptive new economic activity, engagement of productivity activities, regarding land selling and purchasing, tree and other assets' selling and purchasing, commodities' marketing, receiving credit and new investment, sending children to school, marriage of children, purchasing food for family, use of innovative technologies, livestock rearing, daily activities such as cooking, cloth washing, agricultural work, toilet clearing, carrying water, child bathing etc).
16. Descript the status of daily food intake by your family members (female, male and children)? Please tell the above food intake status when your crop production was affected due to adverse effect of climate change.
17. Please tell the role and responsibilities of female and male members of your family regarding the daily activities (Family, domestic activities, crop production related, Purchasing and selling).
18. How do you evaluate the women contribution in all economic activities from family to national level? And what are you thinking to ensure women participation in all economic activities.

**Appendix VII: Key Informant Interview (KII) Checklist of Where the Rain Falls (WtRF)-
Phase III Project, Kurigram**

1. Department of Agriculture Extension (Deputy Director, Upazila Agriculture Officer, Sub-Assistant Agriculture Officer)
DD, Kurigram-1, UAO, Kurigram Sadar- 1, SAAO- 3 (1/union) – Total 5
2. Union Parishad – 3 *Union Chairman*, 3 Mohila Councilors (Total-6)
3. Agriculture Research Institution (BINA, BRRI) – BINA (1), BRRI (1) Total (2)
4. Meteorological Department - 1
5. Private sector (Seed Company) - 2(Lal Teer, ACI)
6. BADC SEED (Assistant/ Deputy Director)-1

A key informant interview is for the representative of the relevant organizations / departments responsible for adaptation to climate change. The interview follows a semi-structure questionnaire/checklist to describe the existing situation in terms of climate change adaptation to agriculture, activities (research and development) undertaken, information dissemination regarding impact of climate change, capacity to cope with adverse effect of climate change in agriculture.

1. Identification

- 1.1. Name of key informant/interviewee :
- 1.2. Designation :
- 1.3. Cell Phone: :
- 1.4. Department/ Organization:
- 1.5. Union :
- 1.6. Upazila :
- 1.7. District :
- 1.8. Date of interview:
- 1.9. Name of interviewer:

Checklist:

1. Perception on climate change and disaster risk reduction
2. Please identify any climate change induced disaster, which have occurred in this Kurigram upazila/district in the last 5 years.
 - a) Type of disaster
 - b) Intensity (high/medium/low)
 - c) Frequency
 - d) Effect on crop production
 - e) Coping mechanisms by community/farmers
3. Name of activities/ projects to cope with climate change effect in your organization (eg, technology, demonstration, training, early warning, weather forecasting etc.)
4. Type of roles, services and resources relevant to address climate change you are obligated to provide to the climate victims through the above activities/projects

5. Strategies/approaches through which you implement the above activities/projects (community selection, targeting of area and participants etc.)
6. Specific achievement of the above activities/projects to address climate change
7. Please mention related plans of your organization to cope with climate change effect (involving community participation, considering women issues etc.)
8. Major areas of budget/fund in the current fiscal year of your organization to address climate change effect (please mention activities in line with budget/fund)
9. Type of awareness activities, skills training, workshop and others so far implemented by your organization in Kurigram to address climate change effect
10. Specific areas of initiatives and innovations of your organization to cope with climate change effect (new strategies, technology, alternate varieties and cropping pattern, early warning disseminating system and knowledge dissemination etc.)
11. Effect of climate change on crop yield, livelihoods, seasonal migration, health and family nutrition, particularly women and children.
12. Major constraints your organization face to address climate change effect and to implement climate resilient activities
13. Specific recommendations in terms of organogram, fund, equipments, staff training, coordination and gender issues.
14. Level of awareness on Bangladesh Climate Change Action plan-2009, DRR policy, New Agriculture Policy, Seed policy, Gender policy and the other (if any) relevant to climate change.
15. Name of activities/initiatives of the above policies in your organizational action plan
16. Status of implementation of the activities/initiatives as per above policies
17. Scope of strengthening community based organizations to sensitize policy makers in favor of integration of climate change risks in the national policies and activities.
18. Status and mechanisms of network/coordination with other organization (Government/ Union Parishad /NGO/Private sectors) to implement the activities relevant to climate change effect at local (union and upazila), regional (district/division) and national level
19. Major gaps/constraints in the coordination mechanisms to integrate climate change risks in the above policies.
20. Specific recommendations for effective coordination to integrate climate change risks in the above policies

Appendix VIII: Statistical Analysis of Data

Table 1: Frequency distribution of Sex.

Sex and Religion	Number of respondent	Percent
Sex		
Male	92	26.3
Female	258	73.7
Total	350	100.0

Table 2: Frequency distribution of grand total of lands

Grand total of lands	Code	Frequency	Percent	Cumulative percent
0-20	1	88	25.1	25.1
21-50	2	172	49.1	74.2
51-100	3	74	21.2	95.4
101-120	4	16	4.6	100
Total		350	100.0	

Table 3: Descriptive statistics of source of income.

Source of income		N	Minimum	Maximum	Mean	Std. Deviation
Agriculture	Male	19	1500	32000	9015.47	7733.99
	Female	307	1000	194700	21966.18	25335.61
	Total	326	1000	194700	21211.39	24837.75
Day labor	Male	30	1800	90000	30724.33	21051.63
	Female	225	4000	162900	52251.78	25359.13
	Total	241	4000	162900	52607.39	25379.65
Service	Male	2	28000	36000	32000.00	5656.85
	Female	35	10000	348000	86113.00	76988.26
	Total	36	10000	560000	92498.75	105498.1
	Male	3	15000	70500	37666.67	29113.28

Business	Female	71	10000	270000	64900.35	41613.35
	Total	74	10000	270000	63796.28	41388.06
Rickshaw/ van/boat/Auto	Male	1	2000	2000	2000.00	.
	Female	19	3000	109500	49300.00	28594.27
	Total	20	2000	109500	46935.00	29773.54
Livestock and poultry rearing	Male	121	250	72600	4063.41	7521.73
	Female	38	500	80800	15265.79	17938.97
	Total	158	250	80800	6783.37	11926.88
Fish culture	Male	0				
	Female	17	400	90000	14023.53	21986.43
	Total	17	400	90000	14023.53	21986.43
Homestead gardening	Male	17	500	8000	2441.18	2439.02
	Female	3	1000	8000	4666.67	3511.89
	Total	20	500	8000	2775.00	2640.55
Handicraft	Male	17	1200	42000	11958.82	11378.27
	Female	0				
	Total	17	1200	42000	11958.82	11378.27
Loan	Male	169	1200	70000	20004.30	12758.36
	Female	26	4000	200000	36711.54	42619.29
	Total	191	1200	200000	22587.58	20351.61
Others	Male	23	1000	100000	15913.04	21443.23
	Female	51	1200	200000	47306.47	35979.26
	Total	74	1000	200000	37265.27	35299.80

Table 4: Descriptive statistics of total income.

Income source	N	Minimum	Maximum	Mean	Std. Deviation
Grand total income of male	350	0	389550	89309.94	60704.238
Grand total income of female	348	0	295000	17262.14	25684.160
Grand total income	350	1500	633233	106353.43	65605.496

Table 5: Frequency distribution of grand total of income.

Grand total of income	Code	Frequency	Percent	Cumulative percent
0-40000	1	18	5.2	5.2
40000-80000	2	109	31.1	36.3
80000-120000	3	131	37.4	73.7
120000-160000	4	46	13.1	86.8
160000-200000	5	21	6.0	92.8
200000+	6	25	7.2	100.0
Total		350	100.0	

Table 6: Descriptive statistics of types of expenditure.

Type of expenditure	N	Minimum	Maximum	Mean	Std. Deviation
Food purchasing	350	3000	657000	55525.19	39090.02
Dowry (if any)	9	8000	90000	42555.56	24213.17
Marriage (if any)	21	3000	90000	27095.24	21438.06
Loan interest repayment(Bank, middle man, NGO)	193	200	115000	21156.41	19775.42
Cultivation	321	0	236000	16290.52	23041.51
Others	23	72	72000	10675.74	17292.52
Education	236	0	60000	6152.88	7696.57
Health/Medical expenditure	347	100	200000	5759.51	14646.88
Cloths/wearing	349	500	30000	4971.32	3462.92
Construction and repairing of house	258	0	60000	4177.48	6597.47
Electricity/solar	190	35	31000	2336.61	3904.23
Entertainment including gift/festival	334	200	20000	2133.32	1753.76

Firewood/Kerosene	220	50	31200	1302.58	2345.44
Cosmetics	276	100	8000	1114.40	1215.28
Total expenditure	350	13830	670550	108450.97	64011.450

Table 7: Frequency distribution of total expenditure.

Total expenditure	Code	Frequency	Percent	Cumulative percent
0-40000	1	14	4.0	4.0
40000-80000	2	109	31.1	35.1
80000-120000	3	128	36.6	71.7
120000-160000	4	52	14.8	86.5
160000-200000	5	24	6.9	93.4
200000+	6	23	6.6	100
Total		350	100.0	

Table-8: Percentage distribution of Do you know about climate change?

Do you know about climate change?	Frequency	Percent
Yes	104	29.71
No	264	70.29
Total	350	100

Table-9: Frequency distribution of did you participate in any training /meeting / workshop related to climate change?

Did you participate in any training /meeting / workshop related to climate change?	Frequency	Percent
Yes	45	13.4
No	294	86.6
Total	339	100

Table-10: Percentage distribution of If you did not participate, are you interested to participate in any such kind of training/workshop?

If you did not participate, are you interested to participate in any such kind of training/workshop?	Frequency	Percent
Yes	215	96.4
No	8	3.6
Total	223	100

Table-11: Percentage distribution of Do you receive any early warning about climate induced disaster?

Do you receive any early warning about climate induced disaster?	Frequency	Percent
Yes	130	37.14
No	220	62.86
Total	350	100

Table-12: Percentage distribution of If you do not receive early warning, are you interested to know the information through early warning?

If you do not receive early warning, are you interested to know the information through early warning?	Frequency	Percent
Yes	258	97.7
No	6	2.3
Total	264	100

Table-13: Percentage distribution of If you receive early warning, do you go to flood rehabilitation centre?

If you receive early warning, do you go to flood rehabilitation	Frequency	Percent
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centre?		
Yes	83	26.3
No	232	73.7
Total	315	100

Table-14: Percentage distribution of Do you think that female are more affected than male due to climate induced disaster in the society/family?

Do you think that female is more affected than male due to climate induced disaster in the society/family?	Frequency	Percent
Yes	185	52.85
No	64	18.29
Don't know	101	28.86
Total	350	100

Table 15: Do you have any communication with the staff of public or private organization?

Do you have any communication with the staff of public or private organization?	Frequency	Percent
Yes	82	23.4
No	268	76.6
Total	350	100

Table 16: Frequency distribution of How do you get access to those offices?

How do you get access to those offices?	Frequency	Percent
Alone	73	48.03
With other	63	41.44

Through mobile	16	10.53
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Table 17: Frequency distribution of who received the services from public or private organization?

Who received the services from public or private organization?	Frequency	Percent
Husband	110	31.7
Wife	28	8.0
Both husband and wife	24	6.9
Other family members	11	3.1

Table 18: Percentage distribution of Are you member of any farmers' organization?

Are you member of any farmers' organization?	Frequency	Percent
Yes	93	26.6
No	257	73.4
Total	350	100

Table 19: Percentage distribution of Are you adopting any agricultural technology in a group?

Are you adopting any agricultural technology in a group?	Frequency	Percent
Yes	15	4.3
No	335	95.7
Total	350	100

Table 20: Percentage distribution of Do you share the acquired knowledge of agriculture with other farmers?

Do you share the acquired knowledge of agriculture with	Frequency	Percent
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other farmers?		
Yes	81	23.1
No	269	76.9

Table 21: Is the information/services you receive from public and private organizations sufficient?

Are the information/services you receive from public and private organizations sufficient?	Frequency	Percent
Sufficient	0	0
Fair	36	13.1
Not sufficient	239	86.9

Table 22: Percentage distribution of did you face the following types of climate induced disaster in the last five years? If yes, what type of damage in crop cultivation did you encounter?

Types of disaster	Answer		Affected area/damage									Intensity of damage		
	Yes	No	1	2	3	4	5	6	7	8	9	1	2	3
Flood	331	29	54.6	29.7	7.1	0	0	0	0.6	2.6	0	5.4	28.3	60.9
Heavy rainfall	96	254	0.9	9.7	1.6	0	0.3	0	0.3	0	0	2.3	20.0	4.6
Drought	31	319	0.3	0.9	0	2.9	4	0.6	0	0.3	0	3.4	4.6	0.6
River erosion	9	341	0.9	0	0	0	0	0	0	1.7	0	0.3	0	2.3
Hail storm	204	146	6	1.4	0	0	0.3	0	44.6	6.9	0	17.4	24	17.7
Tornado/cyclone	2	348	0.3	0	0	0	0	0	0	0.3	0	0	0.3	0.3

Excessive fogginess	2	34	0	0	0	0	0	0	0.3	0.3	0	0.3	0.3	0
Other(If any)	108	34	8.9	1.2	0	0	0	0	0	20.	0	3.1	8.6	20
		2								9				

Affected area/ damage code:

Crops are fully damaged due to flood=1, Crops are partially damaged with reduced yield due to flood=2, Crops are not planted timely or in due time due to recurrent heavy rainfall / flood=3, Crops are fully damaged due to drought =4, Crops are partially damaged with reduced yield due to drought =5, Weed/irrigation management cost is increased due to drought =6, Damage of fish farm /resource=7, Crops are damaged due to hail storms =8, Other=9.

Intensity of damage code:

No damage=0, Minimum damage (below 25%) =1, Medium damage (26-50%) =2, Severe damage (more than 50%) =3.]

Table 23: Frequency distribution of did you bring any change in your cultivation system due to climate change?

21.

Did you bring any change in your cultivation system due to climate change?	Frequency	Percent
Yes	48	13.7
No	302	86.3
Total	350	100

Table 24: Frequency distribution of how many meals do your family take per day with full stomach?

How many meals do your family take per day with full stomach?	Frequency	Percent
One time	1	.3
Two time	214	61.1

Three time	135	38.6
Total	350	100.0

Table 25: Frequency distribution of during climate change induced disaster how many meals with full stomach did your family take per day?

During climate change induced disaster how many meals with full stomach did your family take per day?	Frequency	Percent
One time	230	65.71
Two time	109	31.14
Three time	11	3.15
Total	350	100

Table 26: Frequency distribution of Are your family members facing any malnutrition related problems due to climate change induced disaster?

Are your family members facing any malnutrition related problems due to climate change induced disaster?	Frequency	Percent
Yes	338	96.6
No	12	3.4
Total	350	100

Table 27: Frequency distribution of Do you have any effect of that malnutrition on your health or working efficiency?

Do you have any effect of that malnutrition on your health or working efficiency?	Frequency	Percent
Yes	337	96.3
No	13	3.7

Total	350	100
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Table 28: Frequency distribution of which months of the years did your family generally face food deficiency?

Which months of the years did your family generally face food deficiency?	Frequency	Percent
Baisakh	71	20.3
Jaisthya	24	6.9
Ashar	128	36.6
Sraban	140	40.0
Bhadra	60	17.1
Aswin	160	45.7
Kartik	271	77.4
Agrahayan	40	11.4
Poush	6	1.7
Magh	4	1.1
Falgun	50	14.3
Chaitra	241	68.9

Table 29: Frequency distribution of how do you meet up this food deficiency?

How do you meet up this food deficiency?	Frequency	Percent
Taking loan	221	63.1
Doing more work	53	15.1
Going outside to sell labor	49	14.0
Utilizing own savings	13	3.7
Taking help from relatives	79	22.6
Taking less food	249	71.1
Purchasing less expensive food	131	37.4
Selling productive household assets	32	9.1
Selling poultry/ livestock	46	13.1
Others	21	6.0

Table 30: Frequency distribution of do your family members migrate to other places for searching work?

Do your family members migrate to	Frequency	Percent
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other places for searching work?		
Yes	124	35.4
No	226	64.6
Total	350	100

Table 31: Frequency distribution of If yes, please tell the types of migration

If yes, please tell the types of migration	Frequency	Percent
Short duration (regular) 2 / 3 times per year	68	54.84
Short duration (irregular) 2/3 times per year	15	12.10
Long duration (regular)	33	26.61
Long duration (irregular)	8	6.45
Total	124	100

Table 32: Frequency distribution of did your family members face any problem when you stayed outside due to migration?

Did your family members face any problem when you stayed outside due to migration?	Frequency	Percent
Yes	67	54.03
No	57	45.97
Total	124	100

Table 33: Percentage distribution of Decision-making about household affairs?

Decision-making about household affairs?	Male	Female	Both	Female take minimal responsibilities	Members of other family	Do not know
Buying and selling land	80.4	5.7	13.1	0.3	0.6	0
Buying and selling of trees	82.0	6.6	10.8	0.6	0	0
Buying and marketing small food items, groceries	81.8	6.3	10.7	1.2	0	0

Receiving loan and use of loans	48.1	15.4	30.9	4.9	0	0.6
Sending children to school	11.1	33	54.3	1.2	0.3	0
Arranging child marriage	37.6	5.9	48.0	1.0	7.5	0
Buying food for family members	66.4	13.3	19.4	0.3	0.6	0
Daily family activities	5.3	81.9	12.3	0	0.6	0
Appling innovative technology in agriculture	85.1	8.5	4.9	0.9	0.3	0.3
Cattle rearing (Cow & goat)	39.0	36.6	22.9	0.3	0.9	0.3
Others	54.1	21.6	10.8	0	0	13.5

Table 34: Percentage distribution of how many meals do your family members take per day during climate induced disaster?

Family members	Food intake during normal time(#)			Food intake during disaster period(#)		
	Male	Female	Children	Male	Female	Children
One time	0.3	1.2	3.6	53.1	78.4	1.0
Two time	59.3	74.1	2.3	40.4	18.7	21.8
Three time	40.4	24.8	94.1	6.5	2.9	77.2
Total	100	100	100	100	100	100

Table 35: Distribution of problem facing by women to go outside the house.

Problem faced by women to go outside the house	Frequency	Percent
Yes	273	80

No	48	14.1
Often	20	5.9

Table 36: Percentage distribution of important measures taken by GO and private sectors for women to address adverse effect of climate change.

important measures taken by GO and private sectors for women to address adverse effect of climate change	Frequency	Percent
Yes	31	9.0
No	195	56.9
Don't know	117	34.1