Evaluation of Supporting flood Forecast-based Action and Learning (SUFAL) Project in the 2020 Monsoon Floods

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REPORT

By Consiglieri Private Limited
For Concern Worldwide

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ACKNOWLEDGEMENT

We would like to express our gratitude to Concern Worldwide, Bangladesh for giving Consiglieri Private Limited (CPL) the opportunity to conduct the Evaluation of Supporting flood Forecast-based Action and Learning (SUFAL) Project in the 2020 Monsoon Floods. SUFAL is a unique initiative to increase the resilience of communities in northern Bangladesh to the impacts of flooding.

The Consiglieri team worked hard to make this endeavour successful, and I would like to thank my research team for putting up a good effort in formulating and implementing the data analysis and report writing of this evaluation. Along the way, we also received assistance from SUFAL team including all the partner organizations (consortium- Concern Worldwide, CARE Deutschland e.V. (CARE DE), Islamic Relief Worldwide (IRW), technical partner Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES)) who have granted us all kinds of support to get here. Also, we would like to thank the implementing partner (ASOD) and regional project staffs who have been immensely helpful.

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Sincerely,

Abdullah Al Shakib
Rita Alam
Mohammad Muaz Jalil
Santa Sarmin
K.M. Zaiyyan Adil

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ACRONYMS

€	Euro sign
ASOD	Assistance for Social Organisation and Development
BDT	Bangladeshi Taka
BWDB	Bangladesh Water Development Board
CEGIS	Centre for Environment and Geographic Information Services
CWW	Concern Worldwide
CG	Comparison Group
DAC	Development Assistance Committee
DAE	Department of Agricultural Extension
DC	Deputy Commissioner
DDM	Department of Disaster Management
DGHS	Directorate General of Health Services
DLS	Department of Livestock
DMC	Disaster Management Committee
DPHE	Department of Public Health and Engineering
DRM	Disaster Risk Management
DRRO	District Relief and Rehabilitation Office
ECHO	European Civil Protection and Humanitarian Aid Operations
FbA	Forecast Based Action
FEW	Flood Early Warning
FFWC	Flood Forecasting warning Committee
FCDO	Foreign, Commonwealth and Development Office
FGD	Focus Group Discussions
GBM	Ganges-Brahmaputra-Meghna
GoB	Government of Bangladesh
HHs	Households
IRW	Islamic Relief Worldwide
KAP	Knowledge Attitude Practice
KII	Key Informant Interview

LGIs	Local Government Institutions
MoA	Ministry of Agriculture
MPCG	Multi-purpose cash grants
OECD	Organization for Economic Co-operation and Development
PIO	Project Implementation Officer
RIMES	Regional Integrated Multi-Hazard Early Warning System for Africa and Asia
SDC	Swiss Agency for Development and Cooperation
SOP	Standard Operating Procedure
SUFAL	Supporting flood Forecast-based Action and Learning
ToR	Terms of Reference
TOC	Theory of Change
TV	Television
UDMC	Union Disaster Management Committee
UNO	Upazila Nirbahi Officer
UP	Union Parishad
UzDMCs	Upazila Disaster Management Committee
VfM	Value for Money

EXECUTIVE SUMMARY

Background: 'Supporting flood Forecast-based Action and Learning' (SUFAL) project was designed to contribute to reducing the adverse impacts of the increasing frequency of catastrophic flooding on the vulnerable and poor communities through Forecast-based Action (FbA). The project was funded by The Directorate-General for European Civil Protection and Humanitarian Aid Operations (ECHO) and was implemented through a consortium led by CARE Bangladesh, with Concern Worldwide, Islamic Relief and Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES). The project was implemented in three northern districts of Bangladesh: Jamalpur, Gaibandha, and Kurigram. FbA contributed to disseminating Flood Early Warning messages with a lead time of 10 – 15 days with timely and accurate weather forecast information, while and it also helping to identify potential flooding areas.

Methodology: The primary purpose of the study was to "Evaluate the impact of early actions" applied through the SUFAL project on household and community beneficiaries in responding to the 2020 monsoon floods. Customized **OECD-DAC** criteria**, Quasi-experimental design** (Difference-in-Difference Method), **Knowledge, Attitude and Practices (KAP)** framework and **Value for Money (VfM)** framework were used as guiding methods and tools to design study instruments and evaluate the impact of early actions at every stakeholder level. The study covered a control group in non-project areas and three treatment groups in the project areas: Treatment group 1 (EWM support), Treatment group 2 (EWM + Evacuation + Shelter + WASH support), Treatment group 3 (EWM + Evacuation + Shelter + WASH + Cash-grant support). Treatment groups were categorized in three different groups to conduct cost-effectiveness analysis. The study areas were in the districts of Kurigram (Hatia, Begumganj, Buraburi, Shaheber Alga unions), Gaibandha (Bharatkhali, Saghata, Ghuridaha, Haldia unions) and Jamalpur (Kulkandi, Chinaduli, Noarpara, Shapdhor. The survey sample consisted of 224 control respondents (of which 153 were women) and 754 treatment respondents (of which 426 were women), among which Sample for treatment group 1, 2, and 3 were 293 (100 women), 292 (192 women) and 169 (134 women), respectively. A total of 118 of the 754 treatment households interviewed through the survey were women-headed households and 38 out of 224 control group households were women headed households. The team had conducted 7 FGDs with community members in the three implementation areas, and 27 KIIs with community volunteers, project staff, government officials, and other related NGOs.

Demographic information: In case of the treatment group, the average age of a female respondent was 44 years, and the average age of a male respondent was 46. In case of the control group, the average age of a female respondent was 43 years, and the average age of a male respondent was 45 years. The average annual income for the households was found to be BDT 110,732 for treatment group respondents and BDT 98,724 for control group respondents.

FINDINGS

Relevance and Timeliness: Consortium Partners identified 12 unions under three target upazilas based on level of vulnerability to floods and other factors for the pilot of FbA and subsequently the foundation training and inception workshops at regional and district level had been conducted to introduce key actions to stakeholders and to identify detailed strategies to implement the project. To

reduce the gaps and address the capacity needs of the different stakeholder groups at institutional level related to FbA, the SUFAL team had drafted the forecast-based early action matrix with focal points from Department of Disaster Management (DDM) under the Ministry of Disaster Management and Relief (MoDMR) and Flood Forecasting and Warning Centre (FFWC) under the Bangladesh Water Development Board (BWDB).

There were quite a few pre-existing gaps at the institutional and service provision level that had been addressed through the SUFAL intervention. There had been a prevalent lack of clarity and accuracy of forecast information and actionable forecasts. To address this gap, SUFAL had increased the accuracy of EWMs through developing Upazila-level vulnerability maps, installing gauges, and developing Digital Elevation Model (DEM) with technical support from RIMES.

DMCs and LGIs also lacked organizational capacity in decision making and triggering early actions which was addressed by strengthening capacity of organizations in decision making and triggering forecast based early actions, sensitizing and building capacity through providing training to DMCs and LGIs to understand FbA concept and mechanism, and introducing concept of FbA to National level DDM.

There was a lack of Standard Operating Procedure, and clear direction of responsibilities, and DMCs and LGIs had lack of clarity and guidance in their roles and responsibilities related to flood response, and a list of early actions before the flood. These gaps were addressed by developing Early Action Matrix and List of Early Actions, defining flood triggers, Early Action Matrix and preparing list of early actions through discussions with national stakeholders, local government officials, and community people.

EW information and forecast based action supports failed to reach vulnerable stakeholder groups as public announcements were given when the flood already hit and public supports were mostly provided during and after the floods. This was addressed by disseminating early warning message to the relevant government and LGI officials, community volunteers, prominent community members and at household level. They had also provided cash grant to the most vulnerable community members, engaged community volunteers to enhance early warning message dissemination and forecast based actions, and targeting women and other vulnerable community members through the intervention.

Lastly, there had been inadequate budgetary allocations for Local Administrations for taking forecast based early actions. To address this gap, the team had supported LGIs/DMCs in increasing evacuation boats, shelter renovation, setting tents/ temporary shelters, repairment of roads and embankments, and building temporary walkways, shelter renovation and repairment was completed about 10 – 15 days before the first wave, temporary shade for livestock at flood shelters had been built, additional latrines and tube-wells had been installed, electricity supply had been ensured, and women in some shelters were given hygiene support and kits.

Effectiveness: Most of the activities had been conducted as per the plans of the intervention design, FFWC had introduced 15-day flood outlook in 2020 monsoon, with support of USAID-funded SHOUHARDO through CARE-RIMES, which was utilized by SUFAL project, the DMC and LGI officials had developed a good understanding of the importance and benefits of FbA, the DMCs/LGIs sat for coordination meeting to decide on strategies for their flood response after receiving EWMs, the LGI stakeholders had been able to present their required budget for flood response in 2020 flood around

4 to 7 days before flood, and LGIs/ DMCs were found to be using Digital Bulletin Board, Forecast-based Early Action (FbA) Matrix and List of early actions made in 2020 in upcoming flood preparation (2021) during evaluation. The DMCs/LGIs had strengthened their services to communities to respond to floods through FbA through arranging public announcements of EWMs to communities through miking and their ground level workforce, DMCs had deployed more boats for evacuation support, repaired roads and embankments, and built temporary walkways and some LGIs had increased their supports to some of the shelters.

There has been increased access to and acceptability for the early warning messages. A total of 8,800 households received EWMs through mobile phone voice messaging and 39,729 households were reached through the community volunteers and loudspeaker announcements. In 2019, most of the respondents did not receive accurate EWMs. Hence, most of them disregarded EWMs before the first wave, but the trust and perception on information accuracy significantly increased after seeing the accuracy of the information after first wave of flood. Around 97% of the treatment respondents and 37% of the control respondents said to have received the early warning messages. The tendency for taking early actions increased among treatment households as 51% of treatment households started taking early actions immediately after receiving EWMs and more than 80% after second wave and 100% of the respondents said that early actions they took after receiving EWMs were useful.

Impact: It was found through the study that less people in treatment group experienced damages compared to control households, treatment households saved more resources in 2020 than control households, and the average monetary values of assets saved by treatment group in 2020 were higher compared to the control group households. Due to the drawn-out duration and intensity of the flood in 2020, respondents reported that they were not able to prevent more damages although they took more early actions. Besides, treatment areas were the most flood affected areas. The early messages had helped the community to prevent damage to their assets and livelihoods. The percentage of damage prevented in agricultural sector for the treatment group had increased to 28% since the flood of 2019. The damage prevented in fisheries had increased significantly by 18 percent in 2020 in compared to that of 2019. The death of family members from waterborne diseases had decreased (except female members) in comparison to the previous flood in 2019. It is quite evident that the early warning message had enabled the males to take early actions regarding relocation of the vulnerable family members to higher grounds, relative's houses, or to the shelters. The cash for work modality had also helped the community people to obtain a source of income by working for the embankment, roads, bamboo bridges, etc. Shelter renovations and upgradations reportedly encouraged the community people to evacuate faster. The average amount of loan taken by a treatment respondent and control respondent was found to have been Taka 20,194 and Taka 18,335 respectively. However, post flood loan burden was significantly less for the cash grant recipients (only 32% took loan after flood) as compared to other treatment groups (more than 50% took loan). The cash grants are said to have helped the recipients address their basic needs during the flood and also helped them to some extent to repair their house and pay for livestock treatment after the flood.

Efficiency: Two types of cost-effectiveness had been calculated- one with program cost (excluding management cost and staff cost) and another with total cost of intervention. For SUFAL project, €117 of benefit (calculated as the monetary value of damage prevented by treatment households due to taking early actions in 2020) was generated against each euro with respect to program cost. With total cost, each euro generated benefit of €38. The cost-effectiveness analysis also shows that the most

vulnerable people are those who received cash grant from the project (treatment group 3) prevented the least amount of damage from flood. Therefore, these vulnerable group needs to be focused intensively on upcoming development projects.

As external factors to impede the efficiency of the project, the pandemic and 'excessive relief dependence' have been identified. The COVID-19 pandemic hit the project hard and substantially disrupted intervention activities and so the field level project staff got minimal time to prepare before flood because of the pandemic restrictions.

Sustainability: It is difficult to determine the level of institutional ownership and sustainability of changes at this stage of this pilot project. However, some early signs clearly show positive changes towards institutional ownership and sustainability. The LGIs, UzDMCs, UDMCs, DDMCs expressed satisfaction and appreciation with the FbA and accuracy of EWMs and expressed willingness to continue using project facilitated knowledge products - Forecast-based Early Action (FbA) matrix, List of early actions, digital bulletin board and EW voice messages. In 2020, all the UPs and DMCs reported that they had asked for flood response budget earlier than previous years and started flood emergency coordination meetings as soon as they received the EW messages. All the Union Parishads were found to be in the process of planning to create a new fund to respond to early actions. Some of the government stakeholders (Union Parishads, LGIs) reported that they are planning to allot separate budget, resources and activities to respond to next floods following FbA.

Replicability: As per the understanding of FbA and findings from the field, the model can be implemented and scaled up work for other flood prone areas in Bangladesh as well, considering ground level vulnerability mapping at ward level. Since the FbA approach can be customized along with its early action matrix and early action lists according to area-based needs, it has potential to be applied in other areas also. FbA model can be applicable for other disasters like river erosion if the possible time and area can be forecasted. Early warning messages regarding evacuation, health, sanitation, cash grant and other support are relevant to other disasters as well. Early sign of change in working modality of other NGOs is already surfacing in the target areas.

LEARNINGS AND RECOMMENDATIONS

Process and system level:

- Early actions have been already tested in SUFAL 1. Considering the success of piloted SUFAL in forecast based early actions, the project should be continued in existing and new areas as well. SUFAL should continue to advocate with DMCs to take ownership of this model and implement it in other new locations.
- Though treatment group 1 generated most benefits (more damage control), in terms of pro-poorness and inclusiveness, it is imperative to provide more focus and support to the more disadvantaged (treatment) group 3 and 2.
- To promote the FbA concept and boost contingency planning for early action by government administrative bodies, it is imperative that the fund flow from central to grassroots is strengthened electronically within both the government and private sector financial institutions.
- The project should support the technical service providers e.g., FFWC, BMD, DDM and RIMES in maintaining network and coordinated research on how to calculate and relay earlier lead times i.e. by strengthening and improving accuracy for the multi-hazard early warning system.

- SUFAL should also explore other areas of early actions in future. More attention needs to be given on inclusion of public health component in the FbA approach to decrease mortality and morbidity rates due to waterborne diseases in target areas.
- Besides, SUFAL should work more on early actions especially in agriculture and livestock subsectors as damages were higher in those subsectors.

Local administration, sectoral and central level:

- SOP development and finalization should be the main focus going forward for scaling up. SUFAL should support national task force (in developing protocols, guidelines, financing) and sectoral departments for the development of SOP and then to implement forecast-based action.
- Advocacy is required for dedicated allocation for early action from general disaster management funds both at national level (DDM, sectors) and at local level (administration, sectors). Most of fund allocation is now for relief based or post disaster damage management which needs to be changed.
- Horizontal coordination at upazila level among local public offices and vertical coordination between national and local level administrations should be strengthened through further advocacy and sensitization activities. This would enable more fluidity in decision making and mobilization of resources before, during and after floods that would immensely contribute to the purpose of helping the community people to be safer.
- Capacity building sessions for LGIs, DMCs, community volunteers should be conducted face-to-face and over a longer duration for maximum retention.
- Linkage between FbA and safety net programmes should be further explored (especially with SSNP's employment generation programmes and cash for vulnerable people.
- Furthermore, it is recommended to advocate with the government and donors to establish a joint multi-year, forecast-based monitoring grant which will work towards integrating the FbA/EWS system into regular disaster preparedness work.

Community Level:

- The distribution of early warning message recipients had been uneven in many areas as a majority of the population of a certain area may have received the message while only a handful of people had received message in the neighboring area. This can be solved by selected small community unit, such as a neighborhood or para, first, and then ensure to select people from each neighborhood/*para*.
- To ensure more equitable access to EWMs of women, the intervention can include community level yard meetings and other such interventions to make the women aware and literate of basic mobile operating process.
- The intervention design should focus on institutionalizing and engaging the community volunteers throughout the year in phases instead of just engaging with them during floods for rescue and early warning message dissemination.
- The Flood Preparedness Program (FPP) is being implemented by national Resilience Program (NRP), and Community Preparedness Program (CPP) is being implemented by BDRCS. SUFAL can examine how it can utilize learning components from FPP and CPP for enhancing forecast based early actions, especially in strengthening community preparedness and institutionalizing community volunteers.

- The project could ensure the retention of the community volunteers through engaging younger people who are old enough be volunteers and are still studying in high school or college, thus staying in the locality.
- In addition, young married women (as there would be less risk that they would get married and leave their communities) with some literacy can also be engaged as volunteers who can easily access to women at households to people's yard.
- The hands-on training sessions, yard meetings, showing docudrama, etc. would help to make the concept of early action more easily acceptable to the community people and would help them to sustain the activities after the project ends if the early actions would lead to reduced damage.
- Many people were found to have refrained from going to the shelters during the flood as they felt that their families, assets, and livestock would not be as secure as they/those would be in their relatives' houses or at the embankments. Either the project could engage the police in the shelters (and also in the embankments where livestock are kept during flood) and offer patrolling and guarding of their livestock, assets, and especially the female members of their households. In summary, some form of patrolling and guarding services needs to be introduced into the shelters to motivate more people to avail of the shelters during floods.

1 Introduction

Against the context of increasing frequency of catastrophic flooding and adverse impacts on the vulnerable and poor communities, the project, 'Supporting flood Forecast-based Action and Learning' (SUFAL) funded by the Directorate-General for European Civil Protection and Humanitarian Aid Operations (ECHO) had been implemented through a consortium led by CARE Bangladesh, with Concern Worldwide, Islamic Relief and Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES). The primary aim of SUFAL was to introduce and make clear the Forecast based Action (FbA) approach among the decision-makers at national level, Disaster Management Committees at district and field administrative levels, and other community stakeholders by developing guidelines and tools, and capacity building. The principal objective of the project was to increase the resilience of communities in northern Bangladesh to the impacts of flooding while the specific objective was to reduce the vulnerability of flood-affected populations in Jamalpur, Kurigram and Gaibandha districts by strengthening the anticipatory capacity of communities and institutions through forecast-based early action mechanisms.

Forecast-based Action (FbA) had been a quite unique approach promoted by SUFAL in Bangladesh where upcoming flood was predicted and early actions were executed in prior to the event, in order to reduce potential damage and losses. FbA contributes to a lead time of 10 – 15 days provided that weather forecast information was timely and accurate, and it also aided to identify potential flooding areas. Even though FbA did not lessen the negative impacts of monsoon floods, it can potentially diminish the negative impacts by enabling the households, communities, local government, and the humanitarian sector to act earlier, given that the actions are based on accurate forecasts and appropriate triggers. The key results areas of SUFAL were illustrated here.

1. To understand the landscape status on the key issues of this project
2. To understand the performance direction on particular set of indicators at the end of the project
3. To contribute to designing and implementing the knowledge, awareness and advocacy activities

1.1 Study objectives and goals

The monsoon season of 2020 was found as one of the most disastrous as compared to the floods that had been caused by the monsoons in previous years and the floods impacted around 37% of the country's total areas in 33 districts of Bangladesh with moderate to severe impact on 16 Districts and it has been considered as the longest flooding period in the last 22 years[1]. As of 2nd August 2020, 1022 unions from 158 upazilas were inundated by flood water, affecting 5.4 million people and leaving 1,059,295 families water logged. As per DGHS control room, 135 people lost their life, mostly as a result of drowning was the major cause of the death and among those who drowned, about 70% are child. The first phase of the floods lasted from 25th June to 8th of July, while the second phase continued until 19th July, starting on 11th July and The Ministry of Agriculture (MoA) informs that in the first phase

[1] International Federation of Red Cross and Red Crescent Societies. (2021). Final Report Bangladesh: Monsoon Floods. International Federation of Red Cross and Red Crescent.

of the floods approximately 83,000 hectares of paddy fields, 125,549 hectares of agriculture lands and crops worth of USD 42 million had been damaged[1] and that it concerned 344,000 farmers in 14 districts. In the second phase of the floods, around 83,000 hectares of paddy fields in 26 districts (including 1st phase 14 districts) were affected[2]. The department of livestock had reported that the sector had lost USD 74.5 million worth of livestock including 16,537 hectares of grass land[1]. Furthermore, around 928,60 tube-wells and 100,223 latrines had been damaged due to the flood in 2020 according to Department of Public Health and Engineering (DPHE), and the Water Development Board's north zone office had recorded that around 3,745 hectares of land had eroded by the rivers in 8 flood affected districts in Northern Bangladesh's Rangpur Division[1]. Since 1954, there have been 7 monsoons when the flood impacted area had been higher than that of the 2020 flood[3] but the duration of water-logged situation and inundation of lands had been one of the highest in the past 22 years, which makes it one of the most disastrous floods in the recent history.

According to SUFAL's baseline study report, in the study area, most of the community people did not understand Flood Early Warning (FEW) messages from TV, radio, public announcements (known locally as miking) etc. So, they partially rely on these warning messages. There is no specific arrangement for giving support to understand the FEW messages. There was a lack of Flood Early Warning message dissemination to the affected community and there was reluctance among community members to take necessary precautions which made their life more at risk and vulnerable. There were many reasons identified for not taking precaution measures. Major causes were not believing the warning, remote communication, lack of flood shelters, fear of stolen household belongings, security concerns. It was also found that the floods have adverse effects on the environment and socio-economic systems which increasingly created major challenges for communities in Gaibandha, Jamalpur, and Kurigram. Diverse coping options were not observed in the study area. Getting personal loans from different sources was identified as the main coping strategy for the respondents. In addition, though Social Safety Net Programs (SSNPs) were the vital measures to manage impact of floods, but the baseline study found that there was no specific SSNP to address flood in the study areas.

The floods furthermore heightened the impact of new pandemic of COVID-19, because of which it was found that 93% of the vulnerable people's livelihoods were adversely impacted. The economic activities were already severely hampered, and the floods further disrupted the functioning of local markets. The baseline study reports 43% of the local markets were not functional or were functioning in a limited manner during the flood, and the floods had also impacted and disrupted local storage facilities.

On this backdrop, SUFAL project management towards the end of its first phase was carrying a project evaluation for which the primary purpose of the evaluation is to "Evaluate the impact of early actions" applied through the SUFAL project on household and community beneficiaries in responding to the 2020 monsoon floods. The main objective of this assignment had been to evaluate the impact of SUFAL on the project's performance in regard to how much of the project objectives and results have been reached against the sought after results as articulated in the project's Log-Frame. Specific objectives of the study have been mentioned below:

[2] UN, 2020. Bangladesh: 2020 Severe Monsoon Floods, Office of the UN Resident Coordinator Flash Update, UN Bangladesh
[3] Flood Forecasting and Warning Centre. (2019). Annual Flood Report 2019. Dhaka: Flood Forecasting and Warning Centre.

- Assess the impact of Early Actions on households and communities, including reduction of negative impact of the floods during the 2020 monsoon season, particularly looking at the difference in impact between actions taken early and typical monsoon flood response measures
- Effectiveness and cost-effectiveness analysis of the early actions taken or the FbA approach
- Assess how effectively and efficiently the project built the local capacity
- Assess ownership and sustainability of the FbA approach
- Assess changes in enabling environment (national policies, SOPs, local government capacity and funding mechanisms)
- Identify lessons learned at programs, M&E and operational levels

This report presents the findings from the final evaluation of the SUFAL project. The field work was completed from 6th June to 17th June, 2021. The findings are presented based on the key research areas and questions outlined in the evaluation matrix agreed upon jointly with the SUFAL project management.

2 Methodology

2.1 Analytical Framework

A customized **OECD-DAC**[4] guided criteria was used to evaluate the impact of early actions at every stakeholder level. The evaluation team assessed development interventions of this project according to the eight criteria- Relevance (Quality and Timeliness), Effectiveness, Impact, Efficiency (VFM analysis), Sustainability and Ownership, Replicability, Cross-cutting issues (Gender and Learning). The analytical framework was both quantitative and qualitative in nature. **Quasi-experimental design** (Difference-in-Difference Method) was used to measure the attributable impacts. Also, some components from **Knowledge, Attitude and Practices (KAP)** method were lent during questionnaire design, data collection and analysis. This approach helped the team to measure the extent of changes in knowledge, attitude, and practices of both service providing institutions, and community households. The evaluation team also conducted economic assessment focusing **Value for Money (VfM)** of early actions taken. In order to accurately assess the efficiency of the project's expenditure, the team used components of Foreign, Commonwealth & Development Office's (FCDO's) VfM framework (effectiveness and cost-effectiveness analysis) to track value for money through the results chain. Here, two types of cost-effectiveness ratio were measured- one with program cost, another with total cost of the project. The effectiveness and cost-effectiveness measurement involved the three types of community people under three different intervention types:

Treatment group 1 *(EWM support):* This group received only early warning messages from any of the project facilitated sources (voice messages, public announcements, community volunteers etc.). They did not receive any other supports from the project (e.g., evacuation and shelter support; WASH support, cash-grant support, etc.).

Treatment group 2 *(EWM + Evacuation + Shelter + WASH support):* In addition to early warning message support, this group of beneficiaries received support for temporary, permanent or cattle shelters; evacuation support to move families, valuable assets and livestock to shelters; hygiene kits containing litre bucket, soaps, purification tablets, ORS packets; PPE kits containing face masks, soaps, hand sanitizers; sanitary latrines and tube wells in shelter.

Treatment group 3 *(EWM + Evacuation + Shelter + WASH + Cash-grant support):* In addition to the supports received by treatment group 1 and 2, this group also received multipurpose cash-grant support from SUFAL.

Beneficiary category	EWM dissemination	Shelter and evacuation support	WASH support	Cash-grant support
Treatment group 1: Households that received EWM support	✓	X	X	X
Treatment group 2: Households that received EWM + Evacuation + Shelter + WASH support	✓	✓	✓	X
Treatment group 3: Households that received EWM + Evacuation + Shelter + WASH + cash-grant support	✓	✓	✓	✓

[4] OECD (2021), Applying Evaluation Criteria Thoughtfully, OECD Publishing, Paris, https://doi.org/10.1787/543e84ed-en

To ensure mobility of the flood-affected people, SUFAL project supported repair of minor damages of the embankments, roads and evacuation routes. Another initiative by the project was to build temporary walkway (shaku) at locations that were suggested by the UDMCs. However, because all three treatment groups were directly or indirectly benefited by these supports, therefore, separate treatment group was designed for these supports in the analysis.

2.2 Study Area

The study areas were in the districts of Kurigram (Hatia, Begumganj, Buraburi, Shaheber Alga unions), Gaibandha (Bharatkhali, Saghata, Ghuridaha, Haldia unions) and Jamalpur (Kulkandi, Chinaduli, Noarpara, Shapdhor.

2.3 Desk Review

An analytical review has been performed initially on secondary records (project proposal, log-frame, activity details, baseline report, periodic progress reports, action plan reports, interim reports, and other relevant quantitative and qualitative secondary data), including the latest papers for better clarification of the planned activities (what, how, why). The evaluation team reviewed the following documents.

- Project proposal
- Project log-frame/ results framework
- Project activity details
- Project Performance measurement plan and M&E guideline
- Baseline study report
- Early action plans
- Early action reports (first wave and second wave)
- Post-distribution monitoring survey report
- Post-monsoon assessment report
- Periodic progress reports and interim reports
- Covid-19 response report
- Review of Early Action Matrix
- Livestock related data from the ministry
- Data from agricultural ministry
- Community health centre records
- Relevant study reports

2.4 Data Collection Plan

Both qualitative and quantitative data from the study locations were acquired through household questionnaire survey, Focus Group Discussion (FGD), small group discussion, and Key Informants Interview (KII) in selected unions of Jamalpur, Gaibandha and Kurigram districts.

- **Survey** sample comprised treatment group and control group. Stratified sampling method followed by multistage cluster sampling was used for sample distribution. Treatment group was then divided into three types described above. Treatment group sample was **754** and control group sample was **224**. Sample for treatment 1, 2, and 3 were 293, 292 and 169 respectively. the control group respondents were selected from non-project villages and wards (of Jamalpur, Kurigram and Gaibandha) where the communities did not receive project supports and the living

conditions, environment, livelihood, and other factors were similar to those in project areas. The ideal situation would have been if the control respondents could have been taken from areas that experience similar flood level and impacts but the water level, inundation, water logging situation, and flood intensity was found to have been not similar in neighboring villages and communities where the intervention had not worked. Therefore, the team had resorted to choosing control respondents from neighboring areas with similar context to that of the treatment areas but with different level and intensity of flooding.

- **Focus Group Discussions (FGDs)** were conducted with community people including farmers, women, children, fishermen, day laborers, small traders, poor and marginalized people in order to explore their collective knowledge, attitude and behavioral change regarding forecast-based actions, their understanding and acceptability of early warning messages, impacts and losses they faced due to floods, early actions taken by them, and reduction of losses due to those early actions. A total of **7 FGDs** were conducted with community members. The FGD participants had been chosen at random where the respondents from nearby intervention communities had been asked to accumulate at a centre point of convenience. It was also made sure that participants from different villages are included so that experience and practices in different communities are reflected in the FGDs. Each FGD included adult women and men, and elderly, and teenagers approximately 7-12 persons per meeting.
- **Key-Informants Interviews (KII) or Small Group Discussions** (small group discussion were conducted when several representatives from the same institute or organization were present in an interview) were conducted with key stakeholders or representatives of the target institutions (UMDC, UzMDC, DDMC, FFWC, local government institutes), community volunteers, project staff, and implementing partner staff. A total of **27 KIIs** were conducted.

Table 1: KII/ Small Group Discussion number

Stakeholder type/ category	Number of KIIs/ Small group discussion
Union Disaster Management Committee (UDMC)	4
Upazila Disaster Management Committee (UzDMC)	4
District Disaster Management Committee (DDMC)	3
Community volunteers	3
FFWC, RIMES Staff members	2
Relevant NGOS and INGOS	3
Local Government Institutions (DAE, DLS, DOF, DPHE)	5
Implementing partner staffs	3
Total KII/ Small Group Discussion number	**27**

Total sample size from the surveys, FGDs and KIIs or small group discussions are tabulated below.

Table 2: Total sample size

Household Survey - Treatment Group			
Project Districts	**Sample Size**		
	Male	**Female**	**Total**
Kurigram	**96**	**94**	**190**
Gaibandha	**88**	**146**	**234**
Jamalpur	**144**	**186**	**330**
Total	**328**	**426**	**754**
Household Survey - Control Group			
30% of total sample size	**Sample Size**		

Districts	Male	Female	Total
Kurigram	**19**	**39**	**58**
Gaibandha	**17**	**53**	**70**
Jamalpur	**35**	**61**	**96**
Total	**71**	**153**	**224**
Focus Group Discussion (FGD)			
Kurigram	**2**		
Gaibandha	**3**		
Jamalpur	**2**		
Total	**7**		
Key Informant Interview (KII) or Small Group Discussion			
Kurigram	**5**		
Gaibandha	**7**		
Jamalpur	**9**		
District/ Regional/ Dhaka level	**6**		
Total	**27**		

2.5 Data Collection & Analysis

The team used structured questionnaire for survey and semi-structured checklists for the FGDs, KIIs or small group discussions. Because primary data were collected and analysed from both treatment and control group respondents, the evaluation team compared the differences between the control and treatment group changes (before- and after- flood situation of each group) and thus project attributable achievements were measured.

Descriptive analysis was done, and different respondent groups were compared using arithmetic mean, percentages, and ratios. Comparative analysis was also conducted among different treatment groups under different SUFAL interventions in 2020, consisting of treatment groups 1, 2, and 3. The team analysed which SUFAL intervention was more cost-efficient or cost-effective[5] in achieving target results. Cost-effectiveness ratios were calculated from the benefits (damage prevented) generated by the project and cost incurred for generating those benefits. The benefits were calculated as the monetary value of damage prevented due to taking early actions. The study findings were used to measure average benefit generated per head. Then total benefit generated by total targeted population (total beneficiary) was calculated through extrapolation since the total beneficiary number was defined by the project. Benefits generated by treatment group 1, 2, and 3 were calculated this way. On the other hand, two types of costs were considered here- the program cost (the amount of money that has been disbursed for generating an output; it excludes management cost and staff cost) and total cost (the amount of total budget spend in implementing the program). For every treatment group, benefit generated by that group was divided by the cost of implementation of that intervention. In this way, the cost-effectiveness ratios were generated for different treatment groups.

In addition, gender lens was used in every aspect while analysing project effectiveness and impact. For ensuring an evidenced based evaluation, the team used triangulation process during data analysis drawing on a variety of data sources and approaches to confirm similar results (including findings from synthesis of desk research, expert observation). Quantitative findings were triangulated by qualitative

[5] Cost-effective or cost-efficient interventions are those what provide the best value of successful outcomes against the money spent.

findings from FGDs with community people, KIIs and small group discussions with project stakeholders. Also, BBS data was used as reference of the information presented.

2.6 Study Limitations

- A comprehensive household survey is very important in the beginning of such projects. This would have informed the evaluation team about the amount of assets and productive assets (crops, livestock, poultry etc) of households by different economic category before 2020 floods. This would have helped the evaluation team to better and accurately measure losses or damages by flood, or impact of taking early actions. However, the baseline report does not have such detailed information. Therefore, the evaluation team had to resort to retrospective data collection method which could have generated deviated data in some cases (as it is difficult for people to recall assets and losses details from one or two years back).
- As mentioned in the introduction section (see section 1.1), the flood in 2020 had been far too disastrous as compared to the flood in the previous year, and the community people had faced more damage in 2020 than they had in the flood of 20196. The evaluation team wanted to assess the impact of the SUFAL FbA pilot 2020 against the same indicators in 2019 flood situations. But due to the drawn-out duration and intensity of the flood in 2020, respondents reported that their losses and damages were higher in some areas than the previous year, although they took more early actions.

While selecting the control group, the study team had tried to find a control group that had similar constraints and flood impact within the same unions and upazilas. After consultation with the client, the team had chosen other villages and wards within the same union for selecting control group respondents. However, the level of vulnerability and impact of flood in control areas was not as severe as in the intervention areas of the SUFAL project (as the project targeted the most vulnerable areas for implementation)[7]. For example, in Haldia union of Gaibanda District, it was found during an FGD that households located outside of an elevated road (treatment) had become inundated a few days before the households located inside of the elevated road (control) in 2020, even though the communities were not more than 100 meters away from each other and were only located on either sides of the elevated roads, for which the communities living inside of the elevated roads had more time to take mitigative actions against the flood. In some cases, not having access to a control group with similar flood impacts as the treatment group made it difficult for the evaluation team to compare the effects between these two groups (for example, losses and damages in a few subsectors were found higher among treatment group respondents as compared to control group respondents).

[6] Since 1954, there have been 7 monsoons when the flood impacted area had been higher than that of the 2020 flood[6] but the duration of water-logged situation and inundation of lands had been one of the highest in the past 22 years, which makes it one of the most disastrous floods in the recent history.

[7] The vulnerability of flooding may vary vastly within the same union depending on the location of the communities (which side of the embankment and elevated roads the community is located), land elevation of the area in which the communities are located, the distance of the communities from the riverbank, the direction and flow of the river near the communities, etc.

3 Findings

3.1 Demographic Information

Among the 754 treatment group respondents, 39% said to have received only the early warning message from SUFAL, 39% said to have received early warning message along with evacuation support, shelter, and WASH support, and 22% said to have received all other support along with cash grants from the SUFAL project. (Figure 1)

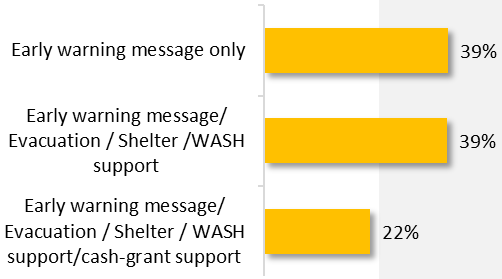

Figure 1: Support received from SUFAL by treatment group

3.1.1 Individual level Information

In case of the treatment group, the average age of a female respondent was 44 years, and the average age of a male respondent was 46. In case of the control group, the average age of a female respondent was 43 years, and the average age of a male respondent was 45 years.

Among the 754 treatment group respondents, most (83%) of the respondents report to be married, while about 13% are widowed, and the rest are either unmarried or had been divorced or separated. Similarly, among the 224 control group respondents, most (81%) of the respondents are married, while about 15% are widowed (Figure 2).

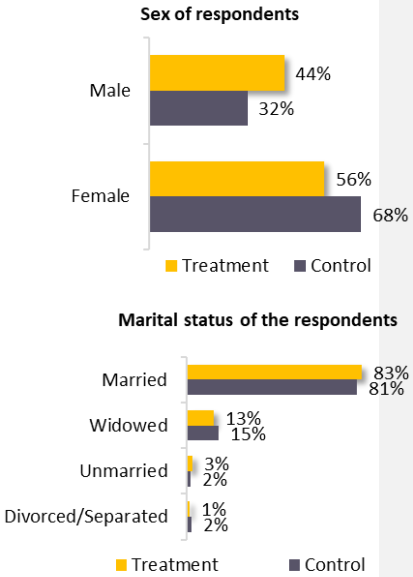

Figure 2: Sex and marital status of respondents

The distribution of respondents had been based on the proportion of the population size (treatment respondents) residing in communities within each of the respective intervention areas. Jamalpur were found to have the largest portion of the treatment group while Kurigram had the lowest. Among the treatment group, a total of 44% of the respondents were from Islampur Upazila in Jamalpur district, 31% respondents were from Saghata Upazila in Gaibandha district, and 25% respondents had been from Ulipur Upazila in Kurigram district. Among the control group, a total of 43% respondents were from Islampur Upazila in Jamalpur district, 31% respondents were from Saghata Upazila in Gaibandha district, and 26% respondents were from Ulipur Upazila in Kurigram district.

Most of the treatment (48%) and control (59%) group respondents said to have only been able to sign or that they had lacked any form of formal education, 24% of the treatment respondents and 17% of the control respondents said to have finished their primary level education, 9% treatment group and 5% of the control group said to have had Secondary level of education, 3% of the treatment and 4% of the control respondents report to have obtained their higher secondary certificate, and only 4% of the treatment group had finished graduation or similar level of education, while the rest had finished

post-graduation (2% treatment) and vocational degree (1% treatment and 1% control) (**Fehler! Verweisquelle konnte nicht gefunden werden.**).

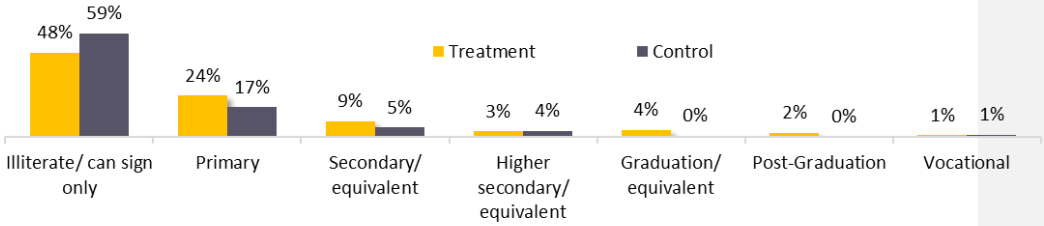

Figure 3: Educational qualification

3.1.2 Household Information

In case of both, treatment group and control group, the study shows that the average number of male household members had been 2, and that there had been an average of 2 female members per household. The average family size of a treatment household was found to be 4.5 people while the average family size of a control household was found to be 4.36 people. The average number of earning family members was found to be 1 in case of both, treatment and control, households.

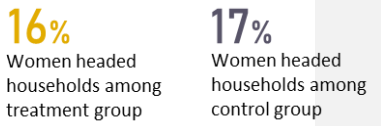

Figure 4: Women headed households

A total of 16% of the treatment households interviewed through the survey were women-headed households and 17% of control group households were women headed households (Figure 4).

The average annual income for the households was found to be BDT 110,732 for treatment group respondents and BDT 98,724 for control group respondents. Most of the treatment group respondents (45%) and control group respondents (52%) had said to have an annual income of BDT 50,000 to BDT 99,999, and 26% treatment respondents and 25% control respondents said to have had an annual income of BDT 100,000 to BDT 149,999, while only 5% of the treatment group respondents and 2% of the control group respondents said to have had an income of greater than Taka 2,50,000 (Figure 5).

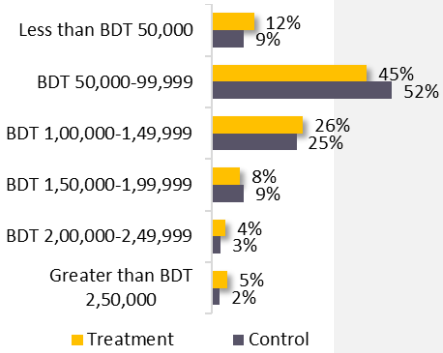

Figure 5: Annual income of respondents

Most of the treatment and control respondents reported to be engaged as agriculture labour and non-agriculture labour as a means of livelihoods, while about 24% of the treatment respondents and 43% of the control respondents were involved in agricultural practices such as cropping paddy, vegetables, etc. About 9% of the treatment and 8% of the control groups report being involved in livestock rearing, and 4% of treatment and 5% of control report being involved in poultry rearing. About 9% of the control and treatment respondents each had said to have had small businesses and about 4% of treatment respondents only had medium or large businesses. Only 3% or the treatment and 6% of the control said to have been employed as RMG workers (Figure 6).

All of the control group respondents and 95% of the treatment group respondents report living in Kacha houses that are basically temporary houses made of mud brick, bamboo, sun-grass, wood and occasionally with corrugated iron sheets as roofs. About 4% of the treatment respondents are reported to have had semi-pucca houses that are semi-permanent houses where walls are made partially of bricks, floors are cemented, and have roofs of corrugated iron. Only 1% of the treatment households said to have had lived in *Jhupri* that are shacks made of jute sticks, tree leaves, jute sacks etc. (Figure 7)

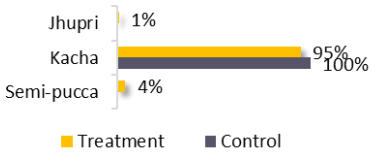

Figure 7: Settlement Condition

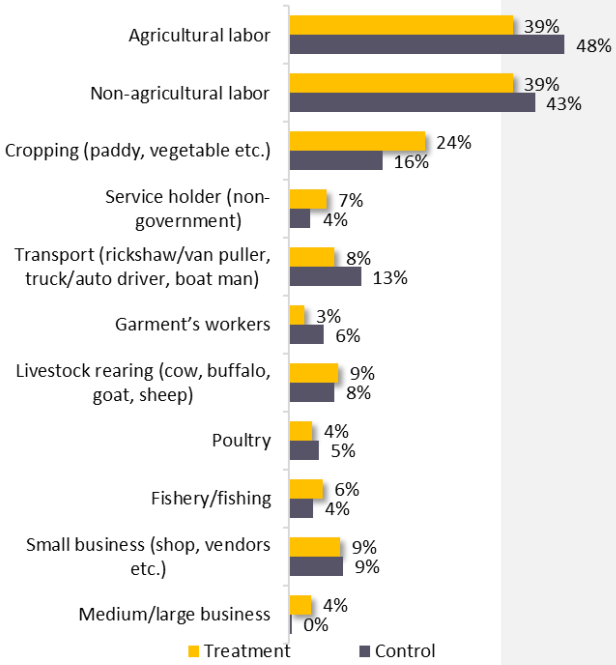

Figure 6: Income Generating Activities

3.2 Relevance

This section of the report discusses whether the project design and activities have been relevant to the prevailing problems and constraints of the target groups and targeted intervention areas. This section will show an assessment regarding the project design and whether the needs of the target group had been satisfied through the intervention, and whether the intervention had been aligned with the plans of the local government. Furthermore, this section also discusses the output quality and timeliness to bring out the project's ability to provide quality intervention activities within the accurate time to ensure best possible implementation of the project to achieve best possible outcome from the activities conducted. With reference to the Evaluation matrix (added in the Annex D), this section laid out the relevance of the project interventions in detail.

3.2.1 Relevance of SUFAL Project against Country Needs and Policies

It is a well-known fact that the government and development agencies' activities and works relating to floods have mostly been focused on and had revolved around during flood and post-flood responses such as providing relief, shelters, evacuation support, livestock medication and vaccination, agricultural seeds, etc. There had been no Standard Operating Procedure (SOP) for floods that specifically include guidelines for the different central government and local government outlining their responsibilities and activities during floods. Furthermore, there had also been gaps regarding the last-mile dissemination in early warning messages and taking forecast-based early actions by both local administrations and communities in the flood prone areas.

However, Bangladesh Government has recently shown strong willingness to work on forecast-based early actions for flood as the government's Standing Order on Disasters (SOD) at national level has recently included a taskforce on Forecast-based Actions, and the relative concerns have also been recently addressed in the Eighth Five Year Plan FY 2021 – FY 2026 and the National Disaster Management Plan. The gaps in the Government's previous approach and SUFAL's intervention design clearly show that SUFAL's objectives and interventions had been relevant and coherent to the country needs and policies.

3.2.2 Relevance of SUFAL interventions against pre-existing gaps and stakeholder needs

SUFAL conducted needs and risk analyses in the initiation phase of the project. The relevant assessments included Scaling Early Actions, District and Upazila DRM Capacity Assessment, Joint Needs Assessment on Monsoon Flood, and assessing the Demographics of Project Areas. Following the learnings from these assessments, the project was designed. The gaps identified by these assessments included lack of connectivity between flood forecasts and vulnerability data; absence of agreed thresholds, triggers, and standard guidelines for taking early actions; lack of proper interpretation and dissemination of early warning information; lack of understanding and buy-in among stakeholders of FbA; lack of available resources for implementing forecast based early actions; limited institutional capacity for early actions; and inability of DRM and DDR system to address gender and age issue specifically. This study also looked into the gaps prevailing from the pre-SUFAL stage throughout the institutional and community level to understand if the project identified gaps correctly and how they addressed them. Here, the pre-existing gaps identified at institutional and service

provision level in pre-SUFAL period, and h How SUFAL addressed these gaps in their project design is discussed are briefly presented. Please see Annex A for details.

3.2.2.1 Pre-existing gap: Lack of clarity and accuracy of forecast information and actionable forecasts before SUFAL

Before the implementation of SUFAL, DMCs lacked access to accurate forecast information and pre-flood planning. The DMCs only sat together for planning and resource mobilization towards flood response based on a 2-3 days early forecast and this gave the related stakeholders too little time to gather resources and place demands for their needs to properly respond to the flood victims. The forecast received before SUFAL did not clearly state accurate information on the potential impact of the flood in specific areas at granular level. Furthermore, the actions taken by the relevant government stakeholders had been focused on during flood and post flood stages as a means of providing aid and relief to the victims.

SUFAL Intervention/ Activities in addressing this Gap: Technical Support provision to FFWC to generate accurate, location specific and reliable early warning forecast information

- At first, FFWC in cooperation with RIMES identified needs of gauges in community level. They also found out if the community gauges can be used by community people and if they can interpret the gauge readings. Working with community people, RIMES identifies need of two gauges which was conveyed to the BWDB through FFWC. Then, BWDB with facilitation of SUFAL installed the gauges in intervention areas. Community volunteers were involved in installing these gauges supporting RIMES at field level. These gauges are being maintained by RIMES now which will be taken over by BWDB after two monsoons passed the project initiation.

  Furthermore, Upazila-level vulnerability maps had been developed and Digital Elevation Models (DEMs) had been developed with technical support from RHIMES and supported by FFWC to generate accurate, location specific, and reliable early warning forecast information on the flood time, duration and water height.

3.2.2.2 Pre-existing gaps: DMCs and LGIs lacked organizational capacity in decision making and triggering early actions

The concept of early action was not in place and actions taken were not as per the needs of the most vulnerable communities, such as the information on early actions for protecting the different assets owned. The DMCs customarily provided relief and evacuation services to the flood affected communities. Furthermore, the UDMCs and local government (Upazila and Union Parishad) lack resources that are necessary to assist the evacuation of vulnerable groups during floods such as boats and community volunteers.

Before the starting of SUFAL, DMC and the LGIs at the District level received forecasts from FFWC but the message dissemination process and next steps had been set back due to the inaccuracy of the early warning and lack of coordination and institutional capacity of DMC and LGIs. Therefore, the early warning messages had not reached the union and upazila level LGIs. The DMCs were also found to ignore regular meetings during the dry season and only sat together during or right before the flood to discuss their strategies (pre-SUFAL scenario).

SUFAL Intervention in addressing this Gap: Strengthening capacity of organizations in decision making and triggering forecast based early actions

- SUFAL project had enabled the messages directly reaching the Upazila level and Union level LGIs through FFWC as a part of the intervention. SUFAL intervention also contributed in increasing fluidity in decision making and mobilization of resources before, during and after floods which have contributed in helping the community people to be safer.
- The project met and consulted with the government actors, local government officials, community members, etc. to understand their respective constraints and designed the project accordingly so that all their needs could be addressed through the intervention activities. Discussions were held with the PIO, DC, DRRO, Livestock officer, DMC, etc. to identify the gaps in support and design an action plan that would address the needs of the community and the relative government actors. Other discussions were likewise held with the flood-prone community people to specifically identify the constraints and the best possible early actions that could enable them to reduce the magnitude of damage faced due to floods.
- These capacity building and sensitization sessions helped SUFAL to support improved coordination among local level stakeholders (LGIs and UP) and come up with an early action matrix for flood response in their respective areas (e.g., EWM dissemination through influential local people, public announcements, planned evacuation support and shelter repairing, etc.).
- Digital display boards have also been set up at the union parishads of the intervention areas so that the chairmen and other members are able to see the updates on a regular basis to enable early action among them. Digital display boards have also been set up at the DC office of the respective district offices for the same reason. The staff of Union Digital Centre (UDCs) were trained by the project to troubleshoot problems and maintain the digital information boards in those target unions.
- Proper and detailed SOP for flood-based actions has not yet been incorporated into the generic SOP for disasters. However, the subsequent activities of the project have enabled many of the government officials in the project locations to start taking proactive charge and decision during flood situations and the response times have improved due to the project's engagement with the relevant actors such as other NGOs working for disaster management, influential community members, etc.

3.2.2.3 Pre-existing gap: Lack of Standard Operating Procedure, and clear direction of responsibilities

There had not been any proper Standard Operating Procedure (SOP) for floods as to which department should take what steps. Without a proper SOP in place with clear instructions on roles and responsibilities of different institutions, the DMCs, their committee members and other stakeholders had lack of clarity and guidance in their roles and responsibilities related to flood response. Though there is Government's `Standing Orders on Disaster' (SOD) at national level which was limited by the lack of actionable forecasts. Also, it was found that the instruction were given only till district level. After that the information and instructions get miscommunicated and confused at field level due to lack of proper instructions and vague distribution of responsibility.

SUFAL Intervention in addressing this Gap: Developing Early Action Matrix and List of Early Actions

- Flood triggers were defined, and Early Action Matrix and list of early actions were prepared through discussions with national stakeholders, local government officials, and community people. Firstly, national level DDM and FFWC supported RIMES in setting triggers for early action. After that, the SUFAL team had drafted the forecast-based early action matrix with focal points from Department of Disaster Management (DDM) under the Ministry of Disaster Management and Relief (MODMR) and Flood Forecasting and Warning Centre (FFWC) under the Bangladesh Water Development Board (BWDB). Interactive community consultations were organized to take input from the community representatives, UDMC members etc. to develop the community level early action matrix. Consultations between SUFAL and FFWC/DDM had taken place to develop the institutional level early action matrix and for formulating the matrix itself.

- The **early action matrix** and **early action list developed** guided the FFWC, DDM and DMCs to take forecast based early decisions according to the danger level of flood water. The early action matrix will also be the basis of developing the SOP, guideline for early actions and financial resource allocation plan.

3.2.2.4 Pre-existing gap: EW information and forecast based action supports failed to reach vulnerable stakeholder groups

Early warning messages failed to reach vulnerable stakeholder groups with adequate lead time before the implementation of the SUFAL project. The prevalent practice of message dissemination during the time had been limited to the DMCs, LGIs and relevant stakeholders. Public announcements used to be arranged sharing the message among community people during the flood and directing them towards the closest shelters when the flood already hit. Furthermore, the spreading of the message through miking/loudspeaker and word-of-mouth had failed to reach the most vulnerable areas that were more difficult to reach during floods.

SUFAL Intervention in addressing this Gap:

- ***Dissemination of early warning and risk information:*** Early warning messages disseminated through mobile voice messaging was disseminated to government stakeholders, volunteers and community stakeholders. Besides, following community-based approach, SUFAL worked with community volunteers in each of the unions to take charge of receiving and sharing the early warning message with the community people who may have not been included in the early warning message recipient list. Public announcements on EW were also arranged in communities before flood by DMCs/LGIs. In addition, Digital display boards were set up at union parishads to see flood updates on a regular basis.

  Cash grant support for the most vulnerable community members: Two kinds of cash grants had been provided to the community people through the intervention. A total of 370 households in Jamalpur and Gaibandha district had received the COVID-19 cash grant of Taka 4,500 per household and flood response cash grant of Taka 4,500 per household.

- ***Engaging Community Volunteers to enhance EW dissemination & forecast based actions:*** The project team had trained community volunteers in the project areas on dissemination of early warning among the community people, early actions that should be taken by community members to decrease their damages due to flood, and capacity building on evacuation and rescue missions during flood. The community volunteers had been in charge of disseminating the early warning message among the community people through word-of-mouth and miking, conducting rescue missions, and conducting surveys with community people to create database of message recipients and most vulnerable factions of the community. The community volunteers had also worked with the LGIs to provide evacuation support to the community people during the flood where they had been transported to higher grounds, nearby embankments, relatives' houses, or shelter centers.

- ***Targeting Women and Other Vulnerable Groups:*** The project design had taken into account the perceptions, insights and needs of the community people, government actors, local government officers, etc. while designing the project interventions so that the most vulnerable groups could be correctly targeted and benefitted through the intervention. The community volunteers assigned through the project were able to reach out to some of the most vulnerable groups of the communities before and during floods to provide support and assistance. The messages also consisted of a list of early actions that had been tailored for lower literacy people consisting preferred methods of communication, evacuation requirements, household responsibilities, cooking and hygiene practices for the women during flood, methods of accessing clean water, different flood resilient livelihood activities, etc.

  The SUFAL team also tried to make the shelters a safe and better place for the community people, especially for women. SUFAL tried to mitigate problems in shelter centers such as shelters not being very safe and accessible for the flood affected people and the unavailability of toilet facilities, absence of drinking water facilities, insufficient space to take shelter, lack of privacy for women and adolescents, prevalence of gender-based violence, etc. by renovating the shelters and fitting those with additional latrines and tube wells. Furthermore, the intervention tried to provide the shelter dwellers with separate living space for women and men to provide security and peace of mind.

3.2.2.5 Pre-existing gap: Inadequate budgetary allocations for Local Administrations for taking forecast based early actions

Inadequate budget for flood relief and support were an ever-prevailing problem in the context of flood prone areas in Bangladesh. There had been lack of dedicated financial, human and logistical resources for them to respond to floods through FbA. Small budget allocations were mostly allocated for post-flood responses.

SUFAL Intervention/ Activities in addressing this Gap:

- ***Supporting LGIs and DMCs with resources for flood shelter point preparation****:* The LGIs and DMC had allocated certain flood shelters to the implementing NGOs in the respective intervention areas to ensure the quality and operation of the flood shelters. SUFAL had been assigned 11 shelters in Gaibanda, 3 shelters in Kurigram, and 8 shelters in Jamalpur. The

project team strived to improve the quality of the shelters through renovation, cleaning, fixing electricity supply and appliances, setting up cattle shed, setting up tents for people, installation of additional latrines and tube wells (where required), etc (Further discussion is given in Section 3.2.4.3 and Section 3.2.5).

Having the responsibility to manage the shelters enabled the SUFAL intervention team to allocate specific rooms and floors for women along with dedicated latrines for women to ensure that women would not face too much difficulty while taking refuge in the shelter during the floods.

- ***Providing temporary shelter support:*** Most of the people resorted to moving to higher grounds near their households so that they can easily access their household to get necessary supplies such as livestock feed, food, firewood, etc. The people staying in these highlands often lack materials that protect them from the rain or sun. SUFAL had provided tents (tarpaulins) to set up temporary shelters for some families and livestock in those higher grounds. These temporary shelters were provided on need basis (especially to those who were unable to move too far away from their houses due to the lack of roads and communication facilities during the floods, to women headed households, to elderly and persons with disabilities). In many cases it was found that the men had sent the women to the nearby shelters and stayed back on the embankments to look after their livestock and other assets. Provision of the temporary shelter ensured that the family could stay together during that period.
- **Resource support for government infrastructure:** The project also tried to complement the local governments' already inadequate budgets in 2020 for flood damage control by improving the quality of some of the shelters with renovation and addition of tube wells and latrines (shelter renovation and repairment was completed about 10 – 15 days before the first wave). Furthermore, the project had also supported the local government and rescue units with acquiring or renting out boats for evacuation of community people. SUFAL also co-financed LGIs in repairing and renovating infrastructures such as bamboo bridges, drum bridges, embankments, and roads to enable the most vulnerable communities to move around easily during floods.

Evacuation support had also been provided by SUFAL during the flood to ferry the community people, their livestock, and belongings to either the nearby shelters, to the embankments near their houses, or to any place the rescued people may have felt was safe for waiting out the flood. This support had been provided through monetary support to local governments and community volunteers for renting out boats and going into rescue missions in various inundated areas.

3.2.3 Timeliness

Most of the activities had been conducted on time as per the plans of the intervention design. The shelters had been renovated, the additional latrines and tube wells had been installed, the bamboo bridges had been built, and cattle sheds had been prepared as per schedule before the flood so that the community people could seek shelter in a safe and liveable environment. However, some yard meetings, discussion sessions and meetings had to be delayed due to the COVID-19 lockdown

restrictions. The early warning voice messages had been shared with the respective stakeholders 7 – 9 days before the flood which had helped reduce some of the damage.

The cash grant for the floods had been provided slightly before the flood and during the flood in some cases which had caused some of the families to not be able to spend the money for the necessary early actions, instead being used to either purchase necessities during the flood or invest in rebuilding their lives after the flood.

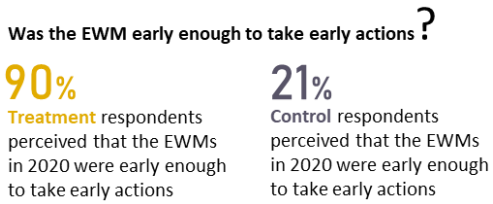

Figure 8: Timeliness of EWMs

The intervention team had been able to successfully provide the early warning message much earlier than the previous years which had enabled decision making and early actions before the flood hit.

It is evident that the lead time of EWMs have considerably increased by SUFAL. Before the initiation of the project, lead time was 2 days before the flood on an average (Table 3). This lead time increased by 1 day for control group, which for the treatment group is 4 more days than before. Also, 90 percent of the treatment respondents said that these 6 days of lead time on an average before flood was early enough for them to take early actions. On the other hand, only 21 percent control group respondents claimed the same (Figure 8).

Table 3: Average lead time (days) of Early Warning Messages

Year	Treatment	Control
2019	2	2
2020	6	3

The contribution of SUFAL in early actions taken by the households is more realised considering the timing of their early actions (Figure 9). In 2020, most (51 percent) of the treatment households took early actions immediately after receiving early warning messages. Though their average lead time was 6 days, it was noted that the households took early actions mostly 1 to 3 days before the floods hit. In case of the control group households, early actions were taken mostly less than 1 day before the flood after they experienced some damage. It was also found that there were no households in 2019 and no control households in 2020 who took early actions before more than 10 days of flood. But few (2 percent) of the treatment group took early actions in 2020 more than 10 days before the monsoon flood. It should be noted that during the first wave of flood in 2020, the people had received the message but had not believed it to be so accurate. The lead time therefore had been very low during the first wave of flood, but during the next waves of the flood in 2020, the people were much quicker to act. However, since the second and third wave of floods had come consecutively, the early actions had not provided the study team with much measurable impact. Such changes in early action that could result in prominent impact is expected will take at least 2 years of being involved in the intervention.

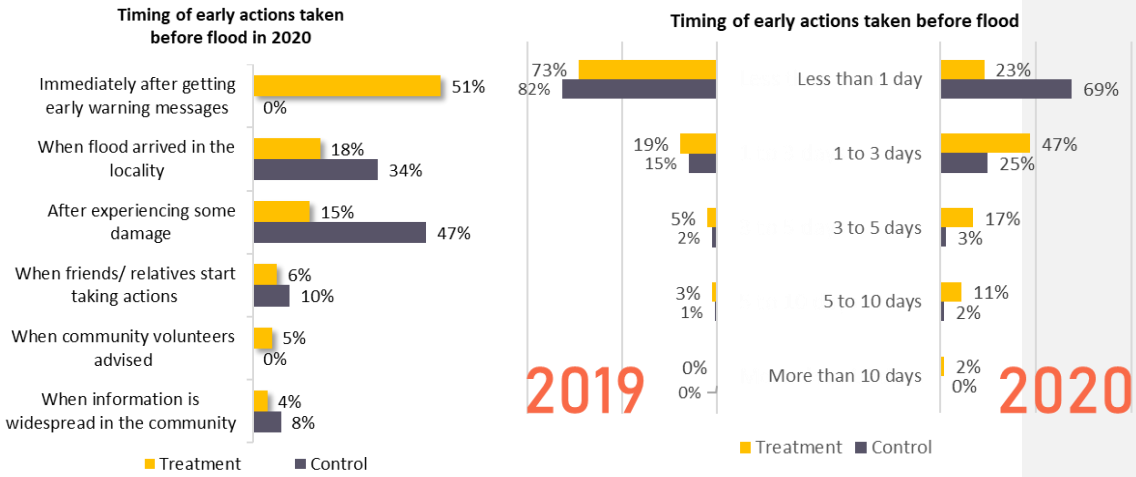

Figure 9: Timing of early actions taken

3.2.4 Gaps in Project Design

3.2.4.1 Unequal distribution of Early Warning Message recipients

The number of the recipients of voice messages was 8,800. Also, 39,729 households (75 percent of total population of target unions) were reached through public announcement, community volunteers, and LGIs. Therefore, the number of EWM receiver was good enough for a pilot project. The gap prevailed in the distribution of the EWM receivers through voice messages. The list of recipients had not been equally distributed across the project intervention area in some districts. Hence, many people from a certain chars may have received the message but the people from a neighbouring char, which was more vulnerable and remote, had only a handful of message recipients. It was found that in some cases none of the remote *paras* received voice messages. This unequal distribution impacted community people in the project areas in not receiving messages at the same time and on time.

The messages can be structured in such a way that even the uneducated people are able to understand the message and act accordingly. The EWM recipient list could be developed more extensively through surveys and coordination with local governments to increase outreach to the areas that hadn't received the messages in the first phase (detailed recommendations available in section **Fehler! Verweisquelle konnte nicht gefunden werden.**).

3.2.4.2 Engagement of Community Volunteers

The intervention design had engaged the community volunteers for only a few days during the sensitization meeting and during the flood for early warning message dissemination and evacuation support. The intervention design should had focused on engaging the community volunteers throughout the year in phases. The community volunteers could be involved in conducting surveys in their respective areas to improve their list of recipients and identification of most vulnerable sections

within their societies to include within their intervention activities. The community volunteers could also be included in the early action planning, seasonal agriculture planning, etc. (detailed recommendations have been provided in section **Fehler! Verweisquelle konnte nicht gefunden werden.**)

The community volunteers appointed by the project did not include any female volunteers for which many of the women had said that they felt uncomfortable taking assistance such as holding hands for getting up on the boats or taking support for moving through difficult terrain. Community volunteer appointments should also include a percentage of female volunteers (detailed recommendations have been provided in section **Fehler! Verweisquelle konnte nicht gefunden werden.**).

3.2.4.3 SOP development

The project target of developing Standard Operating Procedure (SOP) for flood response could not been fully developed because of limited scope, lack of activities involving advocacy and consultation among national and regional level stakeholders as well as inadequate financial resources assigned for this intervention. The SOP development within the pilot phase was found as an ambitious project target, as such development usually require longer time and authorization from national and local levels.

Kommentiert [MIH1]:

3.3 Effectiveness: Strengthened Institutional capacity to respond to floods through Forecast based early actions

The effectiveness section is presented in two parts. This first part discusses the institutional capacity of key stakeholders built or developed by the project. The key stakeholders are the FFWC, DDM, UzDMCs, UDMCs and other LGIs. Also, it narrates the extent to which SUFAL brought about positive changes in their capacity to incorporate FbA into their system and strengthened the institutional capacity in decision making for early actions with enhanced early information Standard Operating Procedure (SOP).

3.3.1 Establishing Impact based Forecast Systems in FFWC

Though the FFWC under Ministry of Water Resources plays the key role in flood forecasting in Bangladesh, FbA actors had rarely involved FFWC in the process in different 'local capacity building initiatives' before SUFAL. SUFAL engaged FFWC heavily in its intervention plan as a key national level stakeholder. Before the project, FFWC provided flood forecast to the national, district level DMCs and at union level to some extent through email and mobile messaging. FFWC under BWDB used to forecast flood with 5 to 10 day outlook without local or grassroot level information. The forecasts were mostly for the larger administrative levels like upazila, so it was difficult to say which ward or union would be the most affected due to floods. Therefore, the forecasts (pre-SUFAL) were not localized till granular (ward) level. Another challenge was that the forecast messages did not reach the community level people who are the primary victims of the floods. Mostly the warning messages by FFWC used to reach district level, in some cases upazila level. Because of lack of understanding and interpretation of flood warning forecasts the key stakeholders at grassroots could not take early preparations before flood.

On that backdrop, impact-based forecasting was introduced by SUFAL successfully to the FFWC operational system with the guidance provided by RIMES throughout the project period. RIMES was responsible for providing technical support to FFWC on how to obtain and use granular level vulnerable area mapping to forecast flood and generate EWMs. Through the project, FFWC managed to forecast with 15 day outlook for flood in 2020.[8] Also, there is a possibility of utilizing monthly outlooks for flood management, which can extend the lead time up to 30 days.

With the project intervention, FFWC had managed to reach grassroots level stakeholders and community people who were the first line of people to be affected by the floods. In addition to the FFWC's existing list of DMCs and DDMs, the project supported the activation of DMCs at union level and engaged additional community people into the list for dissemination of early warning messages. There were 8,800 enlisted mobile phone numbers targeted by FFWC to disseminate voice messages.

[8] The 15 days basin forecast was operationalized at FFWC through RIMES's intervention titled 'Improved Weather and Flood Information System for Community based Risk and Resource Management' under SHOUHARDO III program. This has been a complementarity between these two projects.

RIMES had piloted this kind of early warning messaging previously up to the DMC level and they reported this was not very successful since it had not reached the community level. Through SUFAL the early warning messages had been disseminated and realised effectively since it included instructions systemically for early actions. The messages were developed in simple language so that low-literate people could easily comprehend the messages. Survey respondents expressed that it was more appropriate, informative and user friendly. SUFAL also facilitated digital display boards to DDMs, UzDMCs and UDMCs level which were capable to pull FFWC forecast from its website. This system has been incorporated into FFWC's working process. FFWC reported that they had their own Interactive Voice Recording (IVR), website and mobile application and they expected to incorporate these systems with early action-based forecast as well.

Digestible Messages

"I received the voice message a few days earlier the flood in 2020. I could easily understand the message because it was in Bangla. I also remember listening to information on river water level and possible days of flood to hit our village. I found the messages easy enough to understand."

- Zohurul Baperi, FGD participant, Jamalpur

Box 1

The vulnerability mapping and gauge monitoring was incorporated into FFWC's operational system through RIMES which increased the accuracy and quality of early warning forecast by FFWC. After the project ends, BWDB will take over monitoring the gauges and vulnerability maps to incorporate into their system.

Among the successes, there were challenges as well. The FbA is approach is based on the earliest warnings and greater lead time before flood hits. Greater lead time generation had been one of the challenges faced by FFWC. The greater the lead time, lesser the accuracy of the early warning messages. RIMES and FFWC have been found to be in the process of researching to generate accurate forecast 15 days ahead of flood. Another challenge faced by RIMES at community level was that the community people did not exactly realize the importance of early warnings and accuracy of the forecast. Therefore, the people were doubtful in the forecast of FFWC before the first wave, which resolved itself after the forecast came true.

3.3.2 Capacity of Service Providers to Implement FbA Approach

3.3.2.1 Increased awareness and strengthened institutional capacity in decision making and triggering early actions

After the SUFAL intervention, the DMC and LGI officials report that they have received a good understanding of the importance and benefits of FbA. After receiving the messages, they expressed that they have been impressed upon that it was imperative to take actions before the flood rather than during or after the flood. Previously (pre-SUFAL), they forwarded their budgetary needs and demands (budget allocation for new roads, shelter, latrines, tube wells, livestock vaccination, etc.) to their higher ups mostly when flood water started rising; but after SUFAL intervention.

A Subtle Change in Operation

"In previous years, we used to allocate the fund and support for flood management to LGIs after the flood hit. In 2020, they submitted their requirements much earlier and we could allocate the resources 7 to 10 days earlier flood."

- Mehedy Hasan Titu, Project Implementation Officer, Jamalpur

Box 2

To date the LGI stakeholders had been able to present their required budget for flood response earlier (around 7 days before flood) than previous years which had helped them to better prepare themselves to assist the affected community people. The DPHE in Jamalpur had been able to add the advice for availing purified safe drinking water into the early action message through the project to ensure that the flood affected community people have access to safe drinking water during their stay away from home during the flood season. The financial support for acquiring boats from SUFAL had facilitated them to reach out to more areas where help was needed.

3.3.2.2 Strengthened institutional capacity through co-financing schemes

SUFAL had co-financed with government for the renovation of the shelters, installation of additional tube wells and latrines, installation of water gauges, repair of roads, embankment, bamboo walkways, wooden bridge, acquiring boats for evacuation support, and others early actions. This co-financing schemes strengthened institutional capacity for maintaining infrastructures needed as flood preparations.

In these co-financing schemes, SUFAL spent around 91 percent of costs regarding early actions. Other 9 percent was contributed by UDMCs, union parishads, other NGOs, the school or madrasa authorities which were used as shelters by community people. This 9 percent contribution was both as cash and in kind.

For shelters, school/college/madrasa authority contributed to cleaning, minor repairs, and electricity repairs to some extent in Kurigram and Gaibandha. UDMCs contributed to the portion of cost of repairs of roads, embankments, bamboo walkways, wooden bridges, and boat provision for rescue through cash and construction materials. Also, UDMCs supported tube well installation, materials, and labour for latrine installation in shelters and temporary shelters. Moreover, the speakers for public announcements of EWMs and some kits (soaps) for hand washing stations were provided by UDMCs. In Gaibandha, another NGO supported tube well installation for shelters. Cattle feed was provided by FAO programme in Gaibandha. In Jamalpur, community people provided portion of voluntary labour support and bamboo for temporary shelters. There were also 'cash for work' activity to repair roads and embankments for under SUFAL where community people worked.

3.3.2.3 Strengthened organizational services to communities through FbA

The intervention increased organizational capacity of DMCs/LGIs to provide better services to community. SUFAL initiated community-based approach through local level government institutions, working with community volunteers in each of the unions. These community volunteers under union parishad took charge of receiving and sharing the early warning message with the community people who may have not been included in the early warning message recipient list. For this purpose, two community volunteers were selected in each union.

Approximately 24,000 households were reached by 24 community volunteers in 12 unions. This number includes all direct and indirect information sharing with friends and families, neighbours, community people, and public announcements with loudspeakers in mosques and local marketplace using rickshaw vans through community volunteers. In addition, every local union parishads also arranged public announcements in the targeted project unions. These announcements along with community volunteers covered around 39,729 households in total. The early warning messages enabled the LGIs and community volunteers to take early actions for preparing evacuation resources

so that once the flood hit the evacuation and rescue missions could be more easily mobilized. It has also enabled the community people to relocate their family members with disabilities to higher areas or at shelters.

With financial assistance from SUFAL, DMCs deployed more boats for evacuation support. DMCs lacked evacuation boats for whole affected area which was mitigated to some extent in 2020 from intervention. Through cost sharing, union parishads repaired roads and embankments, and built temporary walkways. These kinds of early actions were not taken before intervention for flood. Also, union parishads engaged community people in road/embankment/bridge making through Cash-for-Work programme which contributed to employment generation in communities. Some LGIs increased their supports to some of the shelters (e.g., DLS provided tents and feed for livestock, Upazila Health Office distributed oral saline, emergency medicines in some shelters, etc.).

The SUFAL team worked with the union level UPs and DPHE to install additional tube wells in the flood shelters before the flood to ensure that the shelter dwellers would have a source of safe drinking water during the flood. Also, the SUFAL team coordinated with UPs and DPHE to install 21 new latrines in shelters much earlier as they had anticipated the flood through the forecast. These supports from SUFAL capacitated the LGIs to better prepare for monsoon flood.

In addition, LGIs contributed additional funds for repair of roads and embankments (including funds for sandbags and transportation) even in adjacent unions. Additional shelters were supported through upazila administration in Saghata. School/ Madrasa committees in some unions also provided additional funds for some of the repairs in the shelter buildings. Also, in shelters LGIs provided food for displaced people through Social Safety Net Programs (SSNPs).

3.4 Effectiveness: Enhanced impact-based flood forecasting and early warning system to trigger early actions

This section discusses the effectiveness of actionable flood forecasting and triggering early actions as a result. Access to and acceptance of functional early warning system among the target people including community people and stakeholders are discussed here. Also, the effectiveness of FbA in enabling households, communities, DMC, and LGIs to take early actions is analysed under this section.

3.4.1 Access to Early Warning Messages (EWMs)

Figure 10: Reception of EWMs before monsoon flood in 2020

Before the SUFAL project started implementation, FFWC had a list of mobile numbers of the members of DDM, UzDMCs and UDMCs (to some extent). SUFAL made use of this list and had added community people, volunteers, and some UDMC members in the list as well. The list included 8,800 mobile phone numbers who were provided with the early warning message. SUFAL targeted 39,729 households who were to be reached through the community volunteers, loudspeaker announcement and individual information dissemination process. According to the last census of BBS (2015), the total population of the target unions was 264,860 with 52,972 households. The project targeted 75 percent of the union population for early action communication. The survey data revealed that 97 percent of targeted households have received early warning messages in 2020. (Figure 10)

It should be noted here that among the treatment households, only 6 percent reported receiving EWMs in the previous year (in 2019, pre-SUFAL year) from local government (union parishads and UNO offices). But after SUFAL intervention, 91 percent treatment group households had received the EWMs in 2020 for the first time, which showcase a noteworthy project outreach.

In 2020, the EWMs disseminated under SUFAL included forecasted timing of the flood, the duration of flood, the height of the water to be reached in respective areas, which areas were most vulnerable to inundation during the flood, and advice on what were some of the early actions that could be taken for reducing damage to households during the flood. Among the control households who were not targeted by the project, 37 percent households received the early warning messages from sources like local marketplace, neighbours, relatives, union parishad and public announcements. It should be noted that the control groups were taken from different unions in the same districts. The district level DDM and UzDMCs members circulated the same EWMs in other union offices as well. Some control group members also received the EWMs from their friends and families living in the treatment areas, or from bazaars or marketplaces during business transactions with treatment community members. This also explains why the lead time of EWMs for control group was lower than that of treatment group.

Though the control group had some access to EWMs in 2020, there were differences in quality of the messages between treatment and control group, especially regarding lead time, duration, water level etc. as illustrated in the bar chart below. The reasons behind these differences were the loss of information along with its accuracy due to indirect receipt of EWMs and lack of correct interpretation of the flood forecasts (details lost in translation or communication). As already mentioned, in many cases, control people in other unions received the warning from relatives or acquaintances living in the project areas.

The treatment group reported that they received more exact information from the EWMs about the forecast of flood time, water level, and duration. In case of all these types of information, control group did not receive proper or any information of flood forecast. 87 percent treatment respondents received the forecast of flood time while only 24 percent of control had the access to some of this information (Figure 11). Similarly, 79 percent of treatment respondents had the information of intensity of flood or forecasted water level, where only 13 percent of control group got this information. Similar differences had been noticed in terms of flood duration forecast, ways to take early actions, exact area of flooding and other preparedness information between treatment and control. SUFAL had thus considerably increased the access to forecast based information for flood to its target population.

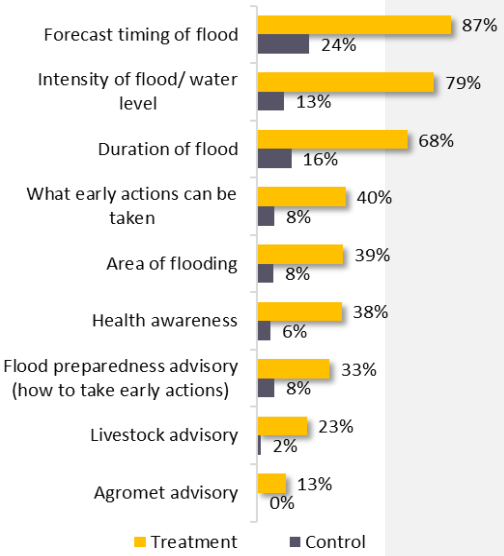

Figure 11: Type of information received in EWMs in 2020

Based on the survey findings, it can be surmised that the number of people accessing actionable early warning messages was achieved effectively and as the respondents have reported, they got this message on time to take adequate preparatory measures.

3.4.2 Acceptability and effectiveness of the EWMs

3.4.2.1 Acceptability of EWMs to community people

Respondents of the treatment group reported that the early warnings received in the past prior to this project period had not been as accurate in terms of the forecast and prediction of the flood. It was found that in 2019, 97 percent of treatment and 96 percent of control respondents did not receive accurate EWMs in terms of flood duration. Also, 99 percent of total respondents stated that EWMs were incorrect considering flood time and water level in 2019.

Therefore, when they had received the message before the first phase of the 2020 monsoon flood, they disregarded it based on their previous experiences; but once they had seen the accuracy of the information, they then started to trust the forecast messages and subsequently followed some of the instructions for early action prior to the second phase of the 2020 floods. Most of the treatment respondents reported the EWMs were quite accurate in the prediction given for flood duration, timing, and water level (Figure 12). It should be noted here, majority of the treatment and control group respondents prioritised the timing of flood and water level information from EWMs as the key information necessary for their needs and preparation. (Figure 14)

RIMES, with help of FFWC and Department of Disaster Management (DDM), prepared and broadcasted the messages which included information about probable time of impending flood, flood duration and expected intensity. As the message had been recorded in Bangla and in simple

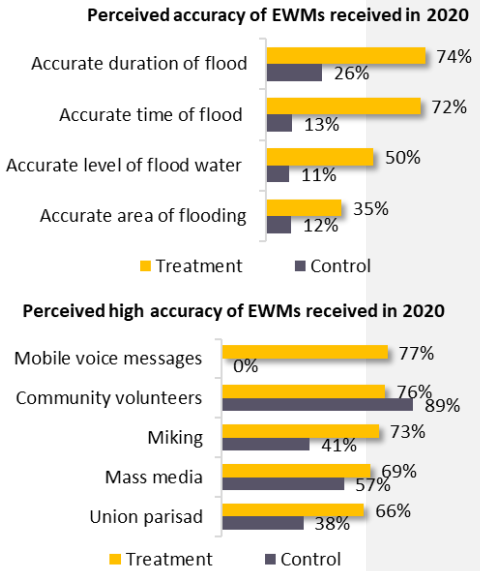

Figure 12: Accuracy of EWMs received

Initial Reservations

"We learned from the project staffs that we were going to receive the exact flood forecast before flooding this year (2020). I did not believe them first, neither did many of our community people. We thought that they were not God, how they could predict the exact flooding time and water level!! When the first wave of flood hit at the exact time and water level they predicted, we were really surprised and started believing them."

-Golapi, FGD participant, Saghata, Gaibandha

Box 3

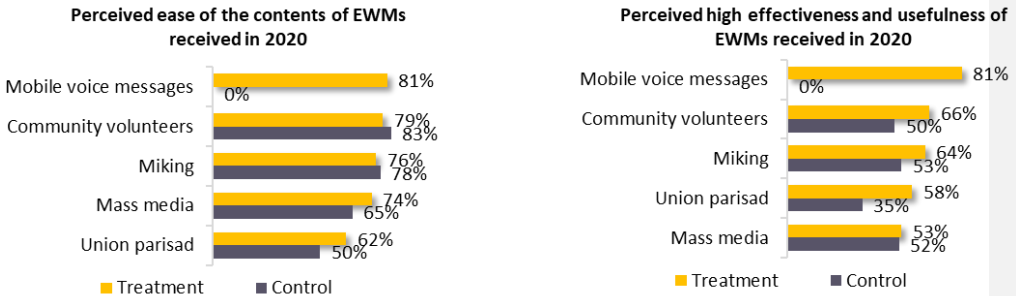

Figure 13: Ease and effectiveness of EWMs

words, the message recipients reported that they did not have any difficulties in understanding the messages being easy to comprehend and understand for the community members. Among the treatment group who received voice messages, around 80 percent reported high accuracy, and easy understanding of the EWMs through voice messages. (Figure 13) Similarly, the EWMs disseminated through the community volunteers and public announcement systems had a high level of accuracy and was also easy and clearly understood among the respondents who heard them. In many cases, the teenage school-going children were found to operate the mobile phone and their parents knew the EWMs from them.

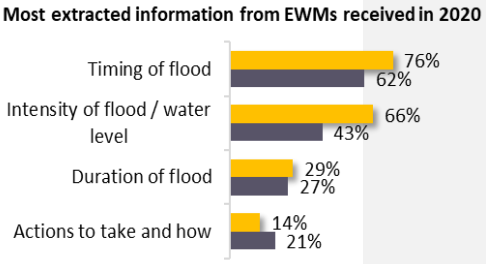

Figure 14: Most extracted information from EWMs received in 2020

SUFAL arranged capacity building sessions for the government officials and community volunteers which enabled them to better interpret the messages (as ascertained by the evaluation team) and disseminate the messages among the community people who had not been included in the message recipient list. Some of the influential people of the community such as the imams and teachers reported that by having increased clarity in understanding the messages, they were able to effectively disseminate it among the community people through their networks and resources such as the mosque sound system or sharing with people in the markets and neighbourhood.

An Inspiring Case

The Department of Public Health Engineering (DPHE) in Jamalpur reportedly used the early action message to spread techniques to avail safe drinking water timely during flood times. Rakibul Rahman, a sub assistant engineer of DPHE had asked the SUFAL team to include a message that informed the message recipients on how to use water purification tablets for safe drinking water during flood and the message had been added to the early action message the very next day.

Box 4

The early actions that had been included in the message advice on how to reduce damage from flood had been understood by the recipients. Respondents reported they used the information on early actions to apply netting around their ponds, stored dry food, made portable stoves, stocked their dry firewood on higher areas, moved their belongings and their livestock to higher ground, relocated the vulnerable community/family members such as the elderly, pregnant women, disabled family members, etc. to shelters or embankments.

Regarding DMC members, community volunteers, LGI stakeholders, and NGO officials that the evaluation team had spoken with, all of them said that they had been able to successfully interpret the early warning messages sent by FFWC. They did not face any difficulty understanding the messages. An UzDMC member described that the structure of the voice messages as easy and effective because the messages were recurring. Even if one accidently

Effectual Message Presentation

"I was impressed receiving the voice messages. It was an effective message, but simple in presentation. The messages were recurring and even if I missed one, I still got the next ones."

-Zahangir Alam, UzDMC member, Jamalpur

Box 5

turns off one message, he/she would get the next message anyway. This structure ensured that everyone enlisted for messages received it. Also, this was beneficial for the less educated people who had limited capacity to operate mobile phone.

The accuracy of the early warning messages was also confirmed by the stakeholders including DMCs and LGIs. The early warning message had helped them in decision-making earlier than before following which the UDMC members were able to make an evidence-based case for their needs before the DC offices for flood response fund allocation and support.

However, 16% of the treatment and 44% of the control group respondents reported that women in the community do not have adequate access to early warning messages. 9% of the treatment and 26% of the control group respondents reported the same for persons with disability. The reason for inadequate access to EWMs for women and persons with disability was that they had lesser mobility in public places like marketplace, mosques, and public gatherings.

Barrier in operating mobile phone

"*Few days before flood in 2020, my daughter came to me in morning saying my mobile phone was receiving some voice messages talking about flood. As I heard about this before from the project staffs, I understood this was the message of early warnings. But to be honest I could only understand as much as my daughter could tell me as I do not know how to operate a mobile.*"

-Kohinur, FGD participant, Chinaduli, Jamalpur

Box 6

Besides, while the core concept of the message had been easily understood by most of the recipients, the community people had not properly understood the parts of the message that contained technical information or numerical information. This lack of understanding was mainly among women who had low levels of literacy. The survey findings also revealed that less female respondents described the EWMs' contents as easy compared to male respondents. It should be noted here that the female respondents had less education level than male respondents. Among the female respondents, 65% of the treatment group members and 75% of the control group members were found to have no formal education (against 48% male in treatment and 68% male in control group).

3.4.2.2 Acceptability of digital display boards

As per project plan, 18 digital information boards were installed at convenient and high traffic locations, at the UDMC, UzDMC and DDMC premises of the target areas. The objective was to display actionable forecast and EW information in easily understandable formats by FFWC.

A total of six digital display boards had been set up in each of three intervention districts- 4 at selected union parishads (at the office of union chairman), 1 at the Upazila Parishad (at the office of upazila chairman or UNO) and 1 at the DC office. The boards were programmed to extract the flood updates from FFWC website according to its area automatically which helped the associated LGIs to be constantly updated about the upcoming floods. Since the digital boards along with the internet system are powered by solar power, it is functional and convenient in flood situations. Relevant UDMC, UzDMC and DDMC members were impressed on the usability of this digital board. The information on these digital boards contained union demographics, local flood and weather forecasts, information on probable flood

Sense of Satisfaction

"Now we do not need to wait for the messages or bulletins to know about the flood forecasts, we can always be updated through the digital display board at our DC office."

-A K M Idris Ali, DRRO, Gaibandha

Box 7

impact, and vulnerability maps. The users of digital boards found these effective in understanding the weather year the round and also look out for flood forecasts. All of them reported that these boards helped them to make preliminary decisions before monsoon flooding in 2020 and expect these will likewise be useful in the next upcoming floods.

However, the usability of the information had not become fully integrated into the governmental disaster risk reduction system as such changes require a longer bureaucratic process and policy level advocacy for this to be institutionally systemised.

3.4.3 Early actions taken at community level

The survey findings revealed that 93 percent of treatment group respondents had taken at least one early action before the flood in 2020. On the other hand, 60 percent the control group respondents taken at least one early action. In 2019, these percentages were 31 for treatment and 37 for control group. Therefore, the tendency for taking early actions had increased over the year by the project since the progress of treatment group compared to the control group is noticeable.

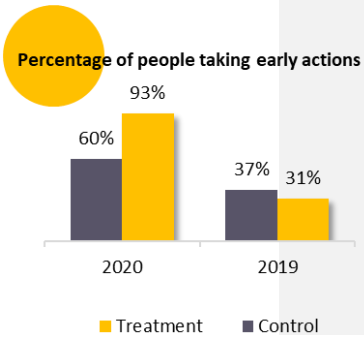

Figure 15: Percentage of respondents taking early actions

Study findings indicate that 51% of treatment households started taking early actions immediately after receiving EWMs, while 47% of control households took early actions after experiencing some damage. The households mostly took actions for safeguarding assets and food storage for flood time. The table and figure below shows the summary of early actions taken by the community people.

Table 4: Summary of early actions taken

Safekeeping/ safeguarding assets	89% of the treatment households dissembled houses and moved household assets and belongings in higher or safer places.
Reserving food	95% reserved dry food, cooking fuel, firewood, fire box, portable stove, etc.
Managing transportation	62% of the treatment respondents arranged small boats and homemade raft
Water	54% respondents collected water purification tablets (*halotab*) before floods; some arranged tube well sealing, water reservoirs, heightened tube well heads
Health	51% collected emergency medicine and oral saline before flood
Safekeeping livestock	41% relocated their livestock on higher grounds, raised their household grounds and cattle sheds before flood, or reserved livestock feed
Agriculture	6 to 7 days of lead time was not enough for early harvesting of crops

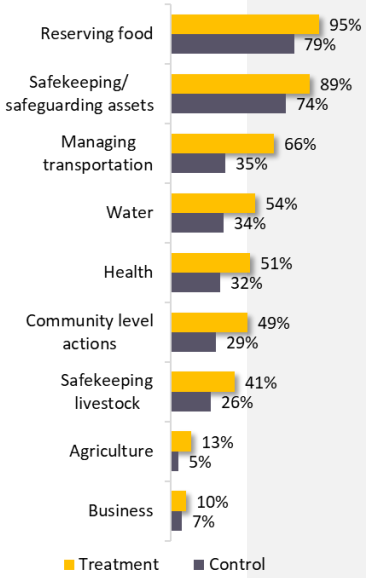

Figure 16: Percentage of households took early actions in 2020

Community level action	25% were involved in repair of roads and embankments, boat transfer, sub-platform for small boats, wooden and bamboo bridge

Early actions regarding safekeeping/ safeguarding assets

Moving household assets and stocking fire box and fuel are common practice among community people before flood and these were actions taken in 2020 flood as well. Also, most of the treatment group respondents were found to shift their valuable assets to higher and safer place before flood. The findings from FGDs revealed that households acquired dry firewood, portable stoves, moved belongings in higher areas, disassembled their homes, etc. Mostly men were involved in disassembling houses, moving household assets to safe places or higher grounds as these were more labour-intensive works. Women arranged stocking of firewood and fire box. These were some of the most common preparations which most of the households took.

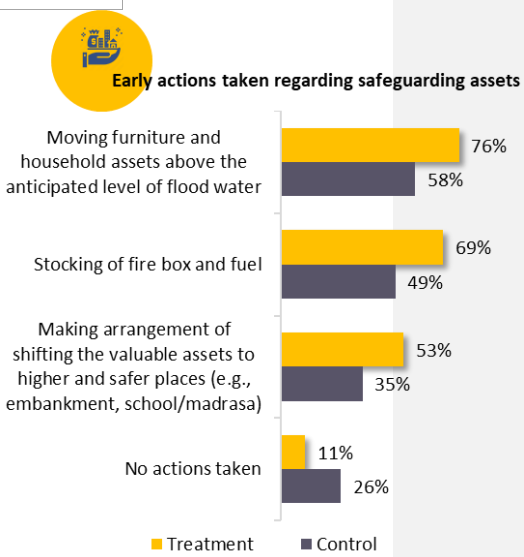

Figure 17: Early actions taken regarding safeguarding assets

Even though these were regular practices, the community people reported that they were able to take the measures earlier than usual and on time in addition to all the other preparatory work which had helped to limit some damage and loss. More of the treatment group respondents had taken early actions regarding their household needs compared to control group because of the early knowledge of floods its intensity and what to do. The treatment group respondents also stated that early warning before flood helped them to act sooner than previous years. Cash grant recipients reported that they could repair households to some extent with the money, which they could not do in many previous years. Very few people (11% of the treatment group and 26% of the control group) were found to take no actions at all to save households assets. (Figure 17)

Early actions regarding reserving food

Dry food, portable stove, firewood, etc. had been acquired and stored earlier than previous years after receiving early warning messages. Similar to the households' assets, community people take some form of early action in case of food security. Around 80 percent treatment group respondents said to take early actions by preserving cooking fuel, stove, dry food, and preparing portable cooking stoves. Overall, by receiving the EWMs, the treatment households were able to take preparatory measures for the different tasks needed to save their goods and assets on time. According to the treatment group respondents, early warning enabled them to decide sooner what to do and take actions consequently. Cash grants had also contributed significantly to buying and stocking foods.

EWM for Food Security

"Usually, we used to store dry food before flood when the water level began to increase. This year, we did it earlier. We started stock-pilling dry food and raised cooking stoves after receiving the voice messages."

- Jahangir Hossain, FGD participant, Kurigram

Box 8

Control group respondents were also found to take similar early actions, but in less number. 54 percent took actions for stockpiled food and 54 percent preserved cooking stove and fuel and 63 percent control respondents prepared portable mud stove as early actions. Also, 21 percent of control respondents did not take any kind of early actions at all. (Figure 18)

Women were found to be engaged heavily in taking early actions regarding food. Stockpiling dry food, preparing portable mud stoves, and stocking firewood and fuel were done by the women mostly. Men were found to contribute quite little in this aspect except buying food from market. In many cases, women reported that they bought rice and lentil from neighbours to store dry food.

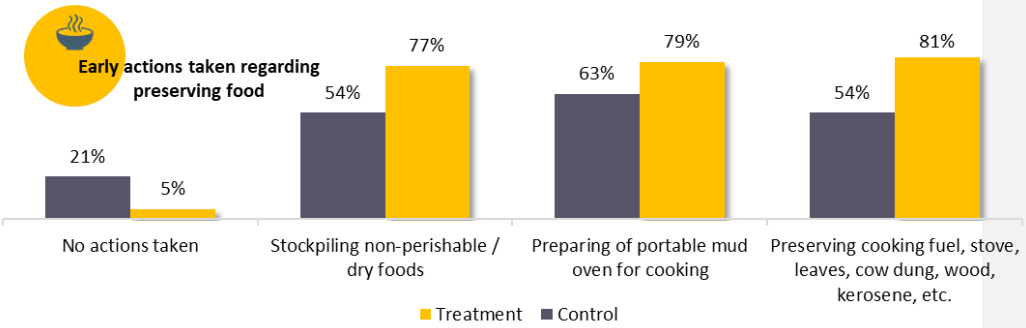

Figure 18: Early actions taken regarding preserving food

Early actions regarding managing transportation

For transportation purposes, most (62 percent) of the treatment respondents arranged small boats and homemade raft known as '*bhela'* from banana trunk. (Figure 19) These temporary boats are the main transportation system for day-to-day life during floods. But, among control group respondents, only 34 percent made arrangement for these rafts. Here as well, most of the control group respondents did not take any action at all. This percentage is lesser for treatment group respondents.

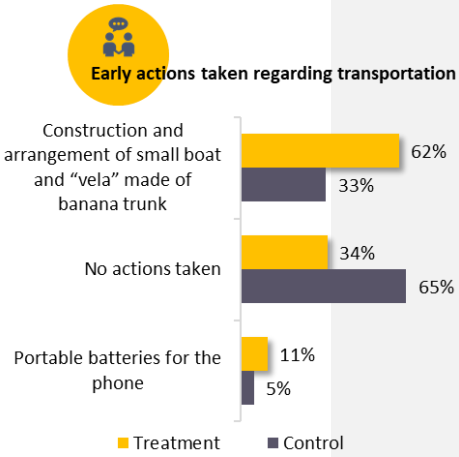

Figure 19: Early actions taken regarding transportation

Both women and men in the households were engaged in construction of homemade raft as raft-making require involvement of more than one person. Mostly, household members made these rafts together before flood. Also, almost of all flood-affected people used this raft during flood irrespective of gender because this has been the main transportation system during flood. Moreover, men were found to be more prone to commute from places to places while women tend to stay at home or shelter to look after children. Regarding arrangement of boats, men were found to contribute more. Women had less mobility and acquaintance to hire boats for evacuation or transportation during flood. Women headed families were also found to make their own bamboo or banana-tree raft with the help of household members or neighbours.

The major challenges in this case were lack of boats available for evacuation and daily transportation during flood. The community people reported that during floods it became difficult to rent a boat and price got higher as well. Therefore, the poor people could not avail boat for evacuation or transportation. In addition, women, elderly, and disabled persons faced the biggest challenges in using boat or rafts. These challenges were addressed by the project to some extent by providing boats to the union parishads for evacuation. The union parishads also expressed that the boat support came in big help for them as they did not have enough boats for all the flood affected people in their locality.

Boat Support

"The biggest help from SUFAL has been the provision of boats. Previously, we had only one boat from UDMC or the whole upazila which was far from enough. SUFAL provided 6 more boats for rescue and evacuation support. However, although these additional boats were really helpful for our communities during 2020 flood, but it is still quite less than our requirement at that crucial time."

- MD Nayeb Ali, DRRO, Jamalpur

Box 9

Early actions regarding drinking water

It had been found that most of the respondents (both control (66%) and treatment (46%)) did not take any early actions in case of safe drinking water. (Figure 20) Some of these actions were not affordable by the community people as they are mostly poor people.

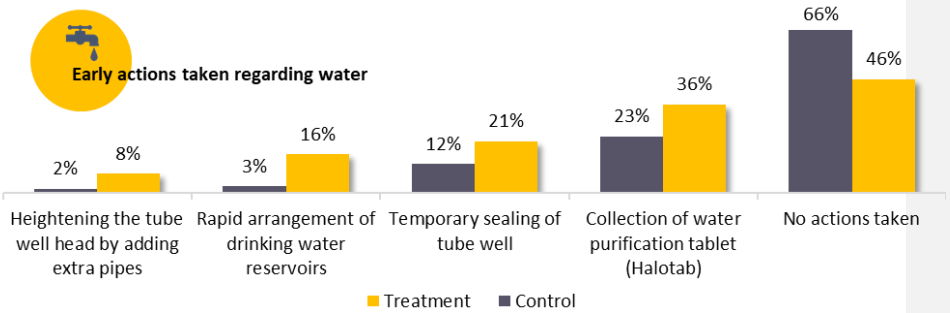

Figure 20: Early actions taken regarding drinking water sources

36 percent of treatment group and 23 percent of the control group respondents collected water purification tablets (halotab) before floods in 2020. A small percentage of respondent households arranged temporary tube well sealing, water reservoirs, and heightened tube well head as seen in the graph below. In case of all actions to arrange and preserve water sources, control group households took fewer actions than treatment group households. Early actions regarding drinking water were mostly taken by male members of households. Women were rarely engaged in tube well heightening and sealing, collecting purification tablets etc. But women were found to collect drinking water

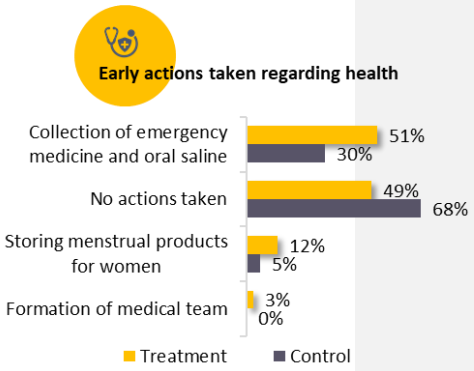

Figure 21: Early actions taken regarding health

during flood from nearby tube wells (if any) for family's daily use.

Early actions regarding health

Little more than half of the treatment group reported that they collected emergency medicine and oral saline before monsoon flood in 2020. 30 percent of control group respondents said the same. A major percentage of treatment (68 percent) and control (49 percent) respondents did not take any actions in terms of preventative health measures. Only 12 percent of treatment and 5 percent of control reported to store menstrual products before flood. (Figure 21)

Collection of medicines and oral saline were mostly done by men as they bought those from market. Women headed families did not collect much medicine, hygiene products or oral saline because of lack of resources and accessibility to market. Most of the women in target area were found to use traditional menstrual products (old cloths). Very few women were found to store extra menstrual products (old cloth) for flood time. They usually do not buy hygienic products for menstruation because of lack of awareness, finance and accessibility.

Early actions regarding livestock and fisheries

In case of livestock and fisheries, less than half of the treatment (about 41 percent) respondents were found to take some actions (Figure 22). The major reasons for not taking early actions were lack of evacuation support; high transportation cost; limited tent facilities in shelter centres; lack of feed, etc.

Some of the community people i.e., 39 percent treatment and 25 percent control had relocated their livestock on higher grounds (mostly embankment) after receiving the early message. The respondents reported that there was lack of security and incidents of thievery on the embankments. Very few treatment respondents (1%) were found to raise their household grounds and cattle sheds before flood.

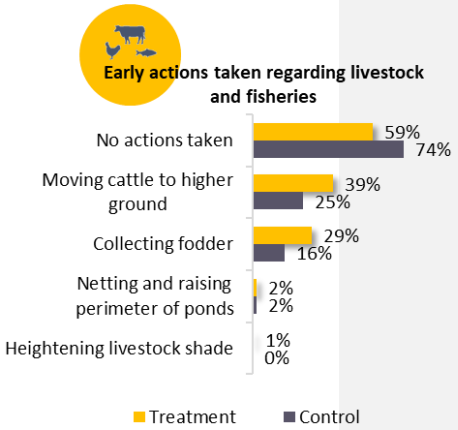

Figure 22: Early actions taken regarding livestock and fisheries

Some community members had also acquired feed for the livestock and kept it safe on a higher ground so that it was not damaged by the flood water. Since the cattle feed arrangement was difficult in the shelter, the people had to come back and forth to collect feed for their cattle. Also, many of the community people brought their livestock to the flood shelters in temporary tents set up by the project. The poultry birds were relocated to shelters or higher ground to prevent death and illness from flood water. Overall, the treatment group respondents showed better practices than control group respondents. Men were predominantly engaged in moving livestock, collecting fodder and heightening livestock shades since these works were more physically demanding. Women headed families moved their livestock with help of neighbours and relatives. Women in these families were found to move poultry birds and goats to shelters and higher places. They also stated that they sought help to collect fodder because it was difficult for women to collect fodder during flood. Submerged grass and plants were collected using bamboo raft.

It should be noted here that only 6 percent treatment and 4 percent control households were engaged in fisheries as their primary income earning sources. As a result, the percentage of taking early actions regarding fisheries was lower. Few of the community people had set up nets around their ponds so that the fish were not washed away when the ponds got completely inundated in flood water. This time they were able to complete the action earlier and on time due to the early warning message. These early actions were predominantly done by male members.

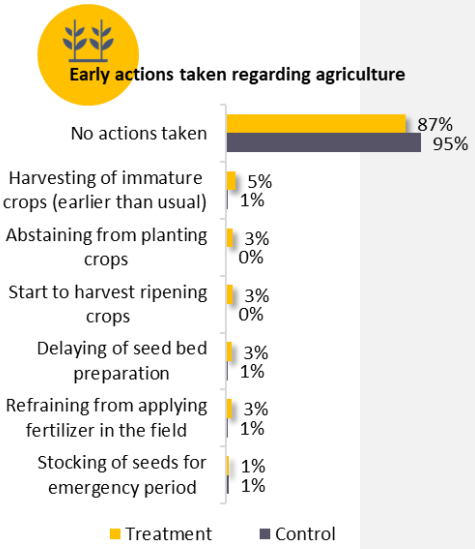

Figure 23: Early actions taken regarding agriculture

Early actions regarding agriculture

The early warning message had a limited role in early action for agricultural activities of the community people as the early warning had come just about 7 days before the flood and there had not been enough time for early harvesting of crops. The lead time needed to plan for harvesting of crops is about one month (discussed in the paragraph below). Furthermore, most of the people cultivate jute during this season and inundation of jute plants for a week does not have too much harmful impact, instead cutting the jute down prematurely would incur economic losses. Most people did not trust the forecast about the duration of the flood and thus did not take early measures for agriculture. 87% of the treatment group despite having received the EWM did not take any early action to protect or preserve the agricultural crop. This was similar to the control group of which 95% took no action also regarding agriculture. From the FGDs households expressed that they realised the urgency of taking early actions after forecast of the first wave in 2020 flood came true. But, since the water level was still standing when the 2nd phase came, they could not harvest their crop.

A few cases had been observed where some farmers harvested jute prior flood after the receiving early warning messages. These farmers claimed that they could not sell their produce at highest market price which they could have if the jute was fully mature. Yet, they prevented the full damage of the crop and complete loss by taking early actions. In these cases, male family members were mostly engaged in harvesting as this is the traditional practice. They also sold their harvest to market before flood. Women were generally involved in post-harvesting process like cleaning the jute fibre, sun drying and storing paddy etc. Women (engaged in cultivating cereal crops) were also engaged in storing seed for next season. Women headed families usually took help from neighbours and relatives to harvest crop (if they had any land to cultivate), since they had less mobility to crop fields and less financial ability to hire labour for harvesting.

Early action in agriculture requires more comprehensive planning and long-term strategy like types of crops they should sow/ produce; seasonality factors; preparing labourers and labour cost for harvesting, capacity development of farmers on these issues, etc. As DAE and community members stated that a longer lead time (probably 1 month) could give farmers better chance in taking early actions in harvesting/ storing/ selling their produce and seeds. RIMES confirmed that they were in the

process of researching on how to provide the forecast a month earlier and it might be possible to lengthen the lead time. However, longer lead time reduces the accuracy of the forecast.

Early actions at community level

Overall, the study found that community people do not take many actions at community level. Among both treatment and control group respondents, only some early actions were recorded e.g., repair of roads and embankments, boat transfer, sub-platform for small boats, wooden and bamboo bridge, etc. Mostly men were involved in these activities as these have been traditionally 'men's work'. Women were not engaged in any construction works at community level.

The Figure 24 shows the community level actions that were guided by DMCs and LGIs and also led by the households themselves. The FGDs suggested that more community level actions were taken in 2020 that were guided by DMCs and LGIs as compared to previous years, which can be attributed to SUFAL. Also, as per the survey findings, in 2020, 25% of treatment group households worked under SUFAL's cash for work intervention for repair of roads and embankments which was 10% in 2019. In 2020, 14 percent of control households support the same cause, and the percentage was 9 percent in 2019.

Early actions regarding business

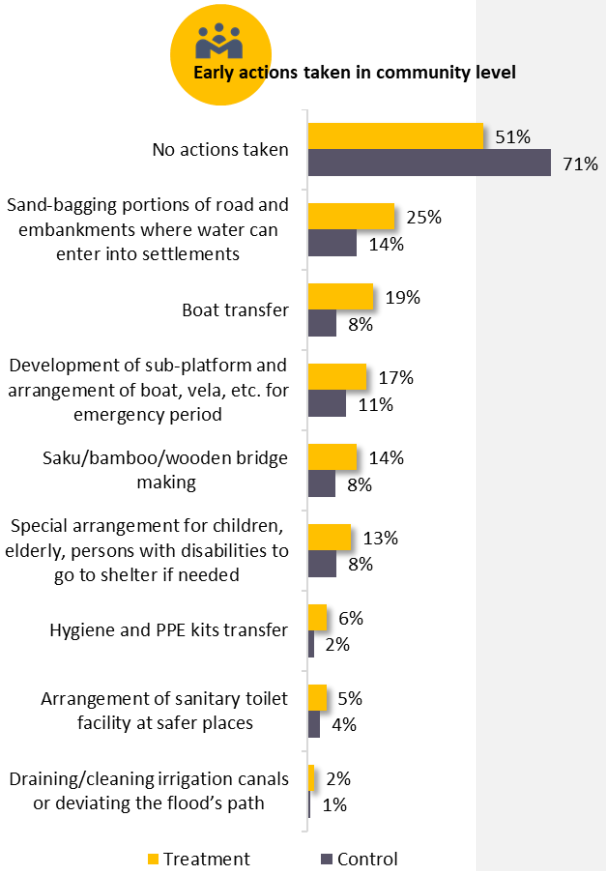

Figure 24: Early actions taken in community level

It was found that most of the community people did not take any early actions regarding business (Figure 25) since only 8 to 9 percent of the respondents were engaged with small to medium business. Few of the respondents were found to shift business goods to higher ground, lift the goods-shelves above flood level, stored daily commodities elsewhere, repaired and increased the height of the shops, early sales of goods that they could not store safely etc. This was one of the sectors where men were responsible for most of the necessary early actions. Women were not engaged here because of their lack of mobility and access to marketplace.

3.4.4 Attitude towards taking early actions

Traditionally people are not willing to leave their household unless it is absolutely necessary (till their household becomes inundated). Therefore, people had not been willing to relocate to higher ground as an early action. The reason behind is that they do not feel safe to leave their household unsecured (in case of theft of robbery); shelters are overcrowded and little space for the whole family and livestock as well. However, the respondents interviewed reported that were grateful to the early warning message as some of them were able to acquire dry food, portable stove, firewood, medicines, and relocate their valuables (assets, livestock, and disabled family members) onto safer areas where they would not be affected by the flood. These early actions were traditionally practiced by the community people. Most of the people took comparatively fewer early actions before the first wave of flood in 2020, as they were doubtful about the EWMs at first. FGD findings suggested that the community people mostly took actions before the second wave of flood when they witnessed the accuracy of the EWMs during the first wave. As found by the survey, 93% households took at least one early action, mostly before the 2nd wave. Besides, agricultural producers or farmers took comparatively less early action as seven days lead time was not enough for them for managing labourer and money for harvesting and selling their crops in that short time. Besides, market price for crops at that time was also quite small. And a major portion took early actions like stocking food, fuel, and firebox as those took lesser time to manage or prepare.

Another reason of taking fewer early actions was lack of financial resources. 42 percent from both the treatment and control group stated that they financed their early actions by own funding (Figure 26). Of the treatment respondents, only 15 percent said that they

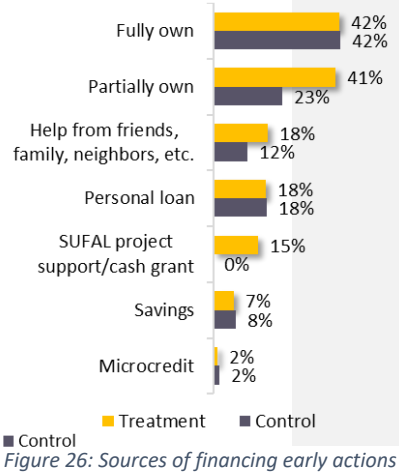

Figure 26: Sources of financing early actions

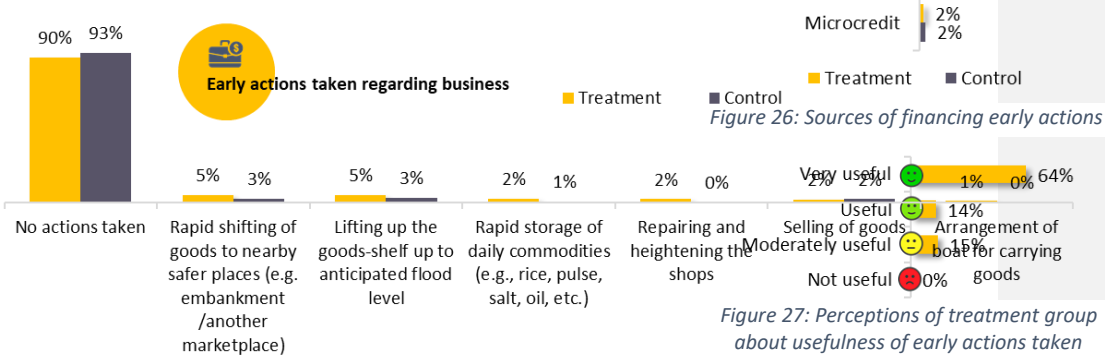

Figure 25: Early actions taken regarding business

Figure 27: Perceptions of treatment group about usefulness of early actions taken

received the funding or support for early actions from SUFAL. This suggests that community people will continue to take some early actions on their own if they are provided with accurate early warning with adequate lead time. In line with that, 38% treatment group respondents reported that they can take early actions without the project support in upcoming years.

Though the practice of taking early actions has not been commonly and uniformly taken up by the respondents, 64 percent of the respondents stated that the early actions taken by them were very useful (Figure 27). Another 29 percent reported this to be useful and moderately useful. Therefore, in total, 93% respondents reported that early actions taken by them were useful to them. Their perception on usefulness of the early actions taken are shown in the chart beside. The community people said they look forward to the early warning message in the following years so that they can take earlier action to further reduce their losses from the annual floods. It should be noted that 96 percent of treatment respondents stated that taking early actions was easier in 2020 than previous years. Only 28 percent of the control respondents reported the same.

The LGIs, UzDMCs, UDMCs, DDMCs expressed satisfaction and appreciation with the FbA and expressed willingness to further integrate the early warning message into their decision making for future floods and other disasters. They are very hopeful that the early warning messages would help them to mobilize their resources much faster to address the problems being caused by flood, prepare better for evacuation services, and support the community people to incur less damage and loss from flood in upcoming years.

Confidence in FbA Approach

"The greatest learning from SUFAL was the FbA approach. We did not exactly think of working in this way for flood management. We were always more concentrated to relief and other post-flood actions. The practice among government bodies will change in time, but it was a necessary eye-opening experience."

- S.M. Jamal Abdunnaser, Upazila Chairman and UzDMC, Jamalpur

Box 10

3.4.5 Enabling factors on uptake of FbA

The evaluation team has found that the FbA concept adapted and implemented by SUFAL worked well in getting the community people and related stakeholders to take early actions. The factors enabling the uptake of the FbA concept and implementation are given below.

3.4.5.1 Increased understanding of FbA appproach

Since FbA was a fairly new concept for LGIs, DMCs and national level stakeholders, it was expected that the approach might not receive full acceptance among them. The typical procedure of government bodies was to respond during flood and post-flood damage mitigation. Yet, all the LGIs, DDM, UzDMCs and UDMCs interviewed expressed high-level acceptance based on their level of understanding of this approach and way of working of the project. This was brought about by SUFAL through capacity building sessions, continuous communication, and regular updates of the project actions.

3.4.5.2 Increased accessibility and acceptability of actionable forecast

The study findings show that project interventions increased the access of community people and relevant government and non-government bodies to actionable forecast in a timely manner. This was the major factor behind their ability to take early actions as found from the survey and qualitative

findings. Increased accessibility to EWMs and increased acceptability of these messages to community people were crucial in triggering changes in their attitude and behaviour related to forecast based early actions. Therefore this change in their behaviour in taking early actions increased effectiveness of project results.

3.4.5.3 Infrastructure supports

SUFAL co-financed with LGIs in the repairment of embankment, roads, and bridges and these tasks were completed before the first wave of flood in 2020. Shelter renovation and repairment was completed about 10 – 15 days before the first wave. Also, the project-built bamboo and wooden bridges to facilitate transport during flood. The infrastructural repair and maintenance enabled the community people to evacuate faster during the floods and maintain communication with communities who were cut off because of inundation. These infrastructural repair and maintenance and support also helped the LGIs as well to better organize and plan their tasks before flood and provide evacuation supports. These initiatives enhanced early warning system to trigger early actions and increased project effectiveness.

3.4.5.4 Shelter supports

Regarding flood shelters and evacuation points, SUFAL assisted in the repair and renovation of local schools as flood shelters, repair of tube wells and electricity supply for the flood shelters, building temporary shelters on higher ground, cattle sheds along with shelters, as reported by the respondents. An age-old trend among the community people is that they do not want to evacuate their households until it became dire situations since they are not secure about the lack of facilities and security in flood shelters.

Shelters with better facilities motivated the community people to evacuate faster and seek out safe place to stay during the floods. Most of the female treatment respondents reported that the facilities in the shelters were better in 2020 than previous years. According to the interviews with an UzDMC member (who was also a member of a District NGO Coordination Committee) in Jamalpur, the shelters under the SUFAL project were repaired and prepared earlier and the facilities were upgraded as well.

3.4.5.5 Emergency support

Among the other emergency supports, evacuation boat was said to be as one of the most vital supports for flood affected population reported by both the community people and LGIs. UzDMCs and UDMCs both lacked adequate number of boats during flood though it is the only form of transportation in flooded areas. Boat support from SUFAL helped the UDMCs to evacuate people faster. Also, there were food and feed support from UDMC and LGIs. 63 percent of treatment and 62 percent of control respondents reported that they received food support during or after floods. These supports have increased people's trust in LGIs and encouraged them to move to shelters instead of staying in inundated households.

3.4.5.6 Cash support for least income group

The project was found to provide multipurpose cash grants to 1,850 households for COVID response and for taking early actions. The cash grants were provided before and during flood to the most vulnerable community people. The survey findings revealed that the cash grant receivers were the

least income group among the respondents. The cash grant support has increased the vulnerable people's ability to take early actions and helped to mitigate the income loos due to pandemic.

The respondents reported the use of the cash grant in taking various types of early actions. The study found that 90% of the cash grant beneficiaries took at least one early action in 2020 where it was only 18% in 2019. These cash grant beneficiaries reported that they took early actions in order to meet their household requirements (e.g., house repairing, house elevation, etc.) and food stocking mostly. 86% of cash grant beneficiaries used the cash for food and 57% used it for house repairing. The FGDs also found that since the cash grant recipients were extremely poor households, they mostly bought food before and during flood with these cash grant.

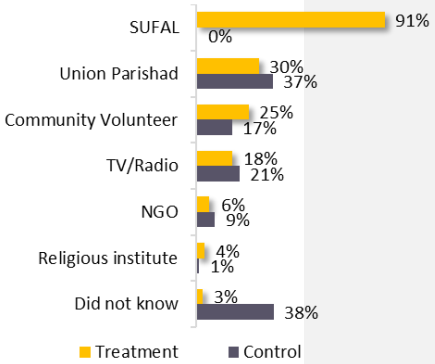

Figure 28: Source of knowledge on early actions to taken before flood

3.4.5.7 Knowledge of early actions

The early warning messages developed by FFWC and early action list developed in consultation with local level stakeholders and community people were major contributing factor for the households to take early actions. The advice for the necessary early actions was disseminated among community people through voice messages and public announcements which guided them to take steps accordingly. (Figure 28) Also, the community people were also informed of the location of nearby shelters and thus shared the knowledge with neighbours and other community members.

3.4.6 Major Challenges faced

According to the study findings, despite the finding that 93 percent respondents having taken at least one pre-flood early action, at the same time, the study found that 79 percent of treatment group respondents and 84 percent of control said that they faced difficulties when taking the early action in 2020. The major challenges of community people were lack of financial resources, manpower, boat provision, and knowledge regarding what early actions to take (Figure 29). The other hindering factors for the project to implementing early actions are discussed below.

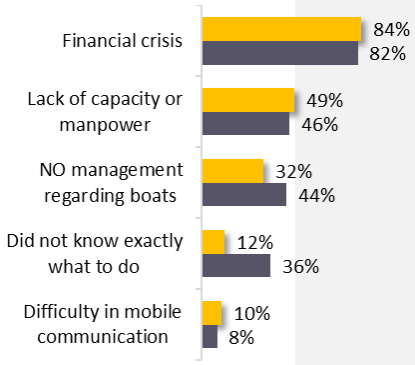

Figure 29: Challenges faced to take early actions before flood

3.4.6.1 COVID-19 pandemic

A major challenge for the project interventions was lack of face-to-face communication and mobilization during pandemic. The workshops with key stakeholders and community discussions sessions were delayed due to nationwide lockdown prior the monsoon period of 2020. This also hindered the preparations of UDMCs and LGIs for early actions.

3.4.6.2 Lack of financial resources

The DPHE, DLS, union parishads and upazila parishads reported lack of financial resources, human resource, and other supports (e.g., medicine, cattle feed, water purification tablet etc.) during flood.

For emergency response, these LGI bodies received support from government bodies, but these were not enough according to need. The service providers- UDMCs, UzDMCs, UPs, DLS and others do not have adequate number of field staff to cover the flood affected area during or before flood. The remote areas always end up remaining untouched. Most of the UPs either do not have any boat or not enough as required. Unfortunately, the UPs do not have any special budgetary plans for disasters. The extra support they get from Upazila level is in relief form, and not for any early action.

3.4.6.3 Lack of coordination at institutional level

The DMCs and LGIs bodies lack proper coordination horizontally and vertically among the departments. These bodies work in separate approach in disaster management. There is no clear instruction how the resources will be passed down to union level in case of emergency. Also, bureaucratic, and political constraints among government bodies make the decision-making process slow. SOP would have provided a standard guideline for every DMCs and LGIs bodies to take structure and predefined actions, but it was not developed within the project timeline.

3.4.6.4 FbA is still a new concept

FbA is still a fairly new concept for community people as they are habituated to taking actions only after flood hit their communities or households. They need to be further sensitized over these early actions to instil it in their pre-flood practices. It will take some time for changing community attitude and bring behavioural changes regarding uptake of forecast based early actions. It would require a few more years of intervention and integration of this new concept through yard meetings and workshops with the community people.

3.4.6.5 Lack of community volunteers

There were 8 community volunteers in each target district. Every union was supported by 2 volunteers which was considered and found not enough to cover all the vulnerable areas in those unions. Also, there were no female volunteers which would be more effective to reach out to the female members in households.

3.4.7 Changes made in the messages and FbA support due to COVID-19 pandemic

Many of the meetings, trainings, and workshops with LGI, DMC, and community volunteers had been conducted virtually instead of being conducted physically because of restrictions imposed during the COVID pandemic across the country. Only in Jamalpur, the project team was able to arrange the workshop in-person.

Some field work had to be suspended due to the lockdown situation for the outbreak of Covid-19. Some of the flood cash grant fund had been used to provide Covid-19 response cash grant as the pandemic had also been a disaster of massive scale.

The actions taken as a response to the Covid-19 situation had been very relevant as it aligned with the government and expert provided safety measures that could help decrease the spread of the virus. Furthermore, the cash grant support that had been provided to the community people at the time

when they had been facing financial constraints and issues in the households had greatly helped the supported households.

As response to pandemic situation, the project incorporated special instructions for COVID-19 safety measures in its early warning messages to the communities and other stakeholders. According to the respondents, they received information of COVID-19 related safety measures from public announcements, union parishads and community volunteers, and voice messages. (Figure 30)

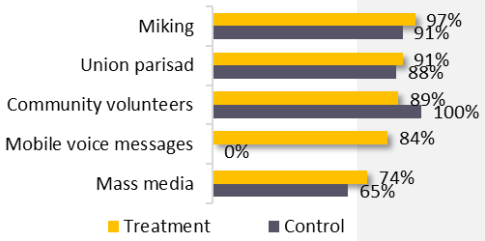

Figure 30: Inclusion of COVID-19 safety measures in the contents of EWMs received in 2020

In addition to COVID-19 information, 55 percent of treatment respondents said to have received support from different entities (i.e., SUFAL, union parishads, other development projects etc.) during pandemic. 37 percent of control group respondents said the same. The supports include awareness messages, installation/maintenance of water facilities and hand-washing points, and disinfection facilities in public spaces. 37 percent of treatment group respondents reported that they received the COVID related support from the project. 23 percent and 14 percent of treatment group was facilitated by union parishad and other NGOs respectively. Though the control group respondents did not get any benefit from SUFAL, they received similar support from UPs and other NGOs.

3.5 Impact

This section talks about the impacts of the intervention. Whether the FbA approach had contributed to the protection of livelihoods and assets of the target population, reduction of mortality and morbidity of the community people after the flood, reduction of losses in agriculture, livestock, poultry, etc. and lastly about whether FbA approach had brought about a positive change for the people in terms of avoiding the negative coping mechanism of taking loans after the flood for damage mitigation and as a major coping mechanism.

3.5.1 FbA's contribution to protection of livelihoods and assets

It was found through the study that the less people in treatment group respondents had experienced damage due to the floods in 2020 compared to the people in control group, despite of being located more flood vulnerable areas than the control group. The treatment group had been able to prevent damage on their assets and subsequently saving their assets from the impacts of flood. The average value of assets saved from the flood impacts had been higher than that of the control group.

As mentioned above, SUFAL project had undertaken activities and intervention in the most vulnerable areas of the 3 intervention districts. As a result, the people who were most vulnerable to flood had been involved in the intervention activities and the people left out of the intervention had not been as vulnerable to floods as the treatment group. While the treatment group were expected to have higher damage incurred due to flood in most areas, it was found that less respondents in treatment group faced damage than the control group respondents in many aspects such as death, disease injury of poultry, damage of seedlings, loss of employment (agriculture and non-agriculture), etc.

3.5.1.1 Damages faced by Treatment and Control Households from floods

Figure 31 illustrates the damage faced by the treatment and control respondents. Around 89% of the treatment respondents and 91% of the control respondents said to have faced damage during the flood in 2020. The least damage was experienced in shortage of feed for poultry (5% treatment and 4% control), damage of seedlings (7% treatment and 8% control), impact on wages (8% treatment and 9% control), shortage of fodder/feed for livestock (9% treatment and 11% control), death, disease, and injury of cattle/livestock (14% treatment and 10% control) as it is illustrated in **Fehler! Verweisquelle konnte nicht gefunden werden.**. The most damage faced by households was regarding the death, diseases, injury of poultry (54% treatment and 57% control), loss of employment as agriculture day labour (38% treatment and 48% control), loss of employment as non-agriculture day labour (36% treatment and 43% control), and crop damage (27% treatment and 16% control).

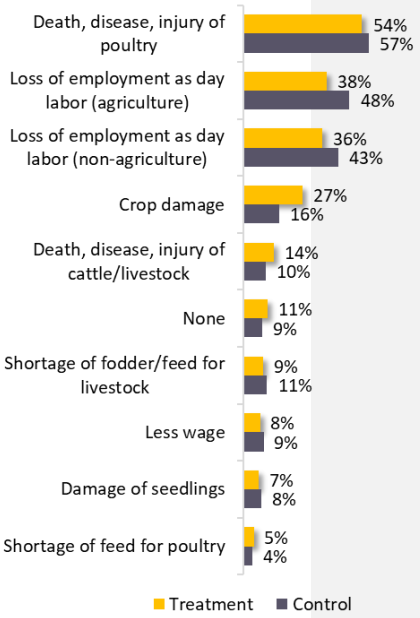

Figure 31: Percentage of households facing damage due to floods in 2020

When talking about damages, it is also important to look into the breakdown of the kinds of damages or losses that the people may have faced during the floods of 2020.

In case of **agriculture**, it was found through the study that around 27% of the treatment and 16% of the control groups had faced damage to their crops that had already been in the agricultural fields, 7% of the treatment and 8% of the control respondents said to have had damaged seedlings that they use for sowing in the agricultural fields, and only 1% of the treatment and control said to have either faced difficulty in selling the agricultural produce or had not found the desired price for their agricultural produce. This was mainly because farmers did not believe the early warnings during the first phase, and by the time they trusted the prediction, it was too late to take any actions. Also, if the crop had survived the flood, farmers would have gotten a full harvest, which they had hoped for but lost because of the long duration of the 2020 floods. Also, early harvesting of the jute crop reduces the market value of the crop. In most of the cases, farmers take this chance of keeping the crop (mostly jute at that season) in the field to get full revenue. Many of the people had said during the FGDs that the loss of agriculture was higher in 2020 than in 2019 due to the longer duration of the flood in 2020. The respondents' report they were able to protect about 10 *maund* of crops per household during 2020 flood as opposed to 13 *maund* of crops protected in 2019.

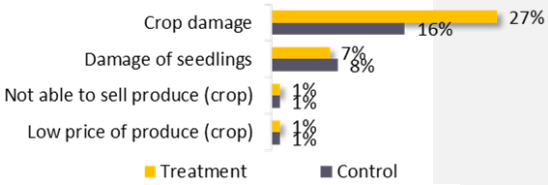

Figure 32: Loss in agriculture from flood

Livestock are such an asset that are more susceptible to illness and death during long duration and recurring floods than they are during shorter floods. It was agreed upon by all respondents that the flood of 2020 had been much more intense and longer lasting compared to that of the flood in 2019 (**Fehler! Verweisquelle konnte nicht gefunden werden.**). Due to the drawn-out duration of the flood in 2020, people reported that they were not able to prevent more damage than they did in 2019. However, they did agree that without SUFAL's support with the temporary shelter materials, installation of cattle shed in the shelters and the early warning message had enabled the people to take early actions to relocate their livestock and kept the damage to a minimum. Most of the community people (54% treatment and 57% control) reported that their livestock suufered from death, disease, or injury; 9% of the treatment and 11% of the control had shortage of fodder or feed for livestock; 2% of the treatment and control had received lower price of livestock than they may have desired; and 1% of the control and treatment said that they were not able to sell their livestock. The treatment respondents said to have protected an average of 2 cattle per household in 2020 while they said to have been able to protect 3 cattle per household in 2019. These findings also suggest that despite all efforts of early actions, response and

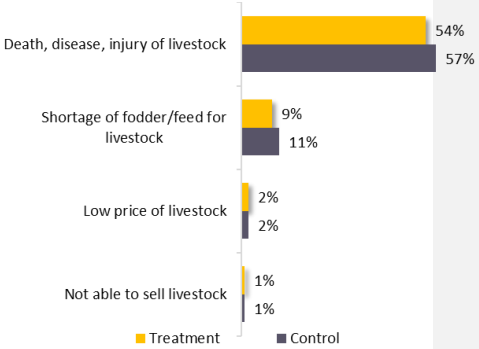

Figure 33: Households faced damage in livestock

recovery should be an integral part for planning in FbA. This point is further detailed in the recommendation section.

The cost of **medical expenses** is also very highly reliant on the duration of the flood as it causes people to stay away from home and in unfavourable conditions for a longer period of time which may lead to illness and subsequently lead to higher medical expenses. The average increase in medical expenses was higher for the treatment group in 2020 than it was in 2019 (Figure 34).

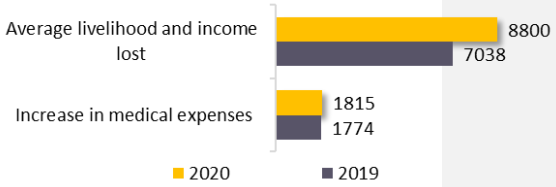

Figure 34: Other expenses (BDT)

The amount of **livelihood and income lost** among the treatment group respondents had also increased in 2020 in comparison to the flood of 2019. This was mainly due to the long duration of the 2020 floods. People had to remain displaced for a much longer time which had resulted in a higher loss in income and livelihoods for the community people.

3.5.1.2 Damage prevention from floods by taking early actions

Many people had been able to save their assets from the flood due to the FbA and the early warning message. People had been able to relocate their assets (that their livelihoods depended on) to higher areas where they would not be damaged by the flood water. The people were able to take early actions to better protect their livelihood and assets. The community people had felt that the early warning message, the shelter facilities, and evacuation support strongly helped them to reduce damage to their livelihoods and assets.

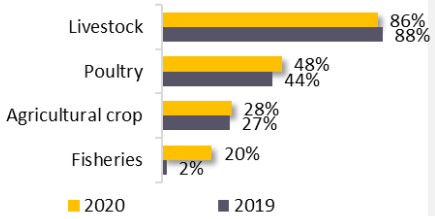

Figure 35 Percentage of damage prevented from floods

It was found that around the damage prevention for **livestock** had decreased by 2% since 2019 as the floods had been more severe than the previous year and the prolonged inundation of the area had caused more of the livestock to be damaged (Figure 35). The study also indicated that the treatment group respondents were able to prevent damages on **livestock** worth of BDT 107,940 in 2020 while the control respondents had been able to prevent damages worth of BDT 75,125 in 2020 (Table 5). The damage prevented for the **agricultural crops** had increased by 1% since the previous year's flood (Figure 35). The treatment respondents said to prevented the damage of BDT 8,452 on their agricultural crops and the control respondents were able to prevent damages on agricultural crops worth of BDT 833 (Table 5) The percentage of damage prevented in **poultry** had also increased by 4% in 2020 in comparison to that of 2019 (Figure 35). The treatment group had been able to prevent damage worth of BDT 2,106 on poultry and control had been able to prevent damages worth BDT 1,890 (Table 5). The damage prevented in **fisheries** had increased significantly by 18 percent in 2020 in compared to that of 2019 (Figure 35). The damage prevented on **fisheries** by the treatment in 2020 was found to have been BDT 2,170 while the control said to have prevented damage worth of BDT 833 in 2020. The few people who had fisheries or ponds in which they had cultivated fishes said to have had decreased damage as they took some form of early action through applying nets around their ponds before the flood so that the fishes are not lost during the flood.

Table 5: Average amount of damage prevented in 2020

Type of Asset	Damage prevented by treatment (BDT)	Damage prevented by control (BDT)
Household settlement	15,289	11,990
Household assets	12,160	11,224
Agricultural crops	8,452	833
Fisheries	2,170	833
Poultry	2,106	1,890
Livestock	107,940	75,125
Latrines/toilets	1,662	1,389
Health of family members	2,601	2,554

Furthermore, it was found that in case of **household settlements**, the treatment group were able to prevent damages worth of BDT 15,289 and the control group had prevented damage worth of BDT 11,990. The treatment group were able to prevent damages on **household assets**, amounting to BDT 12,160 while the control were able to prevent damage worth BDT 11,224.

The average amount of damage that the treatment group 1 had been able to prevent through early actions was found to have been BDT 78,780 per household, treatment group 2 had been able to prevent damage worth of BDT 26,884, and treatment group 3 had been able to prevent damage worth of BDT 23,905. The reason for the treatment group 1 having more saving could have been due to their large numbers and the target population had not been limited to the extreme poor, instead had targeted mostly the educated and well-off people in the community.

3.5.1.3 Value of damage prevention attributable to SUFAL

It was the intention of the evaluation team to focus on the impacts of the project's intervention and how much it has been able to contribute to helping the community people in preventing damage of flood through the forecast-based actions. In order to calculate the attribution of SUFAL project in the change in the amount of damage prevented, the team followed difference-in-difference method. The difference was the subtraction of the amount of damage they were able to prevent during the last flood in 2020 and the previous flood in 2019. The treatment group said to have increased their prevention of damage by BDT 33,972 in 2020 compared to 2019 and the control group were able to increase their prevention of damage by BDT 12,511 in 2020 compared to 2019. The difference in these changes in damage prevention of treatment and control groups was BDT 21,461 per household which is considered as the attribution of the SUFAL project enjoyed by the treatment group due to intervention. Thus, it can be concluded that each treatment household saved BDT 21,461 due to SUFAL intervention alone.

Figure 36: Monetary value of damage prevention due to FbA

3.5.2 Improved shelter and evacuation support

Due to SUFAL's support for renovation of shelters, upgradation of some embankments, bamboo bridges, and roads had enabled people to access the shelters much more easily during the floods. The improved infrastructures such as the bamboo bridges, renovated roads, renovated embankments, etc. had helped people to travel to and from shelters during the flood in 2020 more easily than in 2019 as the most vulnerable areas are very difficult to reach without such infrastructures. It was also said that

many areas that had only been accessible using boats in the past was even accessible by walking and other means of transportations as a result of the improved infrastructures. The collaboration of LGIs, SUFAL implementation team, and community volunteers had provided the community people with improved evacuation support and transportation to the shelters which had encouraged people to evacuate faster and easily. Many respondents had also reported that they were able to transport and save their livestock much better during the 2020 flood in compared to the flood of 2019 due to the improved communication, cattle sheds in the shelters, and temporary shelters provided by SUFAL.

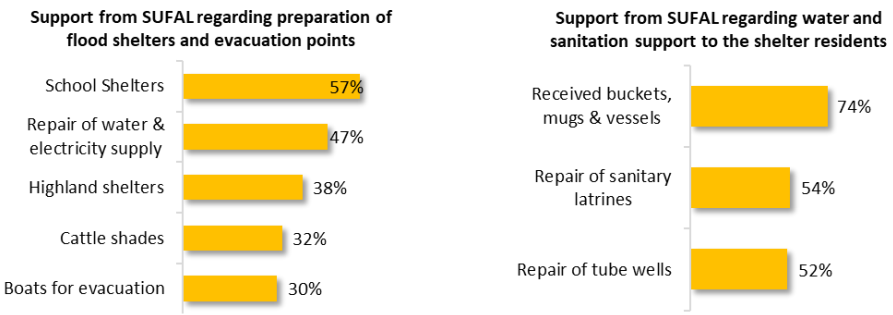

Figure 37: Support from SUFAL regarding shelter and evacuation

Another reason for the increase in people going to shelters during floods was that the shelters had been renovated with better electricity and water supply (tube-wells), separate rooms and latrines for women, improved security, and building of cattle sheds. About 60% of the treatment female respondents said that they felt safer and more secured in SUFAL managed shelter facilities than previous years as they had separate latrine facilities, better security and lighting facility at night, access to water sources and provision of hygiene kits, purification tablets, emergency medication, dry food, firebox, and emergency toolbox. Around 63% of the respondents had said that the living experience in SUFAL maintained shelter centers had been better than previous years due to the same reasons. It was also found that shelter repair and latrine cleaning in the shelters were initiated around 7 days before the floods in 2020. But in previous years, these types of repairs in shelters were not usually done by the LGIs before floods.

3.5.3 Improved access to source of income through Cash-for-Work

The renovation and upgradation of embankments, roads, bamboo bridges, etc. had also provided the community people with a source of income as it followed Cash for Work modality where SUFAL hired the community people to work. The people had reported that the people had been able to earn some extra money before the floods through the Cash for Work modality, which helped them a little more than other years during the flood. The repairment of embankments, roads, bamboo bridges under SUFAL were done by co-financing scheme. The union parishads paid for construction materials and SUFAL paid the labor cost engaging community people which served as the cash for work for people. It should be noted that treatment group 2 respondents received the most cash for work support from this scheme.

3.5.4 FbA's contribution to the reduction of after-flood mortality and morbidity from waterborne diseases

Death and sickness due to waterborne diseases is highly prevalent during floods since the lands are inundated over a long period of time. The people have to survive where often their sources of water become contaminated and water scarcity forces people to move through or consume contaminated water. The tables below (**Fehler! Verweisquelle konnte nicht gefunden werden.**) shows the percentage and total number of household members who said to have death or sickness of family members due to waterborne diseases in 2019 and 2020. The mortality and morbidity rates imply percentages of people dead or sick among the total household members of the sample households.

Table 6: Mortality and morbidity of waterborne diseases (treatment)

Household member	2020		2019	
	Mortality rate	Morbidity rate	Mortality rate	Morbidity rate
Male members	0.29%	6.08%	0.41%	3.54%
Female members	0.47%	7.63%	0.29%	4.07%
Children	0.18%	4.21%	0.23%	2.37%
Elder	0.12%	3.13%	0.06%	1.52%
Pregnant /lactating mother	-	0.35%	-	0.18%
Overall	1.05%	21.41%	0.99%	11.67%

The death of family members among treatment group from waterborne diseases had decreased, except for female and elder members in comparison to the previous flood in 2019 (**Fehler! Verweisquelle konnte nicht gefunden werden.**. It is quite evident that the early warning message had enabled the males to take early actions regarding relocation of the vulnerable family members to higher grounds, relative's houses, or to the shelters. The death rate has increased in some cases as the severity of the flood had been worse in 2020 in compared to 2019 (Table 6**Fehler! Verweisquelle konnte nicht gefunden werden.**).

In addition, Covid pandemic was another crucial factor in 2020. It is suspected that there were more deaths in 2020 (especially among women and elders) because of prevailing pandemic which in case of flood might not have been always detected and thus not treated. And it should be noted again that the floods last year (2020) were much more intense than last year (2019) and that management of health concerns were made difficult with the pandemic situation in the country.

Illness due to floods is highly impacted by the duration and severity of the flood, as people are forced to cope with inundation, displacement, lack of food, lack of safe drinking water, lack of latrines, etc. and are exposed to contaminated water all around them for a longer period of time. The illness from waterborne diseases during floods was found to have significantly increased in 2020 in compared to the flood of 2019 as the 2020 floods (**Fehler! Verweisquelle konnte nicht gefunden werden.**) were much longer than the 2019 floods.

3.5.5 FbA's role in reduction in loan burden among target households

The common mechanism for flood affected people to recover from flood damage is that they often have to take loans from informal money lenders at a high interest rate for rebuilding their lives after

the flood goes down. This is quite common since most incur huge losses and do not have adequate savings or money to support them through the flood times and keep back up for recovery after the flood. The cash grants are said to have helped the recipients address their basic needs during the flood and also helped them to some extent to repair their house and pay for livestock treatment after the flood. The Covid-19 cash grant had also helped the recipients to buy food, livestock feed and cope better.

A total of 385 (51%) treatment respondents and 111 (50%) control respondents had said that they took loan after the flood to mitigate the damage they had incurred during the flood. Most of the people said to have taken loan for food expenses and house repairs while the rest had said that the purpose of the loan was for investing in business, repairing their boats, medical expenses, toilet repair and for investing in agriculture.

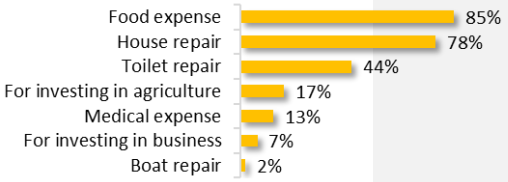

Figure 38: Purpose of taking loan

The average amount of loan taken by a treatment respondent was found to have been BDT 20,194 (**Fehler! Verweisquelle konnte nicht gefunden werden.**). The cash provided by SUFAL was helpful in addressing immediate and short-term needs e.g., food but was not adequate to address their longer-term needs for repairs to the household, assets, sanitary latrine etc. SUFAL would need to increase the size of the cash grant, which is not realistic if it is to be given according to the loan sizes taken. However, if the early actions are more efficiently applied over time, the amount needed to be loaned might lessen as the damages incurred will be less.

Figure 39 Average loan per treatment household

Access to loan is another major constraint that the people face in the intervention areas. One of the main problems for not having access to institutional loans is that the people often have to pay an unfair interest rate on their loans form money lenders. Most of the people had taken loan from informal money lenders as the informal lenders easily give the desired amount without much background check or paperwork or due process. Most NGOs, MFIs and other institutional lenders require extensive paperwork, vetting, background checks, and many other formalities which takes too long to process and therefore negates the purpose of the loan.

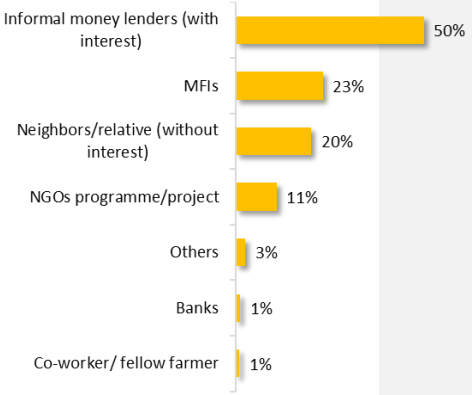

Figure 40 Source of loan after flood

It was also found that, among the three treatment groups, around 62% of the treatment 2 respondents had taken loans after the floods in 2020, 51% of the treatment 1 respondents had taken loans after the floods in 2020, and only 32% of the treatment 3 respondents had taken loans after floods. This could have been because the treatment 3 respondents had received cash grants for Covid-19 and for the flood of 2020 through the SUFAL intervention.

Figure 41: Percentage of people taking loan after flood

Among the treatment 3 respondents who had taken loans after the flood, 85% said to have taken loans for food expenses or for repairing their houses after the flood, 46% said to have taken loan to repair their latrines, 20% said to have taken loans for investing in agriculture, 11% said to have taken loans for medical expenses, and 6% said to have taken the loan to invest in their business after being impacted by the flood in 2020, while only 2% said to have taken the loan for repairing their boats or other purposes. It was also found that among the treatment groups, treatment 1 had taken an average of BDT 28,643 loan after the flood in 2020, whereas the treatment 3 respondents had taken an average of BDT 18,148 and treatment 2 had taken an average of BDT 13,802.

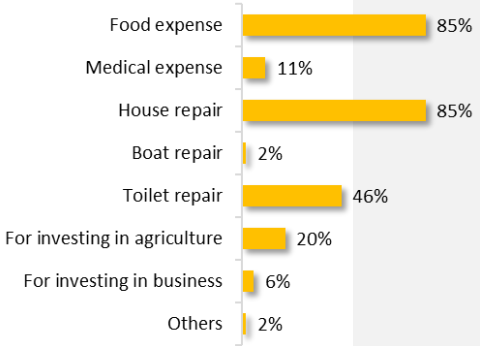

Figure 42: Purpose of using loans for Treatment 3

It was found that most of the treatment 3 respondents had used the cash grant to purchase food (86%), repair their houses or paying rent (57%), and paid for medicines or healthcare expenses (30%). While the rest had said to either spent the cash grants for buying clothes (12%), repaying back loans (7%), buying cooking fuel (5%), buying livestock fodder (5%), and purchasing agricultural input (2%) (Figure 43). About 4% had said to have used the cash grant for preparing for floods. It was found through the qualitative data that the respondents having received the cash grant had reserved the cash grant for using during the flood and after the flood as they knew acquiring loans would be very difficult and expensive after flood. Some had felt that providing cash grants before the flood and once after the flood would ensure people using the cash grant for pre-flood preparations instead of reserving it as they would know that they will receive another support after the flood to pay for their needs accordingly.

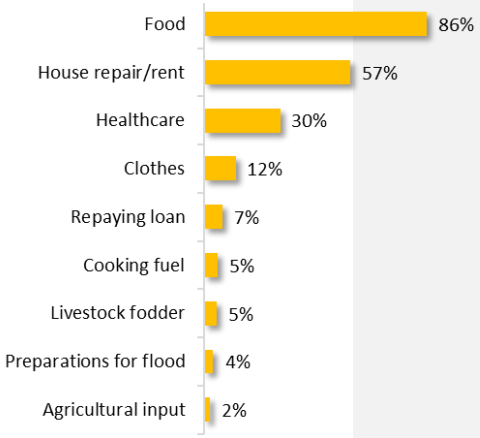

Figure 43 Use of cash grant (treatment 3)

3.6 Efficiency

This section of the report describes efficiency of generating output against the inputs spend. Cost effectiveness analysis is presented and interpreted here according to the VfM analysis of the benefit generated by the project against its costs to generate those outputs. The efficiency sections also compare the different interventions describes to be more or less potential to influence change. The challenges faced by the project which hindered the efficiency is also described here.

3.6.1 Benefit generated- cost effectiveness analysis

The study team conducted cost-effectiveness analysis to assess Value for Money (VfM) of early actions taken. Team used components of Foreign, Commonwealth & Development Office's (FCDO's) VfM framework for this purpose. The cost-effectiveness analysis assessed the level of impact or higher-level results the project had achieved in terms of reducing the vulnerability of flood-affected populations in target area. Two types of cost-effectiveness had been calculated- one with program cost (excluding management cost and staff cost) and another with total cost of intervention.

Figure 44: Cost effectiveness ratio for SUFAL

For SUFAL project, €117 of benefit (calculated as the monetary value of damage prevented by treatment households due to taking early actions in 2020; please see details in the footnote below) was generated against each euro considering only program cost (Figure 44). Regarding total cost (see definition of program and total cost in footnote[9]), each euro generated benefit of €38. It should be noted here that the benefits were calculated as the damage prevented due to taking early actions. Therefore, the cost-effectiveness analysis proved that the project had generated much more benefit (i.e., damage prevented by taking early actions) than the cost spent by SUFAL. Cost-effectiveness was also calculated for three treatment groups of the study which is presented below (Table 7).

Table 7: Cost effectiveness ratio of three treatment groups[10]

Cost Effectiveness Ratio	Treatment 1 ***Received only EWM***	Treatment 2 ***Received EWM, in kind***	Treatment 3 ***Received EWM, in kind and cash grants***
Cost Effectiveness Ratio (total cost)	€ 52.46	€ 28.02	€ 22.13
Cost Effectiveness Ratio (program cost)	€ 204.93	€ 91.45	€ 67.66

[9]Total cost: Total budget of the SUFAL project including program cost, administrative cost and human resources cost
Program cost: Program budget consists of costs for FbA systems, forecasting, capacity building, piloting/implementing, advocacy. Costing per treatment group was not available and hence were adjusted based on outreach and budget allocated to Cash Grant and Shelter Cost, i.e. for treatment 2, budget for cash grant was deducted from average costing per person and for treatment 1, budget for shelter and cash grant were deducted from average costing per person.

[10] The benefits of the early actions were calculated as the monetary value of damage prevented by treatment households due to taking early actions in 2020. These benefits, that is the monetary value of damage prevented, were considered for all the beneficiaries of SUFAL, not just the sample of the study. Data was extrapolated from the beneficiary list of SUFAL as the total beneficiary number was defined for different treatment groups. For example, cost-effectiveness ratio for treatment 1 was calculated as the damage prevented by all the beneficiaries who only received EWMs divided by the project cost of developing and dissemination of EWMs. Detailed calculation process is described in methodology section.

The table shows that treatment group 1 who only received early warning actions generated the highest benefit considering the costs compared to two other treatment groups. The evaluation team ascertains this to be because of the extent of differences in vulnerability levels of the three treatment groups (i.e., treatment group 1 was comparatively well off and was less vulnerable to flood related shocks and hazards than other two groups).

Furthermore, the cost effectiveness estimate is based on damage prevention and treatment 1 group had on average higher valued asset, income, and level of education than treatment group 2 and 3 (See table below). Therefore, damage prevention (benefit) was accrued most to the treatment group 1. This may seem that future programs can be significantly effective if it exclusively focuses on EWM messaging however, but this will reduce its pro-poorness significantly. However, it should be noted that attribution to impact is weakest for the treatment group 1 as there were multiple contributory factors beyond the messaging that led to their damage mitigation. Besides, treatment group 1 had highest average annual income (almost 65+% higher than group 2 and 3) and lowest incidence of vulnerability among the three groups. In addition, because group 1 had higher proportion of transferable/transportable assets (financial, HH, and livestock), they had more to save as opposed to group 2 and 3. Another aspect that may explain limited damage prevention among treatment 2 and 3, could be that EWM messaging targeted literate individuals; unfortunately, 69 percent and 78 percent from treatment 2 and treatment 3 group, respectively, had no formal education as opposed to only 34 percent in treatment group 1 (Table 8).

For discussing the reasons of the differences in cost-effectiveness ratio among different treatment groups, a caparison table is generated below for better visualization.

Table 8: Points of differences among different treatment groups

Points of differences	Treatment group 1	Treatment group 2	Treatment group 3
Income	• Highest income group having average annual income of around BDT **1.5 lakh** • 2 income earning family members on average • Major profession was agricultural cropping	• Average annual income of around BDT **90** thousand • 1 income earning family member on average • Major profession was working as agricultural and non-agricultural labor	• Average annual income of around BDT **90** thousand • 1 income earning family member on average • Major profession was working as subsistence level agricultural and non-agricultural labor
Value of properties and assets	• **91** percent had *kacha* housing (mud/wood/tin) and **9** percent had semi-*pucca* housing (brick/cement/tin) • They had highest valued assets. It can be realized by the value of assets they took in shelter in 2020. Household assets of around BDT **16** thousand were taken to shelter. • Livestock of around BDT **61** thousand were taken to shelter.	• **97** percent had *kacha* housing (mud/wood/tin) and **2** percent had shacks (jute sticks/tree leaves/jute sacks) • Household assets of around BDT **6** thousand were taken to shelter. • Livestock of around BDT **28** thousand were taken to shelter.	• **99** percent had *kacha* housing (mud/wood/tin) and **1** percent had shacks (jute sticks/tree leaves/jute sacks) • Household assets of around BDT **6** thousand were taken to shelter. • Livestock of around BDT **37** thousand were taken to shelter.
Education	• **34** percent respondents had no formal education	• **69** percent respondents had no formal education	• **78** percent respondents had no formal education
Vulnerability	• **38** percent of population was vulnerable (pregnant/new mother,	• **23** percent of population was vulnerable (pregnant/new	• **38** percent of population was vulnerable (pregnant/new

Points of differences	Treatment group 1	Treatment group 2	Treatment group 3
	old, child, disabled/especially abled persons) • **4** percent of households was women-headed	mother, old, child, disabled/especially abled persons) • **20** percent of households was women-headed	mother, old, child, disabled/especially abled persons) • **29** percent of households was women-headed
Other support received	• **32** percent received cash grant from government/other NGO project • **53** percent received food from government/other NGO project • **2** percent got 'cash for work' from SUFAL	• **23** percent received cash grant from government/other NGO project • **72** percent received food from government/other NGO project • **23** percent got 'cash for work' from SUFAL	• **19** percent received cash grant from government/other NGO project • **64** percent received food from government/other NGO project • **7** percent got 'cash for work' from SUFAL
Timing of cash grant	• Cash received from government/ other NGO project **before** flood, **during** flood and **after** flood as well	• Cash received from government/other NGO project **before** flood, **during** flood and **after** flood as well	• Cash received from government/other NGO mostly **during** flood • Cash received from SUFAL **during** second wave
Early actions taken	• **76** percent did not take any early actions regarding agriculture • **49** percent did not take any early actions regarding livestock • **8** percent did not take any early actions regarding household assets • **81** percent stocked food	• **94** percent did not take any early actions regarding agriculture • **62** percent did not take any early actions regarding livestock • **11** percent did not take any early actions regarding household assets • **81** percent stocked food	• **96** percent did not take any early actions regarding agriculture • **69** percent did not take any early actions regarding livestock • **15** percent did not take any early actions regarding household assets • **64** percent stocked food
Experienced damage	• **67** percent had household damage	• **66** percent had household damage	• **71** percent had household damage
Monetary value of damage prevented	Major benefit generating sectors were house/settlement, homestead assets, and livestock as these were the most valued assets of households.		
	• Benefit (monetary value of damage prevented) from household settlements was around BDT **11** thousand per household on an average • Benefit from household assets was around BDT **11** thousand per household on an average • Benefit from livestock was around BDT **40** thousand per household on an average	• Benefit (monetary value of damage prevented) from household settlements was around BDT **7** thousand per household on an average • Benefit from household assets was around BDT **4** thousand per household on an average • Benefit from livestock was around BDT **15** thousand per household on an average	• Benefit (monetary value of damage prevented) from household settlements was around BDT **3** thousand per household on an average • Benefit from household assets was around BDT **5** thousand per household on an average • Benefit from livestock was around BDT **13** thousand per household on an average

It can be understood from the table that treatment group 1 was the highest income group among the study respondents. Better income meant these households had better capacity to take early action provided that they received actionable forecasts. It should be also considered that the flood in 2020

hit during COVID-19 pandemic when the households had lack of access to income generating activities and were struggling with income and household expenditures. Worst hit groups were the treatment 2 and 3 whose principal profession was agricultural and non-agricultural labor. Being engaged in agricultural cropping, treatment 1 was comparatively in a bit better position. Also, the education level was better for treatment group 1 as 66 percent respondents had better literacy levels. The literacy percentages were 31 and 22 for treatment groups 2 and 3 respectively. The rest of the respondents did not have literacy.

Also, the average number of income-earning family members was 2 for treatment group 1. The other 2 groups had on average 1 earning member in the family. The vulnerability was greater for the households headed by women, as found by the survey. Treatment 3 group had 29 percent households headed by women. Women headed households could not take proper early actions to prevent damages from flood because of lack of mobility of women, human labor, and financial resources. 20 percent households of treatment group 2 were women-headed and there were only 4 percent women-headed households in treatment group 1.

The most important reason to be mentioned here is that 98 percent of treatment group 1 respondents took early actions in 2020 which was a little lesser for the other two groups. 90 percent of each treatment group 2 and 3 respondents took early actions in 2020. The data of the table shows that treatment 3 took comparatively less early actions regarding agriculture, livestock, food, and household assets compared to the other two groups. As a result, they experienced more damage than other two groups. Most (69 percent) of the targeted people (all treatment groups) reported that the flood caused damage to the houses (e.g., wall, roof, floor, fence etc.). The treatment group 3 was the worst hit in this case as 71 percent of them experienced damage to their houses. Yet, they were the last ones to take early actions like moving furniture and household assets above the anticipated level of flood water; and shifting the valuable assets to higher and safer places.

Moreover, there were some external factors included which made the difference of treatment 3 from treatment 1 and 2. Treatment 1 and 2 received more cash and food support from government or other development projects compared to treatment 3 because of their increased accessibility to those supports. The timing of cash support received by these three treatment groups was also notable. Treatment 1 and 2 received cash from government or other development projects in pre-flood, during flood and post-flood stages. But the treatment 3 received cash from the same sources only during flood. It is also noteworthy that more households of treatment 2 received the 'cash for work' support from SUFAL compared to treatment 3 who were the most vulnerable households. Moreover, the multipurpose cash grant from SUFAL was provided before the second wave of the flood in 2020. Therefore, treatment 3 group did not get much chance to use those cash grants for taking early actions. The damage had already happened during the first wave of flood.

Therefore, it can be derived from the table and the discussion that treatment group 3 was the most vulnerable group. In addition, value of their properties was less than the other 2 groups. Another reason was the number of the beneficiaries in treatment group 3 was a hundred (around) times lesser than the other two treatment groups. These reasons lowered the benefits or value of damages prevented by taking early actions for treatment group 3. Therefore, treatment group 3 requires most attention and support from DMCs/LGIs to be able to take early actions on their own as they are the most vulnerable group. Similar focus should be given to treatment group 2 as well, since they are not well off than treatment 3.

3.6.2 FbA interventions instilling change in knowledge and behaviour

The interventions with the most potentials were the generation and dissemination of accurate and effective early warning messages, and involvement of all relevant stakeholders in training and activities throughout the project.

SUFAL arranged training for all relevant stakeholders to enhance their capacities to use FbA mechanism and take forecast-based early actions. The trainings were relevant as the need assessment conducted by the project revealed that there was lack of understanding of FbA mechanism in Disaster Management Committees (DMCs) at all levels. At the end of the project, this evaluation assessed that the DDMs, UzDMCs, UDMCs, and local level LGIs have become knowledgeable on the FbA based early actions and they reported that the training helped them understand it. Also, the continuous involvement of the stakeholders in intervention activities also made them realize the usefulness and applicability of FbA in practice.

Across the project locations, the most common response was that the early warning messages (EWM) worked. The DMCs, LGIs, and community volunteers confirmed that the most potential intervention for changing behaviour of both the community people and local authorities was the accurate and timely early warning messages. Though the people were sceptical about the warning in the first phase of the 2020 flood, the proved accuracy made them believe the second phase of the 2020 floods. The EWMs established trust in flood forecasts and the community people expressed their willingness to act early before flood. The DMCs and LGIs had acquired knowledge and some experience about FbA, as SUFAL is the first intervention in pre-flood action in the target areas. The project inception workshop and periodic involvement with the project gave them a general idea of early actions before floods and their role in bringing this about. After receiving the EWMs, the LGIs and DMCs could disseminate the warning among community people faster than before and likewise took pre-flood preparations earlier.

3.6.3 External factors impeding or accelerating project results

Needless to say, that the **COVID-19 pandemic** hit the project hard and substantially disrupted intervention activities. The field level project staff got minimal time to prepare before flood because of the pandemic restrictions. The initial meetings with DMCs and LGIs are conducted online. But face-to-face communication would be far better to make the stakeholders understand the project and retain the disseminated knowledge. Even with this limitation, the project staff made good progress in engaging the DMCs and LGIs with continuous communication and keeping them in loop of all the activities at community level. The stakeholders were found to be knowledgeable and involved in the project.

A contextual characteristic of the target population slowed the project efficiency and impact. This is because of the **'excessive relief dependence'** behaviour of flood affected community people. In some cases, the community people did not prepare

Relief Dependence

"Flood affected people mostly rely on relief during and post-flood period. Also, it is the tendency of disaster management stakeholders to provide relief instead of helping in pre-flood stage. We need to make people aware to reduce excessive relief dependency. Collective engagement in taking early actions may change this tendency."

- MD. Nayeb Ali, DRRO, Jamalpur

Box 11

food and other things before flood as they expected relief from government bodies and other sources like NGOs, individual donors etc. They did not feel the need for their own actions and preparations before the flood. The findings from KIIs with UDMCs, DDMs and community volunteers suggested the same. This might have an impact over the project attribution of early actions taken by community people. The EWMs provided by the project should have contributed to the ability of community people to prepare better before flood. But the attitude of 'excessive relief dependence' deterred the people from taking actions on their own.

Another critical factor was observed among the community people who received cash grants that many of them did not spend the money for taking early actions. They spent it on reinvesting in livelihood expecting that the flood would not make much damage. This was also because they did not believe the early warning messages completely at first.

Bad Decisions

"*I thought buying poultry chicks before flood will be a good way to reinvest the cash grant, because I cannot save that much on my own. But unfortunately, the chicks got washed away during flood. Now I understand it was bad decision to not believing early warning forecasts and buying chicks just before flood.*"

-Minara Begum, FGD participant, Kulkandi, Jamalpur

Box 12

3.7 Sustainability and Ownership

This section discusses the potential of the systems and services produced by the project to be sustained over longer period of time beyond project's duration. For sustainability, the ownership by stakeholders of the project-induced changes is essential. It is difficult to determine the level of institutional ownership and sustainability of changes at this stage of this pilot project. However, these early signs clearly show positive changes towards institutional ownership and sustainability.

3.7.1 Early signs of institutional ownership and sustainability

3.7.1.1 Actionable forecast dissemination

SUFAL initiated its intervention based on the pre-existing gap of lack of actionable early warning messages to related government agencies and community people. The most appreciated benefit of SUFAL described by the beneficiary stakeholders was the accurate, actionable, and timely early warnings forecasts. The accuracy of the EWMs created a new sense of trust about the warning system among the community people as well as the DMCs and LGIs. As stated by the community people, they are now more likely to take early actions and prepare for evacuation after the EWMs. This practice will definitely improve and build over time after the project's end. It also brought changes in the decision-making process of the DMCs and LGIs.

The FFWC was capacitated and facilitated with vulnerability maps, technical supports from RIMES, new monitoring gauges and most importantly the new pool of mobile numbers to disseminate the forecast message. Also, the DDM, UzDMCs and UDMCs were supported with digital display boards to get updates of FFWC website on flood forecasts. The pathways to disseminate forecast information made the FFWC capable of increasing their outreach to the grassroots more effectively, all the way to the community people who are the first-hand victims of flood. Since FFWC will continue to provide the EWMs through this newly established chain, stakeholders and community people will receive the early warnings even after the project ends. FFWC reported that they will also use their Interactive Voice Response (IVR) system, website, and mobile application to disseminate forecast to a vaster audience.

The digital display boards were distributed and facilitated in a way that the monitoring and benefits are ensured. The digital boards were found to contain union demographics, local flood and weather forecasts, information on probable flood impact, and vulnerability maps. The weather forecast data was incorporated to ensure usage of the boards all year. Also, SUFAL arranged trainings for union digital centres' staffs to look after the digital boards and troubleshoot for any technical problems. These boards were facilitated with solar power own internet system so that the electricity failure during flood would not hamper the service. The institutions or service providers at the district and lower administrative levels expressed satisfaction with the EWMs and digital boards and own the introduction of these processes.

3.7.1.2 Use of knowledge materials produced by SUFAL

An extraordinary feature of SUFAL was that the intervention generated multiple knowledge products considering that there were lack of understanding of which areas are the most vulnerable and how to take actions regarding flood. The developed products were Forecast-based Early Action (FbA) matrix,

list of early actions, vulnerability maps, digital elevation maps, and localized flood forecasts. FFWC was found to use vulnerability map, digital elevation maps, and localized flood forecasts. There were found crucial for FFWC to generate customized forecast for different areas. These are also the key factors which will help the FFWC to continue its developed service of providing accurate forecast. DMCs were found to use Forecast-based Early Action (FbA) matrix and list of early actions to take decision before flood according to the flood forecast. The early action matrix and early action list are guiding the FFWC, DDM and DMCs to take early decisions according to the danger level of flood water and these knowledge products will continue to do so in future. These products supported the project to achieve sustainability as the relevant stakeholders will continue to use these after project's duration.

The project is yet to develop SOP and a policy brief to address how FbA can play a significant role in humanitarian practice and disaster risk management. These two knowledge materials are vital for the project to generate sustained impact and incorporate FbA into operational systems of government and policy making bodies related to disaster management and response.

3.7.1.3 Increased institutional capacity

Use of knowledge products and support to take early actions for flood increased the institutional capacity of the relevant government agencies. The project anticipated that the government's organizational system would capture the learning of the project and carry on the interventions after the project's end and therefore the project engaged the DMCs, LGIs and national level stakeholders from the beginning and throughout the intervention.

The evaluation team found that as expected by SUFAL, the LGIs are planning to retain some practices and apply some knowledge from the project. The Union Parishads report that they are planning to create a new fund from their own financing and donations at local level specially to take early actions for floods and other natural disasters in the locality. DPHE in Jamalpur were found trying to incorporate a system so that they can disseminate knowledge and awareness products through mobile messaging in their target community. They learned from SUFAL that the knowledge and awareness materials can easily be disseminated in case of emergencies through mobile voice messaging in addition to the established LGI chain to the community. They asked the SUFAL project management to incorporate one of their awareness messages on how to use water purification tablets. And they were impressed with results of this action. In another case, the Department of Livestock (DLS) at all Upazila levels recognized the benefit of simple sheds (made of tarpaulin) for livestock to save cattle through flooding. They were found to plan the distribution of these temporary sheds for community use in the next monsoon flood.

3.7.1.4 Coordination among different stakeholders

The FbA based SUFAL project was designed based on the institutional preparedness of relevant government bodies, other humanitarian, and DRM actors at national, regional, and local level. This involvement of all related actors in a common platform strengthened their capacities to undertake timely and effective response to floods through FbA. It was found that the DMCs started flood emergency coordination meetings as soon as they received the EW messages. Moreover, the coordination of government agencies (DMCs, LGIs) with each other and, with community people and volunteers had found to be increased in 2020 than previous years.

Needless to say, the project has engaged the LGIs very closely with the interventions throughout its timeline. Also, the stakeholders were found satisfied with their engagement and learning from the project, through the positive demonstration of the new FbA concept in disaster management and preparations. Also, the accuracy of EWMs impressed them and made them interested in FbA to flood responses. However, the early action processes at the central institutional level were not in concurrence because of lack of standard operating procedures and intra-coordination with relevant government bodies (mostly DDM, DC with UNOs, Upazila parishads, Union parishads).

3.7.2 Budgetary plans fo early actions/FbA

Based on the response from the government stakeholders, no visible changes in budgetary plans and allocations for early actions had been observed yet, though the stakeholders were more aware and willing to make a change in the budgets specially to take actions for disasters.

Inspired by the project learnings, all Union Parishads were found to be in the process of planning to create a new fund from their own income of UP especially for floods and other natural disasters in the locality. This planning began after the project made them realise the necessity of early actions in case of flood.

3.7.3 Contributing factors behind sustainable featurs

SUFAL had addressed sustainability of its interventions carefully which can be realised by its engagement with different stakeholders to generate outcome and intervention designs. The services and systems of SUFAL that contributed to making the FbA a sustainable concept and intervention are discussed below.

3.7.3.1 Engaging different stakeholders

Firstly, the project consortium comprised of CARE, Concern Worldwide (CWW) and Islamic Relief Worldwide (IRW), all of who already have strong experience in working on DRR and emergency response for flood in the target areas. These development entities have been implementing several projects in these areas for many years. Also, Assistance for Social Organisation and Development (ASOD) worked as the implementing partner in Gaibandha district who had strong presence in DRR and emergency response related projects. Since, the partners were already working on different development interventions related to flood response in same region, the learning from SUFAL will be realized in these projects directly or indirectly. This brought a continued capacity building process and commitment to the localization agenda. Increased capacity and acceptance of ASOD through the project is expected improve the quality of other projects beyond SUFAL's duration. The lessons and experiences will be carried on by these development partners throughout other development projects in the same region and other areas as well.

Secondly, RIMES was integrated in the project as technical partner. RIMES is an intergovernmental entity supporting research and development of forecasting and warning services at regional, national, and local level. It had already its footprints in the target areas in different projects on floods. This partnership provided a unique opportunity for effective incorporation of technical knowledge in established system of flood response and ensuring knowledge flow in flood response projects afterwards as well. This sharing of FbA concept, knowledge, and learnings from SUFAL will reach out

to government operation system, advocacy level and non-government entities simultaneously through RIMES as it has access to these systems and operational bodies. In addition, this study found that RIMES is researching the development of actionable early warning forecast with increased lead time before flood so that it gives the stakeholders more time to prepare. RIMES's technical expertise and strong links with the relevant ministries strengthens the scope for FbA to be mainstreamed.

Thirdly, FFWC was included in the project as national level partner. Though it is a key stakeholder in flood forecasting system in Bangladesh, FFWC has not been engaged in such type of disaster management projects. This is a major contributing aspect for the continuity of the FbA intervention. It was found that the operational system of FFWC had already incorporated components of the FbA approach. Their reach to disseminate flood forecast through messaging and website updates had increased considerably by partnering with SUFAL. Also, forecasting system had been developed by incorporating vulnerability maps and new gauges at local level with the support from RIMES. The bulletin drafting and forecast related data collection process were planned to be handed over to FFWC by RIMES. Since FFWC is an established flood forecasting body under government wing, additions to their operations will be realised in the government's flood response system.

Fourthly, SUFAL engaged national level DDM and local level DMCs including other relevant LGIs as well. Including all key stakeholders in the same platform made it possible to disseminate the FbA concepts and knowledge simultaneously to all relevant departments of government at all levels. This will provide better chances of sustaining the concepts and decisions based on FbA in the future. Also, the coordination among different department increased through the project. SUFAL project's main strength is in its selection of key government officials- administrative, institutional, and elected who are assigned with duties in disaster management. SUFAL worked with the existing structure of government stakeholders to introduce FbA. The project strived to introduce and integrate in the existing system of government stakeholders to make the FbA approach sustainable in their system.

3.7.3.2 Capacity building of stakeholders

Capacity building trainings under SUFAL were designed for project staff and key stakeholders to introduce FbA concept and its working process. Mostly, the trainings aimed to raise awareness among different stakeholders on FbA and create interest among them to use it at operational level. The intervention was supposed to develop a FbA training manual or handbook for capacity building and development on FbA mechanism for floods which was cancelled because of the COVID-19 situation. Therefore, the project focused on building the capacity of selected stakeholders with the help of training tools for online platform. National level DDM bodies and local level DMCs were provided with online capacity building trainings on how to use the FbA approach to act early and timely ahead of the monsoon seasons. This understanding on FbA supported the DMCs to take early decisions and early actions in the 2020 monsoons. This will keep on supporting them in decision making for early actions to address flood damages.

3.7.3.3 Other factors planned for sustainability

The project had planned to establish a national level FbA forum with both technical and non-technical actors led by Department of Disaster Management (DDM). This forum will include DRM practitioners, weather scientist, sector specialists, and protection experts, for sharing learning and good practices around FbA. It will be responsible for facilitating strategic dialogue on FbA on national level to facilitate

advocacy for FbA through periodic meetings and workshops. This forum will contribute immensely to sustain the concept of FbA at national level policy making. Another sustainability activity planned is developing a video documentary on FbA mechanism to disseminate FbA concepts and its advantages even after the projects end. These plans could not be completed, and evaluation team expects that in the follow up project these will be carried out.

3.7.4 Challenging aspects of the sustainability of results

Although there have been positive changes in knowledge, awareness, and willingness among DMC and LGI officials, there is lack of dedicated financial, human, and logistical resources for them to respond to floods through FbA.

3.7.4.1 Lack of horizontal and vertical coordination

The limiting factors found for sustainability were the incomplete development of SOP; non-inclusion of a standard procedure for early actions at the national level; lack of horizontal and vertical coordination of national level and local level LGIs and DMCs; lack of human resources as community volunteers and no fixed term relationship between community volunteers and union parishads; lack of human and most of all lack of financial resources at UDMCs and union parishads.

3.7.4.2 Lack of budgetary provision

For shelter facility and boat provision, LGIs were found to be dependent on the budget provision from the government or support from other NGOs. This system will be difficult to sustain if the LGIs cannot manage their own finances for the services. The local level government bodies recognize the need for evacuation boats, and it might be expected that they will eventually make arrangements to implement the necessary action. The evaluation team also sensed this commitment from the interviews with LGI officials, if they can secure fund mobilization. Another important intervention was building bamboo bridges in project locations. The LGIs and UPs did not have budget provision for constructing the necessary temporary bamboo bridges before flood at required locations. If they cannot create enough funds or bring a budget for this, this intervention is not going to sustain.

3.7.4.3 Lack of independent decision making

The budgetary allocation is not always in the dominion of upazila or union level LGIs. Though union parishads present a required budget, it is sanctioned by Deputy Commissioner (DC), in discussion with Upazila Chairman and Upazila Nirbahi Officer (UNO). As stated by the UP chairmen and members, that in many cases, the national and divisional level government bodies lack the understanding of need-based budgets in disaster prone areas. There is no flood-based allocation in the budget of UPs, even they cannot adjust more than 10% of the budget from one sector to another sector of expenditure. This puts the UPs in a stringent position to spend on early actions.

According to the government procedure, the LGIs cannot spend for flood before the flood hits. This is also a case for advocacy with the central government to allocate budget for this action, which will be cost-saving and beneficial in the long term. Furthermore, once this concept is well accepted for integration, consideration needs to be reflected in specific clauses in the DM Act 2012 such as for increased contingency budget for the DC to enable FbA and the relevant early actions.

3.8 Replicability

3.8.1 Application of FbA in other flood-prone areas

As per the understanding of FbA and findings from the field, the model can be implemented and scaled up work for other flood prone areas in Bangladesh as well, considering ground level vulnerability mapping at ward level. Since the FbA approach can be customized along with its early action matrix and early action lists according to area-based needs, it has potential to be applied in other areas also.

It is evident from the field that the early sign of change in working modality of other similar actors is already surfacing in the target areas. Unnayan Sangha, an NGO operating in the target area, is a stakeholder in this project as they also work with the flood affected community people. This organization disseminated EWM among their beneficiaries and was impressed with the impact of EWM on them. This encouraged them to disseminate messages regarding flood recovery and COVID-19 awareness among beneficiaries through mobile messaging. They experienced and comprehended the importance of this simple communication tool and are taking steps trying to design their interventions including early actions for flood. They are developing a list of vulnerable people with their details of their contact cell number and this list will be open for everyone to use. Besides, all the local NGOs in any other area have their list of beneficiaries who are most vulnerable people. These contacts can be used to enlarge the beneficiary pool of direct EWMs through voice messages.

3.8.2 Application of FbA in case of other disasters

It is possible that the FbA model is applicable for other disasters like river erosion if the possible time and area can be forecasted. The Centre for Environment and Geographic Information Services (CEGIS) under the Ministry of Water Resources of the Government of Bangladesh is working on this problem. Early warning messages with evacuation, health, sanitation, cash grant and other support are relevant to other disasters as well. This is because the community people of vulnerable areas are always in need of an early forecast which is accurate and timely enough to take precise preparation before disasters. In absence of accurate and trustworthy forecasts, people and community leaders act late and disoriented.

There are a number of NGOs and private bodies working on supporting the flood affected community along with the government. The perspective of early actions and forecasts should be carried out in these projects and in the working modality of government bodies as well. It is learnt that the government bodies including DMCs and LGIs act and take steps when the flood already hits. Applying early forecast base actions, can make their working modality prompt and reduce the damage of community people. SUFAL should support the technical service providers e.g., FFWC, BMD, DDM and RIMES in maintaining network and coordinated research on how to calculate and relay earlier lead times i.e., by strengthening and accuracy in multi-hazard early warning system not only for floods in the project areas but also other areas and for other disasters as possible.

3.9 Cross-cutting (Gender & Social Inclusion)

At community level, the project prioritised female population or household members. This consideration is also reflected in selection of the primary beneficiaries of the project, since it is well known that women and girls are especially vulnerable. Access to early warning messages is not the same for the women of vulnerable and extremely poor families as they do not own cell phones. It was found that women use their husband's or brother's mobile, however the male members of the community are prone to migration to urban areas for livelihood. In such cases, women did not receive the EWMs directly. Even if they received the EWMs, in many cases they could not understand the messages. The EWMs were therefore disseminated by community volunteers in public places like marketplace and mosques. Lack of access to these public places and lack of mobility make the women less able to receive these messages.

In case of the flood shelters, separate arrangements for women could be made in a few shelters along with separate toilets. In most of the shelters, women stayed together with other family members including the male members. The project was able to renovate 14 shelters in the target area, repair toilets, electricity, hygiene kits for gender specific needs, but there are a lot more shelters in that area. Also, the project built temporary shelters with tarpaulins for 190 households and 65 community shelters for 260 households. All shelters of the project areas could not be renovated because of the budget constraints.

Shelter Facility

"Usually, we do not even get usable latrines in shelter, let alone separate latrine for women. We were quite happy that we could use the latrines instead of going far from shelters during flood."

- Golapi Begum, FGD participant, Saghata, Gaibandha

Box 13

Many of the community people reported that they received evacuation support as boat provision for shifting assets, and children and old people. The FGD findings suggested that the women who went to the project-facilitated shelters felt more comfortable using separate latrines and space for lactating mothers to feed their infants. Previously, women had to go farther from shelter with '*bhela'* of banana trunk for open defecation. The community people especially women also mentioned about the electricity facility and extra lighting which made them feel more secure at night. They also had easier access to tube wells for drinking water. These facilities saved women from a lot of hard works and time (as previously they had to collect drinking from distant places using '*bhela'*). Provision of hand washing stations and soap also helped the families and women members as the necessary precautionary measures for hygiene and COVID-19. Moreover, the common diseases like diarrhoea were reportedly less prevalent during floods among women and children in 2020.

Another very well received facility (in shelters) that the community people talked about in the FGDs was the provision of tarpaulins as it was not practiced before among those communities. The women whose households received temporary shelter facilities cited that they could save their children and livestock because of these tarpaulins during rain even if they could not reach to permanent shelters.

In case of the early transport or evacuation, many women received this facility provided by the project. It supported the women to be evacuated along with their children and livestock. No evidence has been found for women to take any gender specific preparation (e.g., saving and bringing sanitary napkins

to shelters) before flood. These are concerns which need to be delved into to educate them to take such steps while at the same time striving to support them when required during floods in the shelters.

Usually, men and women in households took early actions together. But the women headed households were found to have faced more difficulties in doing this before flood, especially in evacuating household members, valuable assets and livestock, as found by the FGDs. It was difficult for women to move livestock and other valuable household assets to the shelters by their own. Their physical strength did not permit for these kinds of heavy work and also, they could not hire labour because of lack of finance. Also, arranging boats were difficult for them since they had little or no communication with the relevant people to call for these arrangements.

Mostly, they sought assistance from neighbours or relatives in these matters which was not always available. Some other preparations were made by women such as storing dry foods (mostly rice and lentil based dry foods), portable mud stoves, firewood etc. The respondents from women headed households also stated that they prioritized food stockpiling for family members and saving livestock and poultry from flood. The FGD participants suggested that it would be better if support can be provided to evacuate the women headed households or women members as well the elderly and persons with disabilities first because they are the most vulnerable. Community approach can be followed to move livestock in an elevated space and guard those so that households who do not have men can also save their livestock assets. Same approach can be used for early crop harvesting for the households where men are not available to tackle the harvesting. Thus, in the next phase the project can sensitize and mobilize community people to support the most vulnerable families. If they understand the benefit of such collective approach, they are supposed to adopt the practice.

Support for Women Headed Families

"We wish that community people or service providers would help us in early crop harvesting and moving livestock before flood as labourer is not available at that time. We do not get such support from community people."

- Minara Begum, FGD participant, Ulipur, Kurigram

Box 14

3.10 Learning and Recommendations

The recommendations given below are based on key interventions, considerations in systems and policies to bring about more effective change at grassroots, level, divisional, district and upazila level, central level with respect to forecast based action.

3.10.1 Process and Systems Level

Considering the success of piloted SUFAL in forecast based early actions, the project should be continued in existing and new areas as well. SUFAL should continue to advocate with DMCs to take ownership of this FbA model. The other learning-based suggestions are discussed below.

3.10.1.1 Breadth versus depth trade-off (Prioritizing Treatment group 3 in SUFAL phase 2)

From the perspective of cost-effectiveness, treatment group 1 benefited the most. They were able to save most and could be reached most cheaply i.e., by using EWM messaging only. However, attribution to impact was weakest for the treatment group 1 as they possessed higher proportion of transferable/transportable assets, had the highest average literacy rate, average annual income and lowest vulnerability among the three groups.

Hence, in terms of **pro-poorness and inclusiveness,** it is imperative to provide **more focus and support to the more disadvantaged (treatment) group 3 and 2**. Obviously, a portfolio approach needs to be followed keeping in mind budgetary and logistical constraints.

3.10.1.2 Electronic financing system and central level monitoring of the cash flow

To promote the FbA concept and boost contingency planning for early action by government administrative bodies, it is imperative that the **fund flow from central to grassroots** is strengthened electronically within both the government and private sector financial institutions. Cash flow at time of disasters requires speedy preparedness, response and recovery, which is usually hampered by the authorisations and processes of these transactions.

Besides, there is always the risk of target drifting and misallocation of funds and therefore a strong monitoring system of the cash flow and fund use in the government system will help to contribute towards effective application of the EWS. This has to be such that the monitoring is not only top-down but also bottom up to increase accountability of the stakeholders throughout the chain of decision-making and implementation.

3.10.1.3 Improved and continuous technical oversight

The project should support the technical service providers e.g., FFWC, BMD, DDM and RIMES in **maintaining network and coordinated research** on how to calculate and relay earlier lead times i.e. by strengthening and improving accuracy for the multi-hazard early warning system.

Technical support and capacity building will also need to be emphasized continuously for better national level risk and vulnerability data management based on a single data source which can be consistently used by all relevant service provider agencies. This will ensure better selection and increased outreach of vulnerable households for the uptake of forecast based early actions. As per current practice in Bangladesh, the Community Risk Analyses (CRA) usually developed as per government SOD at union level, is very generic, based on observational and mostly qualitative

information provided community people. Very little constructive quantitative data such as geographical risk and vulnerability, analyses of these, the assessment of the local capacities is not done.

The CRAs need to be complemented by national level risk and vulnerability data to ensure that the analyses are scientifically established and contribute concretely to decision-making and planning for FbA. If such scientifically grounded data could be collected and process, then the impact analysis of FbA and similar actions could be insightfully assessed. SUFAL can support the government and relevant agencies (private and public – FFWC, BMD, CEGIS, RIMES, universities etc) to support this process.

3.10.1.4 Other areas of exploration

SUFAL should also explore other areas of early actions in future. More attention needs to be given on inclusion of **public health component in the FbA approach** to decrease mortality and morbidity rates due to waterborne diseases in target areas. Besides, SUFAL should work more on early actions especially in agriculture and livestock subsectors as damages were higher in those subsectors.

3.10.2Local administration, sectoral and central level

3.10.2.1 Standard Operating Procedure (SOP) finalization

SOP development and finalization should be the main focus going forward for scaling up. SUFAL should support **national task force (in developing protocols, guidelines, financing)** and sectoral departments for the development of SOP and then to implement forecast-based action according to SOD. The SOP development and internalization by various relevant institutions would require multiple stage by stage processes and authorizations at national and local level. Therefore, enough time, planning and resources should be allocated by the project for SOP development and adoption by targeted stakeholders. In the development of the SOP, multiple and relevant agencies need to be involved and assigned their specific roles and responsibilities in the perspective of FbA. These include not only the respective administrative offices and the DDM but also other service providers such the departments for agriculture, livestock, fisheries, women and children affairs, youth etc.

3.10.2.2 Advocacy for increased budget allocation

SUFAL should advocate with district administration to allocate funding for union level government agencies (LGIs, UDMC) to take early action. **Advocacy is also required for dedicated allocation** for early action from general disaster management funds both at national level (DDM, sectors) and at local level (administration, sectors). Most of fund allocation is now for relief based or post disaster damage management which needs to be changed.

Furthermore, the project can sensitize the upazila and union level government officials to create a different budget or fund for early actions in preparation for floods. The project can also support the research into design and adaptation of increased budgetary allocation by the government according to needs of low, medium, and highly vulnerable areas and households. This can be applied as per needs of specific geographical locations or as per needs of the district and their vulnerability. Once a calculation is done and integrated into the DM plans of the vulnerable districts, this can be reviewed

and updated annually or bi-annually based on the frequency of the disasters and contribute to contingency planning and budgeting by the central government.

3.10.2.3 Advocacy for better horizontal and vertical coordination

Horizontal coordination at upazila level **among local public offices** and vertical coordination **between national and local level administrations** should be strengthened through further advocacy and sensitization activities. This would enable more fluidity in decision making and mobilization of resources before, during and after floods that would immensely contribute to the purpose of helping the community people to be safer. Inter and intra-governmental coordination improvements could be done through an increased number of meetings and workshops among the different government actors such as the Department of Agriculture Extension, Department of Livestock, DRRO, DC, Upazila and Union chairmen, UNO, etc. SUFAL could help towards facilitating more frequent meetings while highlighting the agenda of SUFAL.

3.10.2.4 Capacity building sessions for LGIs, DMCs, community volunteers

The DMC sensitization sessions and community volunteer capacity building sessions had been conducted on-line due to the COVID-19 outbreak. They felt that the sessions would have been more fruitful if the sessions had been conducted **physically and over a longer period of time** so that the participants are able to better comprehend and understand the lessons for application in their activities.

Capacity building and awareness raising drills and sessions in the context of the on-going pandemic needs to be conducted whenever there are gaps in government restrictions on movement to enable the community members to take proper and appropriate early actions after getting the early warning message to reduce even more damage caused by flood.

Furthermore, there is need for capacity building in disaster risk governance for the administrative officials of central, divisional, district and upazila levels. This will reduce the conflict among the different public and politically appointed authorities and contribute to increasing accountability among these key stakeholders who lead the resource mobilisation, planning and allocation down to the grassroots level.

3.10.2.5 Integration of FbA in country policies and plans

At the same time the SOP is developed in the follow-up project phase, an advocacy plan is required on how to integrate FbA and Early Warning System (EWS) considerations in different country policies and plans e.g., starting with:

- Linkage between **FbA and safety net programmes** should be further explored (especially with SSNP's employment generation programmes and cash for vulnerable people
- Review of the Disaster Management Act of 2012, where a key consideration would be to increase contingency budget of Deputy Commissioner (District) for Early actions; and also consider targeting of local service producers and SMEs to be supported by FbA
- Inclusion in relevant departmental (e.g upazila level service departments – agriculture, livestock etc) and associated ministry's citizen charter with respect to disaster prevention, preparedness, early recovery and response

Furthermore, it is recommended to advocate with the government and donors to establish a **joint multi-year, forecast-based monitoring grant** which will work towards integrating the FbA/EWS system into regular disaster preparedness work.

Also, under the purview of the Humanitarian–Development Nexus, the donor commitments need to be aligned with that of government taking into cognizance the needs of the vulnerable communities with the increasing frequency of disasters (in light of the issues in climate change), which in this case is floods. Currently, the FbA is centred mainly on the early warning actions but given the context of Bangladesh and the exacerbating vulnerability of the disaster affected communities and areas, the FbA in this context needs to be inclusive of early response and recovery for recurring disasters risks such as in the case of floods that hit more than once a year as was in the case of 2020 floods.

3.10.3 Community Level

3.10.3.1 Even distribution of EWM beneficiaries

The distribution of early warning message recipients had been uneven in many areas as a majority of the population of a certain area may have received the message while only a handful of people had received message in the neighbouring area. This had caused an uneven impact on the area. This can be solved by selected **small community unit, such as a neighbourhood or *para*, first**, and then ensure to select people from each neighbourhood/*para*.

To ensure more equitable access to EWMs of women, the intervention can include community level **yard meetings** and other such interventions to make the women aware and literate of basic mobile operating process. Another way of reaching out to women might be through different development projects and micro finance institutions working in the locality with women at community level. As these projects or initiatives mostly work at granular community level through yard meeting or periodic meetings, this might be a way to reach out women directly and make them aware about EWMs and how to access those.

3.10.3.2 Institutionalization of community volunteers

The number of community volunteers had been quite low in proportion to the magnitude of people and size of area that they are assigned to support during floods. The intervention design should focus on institutionalizing and engaging the community volunteers throughout the year in phases instead of just engaging with them during floods for rescue and early warning message dissemination.

The Flood Preparedness Program (FPP) is being implemented by national Resilience Program (NRP), and Community Preparedness Program (CPP) is being implemented by BDRCS. SUFAL can examine how it can **utilize learning components from FPP and CPP** for enhancing forecast based early actions, especially in strengthening community preparedness and institutionalizing community volunteers.

The community volunteers could be involved in conducting surveys in their respective areas to improve their list of recipients and identification of most vulnerable sections within their societies to include within their intervention activities. The community volunteers can also be included in the early action planning, seasonal agriculture planning, etc. as they may have access to the community people and insights on the best practices for reduced damage during floods.

3.10.3.3 Increased engagement of youth and female volunteers

While most of the volunteers that had been engaged by the intervention team had been young and proactive in taking actions and going on rescue missions during the flood, it was also seen that many of the trained volunteers had migrated away from home or had become engaged in their employment or business which had taken them away from the activities as community volunteers. The project could ensure the retention of the community volunteers through **engaging younger people** who are old enough be volunteers and are still studying in high school or college, thus staying in the locality. This batch of community volunteers needs to be updated periodically to ensure adequate number are present around the time of floods. If these volunteers could be tagged to LGIs through their awareness programmes and other community level activities, this system may sustain after project ending. LGIs can motivate more people to join as volunteers and existing volunteers can also pass down the responsibilities to new volunteers. **Department of youth development** and **department of women's affairs** should be engaged in these initiatives directly. Also, local level recognition of volunteers through certification and award can motivate young people to engage these kinds of social works.

In addition, **young married women** (as there would be less risk that they would get married and leave their communities) with some literacy can also be engaged as volunteers who can easily access to women at households to people's yard. Basic understanding of gender specific early actions (e.g., saving sanitary napkins, clothing, and garments for flood times) can be also disseminated through this way.

3.10.3.4 Training, sensitization, and capacity building in early actions

While the project ensured the participation of the community people when deciding on the list of early actions and early warning messages, the people had not been engaged extensively through workshops, capacity building, sensitization or training sessions on the early actions that could be undertaken to reduce damage and loss due to flood. The **hands-on training sessions, yard meetings, showing docudrama**, etc. would help to make the concept of early action more easily acceptable to the community people and would help them to sustain the activities after the project ends if the early actions would lead to reduced damage.

The early actions capacity building training and sensitization sessions could be outsourced to other implementing NGOs through sharing the early action matrix and list with the NGOs so that they may integrate the improved practices into their field work and reach out to the community level without having to invest too much financial or human resources.

3.10.3.5 Improvements for shelter security

Many people were found to have refrained from going to the shelters during the flood as they felt that their families, assets, and livestock would not be as secure as they/those would be in their relatives' houses or at the embankments. The community people and project managers expressed the need to invest more into **improving the security of the shelters**. Either the project could **engage the police** in the shelters (and also in the embankments where livestock are kept during flood) and **offer patrolling and guarding of their livestock, assets, and especially the female members** of their households. In summary, some form of patrolling and guarding services needs to be introduced into the shelters to motivate more people to avail of the shelters during floods. Collective initiatives like community-based patrolling or security teams can also be formed and engaged to increase shelter security. These

patrolling teams can also safe-guard livestock piled in embankments or higher places. These community-based patrolling teams can look after the shelters and livestock in shifts. If the benefits of such approach can be realised and internalized by the community people, they will keep up the practice after project's end. Department of Livestock or UDMC can be engaged to form and sensitize/ train community patrolling teams.