DDM

COMMUNITY-BASED FLOOD RISK MANAGEMENT (CBFRM)

A SUB-COMPONENT OF
FLOOD AND RIVERBANK EROSION RISK MANAGEMENT
INVESTMENT PROGRAM (FRERMIP)

EXECUTING AGENCY:
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DEPARTMENT OF DISASTER MANAGEMENT

END-LINE STUDY OF CBFRM (PROJECT 1)

PRESENTED TO

PROJECT MANAGEMENT UNIT
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Table of Contents

Executive Summary i
1. Introduction 1
1.1 Background 1
1.2 Objective of the study 2
1.3 Scope and structure of the report 2
1.4 Limitations of the study 2
2. Methodology 3
2.1 Research approach 3
2.2 Study area 3
2.3 Participants and sampling 3
2.4 Data collection 4
2.5 Data analysis 4
2.6 Ethical considerations 4
3. Analysis of Findings 5
3.1 Socio-demographic characteristics of the Respondents 5
3.1.1 Respondent type 5
3.1.2 Age and gender composition of household Respondents 5
3.1.3 Occupation 7
3.1.4 Household pattern 9
3.2 Assessing knowledge and perception of Flood Risk Mitigation- Beneficiaries 9
3.2.1 Awareness and effectiveness of campaigns 9
3.2.2 Flood experience and response 13
3.2.3 Flood measurement and understanding 21
3.2.4 Flood preparedness and actions 26
3.2.5 Emergency response and evacuation 29
3.2.6 Community activities and drills 32
3.3 Assessing knowledge and perception of Community Volunteers 35
3.3.1 Courtyard meetings 35
3.3.2 Training and knowledge retention 38
3.3.3 Equipment and resources 41
3.3.4 Challenges 43
3.4 Reflection on Gender Action Plan (GAP) in Project-2 45
3.5 Snapshot from qualitative findings 47
3.5.1 Community perceptions 47

3.5.2 Dissemination of flood early warning 48
3.5.3 Flood preparedness measures 48
3.5.4 Strengthening community resilience 49
3.3.5 Building resilience through knowledge sharing 49
3.6 Findings on key evaluation questions 50
3.6.1 Relevance 50
3.6.2 Efficiency 51
3.6.3 Effectiveness 51
3.6.4 Impact 52
3.6.5 Sustainability 52
4. Key challenges 53
5. Lesson learned 54
6. Conclusions and recommendations 56

List of Tables

Table 1: Type of respondent **5**
Table 2: Age and gender composition of household respondents across Districts, Upazilas and Unions **6**
Table 3: Occupation of the respondents **8**
Table 4: Self-categorization of household pattern 9
Table 5: Flood risk preparedness practices 10
Table 6: Retention of knowledge & skills learned for flood risk preparedness campaign 10
Table 7: Participation in courtyard meetings in the last 5-6 years 11
Table 8: Messages delivered in courtyard meetings 12
Table 9: Enhancement of resilience and awareness about flood risk mitigation measures 13
Table 10: Households faced floods in the last 5-6 years 13
Table 11: Measures adopted by households as per knowledge and skill acquired 15
Table 12: Motivation to apply measures in response to flood warning 16
Table 13: Initiatives taken by households (multiple answer) 18
Table 14: Preparedness during severe floods in the last 5-6 years (multiple answer) 20
Table 15: Changes in floods during the last 5-6 years by upazila 21
Table 16: Changing pattern of floods 21
Table 17: Household ability to measure normal, moderate, and severe floods near homestead 22
Table 18: Idea about the flood danger level 22
Table 19: Source of knowledge about danger level (multiple answers) 23

Table 20: Existence of Flood markers previously installed 24
Table 21: Conditions of existing flood markers 24
Table 22: Flood marker's utility for flood level understanding 25
Table 23: Effectiveness of flood marker for flood Level perception 25
Table 24: Understanding of flood warning messages 26
Table 25: suitability of flood warning messages in a local context to take flood preparedness 26
Table 26: Flood preparedness measures over the last 5-6 years by households (multiple answer) . 28
Table 27: Source of drinking water during floods (multiple answer) 30
Table 28: Existence of flood shelter 31
Table 29: Use of flood shelter by beneficiaries 32
Table 30: Memory recollection about events in the mock drill 32
Table 31: Participation in the mock drill by beneficiaries 33
Table 32: Effectiveness of mock drills for flood preparedness 33
Table 33: Memory recollection of messages in folks or drama 34
Table 34: Participation in folks or drama 34
Table 35: Effectiveness of folk song and drama 35
Table 36: Number of courtyard meetings conducted over 5-6 Years 35
Table 37: Average attendance of beneficiaries at courtyard meetings over 5-6 Years 36
Table 37: Messages delivered in courtyard meetings (multiple answer) 37
Table 38: Participants attended in courtyard meetings 38
Table 39: Recollection of attended training Sessions (multiple answer) 40
Table 40: Equipment sufficiency for job fulfillment 41
Table 41: Equipment requirements (multiple answer) 42
Table 42: Challenges from equipment shortage impacting performance (multiple answer) 44
Table 43: Enhancement of resilience to disaster risks by household pattern 45
Table 44: Enhanced disaster resilience and risk awareness among embankment residents 46

Abbreviations

ADB	Asian Development bank
BDPC	Bangladesh Disaster Preparedness Centre
BWDB	Bangladesh Water Development Board
CbFRM	Community-based Flood Risk Management
CDMU	Community Disaster Management Unit
CNRS	Center for Natural Resource Studies
CPP	Cyclone Preparedness Program
CV	Community Volunteer
DDM	Department of Disaster Management
EA	Executing Agency
FRERMIP	Flood and Riverbank Erosion Risk Management Investment Program
FFWC	Flood Forecasting and Warning Center
GoB	Government of Bangladesh
HQ	Head Quarter
IA	Implementing Agency
ILO	International Labor Organization
IT	Information Technology
MFF	Multi-tranche Financing Facility
MoU	Memorandum of Understanding
NGO	Non-Government Organization
INGO	Implementing Non-Government Organization
PIO	Project Implementation Officer
ToR	Terms of Reference
UP	Union Parishad (Council)
UZ	Upazila

Executive Summary

Bangladesh faces significant challenges due to its vulnerability to floods and riverbank erosion, impacting lives, livelihoods, and the economy. In response, the government has implemented various initiatives. The Asian Development Bank (ADB) assisted programme the Flood and Riverbank Erosion Risk Management Investment Program (FRERMIP) aligns with the government's plans to strategically manage flood and riverbank erosion risks along the country's main rivers to reduce damage to people's assets and lessen constraints to economic development. FRERMIP has been rightfully addressing both structural and non-structural aspects of disaster management. The Department of Disaster Management (DDM) under the Ministry of Disaster Management and Relief (MoDMR) is the implementing agency for Community-based Flood Risk Management (CbFRM) support activities that are part of the non-structural interventions of Project-2 in continuation of the similar activities implemented during Project-1. In Project 1, the DDM selected the Bangladesh Disaster Preparedness Centre (BDPC) as the Implementing Non-Government Organization (INGO) responsible for implementing the CbFRM support on their behalf. Conversely, in Project 2, the DDM has chosen the Center for Natural Resource Studies (CNRS) as the INGO for implementing the CbFRM. In compliance with one of the tasks in the ToR of the CbFRM project (Project 2), CNRS, as per the contract agreement, carried out an end-line study of Project 1 of the target sampled households composed of a low-income population based on a pre-tested structured questionnaire in the CbFRM project areas.

The broader objectives of the end-line study are to assess the overall effectiveness and impact of Project 1 interventions in reducing flood and erosion risks and enhancing community resilience in the targeted areas of Bangladesh. CNRS utilized a mixed-method approach, combining qualitative and quantitative methods, including a survey, FGDs, KIIs, desk reviews, and field observations. The research approach involved diverse stakeholders and followed OECD-DAC criteria[1] to assess project relevance, effectiveness, efficiency, impact, and sustainability. A structured questionnaire was used for household surveys, and a semi-structured checklist was used for qualitative data. Data were gathered from 28 unions encompassing 7 upazilas in the Sirajgong, Manikgonj, and Tangail districts. Sampling prioritized fairness and inclusivity, with 578 households surveyed. FGDs provided qualitative insights.

Ten enumerators collected survey data over 11 days, with three groups for FGDs. A comprehensive one-day training was conducted, emphasizing research ethics. Data quality was ensured through cross-checking and rigorous data cleaning. Quantitative analysis used SPSS and Excel, while qualitative data underwent thematic analysis. Ethical considerations included informed consent, confidentiality, participant well-being, and adherence to CNRS policies throughout the process.

Key Findings

Beneficiaries

The survey indicates a high level of awareness and adoption of flood and erosion risk reduction strategies across all surveyed Upazilas, with 100% of respondents affirming their adherence to these measures. Moreover, the awareness campaigns were highly effective in promoting preparedness for risk reduction, with 99.81% of respondents confirming their readiness. Respondents demonstrated strong retention of knowledge and skills acquired from previous flood risk preparedness campaigns, with 99.81% confirming retention. Discussions during courtyard meetings primarily focused on flood preparedness, warnings, awareness, and protecting cattle and poultry from floods.

The project intervention significantly enhanced respondents' resilience to disaster risks and awareness of risk mitigation measures, with 100% of respondents across all upazilas reporting improvements.

[1] When assessing programs or projects, the OECD DAC Criteria - relevance, effectiveness, efficiency, impact, and sustainability-provide a comprehensive framework to ensure alignment with goals, successful outcomes, resource optimization, long-term effects, and continued benefits even after external support ends.

Respondents have a high level of awareness regarding flood danger levels across all surveyed Upazilas. Most respondents reported knowledge about flood danger levels, with local marks hoisted by government agencies as the primary source of information. The presence of previously installed flood markers varied across Upazilas, with some areas showing higher percentages of existing markers than others. While most flood markers were reported to be in fairly good condition, there were areas where improvements were needed to ensure optimal functionality. Overall, the majority of respondents reported that flood markers met their needs for understanding flood levels. However, there were variations across Upazilas, with some areas indicating lower effectiveness. Respondents' understanding of flood warning messages varied across Upazilas, with differing levels of comprehension reported. While a significant portion of respondents found the messages fully understandable, there is room for improvement to ensure better comprehension among all community members. Respondents unanimously agreed that flood preparedness measures were suitable for their local context across all surveyed Upazilas, indicating the effectiveness and appropriateness of the implemented strategies.

Household engagement in flood preparedness measures has been active over the last 5-6 years across all surveyed Upazilas. The reliance on purified water during floods emerges as a consistent trend, with over 99% of respondents across all surveyed areas depending on it as the primary source of drinking water. Disparities in infrastructure readiness are evident, with only about 41% of participants reporting the presence of flood shelters in their respective upazilas. However, the utilization of these shelters during evacuations remains relatively low, with only about 22.7% of participants seeking refuge in them, indicating the need for increased awareness and accessibility of shelter facilities.

On the other hand, community activities and drills are crucial in enhancing disaster preparedness and response. Mock drills were conducted in most surveyed upazilas, with high participation rates and overwhelmingly positive feedback regarding their effectiveness for flood preparedness. These drills provide invaluable opportunities for communities to simulate disaster scenarios and practice response activities, fostering collaboration between local officials and community members. Furthermore, cultural events such as dramas and folk performances were widely witnessed across upazilas, providing inclusive platforms for community engagement and disseminating flood-related messages. Participation in these events was almost universal, showcasing widespread community involvement in initiatives to enhance disaster resilience.

Community Volunteers (CVs)

CVs underwent intensive training in flood and riverbank erosion risk reduction, climate change impacts, and early warning dissemination. They conducted numerous sensitization meetings, mock drills, workshops, and courtyard sessions, engaging over 5,000 individuals, primarily women. Analyzing CV responses revealed that male attendance tends to concentrate heavily in the 9 or fewer meetings category, comprising 79.07% across all areas; in contrast, females show more consistent attendance, with 76.74% attending between 11 to 20 meetings, indicating higher and more steady engagement levels in community activities compared to males. Courtyard meetings effectively disseminated flood preparedness messages, covering essential topics such as raising homesteads, storing dry food, and protecting tube wells, with universal acknowledgment across all upazilas. CVs demonstrated high recall rates for training topics, with uniformity in recall across different upazilas, highlighting the effectiveness of training sessions. Despite their crucial role, all CVs reported a lack of necessary equipment, including hand mics, torch lights, raincoats, and umbrellas, which impacted their ability to fulfill their responsibilities effectively. The absence of essential equipment led to various challenges for CVs, including identity issues, attention problems, and avoidance behaviors, underscoring the importance of providing adequate resources for effective performance.

Gender situation analysis

A collaborative effort involving both men and women led to significant progress in household preparedness measures across all upazilas, with notable achievements in securing homesteads, installing latrines, and protecting tube wells. Analysis by household patterns revealed that deficit households generally reported lower levels of enhancement in disaster resilience and risk awareness compared to break-even and surplus households. This trend was consistent across all upazilas surveyed. Residents living on embankments, particularly females, reported a notable increase in resilience to disaster risks and awareness of mitigation measures during post-intervention across all upazilas. Training initiatives focusing on gender awareness and leadership showed highly positive results, with a significant portion of women (over 30%) reporting tangible benefits. Increased knowledge acquisition, particularly among women participating in O&M training, underscores the effectiveness of the program in enhancing community infrastructure management and addressing Gender-Based Violence (GBV) issues.

Qualitative Findings

Community perceptions: Courtyard meetings were instrumental in informing villagers about disaster management, women's empowerment, and flood resilience, fostering a sense of community and practical knowledge application. Awareness dramas and discussions facilitated understanding and engagement, contributing to increased community cohesion.

Dissemination of flood early warning: Timely early warning messages led to implementing various preparedness measures at household and community levels, emphasizing safe water collection, financial preparedness, livestock management, and food preservation. Community communication and assistance to vulnerable groups were critical aspects of flood preparedness.

Flood preparedness measures: The CbFRM project significantly increased community engagement in proactive measures before, during, and after floods, with a notable focus on women's safety, health, and hygiene. Practices such as water purification, safe shelter identification, and hygiene management were actively adopted, showcasing a proactive stance towards disaster management.

Strengthening community resilience: The introduction of the concept of community resilience through the CbFRM project enhanced community knowledge and participation in disaster risk reduction. Community members articulated a solid understanding of resilience and emphasized the importance of saving money, developing action plans, maintaining early warning systems, and fostering community connectedness.

Building resilience through knowledge sharing: Continuous discussions on disaster preparedness were recognized as vital for increasing awareness, enhancing community resilience, mitigating impact, and empowering individuals. Personal stories highlighted the practical benefits of prior knowledge and preparedness, reinforcing the importance of current awarness and information sharing.

Key evaluation findings:

Relevance: The CbFRM project is highly relevant, aligning with Sustainable Development Goals (SDGs) and national development plans. Activities target flood-vulnerable communities and address climate resilience, poverty reduction, and disaster risk reduction.

Efficiency: Project management is efficient, with transparent resource management and well-conducted baseline surveys. Training programs effectively equip Community Volunteers (CVs) with the necessary skills contributing to improved disaster preparedness and response.

Effectiveness: Project activities, including flood marker installations and community drills, are effective in enhancing disaster risk management. The formation of Community Disaster Management Units (CDMUs) strengthens community engagement and coordination.

Impact: The CbFRM project has significantly strengthened community flood and erosion risk preparedness and resilience. CVs and CDMUs play key roles in disseminating preparedness messages and coordinating response efforts.

Sustainability: The project promotes sustainability through community empowerment, capacity building, and institutionalization of disaster risk management practices. However, formal integration with national disaster management institutional frameworks at the union and ward levels should better ensure long-term impact and resilience building beyond project completion.

Key Challenges: The implementation of the CbFRM project faced significant challenges, including a shortened project lifespan, lack of specific guidelines for institutionalization, awareness and functionality issues of Disaster Management Committees (DMCs), resistance from DMC leaders, insufficient monitoring and follow-up mechanisms, and disruptions during political events.

- *Short Lifespan:* The project faced delays in contract finalization, leading to a significantly reduced project duration. This constrained the implementation of planned activities and heightened pressure on project personnel.
- *Lack of Institutionalization Guidelines:* The absence of clear guidelines hindered the integration of community-driven approaches into existing disaster management frameworks.
- *DMC Awareness and Functionality:* Many DMC members were unaware of their roles, leading to ineffective disaster preparedness. Some DMCs remained non-functional outside disaster situations.
- *Resistance from DMC Leaders:* Some leaders resisted empowering communities, hindering decision-making processes and project effectiveness.
- *Insufficient Monitoring:* The lack of robust monitoring mechanisms made it challenging to assess DMC performance and project impact.
- *Challenges During Political Events:* Political events disrupted project activities, affecting community engagement and project timelines.

Lessons Learned: The CbFRM project offered valuable insights into disaster risk management, highlighting the importance of policy alignment, community empowerment, efficient resource management, sustainability, and enhanced community resilience. Key lessons include:

- Aligning projects with policy frameworks enhances relevance and effectiveness.
- Community empowerment and capacity building are crucial for proactive disaster management.
- Efficient resource management ensures project success and sustainability.
- Institutionalizing community-driven approaches promotes long-term impact.
- Holistic strategies foster community resilience and sustainable development.

Recommendations: To build upon the project's success and address remaining challenges, recommendations include:

- Implement additional projects targeting poverty-disaster vulnerability linkages.
- Prioritize indigenous knowledge in nature-based flood solutions.
- Advocate for promoting flood-resilient water and sanitation initiatives and shelter interventions through broader disaster risk reduction and resilience programs, ensuring a holistic approach to community resilience.

- Facilitate the registration of CDMUs with government agencies to establish them as legal entities capable of effectively serving and representing their communities in disaster management efforts.
- Construct community-led flood shelters and introduce flood-resilient forage.
- Strengthen health linkages between disaster management and health centers.
- Allocate funds for household-level resilient shelter construction.

1. Introduction

1.1 Background

Bangladesh, with its vast low-lying floodplains and tidal areas, is one of the largest and most disaster-prone deltas globally. The hydrological dynamics of the country are heavily influenced by the convergence of the Jamuna, Ganges, and Meghna rivers, leading to frequent monsoon floods that significantly affect its population, environment, and economy. While these floods have traditionally enriched the soil, they can become destructive when they surpass manageable levels, particularly through the erosion of riverbanks, thereby negatively impacting lives and livelihoods. To address these challenges, Bangladesh has adopted strategies to alleviate poverty and reduce inequality, including measures to mitigate the effects of flooding and riverbank erosion. These initiatives are part of the country's Vision 2021, which prioritizes sustainable development. A key component of these efforts is the Bangladesh Delta Plan 2100, which aims to eliminate poverty and enhance economic and social well-being through a climate change management strategy that prioritizes the needs of people experiencing poverty. This plan focuses on the long-term stabilization of rivers, boosting climate resilience, and reducing disaster risks, thereby supporting a sustainable and equitable development path for the country.

The government has been actively developing and implementing various measures to enhance the country's capacity to manage floods more effectively. Notable initiatives include the Flood Action Plan, the Flood Hydrology Study, the Flood Management Model Study, the National Water Management Plan, the National Water Policy, the Flood Early Warning Study, and the construction of flood embankments and flood shelters. ADB is assisting the government of Bangladesh in improving people's livelihoods in the country's most flood- and erosion-prone areas along the Jamuna, Ganges, and Padma rivers. The Flood and Riverbank Erosion Risk Management Investment Program (FRERMIP) aligns with the government's plans to strategically manage flood and riverbank erosion risks along the country's main rivers to reduce damage to people's assets and lessen constraints to economic development.

FRERMIP has been rightfully addressing both structural and non-structural aspects of disaster management. The Department of Disaster Management (DDM) under the Ministry of Disaster Management and Relief (MoDMR) is the implementing agency for Community-based Flood Risk Management (CbFRM) support activities that are part of the non-structural interventions of Project-2 in continuation of the similar activities implemented during Project-1. It aims to "ensure and strengthen local community participation in creating awareness and developing the capacity of the community people to reduce the river flood and flood-induced river erosion risks, reinforced by structural mitigation sub-component, implemented by BWDB; as well as to accelerate community participation in routine O&M of the flood and erosion mitigation infrastructures."

In Project 1, the DDM selected the Bangladesh Disaster Preparedness Centre (BDPC) as the Implementing Non-Government Organization (INGO) responsible for implementing the CbFRM support on their behalf. Conversely, in Project 2, the DDM has chosen the Center for Natural Resource Studies (CNRS) as the INGO for implementing the CbFRM. This includes Community Capacity Development Support for Participatory Operations and Maintenance (O&M) as part of the Institutional Strengthening and Project Management Consulting (ISPMC) Services. CNRS works with the Project Management Unit (PMU) to ensure the effective execution of this project.

In compliance with one of the tasks in the ToR of the CbFRM project (Project 2), CNRS, as per the contract agreement, carried out an end-line study of Project 1 of the target sampled households composed of a low-income population based on a pre-tested structured questionnaire in the CbFRM project areas. The specific survey areas were selected in accordance with the same criteria as those followed in the CbFRM project area selection. The criteria mainly prioritize areas with a high degree of

vulnerability to floods and erosion almost every year, situated within a 4-5 km range along the right and left banks of the Jamuna and Padma rivers in the central zone of Bangladesh. The areas were located in 28 unions of 7 upazilas in the Sirajgong, Manikgonj, and Tangail districts. Understandably, the survey areas were close to FRERMIP Project-1 sites, which focus on structural mitigation measures for flood control, drainage, and protection against bank erosion of the Jamuna and Padma rivers in the abovementioned areas.

1.2 Objective of the study

The broader objectives of the end-line study are to assess the overall effectiveness and impact of Project 1 interventions in reducing flood and erosion risks and enhancing community resilience in the targeted areas of Bangladesh. The specific objectives are to:

- Assess the effectiveness of Project 1 interventions in enhancing the capacity of communities to mitigate flood risk, including their ability to cope with and recover from flood and erosion events.
- Evaluate the impact of Project 1 interventions on strengthening community resilience within targeted communities by analyzing changes in their preparedness, response capacity, and mechanisms for recovery in the face of flood and erosion events.
- Capture key challenges and lessons learned from Project 1 and provide recommendations.

1.3 Scope and structure of the report

This report provides a comprehensive analysis of the effectiveness and impact of Project 1 interventions in reducing flood and erosion risks and enhancing community resilience in the targeted areas of Bangladesh. The scope of the report includes both quantitative and qualitative data collected from various regions prone to flooding and erosion, focusing on the Jamuna and Padma rivers' floodplains.

The structure of the report is organized as follows: The Introduction provides an overview of the study's background, objectives, and research significance. The Methodology section explains the data collection methods, including the procedures for surveys and FGDs, and the analytical approaches used for quantitative and qualitative data. The Findings and discussion section presents the quantitative and qualitative data analysis results, highlighting key outcomes and insights related to the study's objectives, and interprets the findings within the context of the study's objectives and the broader literature, identifying significant patterns, themes, and implications. The Key Challenges section assesses the challenges encountered during the study, including logistical, methodological, and contextual issues. The Lessons Learned section reflects on the lessons learned from the implementation and evaluation of Project 1, providing insights for future projects. Finally, the Conclusion and Recommendations section summarizes the study's conclusions, offering practical recommendations for improving flood risk mitigation and enhancing community resilience, and provides suggestions for policy considerations and future interventions.

1.4 Limitations of the study

Despite rigorous efforts to ensure data accuracy and reliability, several limitations are inherent in this study. Firstly, the door-to-door approach used for in-person verification of household circumstances may have introduced over-reporting biases, as participants might exaggerate their situations to receive more assistance. While enumerator training and triangulation of information were employed to mitigate this, the potential for over-reporting remains a concern. Secondly, respondents may have provided socially desirable responses, leading to overestimating positive outcomes or underestimating challenges within the community. Moreover, adverse weather conditions significantly impacted data

collection, with enumerators facing difficulties reaching certain locations due to impassable roads, flooding, or dangerous weather conditions.

Additionally, the remoteness of certain areas posed a challenge in reaching participants, potentially introducing bias towards more accessible regions. Finally, recall bias could affect the accuracy of responses, particularly for events that occurred in the distant past or were emotionally charged. These limitations should be considered when interpreting the findings of the study, as they may impact the generalizability and reliability of the results.

2. Methodology

2.1 Research approach

CNRS employed a mixed-method approach to conduct this study. A range of qualitative and quantitative methods, including a survey, focus group discussions (FGDs), Key Informant Interviews (KIIs), desk reviews, and, where possible, field observations and visits, were followed. The evaluation approach was participatory in nature and involved diverse stakeholders, including direct project participants, project staff, civil society members, etc. Thus, the report expressed in detail how various stakeholders were involved meaningfully throughout the evaluation process.

CNRS also followed the OECD-DAC criteria to identify the project's relevance, effectiveness, efficiency, impact, and sustainability. Cross-cutting issues, mainly gender, age, and inclusion, were addressed throughout the process. A structured questionnaire was used to conduct household surveys to get quantitative data. Similarly, a semi-structured checklist was used to gather qualitative data. The data collection included a desk review of relevant studies and research. CNRS developed and finalized the study tools in English and translated them into Bangla. Finally, a pre-test was conducted to finalize the study tools.

2.2 Study area

Data were gathered from 28 unions encompassing 7 upazilas situated in the Sirajgong, Manikgonj, and Tangail districts. The specific survey zones were chosen using criteria akin to those employed in the CbFRM project area selection process. These criteria mainly prioritize areas highly vulnerable to floods and erosion almost annually, located within a 4-5 km radius along the Jamuna and Padma rivers in the central region of Bangladesh. Notably, these survey areas were in close proximity to FRERMIP Project-1 sites, which focus on structural measures for flood control, drainage, and safeguarding against bank erosion along the Jamuna and Padma rivers in the mentioned areas.

2.3 Participants and sampling

CNRS has adopted a comprehensive sampling methodology for household selection, prioritizing fairness and inclusivity across diverse demographics and geographic regions. In CDUMs with significant beneficiary populations, such as Gala Union, systematic random sampling was employed, utilizing intervals based on beneficiary counts. In areas where beneficiary lists were unavailable, a proximity-based approach considering distance and direction was utilized to guide selection. Across 195 villages, sample households were distributed to ensure a representative sample, averaging 2.95 beneficiaries per village and targeting a total of 576 beneficiaries. Adjustments were made as necessary to maintain consistency, occasionally selecting two beneficiaries from a village to meet the set target. These rigorous methods aimed to establish an equitable and credible selection process, which is crucial for the success of the study. Finally, a total of 578 households were surveyed, of which 535 were beneficiaries who participated in different activities under the project, such as courtyard meetings and 43 community volunteers.

The study team used a Participatory Learning and Action (PLA) tool, *i.e*., Focus Group Discussions (FGDs), to gain insight and understand qualitative aspects. The qualitative data collection process was summary-based. The team prepared tools for qualitative data collection and translated the FGD checklist into Bengali. Overall, 06 FGDs were conducted in the 6 Unions under the project areas.

2.4 Data collection

Survey data was collected by 10 enumerators over the course of 11 days. Each enumerator brought relevant expertise and experience in the field of research. Three groups of enumerators were organized to collect FGD data. Each group consisted of two members: one served as the session facilitator, while the other acted as a note-taker and assisted the facilitator.

CNRS conducted a comprehensive one-day in-person training to prepare the enumerators thoroughly. This training aimed to familiarize them with the tools, checklists, and procedural aspects of the assessment. Prior to the training, a detailed schedule was prepared, outlining the content, time allocation, methodology, and tools to be used. The training sessions covered various important topics, including the quality assurance plan, the piloting of all tools, and the specific roles of interviewers and note-takers. A strong emphasis was placed on research ethics to ensure the integrity and reliability of the data collected.

Additionally, the training included practical exercises and simulations to help enumerators understand and apply the procedures effectively. CNRS also facilitated background checks for all research participants—this thorough preparation aimed to ensure high-quality data collection and adherence to ethical standards throughout the research process.

2.5 Data analysis

CNRS was committed to ensuring the quality of data collection during the field assessment. Crosschecking at least 10% of respondents' assessments was conducted by CNRS, providing instant feedback to data collectors to finalize the interviewed questionnaires and tools. Any form of bias in the data was not tolerated, and rigorous data-cleaning procedures were implemented. Quality assurance and consistency were maintained through continuous supervision and guidance.

After conducting interview sessions with the participants, the collected data was carefully examined to ensure it aligned with the objectives of this study. The quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS) and Microsoft Excel software. These tools enabled the application of two common quantitative data analysis methods: descriptive and inferential statistics. These analytical approaches provided valuable insights into the study's objectives.

Conversely, the qualitative information was compiled and categorized, and then thematic analysis was performed to identify key themes and patterns relevant to the research objectives. The study team meticulously analyzed the qualitative data to make sense of it and identify significant themes and patterns that emerged from the interviews and documents.

2.6 Ethical considerations

Ethical considerations are paramount in any research endeavor undertaken by CNRS. Central to CNRS's ethical framework is the principle of respect for the dignity, rights, and well-being of all individuals involved in all studies. For this study, CNRS prioritized informed consent, ensuring that participants fully understand the purpose of their involvement, procedures, and potential risks before consenting to participate. Confidentiality and anonymity were rigorously upheld, with all personal information treated with the utmost sensitivity and protected from unauthorized access. Furthermore, CNRS was

committed to mitigating any potential harm or distress arising from participation in this study, promptly addressing any concerns or adverse effects. The study team adhered strictly to the policies outlined by CNRS, including the Child Safeguard Policy, Prevention of Sexual Exploitation and Abuse (PSEA), and Intimidation and Bullying protocols, throughout the data collection process in the field.

3. Analysis of Findings

3.1 Socio-demographic characteristics of the Respondents

3.1.1 Respondent type

The survey was conducted among 578 households, of which 535 were beneficiaries who participated in different activities under the project, such as courtyard meetings and 43 community volunteers. Among the beneficiaries, females were 72.71%, compared to 27.29% of males, a trend consistent across various upazilas like Sahjadpur, Chauhali, and Harirampur. In contrast, among community volunteers, 55.81% were females, and 44.19% were males. In this survey, 71.45% of respondents were female, while 28.55% were male.

Table 1: Type of respondent

Upazila	Type of respondents				Total	
	Beneficiaries		Community Volunteer			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	87	87.00	13	13.00	100	100.00
Chauhali	134	93.71	9	6.29	143	100.00
Tangail Sadar	13	92.86	1	7.14	14	100.00
Nagarpur	13	92.86	1	7.14	14	100.00
Daulatpur	81	93.10	6	6.90	87	100.00
Shibalaya	110	94.02	7	5.98	117	100.00
Harirampur	97	94.17	6	5.83	103	100.00
Total	535	92.56	43	7.44	578	100.00

The table above presents the distribution of two types of respondents, beneficiaries and community volunteers, across several upazilas. Beneficiaries constitute the majority, accounting for approximately 92.56% of the respondents, while community volunteers comprise the remaining 7.44%. Notably, Chauhali displays the highest proportion of beneficiaries at 93.71% and the lowest proportion of community volunteers at 6.29%. Conversely, Sahjadpur exhibits an equal split between beneficiaries and community volunteers, each representing 50% of the respondents. Tangail Sadar and Nagarpur demonstrate minimal community volunteer engagement, with only one individual each in this category. Out of 578 respondents surveyed across the upazilas, 535 are beneficiaries, and 43 are community volunteers.

3.1.2 Age and gender composition of household Respondents

The analysis of the data highlights a significant number of respondents falling within the 31-40 age group, comprising 37.02% of the total, with the 26 to 30 age group following at 19.38%. While Sahjadpur exhibits a relatively even spread across age groups, other Upazilas like Chauhali and Shibalaya demonstrate a greater concentration within the 31 to 40 age bracket. Out of the total respondents, 28.55% are male and 71.45% are female.

Table 2: Age and gender composition of household respondents across Districts, Upazilas and Unions

District	Upazila	Union	Gender		Age Group					Total	
			Male	Female	20-25	26-30	31-40	41-50	Above 50		
			(%)	(%)	(%)	(%)	(%)	(%)	(%)	No.	(%)
Sirajganj	Shahajadpur	Gala	21.43	78.57		35.71	64.29			14	100.00
		Jalalpur	20.69	79.31	6.90	41.38	51.72			29	100.00
		Kaijuri	34.48	65.52	6.90	13.79	51.72	13.79	13.79	29	100.00
		Porjana	28.57	71.43			21.43	50.00	28.57	14	100.00
		Sonatani	35.71	64.29		14.29	14.29	35.71	35.71	14	100.00
	Chowhali	Bagutia	50.00	50.00			64.29	35.71		14	100.00
		Gharjan	28.57	71.43		10.71	35.71	42.86	10.71	28	100.00
		Khas Kaulia	37.93	62.07	3.45	17.24	65.52	6.90	6.90	29	100.00
		Khas Pukuria	14.29	85.71		21.43	28.57	42.86	7.14	14	100.00
		Umarpur	20.00	80.00	6.67	6.67	66.67	13.33	6.67	15	100.00
		Sadia Chandpur	37.93	62.07		20.69	31.03	24.14	24.14	29	100.00
		Sthal	21.43	78.57		14.29	28.57	35.71	21.43	14	100.00
Tangail	Tangail Sadar	Katuli	57.14	42.86	7.14	7.14	42.86	28.57	14.29	14	100.00
	Nagarpur	Bhara	14.29	85.71	21.43	42.86	21.43	14.29		14	100.00
Manikganj	Daulatpur	Bachamara	16.67	83.33	10.00	16.67	36.67	20.00	16.67	30	100.00
		Bagutia	44.83	55.17	6.90	13.79	37.93	10.34	31.03	29	100.00
		Jiyanpur	42.86	57.14	7.14	28.57		21.43	42.86	14	100.00
		Khalsi		100.00	7.14	21.43	28.57	28.57	14.29	14	100.00
	Shibalay	Arua		100.00		53.33	33.33	13.33		15	100.00
		Shibalaya	46.67	53.33		46.67	6.67	26.67	20.00	15	100.00
		Teota	31.11	68.89	4.44	8.89	24.44	15.56	46.67	45	100.00
		Uthali	14.29	85.71		21.43	14.29	21.43	42.86	14	100.00
	Harirampur	Boyra	42.86	57.14	14.29	7.14	42.86	28.57	7.14	14	100.00
		Dhulsunra	28.57	71.43		7.14	42.86	21.43	28.57	14	100.00
		Gopinathpur	10.00	90.00	6.67	20.00	36.67	23.33	13.33	30	100.00
		Harunkhandi	55.17	44.83	3.45	13.79	37.93	24.14	20.69	29	100.00
		Kanchanpur	13.33	86.67	6.67	20.00	60.00	6.67	6.67	15	100.00
		Ramkrishnapur	13.79	86.21	17.24	31.03	27.59	13.79	10.34	29	100.00
		Total	28.55	71.45	5.19	19.38	37.02	20.59	17.82	578	100.00

The table above presents detailed demographic information across several upazilas. On average, the female population surpasses males, constituting 71.45% of the total population, while males represent 28.55%. Notably, age group 31-40 emerges as the most prevalent demographic segment, comprising 37.02% of the population, followed by age groups 26-30 and above 50. Individual upazilas display nuanced patterns; for instance, Sahjadpur and Chauhali exhibit a higher proportion of females and a

dominance of the 31-40 age group, while Tangail Sadar has a higher male population and a significant presence of individuals aged 41-50. Nagarpur displays a remarkable proportion of young adults (20-25 age group), and Daulatpur, Shibalaya, and Harirampur consistently depict higher female populations across various age brackets.

3.1.3 Occupation

The data illustrates the distribution of respondents by occupation across different Upazilas, providing insights into the varied economic activities within each region. Given that most respondents are female, it is not surprising that a significant proportion are housewives. In Sahjadpur, 72% of respondents are housewives, while in Chauhali, 60.84% fall into this category. Tangail Sadar also sees 42.86% of respondents as housewives. Nagarpur has the highest percentage of housewives at 92.86%. In Daulatpur, housewives make up 65.52% of respondents, while in Shibalaya and Harirampur, they constitute 66.67% and 67.96%, respectively. This pattern reflects the broader trend across Bangladesh, where many women primarily engage in household duties. Other occupations, such as agriculture and various forms of day labor, are also present but less dominant. Chauhali sees a notable presence of individuals engaged in agriculture, with 9.79% of respondents working in this sector.

Conversely, Tangail Sadar exhibits diverse occupations, including small business owners and students, each comprising 7.14% and 42.86% of respondents, respectively. Nagarpur has a smaller sample size, but those engaged in agriculture and day laborer roles are prominent, making up 21.43% and 42.86% of respondents, respectively. Daulatpur shows a balanced spread across various occupations, with housewives, agricultural workers, and small business owners featuring 65.52%, 16.09%, and 11.97%, respectively. Shibalaya demonstrates a similar trend, with housewives, agricultural workers, and students comprising significant portions of respondents at 66.67%, 11.97%, and 29.91%, respectively. Harirampur, like several other Upazilas, sees a substantial number of respondents involved in household duties, along with diverse occupations such as agricultural workers and private jobs, including NGOs, making up 66.67%, 11.97%, and 11.97% of respondents, respectively.

Table 3: Occupation of the respondents

Occupation	Upazila														Total	
	Sahjadpur		Chauhali		Tangail Sadar		Nagarpur		Daulatpur		Shibalaya		Harirampur			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Agriculture	9	9.00	14	9.79	2	14.29			14	16.09	14	11.97	13	12.62	66	11.42
Day laborer (Agriculture)	13	13.00	7	4.90	1	7.14			2	2.30	8	6.84	2	1.94	33	5.71
Day laborer (Non-Agricultural)	1	1.00	1	0.70					1	1.15	1	0.85	5	4.85	9	1.56
Non-agricultural workers (eg, construction, factories, transport)			1	0.70	2	14.29			1	1.15					4	0.69
Personal business	2	2.00	4	2.80							1	0.85	2	1.94	9	1.56
Fisherman			1	0.70											1	0.17
Cattle (cows, goats, sheep) husbandry			2	1.40											2	0.35
Residential vegetable farming			1	0.70											1	0.17
Poultry farming									1	1.15					1	0.17
Government job	2	2.00	1	0.70											3	0.52
Private jobs including NGOs	1	1.00	4	2.80					2	2.30	5	4.27	2	1.94	14	2.42
Teacher			2	1.40											2	0.35
Van/ Rickshaw/ Pushcart/ Motor cycle driver			1	0.70			1	7.14			3	2.56			5	0.87
Artisan (carpenter; blacksmith, potter; goldsmith, craftsman, cobbler, weaver)			5	3.50											5	0.87
Non-agricultural traders			2	1.40									3	2.91	5	0.87
Food retailers in local markets			1	0.70											1	0.17
Works in tea/ sweet shop											1	0.85			1	0.17
Factory worker			1	0.70											1	0.17
Teacher									1	1.15					1	0.17
Earthwork											2	1.71	2	1.94	4	0.69
Village Doctor			1	0.70											1	0.17
Small business			5	3.50	3	21.43			2	2.30	2	1.71	1	0.97	13	2.25
Student									6	6.90	1	0.85	2	1.94	9	1.56
Housewife	72	72.00	87	60.84	6	42.86	13	92.86	57	65.52	78	66.67	70	67.96	383	66.26
Retired			2	1.40											2	0.35
Unemployed											1	0.85	1	0.97	2	0.35
Total	**100**	**100.00**	**143**	**100.00**	**14**	**100.00**	**14**	**100.00**	**87**	**100.00**	**117**	**100.00**	**103**	**100.00**	**578**	**100.00**

3.1.4 Household pattern

The data on household self-categorization by wealth across different Upazilas reveals significant economic disparities among the respondents. Overall, 69.38% of households are in the deficit category, struggling to meet their basic needs, while 25.78% break even, and only 4.84% are in surplus. Sahjadpur has 63% of households in deficit, 31% breaking even, and 6% surplus. In Chauhali, 65.73% are in deficit, 27.97% break even, and 6.29% are in surplus. Tangail Sadar shows 71.43% in deficit, with 14.29% each breaking even and surplus. Nagarpur is particularly vulnerable, with 100% of households in deficit. Daulatpur has 73.56% of households in deficit, 25.29% breaking even, and 1.15% surplus. Shibalaya sees 65.81% in deficit, 29.06% breaking even, and 5.13% in surplus. Harirampur has 76.70% in deficit, 19.42% breaking even, and 3.88% in surplus. These figures highlight the widespread economic challenges in these communities, with Nagarpur standing out for its severe economic instability and Tangail Sadar showing a slightly better, yet still concerning, distribution.

Table 4: Self-categorization of household pattern

Upazila	Household pattern						Total	
	Deficit		Break-even		Surplus			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	63	63.00	31	31.00	6	6.00	100	100.00
Chauhali	94	65.73	40	27.97	9	6.29	143	100.00
Tangail Sadar	10	71.43	2	14.29	2	14.29	14	100.00
Nagarpur	14	100.00					14	100.00
Daulatpur	64	73.56	22	25.29	1	1.15	87	100.00
Shibalaya	77	65.81	34	29.06	6	5.13	117	100.00
Harirampur	79	76.70	20	19.42	4	3.88	103	100.00
Total	401	69.38	149	25.78	28	4.84	578	100.00

3.2 Assessing knowledge and perception of Flood Risk Mitigation- Beneficiaries

3.2.1 Awareness and effectiveness of campaigns

Retention and effectiveness of flood preparedness skills

In assessing the impact of previous awareness campaigns, the survey delved into respondents' recollections and adherence to flood and erosion risk reduction strategies/actions. Respondents were asked whether they remember and follow any flood and erosion risk reduction strategies/actions they learned during the previous project awareness campaign. The data indicates a high level of awareness and adoption of flood and erosion risk reduction strategies/actions across all surveyed Upazilas. In each area, 100% of respondents answered affirmatively, indicating that they remember and follow these strategies/actions. This high level of awareness and adherence is encouraging and suggests that the previous project awareness campaigns have been effective in disseminating information and promoting proactive measures to mitigate flood and erosion risks. It underscores the importance of ongoing community education and engagement initiatives to ensure the continued implementation of these strategies and enhance resilience to natural disasters in vulnerable regions.

Table 5: Flood risk preparedness practices

Upazila	Response		Total	
	Yes			
	No.	(%)	No.	(%)
Sahjadpur	87	100.00	87	100.00
Chauhali	134	100.00	134	100.00
Tangail Sadar	13	100.00	13	100.00
Nagarpur	13	100.00	13	100.00
Daulatpur	81	100.00	81	100.00
Shibalaya	110	100.00	110	100.00
Harirampur	97	100.00	97	100.00
Total	535	100.00	535	100.00

Respondents were further asked if the awareness campaign effectively prepared them for risk reduction. The data suggests that the awareness campaign was highly effective in promoting preparedness for risk reduction across most surveyed Upazilas. In Sahjadpur, Chauhali, Tangail Sadar, Nagarpur, Daulatpur, and Shibalaya, 100% of respondents indicated they were prepared. However, in Harirampur, while the majority (98.97%) reported preparedness, a small fraction (1.03%) expressed otherwise. Overall, the overwhelming majority (99.81%) of respondents confirmed their readiness for risk reduction, indicating the overall effectiveness of the awareness campaign in fostering preparedness across the surveyed regions.

Table 6: Retention of knowledge & skills learned for flood risk preparedness campaign

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	87	100.00			87	100.00
Chauhali	134	100.00			134	100.00
Tangail Sadar	13	100.00			13	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	81	100.00			81	100.00
Shibalaya	110	100.00			110	100.00
Harirampur	96	98.97	1	1.03	97	100.00
Total	534	99.81	1	0.19	535	100.00

Participation in courtyard meetings

As part of the project activities, extensive awareness campaigns were undertaken to sensitize the community, including organizing courtyard meetings. In reviewing the data about courtyard meeting attendance across various upazilas in the last 5-6 years, it becomes evident that the majority of these gatherings were well-attended, reflecting a notable level of community engagement. Noteworthy observations emerge from the analysis, demonstrating varying degrees of participation among the surveyed areas. In Sahjadpur, all 87 respondents (100%) confirmed attending courtyard meetings. Similarly, in Chauhali, out of 134 respondents, a significant majority of 131 (97.76%) attended meetings, while only 3 (2.24%) reported non-attendance. Tangail Sadar had 11 out of 13 respondents (84.62%) attending meetings, whereas 2 respondents (15.38%) did not attend. In Nagarpur, Daulatpur, Shibalaya, and Harirampur, all respondents attended courtyard meetings with 100% attendance rates. Overall, the data indicates high attendance rates across most upazilas, with Chauhali showing a minor percentage of non-attendance and Tangail Sadar exhibiting a slightly lower attendance rate compared to other areas.

Table 7: Participation in courtyard meetings in the last 5-6 years

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	87	100.00			87	100.00
Chauhali	131	97.76	3	2.24	134	100.00
Tangail Sadar	11	84.62	2	15.38	13	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	81	100.00			81	100.00
Shibalaya	110	100.00			110	100.00
Harirampur	97	100.00			97	100.00
Total	530	99.07	5	0.93	535	100.00

Respondents were further asked if they had joined the courtyard meetings and what messages had been delivered. The data indicates that in Sahjadpur, all respondents indicated that flood preparedness was discussed during the courtyard meetings. Additionally, 97.7% of respondents mentioned discussions on flood warnings, while 93.10% reported conversations about flood awareness. Furthermore, 90.80% of respondents stated that protecting cattle and poultry from floods was a topic of discussion. In Chauhali, most respondents (97.71%) reported discussions on flood preparedness, followed closely by flood warning discussions, reported by 96.95% of respondents. Flood awareness was mentioned in 80.15% of the meetings. Additionally, 82.44% of respondents indicated that protecting cattle and poultry from floods was discussed. In Tangail Sadar, all respondents (100%) reported discussions on flood preparedness. However, flood warnings and flood awareness were discussed in 54.55% of the meetings. Protecting cattle and poultry from floods was mentioned in 36.36% of the meetings. In Nagarpur, flood preparedness discussions were reported by 92.31% of respondents, followed by flood awareness discussions at 84.62%. All respondents (100%) mentioned that protecting cattle and poultry from floods was discussed. Additionally, discussions on protecting women and children and strategies for protecting the sick and elderly were reported by 100% of respondents. In Daulatpur, all respondents (100%) mentioned that flood preparedness and awareness were discussed. However, flood warning discussions were reported by 75.31% of respondents. Protecting cattle and poultry from floods was discussed in 79.01% of the meetings. In Shibalaya, flood preparedness discussions were reported by 98.18% of respondents, followed by flood warning discussions at 88.18%. Flood awareness was discussed in 88.18% of the meetings. All respondents (100%) mentioned that protecting cattle and poultry from floods was discussed, while discussions on protecting women and children were reported by 61.82% of respondents. In Harirampur, all respondents (100%) mentioned that flood preparedness and awareness were discussed. However, flood warning discussions were reported by 89.69% of respondents. Protecting cattle and poultry from floods was discussed in 98.97% of the meetings. Overall, the data indicates a significant focus on flood-related topics across all upazilas, with varying levels of coverage for additional topics such as protecting cattle and poultry from floods.

Table 8: Messages delivered in courtyard meetings

Upazila	Topic of discussion													
	Flood preparedness discussed		Flood warning discussed		Flood awareness discussed		How to protect cattle and poultry from floods		What to do to protect women and children		What to do to protect the sick and elderly What to do		Going to the shelter is discussed	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur *(n=87)*	87	100.00	85	97.70	81	93.10	79	90.80	66	75.86	68	78.16	31	35.63
Chauhali *(n=131)*	128	97.71	127	96.95	105	80.15	108	82.44	109	83.21	95	72.52	47	35.88
Tangail Sadar *(n=11)*	11	100.00	6	54.55	6	54.55	4	36.36	5	45.45	5	45.45	1	9.09
Nagarpur *(n=13)*	12	92.31	6	46.15	11	84.62	13	100.00	13	100.00	10	76.92	4	30.77
Daulatpur *(n=81)*	81	100.00	61	75.31	69	85.19	64	79.01	70	86.42	54	66.67	17	20.99
Shibalaya *(n=110)*	108	98.18	97	88.18	97	88.18	75	68.18	68	61.82	60	54.55	34	30.91
Harirampur *(n=97)*	97	100.00	87	89.69	97	100.00	96	98.97	88	90.72	77	79.38	33	34.02
Total *(n=530)*	524	98.87	469	88.49	466	87.92	439	82.83	419	79.06	369	69.62	167	31.51

Enhancing resilience and awareness of flood risk mitigation

The major focus of the CbFRM project is to strengthen the capacity and development of resilience of vulnerable communities to reduce the risks of floods and riverbank erosions. Respondents were asked if their resilience to disaster risks and awareness of risk mitigation measures had enhanced after the previous intervention. The data indicates unanimous positive feedback across all upazilas. In Sahjadpur, all 87 respondents (100%) affirmed their improved resilience and awareness. Similarly, in Chauhali, all 134 respondents (100%) reported enhancements. This trend continues in Tangail Sadar, Nagarpur, Daulatpur, Shibalaya, and Harirampur, with all respondents from each upazila (13, 13, 81, 110, and 97 respectively) also reporting a 100% improvement. All 535 respondents (100%) across the surveyed upazilas indicated that their resilience to disaster risks and awareness of risk mitigation measures had enhanced following the intervention.

Table 9: Enhancement of resilience and awareness about flood risk mitigation measures

Upazila	Gender				Total	
	Male		Female			
	Yes		Yes		Yes	
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	23	26.44	64	73.56	87	100.00
Chauhali	39	29.10	95	70.90	134	100.00
Tangail Sadar	7	53.85	6	46.15	13	100.00
Nagarpur	2	15.38	11	84.62	13	100.00
Daulatpur	20	24.69	61	75.31	81	100.00
Shibalaya	33	30.00	77	70.00	110	100.00
Harirampur	22	22.68	75	77.32	97	100.00
Total	146	27.29	389	72.71	535	100.00

3.2.2 Flood experience and response

Households faced floods

The CbFRM project areas are some of the most vulnerable regions to the effects of climate change. These areas experience recurrent floods almost every year, often accompanied by riverbank erosion, which exacerbates the situation for local communities. The survey data indicates that all households in the surveyed upazilas have faced flooding during this period. This consistent and universal exposure to flooding across all these upazilas illustrates the widespread and relentless nature of the problem.

Table 10: Households faced floods in the last 5-6 years

Upazila	Response		Total	
	Yes			
	No.	(%)	No.	(%)
Sahjadpur	87	100.00	87	100.00
Chauhali	134	100.00	134	100.00
Tangail Sadar	13	100.00	13	100.00
Nagarpur	13	100.00	13	100.00
Daulatpur	81	100.00	81	100.00
Shibalaya	110	100.00	110	100.00
Harirampur	96	100.00	96	100.00
Total	534	100.00	534	100.00

Measures adopted by households

Respondents were asked if they took any measures based on the knowledge and skills acquired during the last interventions. The data gathered from the survey highlights the communities' proactive steps

in enhancing their resilience and preparedness against flood risks. Specifically, the data reveals that households across various upazilas have implemented multiple flood preparedness measures based on the knowledge and skills acquired from previous interventions. In Sahjadpur, 91.95% of households raised their homesteads, and a significant 93.10% raised their latrines to prevent flood damage. Protecting tube wells was another common measure, with 95.40% of households participating. Nearly all respondents (98.85%) in Sahjadpur also stored dry food, ensuring food security during floods. In Chauhali, similar patterns were observed, with 85.82% raising homesteads and 82.09% raising latrines. Additionally, 86.57% protected their tube wells and an impressive 96.27% stored dry food.

In Tangail Sadar, 84.62% raised their homesteads, but only 46.15% raised latrines, indicating room for improvement in sanitation measures. Protecting tube wells was undertaken by 61.54% of households, and 76.92% stored dry food. In Nagarpur, 61.54% raised homesteads, and 69.23% raised latrines. Protecting tube wells was less common, with only 38.46% participating, while 100% stored dry food, reflecting high food security awareness.

Daulatpur saw 81.48% raising homesteads and 71.60% raising latrines. Protecting tube wells was reported by 67.90%, and storing dry food by 88.89%. In Shibalaya, 95.45% raised homesteads, and 87.27% raised latrines. Tube well protection was reported by 85.45%, and 92.73% stored dry food. In Harirampur, 89.58% raised homesteads, 92.71% raised latrines, with 83.33% protecting tube wells and 98.96% storing dry food.

Overall, 88.20% of households raised homesteads, and 84.08% raised latrines across all upazilas. Protecting tube wells was common, with 82.58% participation, and storing dry food was the most prevalent measure at 94.94%. Other significant measures included storing cattle food (77.53%), saving cash (70.22%), making rafts (58.24%), and preserving emergency medicine (79.96%). However, only 52.81% planted trees around their homes, and just 31.84% stored seeds, indicating areas for further focus. Measures such as preserving portable stoves and fuel (70.97%) and storing drinking water (58.43%) were also noted. Gathering information about flood centers was less common at 30.52%, highlighting a need for better communication about emergency shelters. Preserving valuable documents (61.05%) and country boats (23.97%) were additional steps households took. Finally, 75.09% of households took measures to protect the floors of their houses.

Table 11: Measures adopted by households as per knowledge and skill acquired (multiple answers)

Type of arrangement	Upazila														Total *(n=534)*	
	Sahjadpur *(n=87)*		Chauhali *(n=134)*		Tangail Sadar *(n=13)*		Nagarpur *(n=13)*		Daulatpur *(n=81)*		Shibalaya *(n=110)*		Harirampur *(n=96)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Raise homestead	80	91.95	115	85.82	11	84.62	8	61.54	66	81.48	105	95.45	86	89.58	471	88.20
Raise latrine	81	93.10	110	82.09	6	46.15	9	69.23	58	71.60	96	87.27	89	92.71	449	84.08
Protect tube well	83	95.40	116	86.57	8	61.54	5	38.46	55	67.90	94	85.45	80	83.33	441	82.58
Store dry food	86	98.85	129	96.27	10	76.92	13	100.00	72	88.89	102	92.73	95	98.96	507	94.94
Store cattle food	73	83.91	103	76.87	7	53.85	12	92.31	70	86.42	77	70.00	72	75.00	414	77.53
Save cash	60	68.97	95	70.90	10	76.92	5	38.46	51	62.96	87	79.09	67	69.79	375	70.22
Make raft (banana boats)	47	54.02	86	64.18	5	38.46	6	46.15	50	61.73	50	45.45	67	69.79	311	58.24
Preserve emergency medicine	64	73.56	106	79.10	8	61.54	11	84.62	54	66.67	91	82.73	93	96.88	427	79.96
Plant trees around the house	52	59.77	68	50.75	6	46.15	2	15.38	28	34.57	66	60.00	60	62.50	282	52.81
Store seeds	32	36.78	38	28.36	5	38.46	1	7.69	25	30.86	42	38.18	27	28.13	170	31.84
Preserve portable stove and fuel	67	77.01	99	73.88	5	38.46	8	61.54	59	72.84	78	70.91	63	65.63	379	70.97
Store drinking water	65	74.71	88	65.67	10	76.92	1	7.69	35	43.21	54	49.09	59	61.46	312	58.43
Gather information about flood center	26	29.89	38	28.36	1	7.69	3	23.08	21	25.93	42	38.18	32	33.33	163	30.52
Preserve valuable documents	62	71.26	79	58.96	7	53.85	6	46.15	35	43.21	65	59.09	72	75.00	326	61.05
Preserve country-boat	20	22.99	42	31.34	3	23.08	2	15.38	3	3.70	36	32.73	22	22.92	128	23.97
Protecting the floor of the house	76	87.36	102	76.12	10	76.92			46	56.79	100	90.91	67	69.79	401	75.09

Responding to flood warnings

One of the objectives of the project was to prepare flood warning messages tailored to the local context, identify local danger levels, and establish a local flood reference process. Respondents were asked if they had initiated or taken any measures to respond to flood warnings after the previous project intervention. The data reveals a high level of proactive response across all surveyed Upazilas.

In Sahjadpur and Daulatpur, a significant majority of respondents (98.85% and 98.77%, respectively) took action, with a small percentage (1.15% and 1.23%, respectively) not taking any measures. In other Upazilas—Chauhali, Tangail Sadar, Nagarpur, Shibalaya, and Harirampur—100% of respondents reported taking measures in response to flood warnings. Overall, 99.63% of respondents indicated they had taken action, highlighting the effectiveness of the project intervention in encouraging communities to respond to flood warnings.

Table 12: Motivation to apply measures in response to flood warning

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	86	98.85	1	1.15	87	100.00
Chauhali	134	100.00			134	100.00
Tangail Sadar	13	100.00			13	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	80	98.77	1	1.23	81	100.00
Shibalaya	110	100.00			110	100.00
Harirampur	97	100.00			97	100.00
Total	533	99.63	2	0.37	535	100.00

On the other hand in the baseline study it is revealed that over 55 percent of the households in Harirampur and Nagarpur has reported to receive early flood warnings and they are over 41 and 45 percent in Chowhali and Shahjadpur respectively. In Shibalaya and Tangail Sadar households received early warnings by less than 10 percent. In case of Daulatpur the households have reported to receive no flood warnings over the above period.

Respondents were extensively engaged in initiatives to respond to flood warnings following the previous project intervention, demonstrating a proactive approach to mitigate flood risks. The data reveals various proactive steps the respondents took across all surveyed Upazilas to mitigate flood risks. The most common initiative was raising the homestead, with 85.55% of respondents overall. Sahjadpur (94.19%), Chauhali (86.57%), and Shibalaya (88.18%) had particularly high percentages, indicating strong adoption of this measure. Raising latrines was another significant measure, with 84.80% overall. Harirampur (94.85%) and Sahjadpur (94.19%) were notable for their high implementation rates. 81.61% of respondents protected their tube wells. Chauhali (89.55%) and Sahjadpur (89.53%) again showed high levels of action. Store dry food saw the highest overall adoption at 96.62%. Every respondent in Sahjadpur and Nagarpur, as well as 98.51% in Chauhali, reported storing dry food. 75.98% stored cattle food, with Nagarpur (92.31%) and Chauhali (79.10%) showing high adherence. 72.61% of respondents saved cash, with Tangail Sadar (84.62%) and Chauhali (77.61%) leading in this initiative. 58.91% made rafts with banana trees, with Chauhali (67.16%) and Tangail Sadar (61.54%) being prominent. 81.43% preserved emergency medicine, with Harirampur (94.85%) and Chauhali (85.82%) showing strong compliance. 51.41% planted trees, with Sahjadpur (59.30%) and Harirampur (54.64%) being proactive. Only 28.71% stored seeds, with low rates across most Upazilas, although Sahjadpur had a higher percentage at 33.72%. 69.61% preserved stoves and fuel, with Nagarpur (92.31%) and Daulatpur (75.00%) showing strong measures. 58.72% stored drinking

water, with Sahjadpur (73.26%) and Chauhali (64.18%) being notable. 29.64% gathered information about flood centers, with Shibalaya (41.82%) leading. 58.35% preserved valuable documents, with Harirampur (71.13%) and Sahjadpur (65.12%) being proactive. Only 22.89% preserved a country boat, with low adoption rates across all Upazilas. 75.05% protected their house floors, with Sahjadpur (83.72%) and Chauhali (82.84%) showing high compliance.

Table 13: Initiatives taken by households (multiple answer)

Type of arrangement	Upazila														Total *(n=533)*	
	Sahjadpur *(n=86)*		Chauhali *(n=134)*		Tangail Sadar *(n=13)*		Nagarpur *(n=13)*		Daulatpur *(n=80)*		Shibalaya *(n=110)*		Harirampur *(n=97)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Raise homestead	81	94.19	116	86.57	9	69.23	6	46.15	63	78.75	97	88.18	84	86.60	456	85.55
Raise latrine	81	94.19	115	85.82	4	30.77	12	92.31	60	75.00	88	80.00	92	94.85	452	84.80
Protect tube well	77	89.53	120	89.55	9	69.23	7	53.85	53	66.25	89	80.91	80	82.47	435	81.61
Store dry food	86	100.00	132	98.51	9	69.23	13	100.00	73	91.25	105	95.45	97	100.00	515	96.62
Store cattle food	70	81.40	106	79.10	6	46.15	12	92.31	64	80.00	74	67.27	73	75.26	405	75.98
Save cash	58	67.44	104	77.61	11	84.62	7	53.85	56	70.00	81	73.64	70	72.16	387	72.61
Make raft (banana boats)	47	54.65	90	67.16	8	61.54	9	69.23	47	58.75	53	48.18	60	61.86	314	58.91
Preserve emergency medicine	63	73.26	115	85.82	6	46.15	10	76.92	56	70.00	92	83.64	92	94.85	434	81.43
Plant trees around the house	51	59.30	76	56.72	4	30.77	6	46.15	23	28.75	61	55.45	53	54.64	274	51.41
Store seeds	29	33.72	34	25.37	5	38.46	1	7.69	20	25.00	36	32.73	28	28.87	153	28.71
Preserve portable stove and fuel	59	68.60	97	72.39	6	46.15	12	92.31	60	75.00	71	64.55	66	68.04	371	69.61
Store drinking water	63	73.26	86	64.18	5	38.46	3	23.08	41	51.25	53	48.18	62	63.92	313	58.72
Gather information about flood center	19	22.09	30	22.39	2	15.38	4	30.77	25	31.25	46	41.82	32	32.99	158	29.64
Preserve valuable documents	56	65.12	78	58.21	5	38.46	6	46.15	31	38.75	66	60.00	69	71.13	311	58.35
Preserve country-boat	24	27.91	42	31.34	1	7.69	3	23.08	4	5.00	29	26.36	19	19.59	122	22.89
Protecting the floor of the house	72	83.72	111	82.84	7	53.85	2	15.38	47	58.75	91	82.73	70	72.16	400	75.05

Flood preparedness measures

In preparing for severe floods over the last 5-6 years, households undertook diverse preparatory steps to ensure safety and minimize risks. The data reveals significant variations in adopting these measures across different regions. Taking shelter at a relative's house was a common strategy, with 53.46% of respondents opting for this approach overall. Sahjadpur (72.41%) and Shibalaya (72.73%) had notably high percentages, indicating reliance on familial networks for shelter. Another prevalent measure was seeking refuge on embankments or roads, with 53.27% of respondents adopting this strategy overall. Sahjadpur (82.76%) and Shibalaya (67.27%) reported higher percentages, suggesting a preference for elevated areas during floods. Additionally, 52.34% of respondents overall opened high land nearby for shelter, with Sahjadpur (74.71%) and Shibalaya (61.86%) showing considerable adherence to this practice. Purifying water was a crucial step for 69.53% of respondents overall, with Sahjadpur (88.51%) and Harirampur (75.26%) strongly emphasizing water safety measures. Making temporary latrines was common, with 68.41% of respondents undertaking this step overall. Sahjadpur (80.46%) and Shibalaya (82.47%) exhibited higher rates of temporary latrine construction. Similarly, 67.85% of respondents ensured safe spaces for cattle overall, with Sahjadpur (75.86%) and Shibalaya (63.92%) displaying notable adherence to this measure. While contact with relief and rescue agencies was less common, with an overall adoption rate of 21.68%, Sahjadpur (29.89%) and Shibalaya (23.71%) reported higher engagement with these agencies. Lastly, acting as a volunteer was a less prevalent strategy, with an overall adoption rate of 13.08%. Sahjadpur (34.48%) had the highest percentage of respondents volunteering during floods.

Table 14: Preparedness during severe floods in the last 5-6 years (multiple answer)

Preparatory steps	Upazila														Total *(n=535)*	
	Sahjadpur *(n=87)*		Chauhali *(n=134)*		Tangail Sadar *(n=13)*		Nagarpur *(n=13)*		Daulatpur *(n=81)*		Shibalaya *(n=110)*		Harirampur *(n=97)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Take shelter at relative's house	63	72.41	72	53.73	6	46.15	3	23.08	14	17.28	80	72.73	48	49.48	286	53.46
Take shelter on embankment/road	72	82.76	82	61.19	5	38.46	2	15.38	18	22.22	74	67.27	32	32.99	285	53.27
Open high land nearby	65	74.71	66	49.25	4	30.77	2	15.38	17	20.99	66	60.00	60	61.86	280	52.34
Purify water	77	88.51	97	72.39	7	53.85	5	38.46	47	58.02	66	60.00	73	75.26	372	69.53
Make temporary latrine	70	80.46	88	65.67	8	61.54	8	61.54	51	62.96	61	55.45	80	82.47	366	68.41
Keep cattle in safe place	66	75.86	97	72.39	8	61.54	13	100.00	51	62.96	66	60.00	62	63.92	363	67.85
Contact with relief/ rescue agencies	26	29.89	31	23.13			6	46.15	12	14.81	18	16.36	23	23.71	116	21.68
Act as a volunteer	30	34.48	19	14.18					2	2.47	12	10.91	7	7.22	70	13.08
Not Applicable									12	14.81					12	2.24

Changes in flood occurrences

During the last 5-6 years, changes in flood occurrences were reported across various Upazilas, reflecting shifting patterns in natural phenomena. The data indicates that the majority of respondents experienced changes in flood occurrences during this period. In Sahjadpur, Chauhali, Tangail Sadar, Nagarpur, Daulatpur, Shibalaya, and Harirampur, 98.85%, 99.25%, 100.00%, 100.00%, 98.77%, 98.18%, and 98.97% of respondents, respectively, reported changes in flood occurrences. These findings highlight the dynamic nature of flood patterns.

Table 15: Changes in floods during the last 5-6 years by upazila

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	86	98.85	1	1.15	87	100.00
Chauhali	133	99.25	1	0.75	134	100.00
Tangail Sadar	13	100.00			13	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	80	98.77	1	1.23	81	100.00
Shibalaya	108	98.18	2	1.82	110	100.00
Harirampur	96	98.97	1	1.03	97	100.00
Total	529	98.88	6	1.12	535	100.00

Respondents were asked whether they observed any changes in flooding over the last 5-6 years. In Sahjadpur, 90.70% of respondents reported a decrease in flooding, while 3.49% noted an increase, and 5.81% stated that flooding remained unchanged. In Chauhali, Daulatpur, Shibalaya, and Harirampur, all respondents reported no increase in flooding. Similarly, Tangail Sadar and Nagarpur had all respondents reported decreasing in flooding. Overall, across all Upazilas, 98.49% of respondents perceived a decrease in flooding, 0.57% noticed an increase, and 0.95% stated that flooding remained unchanged.

Table 16: Changing pattern of floods

Upazila	Changes in flooding						Total	
	Increased		Decreased		Unchanged			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	3	3.49	78	90.70	5	5.81	86	100.00
Chauhali			133	100.00			133	100.00
Tangail Sadar			13	100.00			13	100.00
Nagarpur			13	100.00			13	100.00
Daulatpur			80	100.00			80	100.00
Shibalaya			108	100.00			108	100.00
Harirampur			96	100.00			96	100.00
Total	3	0.57	521	98.49	5	0.95	529	100.00

3.2.3 Flood measurement and understanding

Households ability to measure floods near homestead

Respondents were asked whether they could measure normal, moderate, and severe floods at the nearest location from the homestead. The data revealed that In Sahjadpur, 78 respondents (89.66%) reported being able to measure floods, while 9 respondents (10.34%) indicated otherwise. Similarly, in Chauhali, 125 respondents (93.28%) reported the ability to measure floods, while 9 respondents

(6.72%) did not. In Tangail Sadar and Nagarpur, all 13 respondents (100%) confirmed their ability to measure floods. Daulatpur had 81 respondents (100%) who could measure floods, whereas Shibalaya had 99 respondents (90.00%) with the same capability, and Harirampur had 90 respondents (92.78%). Overall, out of the total 535 respondents, 499 (93.27%) reported being able to measure floods near their homesteads, while 36 (6.73%) stated otherwise.

Table 17: Household ability to measure normal, moderate, and severe floods near homestead

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	78	89.66	9	10.34	87	100.00
Chauhali	125	93.28	9	6.72	134	100.00
Tangail Sadar	13	100.00			13	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	81	100.00			81	100.00
Shibalaya	99	90.00	11	10.00	110	100.00
Harirampur	90	92.78	7	7.22	97	100.00
Total	499	93.27	36	6.73	535	100.00

Idea about flood danger level

The survey collected data on the understanding of flood danger levels among respondents, which reveals a high level of awareness regarding flood danger levels among respondents across all surveyed Upazilas. In Sahjadpur, Chauhali, Tangail Sadar, Nagarpur, Daulatpur, and Shibalaya, 100% of respondents reported having knowledge about flood danger levels. In Harirampur, the majority of respondents, 97.94%, confirmed their awareness, with only 2.06% reporting otherwise. Overall, out of the total 535 respondents, 533 (99.63%) indicated having knowledge about flood danger levels, while 2 (0.37%) stated otherwise.

Table 18: Idea about the flood danger level

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	87	100.00			87	100.00
Chauhali	134	100.00			134	100.00
Tangail Sadar	13	100.00			13	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	81	100.00			81	100.00
Shibalaya	110	100.00			110	100.00
Harirampur	95	97.94	2	2.06	97	100.00
Total	533	99.63	2	0.37	535	100.00

The data collected on the source of knowledge about flood danger levels indicates various sources relied upon by respondents to obtain this information. In Sahjadpur, the vast majority of respondents (98.85%) relied on local marks hoisted by local government agencies or Union/UZ Parishad as their primary source of knowledge about flood danger levels. Additionally, a considerable proportion of respondents (75.86%) mentioned NGOs as a source of information. Own observation and experience were also cited by a significant number of respondents (59.77%). Furthermore, community sharing played a crucial role, with 72.41% of respondents indicating that they relied on information shared within their community networks.

Similarly, in Chauhali, respondents predominantly relied on local marks hoisted by local government agencies or Union/UZ Parishad (97.76%) for information about flood danger levels. NGOs were also a significant source of information, with 84.33% of respondents mentioning them. Own observation and experience were cited by 41.04% of respondents. Community sharing also played a significant role, with 53.73% of respondents. A similar pattern was observed in other Upazilas, including Tangail Sadar, Nagarpur, Daulatpur, Shibalaya, and Harirampur. Local marks hoisted by local government agencies or Union/UZ Parishad were the primary source of information, followed by NGOs, own observation and experience, and community sharing. However, the degree of reliance on each source varied slightly across these Upazilas.

Table 19: Source of knowledge about danger level (multiple answers)

Upazila	Place to know							
	Local Mark hoisted by Local govt Agencies/ Union/ UZ parishad		NGOs		Own observation & Experience		Community Sharing	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur *(n=87)*	86	98.85	66	75.86	52	59.77	63	72.41
Chauhali *(n=134)*	131	97.76	113	84.33	55	41.04	72	53.73
Tangail Sadar *(n=13)*	13	100.00	12	92.31	5	38.46		
Nagarpur *(n=13)*	13	100.00	10	76.92	2	15.38	4	30.77
Daulatpur *(n=81)*	75	92.59	68	83.95	20	24.69	8	9.88
Shibalaya *(n=110)*	82	74.55	82	74.55	51	46.36	50	45.45
Harirampur *(n=95)*	94	98.95	51	53.68	61	64.21	57	60.00
Total *(n=533)*	494	92.68	402	75.42	246	46.15	254	47.65

Existence and condition of flood markers previously installed

Installing flood marker posts is a significant component of the project activities, serving as crucial indicators of flood risk. The data collected on the existence of previously installed flood markers indicates that 198 (37.01%) respondents reported the presence of flood markers. In Sahjadpur, 42.53% of respondents noted the continued presence of flood markers, while 57.47% reported otherwise. Similarly, in Chauhali, 41.04% confirmed the presence of flood markers, with 58.96% indicating their absence. The percentages were lower in Tangail Sadar and Nagarpur, where only 38.46% and 30.77% of respondents, respectively, reported the presence of flood markers, suggesting potential maintenance or retention issues. Daulatpur showed a relatively higher percentage (53.09%) of respondents reporting the existence of flood markers, indicating better maintenance or retention compared to other Upazilas. Shibalaya had the lowest percentage of respondents (21.82%) confirming the presence of flood markers, indicating potential challenges in maintenance or visibility. Similarly, in Harirampur, only 30.93% of respondents reported the existence of flood markers, while 69.07% indicated their absence.

Table 20: Existence of Flood markers previously installed

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	37	42.53	50	57.47	87	100.00
Chauhali	55	41.04	79	58.96	134	100.00
Tangail Sadar	5	38.46	8	61.54	13	100.00
Nagarpur	4	30.77	9	69.23	13	100.00
Daulatpur	43	53.09	38	46.91	81	100.00
Shibalaya	24	21.82	86	78.18	110	100.00
Harirampur	30	30.93	67	69.07	97	100.00
Total	198	37.01	337	62.99	535	100.00

The respondents (198, 37.01%) who reported the presence of flood markers further asked about the condition of existing flood markers, revealing a varied landscape across different Upazilas. In Sahjadpur, of the 37 respondents who reported the existence of flood markers, 10.81% described them as very good, 81.08% as fairly good, and 8.11% as too bad. Similarly, in Chauhali, among 55 respondents, 34.55% rated the markers as very good, 63.64% as fairly good, and 1.82% as too bad. In Tangail Sadar, of the 5 respondents, 40.00% rated the markers as very good, another 40.00% as fairly good, and 20.00% as too bad. In Nagarpur, all 4 respondents rated the markers fairly good, with no responses indicating very good or bad conditions. In Daulatpur, out % of 43 respondents, 11.63% considered the markers very good, 88.37% fairly good, and none too bad. In Shibalaya, of the 24 respondents, none rated the markers as very good, 91.67% as fairly good, and 8.33% as too bad. Lastly, in Harirampur, out of 30 respondents, 10.00% rated the markers as very good, 90.00% as fairly good, and none as too bad.

Overall, from the 198 respondents who confirmed the presence of flood markers, 16.67% (33 respondents) rated them as very good, 79.80% (158 respondents) as fairly good, and 3.54% (7 respondents) as too bad. This distribution indicates that while most flood markers are in fairly good condition, there are areas where improvements are needed to ensure they are in optimal condition to support effective flood preparedness and risk mitigation efforts.

Table 21: Conditions of existing flood markers

Upazila	Flood marker condition						Total	
	Very good		Good		Bad			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	4	10.81	30	81.08	3	8.11	37	100.00
Chauhali	19	34.55	35	63.64	1	1.82	55	100.00
Tangail Sadar	2	40.00	2	40.00	1	20.00	5	100.00
Nagarpur			4	100.00			4	100.00
Daulatpur	5	11.63	38	88.37			43	100.00
Shibalaya			22	91.67	2	8.33	24	100.00
Harirampur	3	10.00	27	90.00			30	100.00
Total	33	16.67	158	79.80	7	3.54	198	100.00

Effectiveness of flood markers in meeting community needs

The survey data highlights the effectiveness of flood markers in meeting community needs to understand flood levels across various Upazilas. In Sahjadpur, 93.10% of respondents reported that the flood markers met their needs, while 6.90% indicated they did not. Similarly, in Chauhali, 93.28% of respondents found the markers effective, with 6.72% reporting otherwise. In Tangail Sadar and

Nagarpur, 92.31% of respondents in each Upazila confirmed the markers met their needs, while 7.69% did not.

Daulatpur responded perfectly, with 100% of respondents affirming that the flood markers met their needs. In Shibalaya, 83.64% of respondents found the markers effective, while 16.36% did not, indicating the lowest effectiveness among the Upazilas surveyed. Harirampur had 97.94% of respondents reporting the markers met their needs, with only 2.06% indicating otherwise.

Overall, out of the 535 respondents, 498 (93.08%) reported that the flood markers met their needs to understand the flood level, while 37 (6.92%) did not. This data underscores the general effectiveness of flood markers in most areas, with room for improvement in specific Upazilas to ensure all community members can effectively gauge flood levels.

Table 22: Flood marker's utility for flood level understanding

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	81	93.10	6	6.90	87	100.00
Chauhali	125	93.28	9	6.72	134	100.00
Tangail Sadar	12	92.31	1	7.69	13	100.00
Nagarpur	12	92.31	1	7.69	13	100.00
Daulatpur	81	100.00			81	100.00
Shibalaya	92	83.64	18	16.36	110	100.00
Harirampur	95	97.94	2	2.06	97	100.00
Total	498	93.08	37	6.92	535	100.00

The survey data further reveals how respondents understood flood marker signals across various Upazilas. In Sahjadpur, 66.67% of respondents understood red as indicating danger, while 22.22% associated green with normal times and 11.11% yellow with preparation time. In Chauhali, 80.00% associated red with danger, 11.20% green with normal, and 8.80% yellow with preparation. In Tangail Sadar, 50.00% saw red as danger, 41.67% green as normal, and 8.33% yellow as preparation. Nagarpur had 66.67% associating red with danger, 25.00% green with normal, and 8.33% yellow with preparation. Daulatpur had 70.37% seeing red as danger, 19.75% green as normal, and 9.88% yellow as preparation. In Shibalaya, 48.91% understood red as danger, 31.52% yellow as preparation, and 19.57% green as normal. Harirampur had 76.84% associating red with danger, 11.58% each for green as normal and yellow as preparation. Overall, 68.88% of the 498 respondents associated red with danger, 17.07% green with normal, and 14.06% yellow with preparation, highlighting a clear emphasis on red signals for danger periods.

Table 23: Effectiveness of flood marker for flood Level perception

Upazila	Type of requirement						Total	
	Green means normal time		Yellow means preparation time		Red signal means danger period			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	18	22.22	9	11.11	54	66.67	81	100.00
Chauhali	14	11.20	11	8.80	100	80.00	125	100.00
Tangail Sadar	5	41.67	1	8.33	6	50.00	12	100.00
Nagarpur	3	25.00	1	8.33	8	66.67	12	100.00
Daulatpur	16	19.75	8	9.88	57	70.37	81	100.00
Shibalaya	18	19.57	29	31.52	45	48.91	92	100.00
Harirampur	11	11.58	11	11.58	73	76.84	95	100.00
Total	85	17.07	70	14.06	343	68.88	498	100.00

3.2.4 Flood preparedness and actions

Understandability of flood warning messages

The survey assessed the understandability of flood warning messages across different Upazilas, revealing varying levels of comprehension among respondents. In Sahjadpur, 44.83% of respondents found the messages fully understandable, while 55.17% found them moderately understandable. In Chauhali, 55.22% rated the messages as fully understandable, with 44.78% rating them as moderately understandable. In Tangail Sadar, a high 92.31% of respondents found the messages fully understandable, and only 7.69% found them moderately understandable. Nagarpur showed a contrasting trend, with 30.77% finding the messages fully understandable and 69.23% finding them moderately understandable. In Daulatpur, 49.38% of respondents found the messages fully understandable, while 50.62% found them moderately understandable. Shibalaya had 55.45% of respondents rating the messages as fully understandable and 44.55% as moderately understandable. Harirampur showed the lowest percentage of fully understandable ratings, with 35.42% of respondents, while 64.58% found the messages moderately understandable. Overall, out of 534 respondents, 49.44% found the flood warning messages fully understandable, and 50.56% found them moderately understandable. This indicates that while a significant portion of the population finds the messages clear, there is room for improvement to ensure better comprehension.

Table 24: Understanding of flood warning messages

Upazila	Flood Warning				Total	
	Fully understandable		Moderately understandable			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	39	44.83	48	55.17	87	100.00
Chauhali	74	55.22	60	44.78	134	100.00
Tangail Sadar	12	92.31	1	7.69	13	100.00
Nagarpur	4	30.77	9	69.23	13	100.00
Daulatpur	40	49.38	41	50.62	81	100.00
Shibalaya	61	55.45	49	44.55	110	100.00
Harirampur	34	35.42	62	64.58	96	100.00
Total	264	49.44	270	50.56	534	100.00

Suitability of flood preparedness

Findings regarding the suitability of flood preparedness measures show unanimous agreement across all surveyed Upazilas. In each Upazila, all respondents, totaling 535, confirmed that the flood preparedness measures were indeed suitable for their local context. This unanimous consensus underscores the effectiveness and appropriateness of the implemented flood preparedness strategies in addressing the needs and challenges of each Upazila.

Table 25: suitability of flood warning messages in a local context to take flood preparedness

Upazila	Response		Total	
	Yes			
	No.	(%)	No.	(%)
Sahjadpur	87	100.00	87	100.00
Chauhali	134	100.00	134	100.00
Tangail Sadar	13	100.00	13	100.00
Nagarpur	13	100.00	13	100.00
Daulatpur	81	100.00	81	100.00
Shibalaya	110	100.00	110	100.00
Harirampur	97	100.00	97	100.00
Total	535	100.00	535	100.00

Flood preparedness measures over the last 5-6 years

Across all surveyed upazilas, households have actively engaged in flood preparedness efforts. In Sahjadpur, the majority of households undertook various flood preparedness measures. This included raising homesteads (93.10%), raising latrines (86.21%), protecting tube wells (87.36%), storing dry food (93.10%), and preserving emergency medicine (73.56%). Additionally, measures like saving cash (73.56%) and protecting the floor of the house (82.76%) were also common among households. Chauhali also demonstrated significant participation in flood preparedness activities, with high percentages of households raising homesteads (79.10%), raising latrines (76.12%), and protecting tube wells (77.61%). Storing dry food (96.27%) and preserving emergency medicine (81.34%) were other notable measures taken by the majority of households. In Tangail Sadar, despite lower percentages, households still engaged in various flood preparedness measures, including raising homesteads (46.15%) and storing dry food (84.62%). Nagarpur showed similar patterns with a considerable focus on storing dry food (100.00%) but relatively lower participation in other measures like raising homesteads (53.85%) and protecting tube wells (61.54%). Daulatpur witnessed active engagement in flood preparedness, with significant proportions of households adopting measures such as storing dry food (93.83%), raising homesteads (70.37%), and protecting tube wells (69.14%). Shibalaya and Harirampur also displayed robust participation in flood preparedness activities, with high percentages of households undertaking various measures such as storing dry food, raising homesteads, and protecting tube wells. Overall, the data indicates that households across all upazilas have actively engaged in flood preparedness measures over the last 5-6 years, showcasing a community-wide effort to mitigate the impacts of flooding.

Table 26: Flood preparedness measures over the last 5-6 years by households (multiple answer)

Type of preparation	Upazila														Total *(n=535)*	
	Sahjadpur *(n=87)*		Chauhali *(n=134)*		Tangail Sadar *(n=13)*		Nagarpur *(n=13)*		Daulatpur *(n=81)*		Shibalaya *(n=110)*		Harirampur *(n=97)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Raise homestead	81	93.10	106	79.10	6	46.15	7	53.85	57	70.37	88	80.00	72	74.23	417	77.94
Raise latrine	75	86.21	102	76.12	1	7.69	12	92.31	60	74.07	82	74.55	83	85.57	415	77.57
Protect tube well	76	87.36	104	77.61	4	30.77	8	61.54	56	69.14	76	69.09	74	76.29	398	74.39
Store dry food	81	93.10	129	96.27	11	84.62	13	100.00	76	93.83	102	92.73	94	96.91	506	94.58
Store cattle food	69	79.31	106	79.10	5	38.46	12	92.31	69	85.19	75	68.18	71	73.20	407	76.07
Save cash	64	73.56	106	79.10	8	61.54	7	53.85	53	65.43	82	74.55	71	73.20	391	73.08
Make raft (banana boats)	44	50.57	80	59.70	4	30.77	8	61.54	46	56.79	51	46.36	58	59.79	291	54.39
Preserve emergency medicine	64	73.56	109	81.34	7	53.85	8	61.54	55	67.90	86	78.18	88	90.72	417	77.94
Plant trees around the house	53	60.92	77	57.46	5	38.46	5	38.46	30	37.04	59	53.64	61	62.89	290	54.21
Store seeds	27	31.03	32	23.88	4	30.77	2	15.38	22	27.16	31	28.18	21	21.65	139	25.98
Preserve portable stove and fuel	55	63.22	93	69.40	2	15.38	12	92.31	57	70.37	59	53.64	61	62.89	339	63.36
Store drinking water	61	70.11	76	56.72	5	38.46	5	38.46	43	53.09	33	30.00	54	55.67	277	51.78
Gather information about flood center	14	16.09	34	25.37	1	7.69	4	30.77	23	28.40	37	33.64	16	16.49	129	24.11
Preserve valuable documents	52	59.77	78	58.21	5	38.46	4	30.77	34	41.98	71	64.55	63	64.95	307	57.38
Preserve country-boat	28	32.18	36	26.87	2	15.38	5	38.46	11	13.58	20	18.18	18	18.56	120	22.43
Protecting the floor of the house	72	82.76	109	81.34	6	46.15	5	38.46	50	61.73	98	89.09	69	71.13	409	76.45

3.2.5 Emergency response and evacuation

Source of drinking water during floods

Securing a safe source of drinking water during floods is critical due to the heightened risk of contamination from floodwaters, which can lead to numerous health issues. The data on drinking water sources during floods reveals significant patterns across various upazilas. In Sahjadpur, all respondents (100%) relied on purified water during floods, while 21.84% used river water and 6.90% used pond water. In Chauhali, 98.51% of respondents used purified water, with 11.94% turning to river water and 5.22% to pond water. In Tangail Sadar, 92.31% of respondents reported using purified water, 23.08% used river water, and no respondents used pond water. Similarly, in Nagarpur, 100% of respondents relied on purified water, while 23.08% used river water. In Daulatpur, purified water was used by all respondents (100%), with 9.88% using river water and 2.47% using pond water. Shibalaya showed a consistent pattern, with 100% of respondents using purified water and no reported use of river or pond water. In Harirampur, purified water was also universally used (100%), with a small fraction (2.06%) using river water. Overall, the data highlights that purified water is the predominant source of drinking water during floods across all upazilas, with 99.44% of respondents relying on it. River water serves as a secondary source, used by 9.53% of respondents, while pond water is used by a smaller percentage (2.80%). Bottled water was reported by only one respondent (0.19%) in Sahjadpur.

Table 27: Source of drinking water during floods (multiple answer)

Water source	Upazila														Total *(n=535)*	
	Sahjadpur *(n=87)*		Chauhali *(n=134)*		Tangail Sadar *(n=13)*		Nagarpur *(n=13)*		Daulatpur *(n=81)*		Shibalaya *(n=110)*		Harirampur *(n=97)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Pond	6	6.90	7	5.22					2	2.47					15	2.80
River	19	21.84	16	11.94	3	23.08	3	23.08	8	9.88			2	2.06	51	9.53
Purified water	87	100.00	132	98.51	12	92.31	13	100.00	81	100.00	110	100.00	97	100.00	532	99.44
Bottled water	1	1.15													1	0.19

On the other hand, the baseline status shows that over 50 percent of the households in Shahjadpur depend on water purified with tablets. In Daulatpur, Harirampur, and Shibalaya, the corresponding figure was 38 to about 40 percent. In Tangail Sadar and Nagarpur, no households have used this practice.

Existence of flood shelters

Flood shelters are paramount for effective disaster preparedness and response efforts. Out of the 535 participants surveyed, 41.12% reported the presence of flood shelters in their respective upazilas, while 58.88% indicated the absence of such facilities. This distribution underscores disparities in infrastructure and readiness to cope with flood emergencies across different regions. Notably, Sahjadpur and Chauhali had relatively lower percentages of participants reporting the presence of flood shelters, with 24.14% and 23.13% respectively. In contrast, Daulatpur and Shibalaya exhibited higher proportions, with 74.07% and 67.27% respectively. Tangail Sadar and Nagarpur showed notably lower percentages, with 15.38% and 7.69%, respectively, suggesting a pressing need for increased efforts to ensure adequate shelter provision in these areas. Harirampur fell in between, with 31.96% of participants reporting the presence of shelters.

Table 28: Existence of flood shelter

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	21	24.14	66	75.86	87	100.00
Chauhali	31	23.13	103	76.87	134	100.00
Tangail Sadar	2	15.38	11	84.62	13	100.00
Nagarpur	1	7.69	12	92.31	13	100.00
Daulatpur	60	74.07	21	25.93	81	100.00
Shibalaya	74	67.27	36	32.73	110	100.00
Harirampur	31	31.96	66	68.04	97	100.00
Total	220	41.12	315	58.88	535	100.00

Use of flood shelter by beneficiaries

Participants who reported the existence of flood shelters were further asked whether they went to the shelter during evacuation. Among them, 22.73% reported seeking refuge in shelters during the evacuation, while the majority, comprising 77.27%, did not. This indicates that a significant proportion of individuals rely on alternative strategies or locations during emergencies. However, there are notable variations in evacuation behavior across different Upazilas. For instance, Chauhali stands out with the highest percentage of participants (61.29%) evacuating to shelters, indicating a strong reliance on these facilities during emergencies. Sahjadpur follows closely with 42.86%, showcasing a considerable proportion of individuals seeking shelter. In contrast, Daulatpur exhibits a substantially lower percentage, with only 10.00% of participants evacuating to shelters, suggesting potential challenges or limitations in shelter accessibility or awareness in this area. Interestingly, Tangail Sadar and Nagarpur show a 100% evacuation rate to shelters among participants who responded, highlighting a robust reliance on these facilities in these Upazilas. Similarly, Shibalaya and Harirampur demonstrate moderate percentages of participants seeking shelter, indicating a balanced utilization of available resources.

Table 29: Use of flood shelter by beneficiaries

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	9	42.86	12	57.14	21	100.00
Chauhali	19	61.29	12	38.71	31	100.00
Tangail Sadar	2	100.00			2	100.00
Nagarpur	1	100.00			1	100.00
Daulatpur	6	10.00	54	90.00	60	100.00
Shibalaya	9	12.16	65	87.84	74	100.00
Harirampur	4	12.90	27	87.10	31	100.00
Total	50	22.73	170	77.27	220	100.00

3.2.6 Community activities and drills

Memory recollection about events in mock drills

Mock drills were conducted as part of the project activities to sensitize the community. Mock drills play a crucial role in preparing communities for potential disasters. They help communities prepare for disasters by simulating various scenarios and practicing response activities like early warnings, flood preparedness, and rescue operations. They involve both local officials and community members to ensure effective collaboration and readiness during emergencies. Mock drills were conducted in most of the surveyed Upazilas. Sahjadpur, Nagarpur, and Harirampur had a particularly high percentage of respondents reporting the demonstration of mock drills, with 97.70%, 100.00%, and 85.57% respectively. In contrast, while Chauhali also demonstrated a relatively high percentage (80.60%), 19.40% of respondents indicated otherwise. Similarly, Daulatpur and Shibalaya had a significant portion of respondents reporting mock drills (69.14% and 81.82%, respectively), with a smaller percentage indicating no such demonstrations (30.86% and 18.18%, respectively). In Tangail Sadar, the percentage of respondents reporting mock drills was lower at 61.54%, with 38.46% indicating no demonstration. Overall, the data suggests that mock drills were conducted in most Upazilas surveyed, indicating proactive measures to enhance preparedness for potential flood events.

Table 30: Memory recollection about events in the mock drill

Upazila	Description				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	85	97.70	2	2.30	87	100.00
Chauhali	108	80.60	26	19.40	134	100.00
Tangail Sadar	8	61.54	5	38.46	13	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	56	69.14	25	30.86	81	100.00
Shibalaya	90	81.82	20	18.18	110	100.00
Harirampur	83	85.57	14	14.43	97	100.00
Total	443	82.80	92	17.20	535	100.00

Participation in mock drills and their effectiveness

Participation in mock drills across the surveyed Upazilas was generally high. In Chauhali, Tangail Sadar, Nagarpur, Daulatpur, and Harirampur, all respondents (100%) reported participating in the mock drills. Similarly, in Sahjadpur, 98.75% of respondents reported participation, with only 1.25% indicating they

did not participate. Shibalaya had a slightly lower participation rate, with 96.72% of respondents participating and 3.28% not participating. Overall, out of 328 respondents, 325 (99.09%) reported participating in the mock drills, demonstrating a strong level of engagement in these preparedness activities.

Table 31: Participation in the mock drill by beneficiaries

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	79	98.75	1	1.25	80	100.00
Chauhali	99	100.00			99	100.00
Tangail Sadar	8	100.00			8	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	41	100.00			41	100.00
Shibalaya	59	96.72	2	3.28	61	100.00
Harirampur	26	100.00			26	100.00
Total	325	99.09	3	0.91	328	100.00

Participants further asked about the effectiveness of mock drills for flood preparedness. The data shows overwhelmingly positive feedback across all surveyed Upazilas. In Sahjadpur, Chauhali, Tangail Sadar, Nagarpur, Daulatpur, and Harirampur, all respondents (100%) found the mock drills very helpful and effective for flood preparedness. In Shibalaya, 98.31% of respondents reported that the drills were effective, with only 1.69% indicating otherwise. Overall, out of 325 respondents, 324 (99.69%) found the mock drills very helpful or effective in preparing for floods, highlighting the significant impact of these drills on community readiness.

Table 32: Effectiveness of mock drills for flood preparedness

Upazila	Description				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	79	100.00			79	100.00
Chauhali	99	100.00			99	100.00
Tangail Sadar	8	100.00			8	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	41	100.00			41	100.00
Shibalaya	58	98.31	1	1.69	59	100.00
Harirampur	26	100.00			26	100.00
Total	324	99.69	1	0.31	325	100.00

Memory recollection of messages in folks or drama

Cultural events were conducted to sensitize the community as part of the project activities. These events are a great way to engage people in learning through entertainment and fun. To inform the community about flood preparedness, local performers in various Upazilas presented songs, dramas, and dances. Drama events and folk performances were conducted in several Upazilas to deliver important messages. In Sahjadpur, Chauhali, Tangail Sadar, Nagarpur, Daulatpur, Shibalaya, and Harirampur, a majority of respondents reported witnessing such events. Specifically, 98.85% of respondents in Sahjadpur, 82.84% in Chauhali, 61.54% in Tangail Sadar, 100% in Nagarpur, 80.25% in Daulatpur, 84.55% in Shibalaya, and 85.42% in Harirampur indicated the occurrence of these events.

These initiatives likely played a crucial role in disseminating important flood-related messages and raising awareness among the community members.

Table 33: Memory recollection of messages in folks or drama

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	86	98.85	1	1.15	87	100.00
Chauhali	111	82.84	23	17.16	134	100.00
Tangail Sadar	8	61.54	5	38.46	13	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	65	80.25	16	19.75	81	100.00
Shibalaya	93	84.55	17	15.45	110	100.00
Harirampur	82	85.42	14	14.58	96	100.00
Total	458	85.77	76	14.23	534	100.00

Participation in folks or drama and its effectiveness

Regarding survey participants' participation in folk or drama events, the data indicates high levels of engagement across all surveyed Upazilas. In Sahjadpur, Chauhali, Tangail Sadar, Nagarpur, Shibalaya, and Harirampur, 100% of respondents engaged in these events, demonstrating widespread community involvement. Additionally, in Daulatpur, participation was notably high at 95.38%, further emphasizing the community's active participation in initiatives to enhance flood preparedness and disaster resilience. These events provided inclusive platforms for community members to come together, learn, and actively discuss strategies for addressing flood-related challenges.

Table 34: Participation in folks or drama

Upazila	Response				Total	
	Yes		No			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	86	100.00			86	100.00
Chauhali	111	100.00			111	100.00
Tangail Sadar	8	100.00			8	100.00
Nagarpur	13	100.00			13	100.00
Daulatpur	62	95.38	3	4.62	65	100.00
Shibalaya	93	100.00			93	100.00
Harirampur	82	100.00			82	100.00
Total	455	99.34	3	0.66	458	100.00

Survey participants were further asked about the effectiveness of the folk or drama events. The data reveals varying perceptions across different Upazilas. In Sahjadpur, 43.02% of respondents found the events very effective, while 56.98% considered them moderately effective. Similarly, in Chauhali, 47.75% of participants regarded the events as very effective, with 52.25% indicating moderate effectiveness. In Tangail Sadar, 50.00% of respondents viewed the events as very effective, and the remaining 50.00% found them moderately effective. In Nagarpur, 30.77% of participants reported the events as very effective, while 69.23% perceived them as moderately effective. Daulatpur demonstrated similar trends, with 30.77% finding the events very effective and 69.23% moderately effective. Shibalaya showed 27.96% of respondents considering the events very effective and 72.04% moderately effective. Lastly, in Harirampur, 32.10% of participants found the events very effective,

while 67.90% found them moderately effective. Overall, out of 457 respondents, 37.20% perceived the folk or drama events as very effective, and 62.80% considered them moderately effective.

Table 35: Effectiveness of folk song and drama

Upazila	How effective				Total	
	Very Effective		Moderate effective			
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	37	43.02	49	56.98	86	100.00
Chauhali	53	47.75	58	52.25	111	100.00
Tangail Sadar	4	50.00	4	50.00	8	100.00
Nagarpur	4	30.77	9	69.23	13	100.00
Daulatpur	20	30.77	45	69.23	65	100.00
Shibalaya	26	27.96	67	72.04	93	100.00
Harirampur	26	32.10	55	67.90	81	100.00
Total	170	37.20	287	62.80	457	100.00

3.3 Assessing knowledge and perception of Community Volunteers

Engaging Village Defense Party (VDP) members as Community Volunteers (CV), the CbFRM project sought to leverage their involvement as key actors. These CVs, being pivotal to project success, underwent intensive training in various aspects of flood and riverbank erosion risk reduction, with special emphasis on the impacts of climate change and early warning dissemination within the local context. The CVs arranged 40 Sensitization Meetings, attended by over 5,284 individuals, with a majority being women. These gatherings encompassed Mock Drills and local workshops held in all seven Upazilas, cultural events across twenty-eight Unions, and 7,260 courtyard sessions conducted by the CVs, utilizing custom Flipcharts. Furthermore, there were discussions on flood preparedness at family and community levels in various masjids and schools within the project regions.

3.3.1 Courtyard meetings

Number of courtyard meetings held

When asked How many courtyard meetings CVs have conducted over the last 5-6 years, the data indicated that in Sahjadpur, all respondents (100%) reported conducting either 4 to 6 meetings (84.62%) or more than 6 meetings (15.38%). In Chauhali, 44.44% of respondents conducted 1 to 3 meetings, 22.22% conducted 4 to 6 meetings, and 33.33% conducted more than 6 meetings. Tangail Sadar and Nagarpur had all respondents conducting more than 6 meetings (100%). In Daulatpur, 50% of respondents conducted 4 to 6 meetings, and the other 50% conducted more than 6 meetings. In Shibalaya, 14.29% conducted 1 to 3 meetings, 57.14% conducted 4 to 6 meetings, and 28.57% conducted more than 6 meetings. For Harirampur, 50% conducted 1 to 3 meetings, and the remaining 50% conducted 4 to 6 meetings. Overall, the majority of respondents (53.49%) conducted 4 to 6 meetings, indicating a considerable effort in engaging communities through courtyard meetings for flood preparedness initiatives over the specified period.

Table 36: Number of courtyard meetings conducted over 5-6 Years

Upazila	Number of meetings						Total	
	1 to 3		4 to 6		Above 6			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur			11	84.62	2	15.38	13	100.00
Chauhali	4	44.44	2	22.22	3	33.33	9	100.00
Tangail Sadar					1	100.00	1	100.00
Nagarpur	1	100.00					1	100.00

Daulatpur			3	50.00	3	50.00	6	100.00
Shibalaya	1	14.29	4	57.14	2	28.57	7	100.00
Harirampur	3	50.00	3	50.00			6	100.00
Total	9	20.93	23	53.49	11	25.58	43	100.00

Average beneficiaries attended in courtyard meetings

In terms of the average number of beneficiaries attending courtyard meetings per Upazila, the data reveals in Sahjadpur, the distribution indicates that 38.46% of respondents reported an attendance of 15 to 20 beneficiaries, 23.08% reported 21 to 25 beneficiaries, another 23.08% reported 26 to 30 beneficiaries, and 23.08% reported more than 30 beneficiaries. For Chauhali, 22.22% of respondents reported 15 to 20 beneficiaries, another 22.22% reported 21 to 25 beneficiaries, and the majority, 55.56%, reported 26 to 30 beneficiaries. In Tangail Sadar and Nagarpur, all respondents reported attendance of more than 30 beneficiaries (100%). In Daulatpur, 33.33% of respondents reported 15 to 20 beneficiaries, 16.67% reported 21 to 25 beneficiaries, another 33.33% reported 26 to 30 beneficiaries, and the remaining 16.67% reported more than 30 beneficiaries. In Shibalaya, 14.29% reported 15 to 20 beneficiaries, 28.57% reported 21 to 25 beneficiaries, and the majority, 57.14%, reported 26 to 30 beneficiaries. Lastly, for Harirampur, 50% of respondents reported 15 to 20 beneficiaries, and the other 50% reported 26 to 30 beneficiaries. Overall, the majority of respondents (39.53%) reported an attendance of 26 to 30 beneficiaries, indicating significant community engagement during courtyard meetings across surveyed Upazilas.

Table 37: Average attendance of beneficiaries at courtyard meetings over 5-6 Years

Upazila	Number of beneficiaries								Total	
	15 to 20		21 to 25		26 to 30		Above 30			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	5	38.46	3	23.08	2	15.38	3	23.08	13	100.00
Chauhali	2	22.22	2	22.22	5	55.56			9	100.00
Tangail Sadar					1	100.00			1	100.00
Nagarpur	1	100.00							1	100.00
Daulatpur	2	33.33	1	16.67	2	33.33	1	16.67	6	100.00
Shibalaya	1	14.29	2	28.57	4	57.14			7	100.00
Harirampur	3	50.00			3	50.00			6	100.00
Total	14	32.56	8	18.60	17	39.53	4	9.30	43	100.00

Messages delivered by CV members in the courtyard meeting

CV members were asked about the messages delivered if courtyard meetings were conducted. The data unveils the dissemination of various flood preparedness messages during courtyard meetings, with notable participation and coverage across Sahjadpur, Chauhali, Tangail Sadar, Nagarpur, Daulatpur, Shibalaya, and Harirampur. Key topics such as rising homesteads, raising latrines, protecting tube wells, storing dry food, and storing cattle food were universally addressed, with all respondents in all Upazilas acknowledging their discussion, accounting for 100% coverage. Other topics like saving cash (83.72%), making rafts (69.77%), and preserving emergency medicine (93.02%) showed varied coverage percentages across different Upazilas. Additionally, aspects like planting trees around the house (79.07%), gathering information about flood centers (69.77%), preserving valuable documents (76.74%), and safeguarding country boats (58.14%) were addressed with considerable attention, albeit with slight variations in coverage rates. These findings highlight the effectiveness of courtyard meetings in disseminating comprehensive flood preparedness measures and fostering community engagement and readiness.

Table 37: Messages delivered in courtyard meetings (multiple answer)

Topic of discussion	Upazila														Total *(n=43)*	
	Sahjadpur *(n=13)*		Chauhali *(n=9)*		Tangail Sadar *(n=1)*		Nagarpur *(n=1)*		Daulatpur *(n=6)*		Shibalaya *(n=7)*		Harirampur *(n=6)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Rise homestead	13	100.00	9	100.00	1	100.00	1	100.00	6	100.00	7	100.00	6	100.00	43	100.00
Raise latrine	13	100.00	8	88.89	1	100.00	1	100.00	6	100.00	7	100.00	6	100.00	42	97.67
Protect tube well	13	100.00	9	100.00	1	100.00	1	100.00	5	83.33	7	100.00	4	66.67	40	93.02
Store dry food	13	100.00	9	100.00	1	100.00	1	100.00	6	100.00	7	100.00	6	100.00	43	100.00
Store cattle food	13	100.00	9	100.00	1	100.00	1	100.00	6	100.00	7	100.00	5	83.33	42	97.67
Save cash	10	76.92	8	88.89	1	100.00		0.00	5	83.33	7	100.00	5	83.33	36	83.72
Make raft (banana boats)	8	61.54	7	77.78		0.00		0.00	5	83.33	5	71.43	5	83.33	30	69.77
Preserve emergency Medicine	11	84.62	9	100.00	1	100.00	1	100.00	5	83.33	7	100.00	6	100.00	40	93.02
Plant trees around the house	9	69.23	8	88.89	1	100.00	1	100.00	4	66.67	6	85.71	5	83.33	34	79.07
Store Seeds	8	61.54	6	66.67	1	100.00	1	100.00	3	50.00	6	85.71	4	66.67	29	67.44
Preserve portable stove and fuel	11	84.62	9	100.00		0.00	1	100.00	6	100.00	6	85.71	5	83.33	38	88.37
Store drinking water	12	92.31	7	77.78	1	100.00	1	100.00	6	100.00	6	85.71	4	66.67	37	86.05
Gather information about flood center	9	69.23	6	66.67	1	100.00	1	100.00	3	50.00	6	85.71	4	66.67	30	69.77
Preserve valuable documents	9	69.23	7	77.78	1	100.00	1	100.00	4	66.67	5	71.43	6	100.00	33	76.74
Preserve country-boat	9	69.23	6	66.67					2	33.33	5	71.43	3	50.00	25	58.14
Protecting the floor of the house	10	76.92	8	88.89					5	83.33	7	100.00	5	83.33	35	81.40

participants (male and female) attended the courtyard meetings

According to the responses of community volunteers (CVs), the analysis of attendance patterns among male and female participants across several Upazilas reveals distinct trends. In Sahjadpur, a majority of male participants (69.23%) attended 9 or fewer meetings, with significant proportions attending 11 to 20 meetings (23.08%) and above 20 meetings (7.69%). Similarly, in Chauhali, almost all male participants (88.89%) attended 9 or fewer meetings, with a smaller fraction attending 11 to 20 meetings (11.11%). Tangail Sadar and Nagarpur saw all male participants attending 9 or fewer meetings, while in Daulatpur, Shibalaya, and Harirampur, the majority attended 9 or fewer meetings, with varying smaller percentages attending 11 to 20 meetings or above 20 meetings.

Female participants in Sahjadpur were evenly distributed across attendance categories, with 30.77% attending 9 or fewer meetings, 38.46% attending 11 to 20 meetings, and another 30.77% attending above 20 meetings. Conversely, all female participants in Chauhali attended 9 or fewer meetings, and in Tangail Sadar and Nagarpur, all attended 11 to 20 meetings. In Daulatpur, Shibalaya, and Harirampur, the majority of female participants attended 11 to 20 meetings.

Across all Upazilas, a significant portion of male participants attended 9 or fewer meetings (79.07%), with fewer attending 11 to 20 meetings (16.28%) or above 20 meetings (4.65%). Conversely, the majority of female participants attended 11 to 20 meetings (76.74%), with a smaller proportion attending 9 or fewer meetings (11.63%) or above 20 meetings (11.63%). This disparity in attendance suggests potential challenges or lower engagement among male participants compared to females, who demonstrate more consistent involvement in community activities across the middle range of meetings (11 to 20).

Table 38: Participants attended in courtyard meetings

Upazila	Male attendance rate						Total		Female attendance rate						Total	
	<=10		11 to 20		Above 20				<=10		11 to 20		Above 20			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	9	69.23	3	23.08	1	7.69	13	100.00	4	30.77	5	38.46	4	30.77	13	100.00
Chauhali	8	88.89	1	11.11			9	100.00			9	100.00			9	100.00
Tangail Sadar	1	100.00					1	100.00			1	100.00			1	100.00
Nagarpur	1	100.00					1	100.00			1	100.00			1	100.00
Daulatpur	5	83.33			1	16.67	6	100.00	1	16.67	4	66.67	1	16.67	6	100.00
Shibalaya	5	71.43	2	28.57			7	100.00			7	100.00			7	100.00
Harirampur	5	83.33	1	16.67			6	100.00			6	100.00			6	100.00
Total	34	79.07	7	16.28	2	4.65	43	100.00	5	11.63	33	76.74	5	11.63	43	100.00

3.3.2 Training and knowledge retention

Across all surveyed Upazilas, every CV member recalled the training they attended. The CV members' survey regarding the topics remembered from their training sessions showed a notable uniformity in recall across different Upazilas. Every respondent (100%) from the surveyed Upazilas remembered the topics of rising homesteads and raising latrines. Similarly, 100% of respondents in all Upazilas recalled the storage of dry food except for one respondent in Chauhali, resulting in a 97.67% overall recall rate. The topic of protecting tube wells was remembered by all respondents except for one in Daulatpur and two in Harirampur, leading to a 90.70% recall rate. The preservation of emergency medicine was recalled by 95.35% of respondents, with full recall in most Upazilas except for Daulatpur. Storing cattle food was remembered by 93.02% of respondents, with high recall rates in all Upazilas. Topics such as saving cash, making rafts (banana boats), and preserving portable stoves and fuel had slightly lower recall rates of 79.07%, 69.77%, and 88.37%, respectively, with variations among the Upazilas.

Additionally, preserving valuable documents, planting trees around the house, and protecting the house floor had recall rates of 79.07%, 79.07%, and 76.74%, respectively. Specific topics like preserving country boats and storing seeds had recall rates of 58.14% and 69.77%, respectively, showing more variability in recall across different Upazilas. Lastly, gathering information about flood centers and storing drinking water had recall rates of 72.09% and 69.77%, reflecting some inconsistencies in recall among respondents from different Upazilas.

Table 39: Recollection of attended training Sessions (multiple answer)

Topic of discussion	Upazila														Total *(n=43)*	
	Sahjadpur *(n=13)*		Chauhali *(n=9)*		Tangail Sadar *(n=1)*		Nagarpur *(n=1)*		Daulatpur *(n=6)*		Shibalaya *(n=7)*		Harirampur *(n=6)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Rise homestead	13	100.00	9	100.00	1	100.00	1	100.00	6	100.00	7	100.00	6	100.00	43	100.00
Raise latrine	13	100.00	9	100.00	1	100.00	1	100.00	6	100.00	7	100.00	6	100.00	43	100.00
Protect tube well	12	92.31	9	100.00	1	100.00		0.00	5	83.33	7	100.00	5	83.33	39	90.70
Store dry food	13	100.00	8	88.89	1	100.00	1	100.00	6	100.00	7	100.00	6	100.00	42	97.67
Store cattle food	12	92.31	8	88.89	1	100.00	1	100.00	5	83.33	7	100.00	6	100.00	40	93.02
Save cash	10	76.92	7	77.78	1	100.00		0.00	5	83.33	7	100.00	4	66.67	34	79.07
Make raft (banana boats)	8	61.54	7	77.78		0.00	1	100.00	5	83.33	4	57.14	5	83.33	30	69.77
Preserve emergency Medicine	12	92.31	9	100.00	1	100.00	1	100.00	5	83.33	7	100.00	6	100.00	41	95.35
Plant trees around the house	9	69.23	7	77.78	1	100.00	1	100.00	5	83.33	6	85.71	5	83.33	34	79.07
Store Seeds	9	69.23	8	88.89	1	100.00	1	100.00	2	33.33	5	71.43	4	66.67	30	69.77
Preserve portable stove and fuel	10	76.92	9	100.00	1	100.00	1	100.00	6	100.00	6	85.71	5	83.33	38	88.37
Store drinking water	11	84.62	6	66.67		0.00	1	100.00	5	83.33	4	57.14	3	50.00	30	69.77
Gather information about flood center	9	69.23	7	77.78	1	100.00	1	100.00	3	50.00	6	85.71	4	66.67	31	72.09
Preserve valuable documents	10	76.92	7	77.78	1	100.00	1	100.00	5	83.33	5	71.43	5	83.33	34	79.07
Preserve country-boat	6	46.15	6	66.67	1	100.00			4	66.67	5	71.43	3	50.00	25	58.14
Protecting the floor of the house	11	84.62	6	66.67					5	83.33	7	100.00	4	66.67	33	76.74

3.3.3 Equipment and resources

When asked if they felt a lack of equipment needed to fulfill their job, all respondents from each Upazila reported 'Yes' unanimously. Specifically, 100% of respondents from Sahjadpur (13 respondents), Chauhali (9 respondents), Tangail Sadar (1 respondent), Nagarpur (1 respondent), Daulatpur (6 respondents), Shibalaya (7 respondents), and Harirampur (6 respondents) indicated that they experienced a lack of necessary equipment. All 43 respondents (100%) across all Upazilas affirmed this issue.

Table 40: Equipment sufficiency for job fulfillment

Upazila	Response		Total	
	Yes			
	No.	(%)	No.	(%)
Sahjadpur	13	100.00	13	100.00
Chauhali	9	100.00	9	100.00
Tangail Sadar	1	100.00	1	100.00
Nagarpur	1	100.00	1	100.00
Daulatpur	6	100.00	6	100.00
Shibalaya	7	100.00	7	100.00
Harirampur	6	100.00	6	100.00
Total	43	100.00	43	100.00

As reported by respondents, the equipment needed to carry out responsibilities varied across different Upazilas. In Sahjadpur, Chauhali, Tangail Sadar, Nagarpur, Daulatpur, Shibalaya, and Harirampur, respondents expressed a need for hand mics, torch lights, raincoats, and umbrellas, with percentages ranging from 71.43% to 100%. Additionally, respondents from these Upazilas mentioned a requirement for bicycles and body bags, with percentages ranging from 22.22% to 100%. Wheelchairs were identified as necessary by respondents from Sahjadpur, Daulatpur, and Shibalaya. Stretchers were deemed necessary by respondents from Sahjadpur, Daulatpur, Shibalaya, and Harirampur. Overall, respondents across all Upazilas highlighted the need for essential tools such as hand mics, torch lights, raincoats, and umbrellas, along with other items like bicycles, body bags, wheelchairs, and stretchers, to effectively carry out their responsibilities.

Table 41: Equipment requirements (multiple answer)

Tools	Upazila														Total *(n=43)*	
	Sahjadpur *(n=13)*		Chauhali *(n=9)*		Tangail Sadar *(n=1)*		Nagarpur *(n=1)*		Daulatpur *(n=6)*		Shibalaya *(n=7)*		Harirampur *(n=6)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Hand mic	12	92.31	8	88.89	1	100.00			6	100.00	5	71.43	6	100.00	38	88.37
Bicycle	3	23.08	3	33.33					2	33.33	1	14.29	3	50.00	12	27.91
Brest	3	23.08	2	22.22					2	33.33	2	28.57	3	50.00	12	27.91
Torch light	13	100.00	8	88.89	1	100.00	1	100.00	5	83.33	5	71.43	6	100.00	39	90.70
Raincoat	12	92.31	7	77.78	1	100.00	1	100.00	6	100.00	7	100.00	6	100.00	40	93.02
Umrella	13	100.00	8	88.89	1	100.00	1	100.00	5	83.33	7	100.00	6	100.00	41	95.35
Wheel chair	3	23.08	2	22.22			1	100.00	2	33.33	1	14.29	3	50.00	12	27.91
Body Bag	9	69.23	6	66.67			1	100.00	1	16.67	5	71.43	4	66.67	26	60.47
Strecher	6	46.15	2	22.22					1	16.67	2	28.57	4	66.67	15	34.88

3.3.4 Challenges

CV members were asked whether they faced any problems carrying out their responsibilities without the equipment they mentioned, which diminished their performance. In Sahjadpur, respondents reported encountering identity problems (15.38%) and attention problems (92.31%) when carrying out their responsibilities without the necessary equipment. Similarly, in Chauhali, attention problems were prevalent (88.89%), while a smaller percentage faced identity (33.33%) and avoidance problems (33.33%). Tangail Sadar respondents mainly cited attention problems (100.00%). In Daulatpur, respondents experienced a range of challenges, including identity (66.67%), attention (50.00%), and avoidance problems (33.33%). Shibalaya respondents primarily faced attention problems (85.71%), followed by identity (42.86%) and avoidance problems (42.86%). In Harirampur, attention problems were predominant (83.33%), followed by identity (50.00%) and avoidance problems (16.67%). These issues underscore the importance of having the necessary equipment to facilitate the efficient performance of job responsibilities, as the absence of such tools can lead to various challenges that diminish overall effectiveness.

Table 42: Challenges from equipment shortage impacting performance (multiple answer)

Problem	Upazila														Total *(n=43)*	
	Sahjadpur *(n=13)*		Chauhali *(n=9)*		Tangail Sadar *(n=1)*		Nagarpur *(n=1)*		Daulatpur *(n=6)*		Shibalaya *(n=7)*		Harirampur *(n=6)*			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Identity problem	2	15.38	3	33.33					4	66.67	3	42.86	3	50.00	15	34.88
Attention problem	12	92.31	8	88.89	1	100.00			3	50.00	6	85.71	5	83.33	35	81.40
Avoidance problem	4	30.77	3	33.33			1	100.00	2	33.33	3	42.86	1	16.67	14	32.56
They did not five us proper importance	2	15.38							2	33.33			1	16.67	5	11.63

3.4 Reflection on Gender Action Plan (GAP) in Project-2

Initiation of community-based flood warning procedures

The target of initiating community-based flood warning procedures, with 50% applying indigenous techniques, reflects a collaborative effort involving both men and women within the community. This proactive approach aims to enhance community resilience and preparedness in the face of flood events. The results indicate significant progress in household preparedness measures across all upazilas: 88.20% secured homesteads, 84.08% installed latrines, and 82.58% protected tube wells. Most notably, 94.94% stored dry food, yet areas like tree planting (52.81%) and seed storage (31.84%) need improvement. Other measures, including cattle food storage (77.53%) and cash savings (70.22%), reflect comprehensive readiness. Despite challenges, like limited flood center information (30.52%), households actively enhance resilience by safeguarding valuables (61.05%) and maintaining boats (23.97%). These efforts show a collective commitment to mitigating flood impacts and securing livelihoods.

Specifically, 88.20% of households raised homesteads, demonstrating a widespread effort to secure living spaces. Additionally, 84.08% raised latrines, highlighting the community's commitment to sanitation practices. Protecting tube wells was common, with 82.58% participation, ensuring access to clean water sources during floods.

Enhancement of resilience to disaster risks by household pattern

According to their household patterns, respondents were asked whether they perceived an enhancement in their resilience to disaster risks and awareness of risk mitigation measures following the previous intervention. The data shows the perceived enhancement of disaster resilience and risk awareness across various upazilas categorized by gender and household patterns.

Table 43: Enhancement of resilience to disaster risks by household pattern

Upazila	Household pattern	Gender				Total	
		Male		Female			
		Yes		Yes		Yes	
		No.	(%)	No.	(%)	No.	(%)
Sahjadpur	Deficit	11	47.83	50	78.13	61	70.11
	Break-even	10	43.48	12	18.75	22	25.29
	Surplus	2	8.70	2	3.13	4	4.60
	Total	**23**	**100.00**	**64**	**100.00**	**87**	**100.00**
Chauhali	Deficit	19	48.72	73	76.84	92	68.66
	Break-even	16	41.03	19	20.00	35	26.12
	Surplus	4	10.26	3	3.16	7	5.22
	Total	**39**	**100.00**	**95**	**100.00**	**134**	**100.00**
Tangail Sadar	Deficit	5	71.43	5	83.33	10	76.92
	Break-even	1	14.29	1	16.67	2	15.38
	Surplus	1	14.29			1	7.69
	Total	**7**	**100.00**	**6**	**100.00**	**13**	**100.00**
Nagarpur	Deficit	2	100.00	11	100.00	13	100.00
	Total	**2**	**100.00**	**11**	**100.00**	**13**	**100.00**
Daulatpur	Deficit	13	65.00	49	80.33	62	76.54
	Break-even	7	35.00	12	19.67	19	23.46
	Total	**20**	**100.00**	**61**	**100.00**	**81**	**100.00**
Shibalaya	Deficit	15	45.45	59	76.62	74	67.27
	Break-even	14	42.42	17	22.08	31	28.18
	Surplus	4	12.12	1	1.30	5	4.55

	Total	**33**	**100.00**	**77**	**100.00**	**110**	**100.00**
Harirampur	Deficit	14	63.64	63	84.00	77	79.38
	Break-even	7	31.82	10	13.33	17	17.53
	Surplus	1	4.55	2	2.67	3	3.09
	Total	**22**	**100.00**	**75**	**100.00**	**97**	**100.00**
Over All	Deficit	79	54.11	310	79.69	389	72.71
	Break-even	55	37.67	71	18.25	126	23.55
	Surplus	12	8.22	8	2.06	20	3.74
	Total	**146**	**100.00**	**389**	**100.00**	**535**	**100.00**

Analyzing the data reveals notable trends. In Sahjadpur, both genders from deficit households reported significant enhancements, with 47.83% of males and 78.13% of females indicating improvements. Similarly, Chauhali exhibited a similar pattern, with 48.72% of males and 76.84% of females from deficit households reporting enhancements. Tangail Sadar showed relatively high percentages of both males (71.43%) and females (83.33%) reporting enhancements in deficit households. Despite limited data, Nagarpur showed 100% reporting enhancements for both genders. Across all upazilas, households classified as deficit generally displayed lower enhancement percentages than those classified as break-even or surplus. Specifically, the deficit pattern had the highest number of respondents, with 54.11% of males and 79.69% of females reporting enhancements. Conversely, the break-even pattern had 37.67% of males and 18.25% of females reporting enhancements, while the surplus pattern had the lowest percentages, with 8.22% of males and 2.06% of females reporting enhancements.

Enhanced disaster resilience and risk awareness on O&M among residents in the vicinity of flood embankment

The respondents (*n*=285) living on embankments were asked whether they perceived an enhancement in their resilience to disaster risks and awareness of risk mitigation measures after the previous intervention. The following reflects a gender-specific perspective on the perceived enhancement of resilience to disaster risks and awareness of risk mitigation measures post-intervention. In Sahjadpur, 26.39% of males and 73.61% of females reported improved resilience and awareness. Chauhali showed that 20.73% of males and 79.27% of females acknowledged enhancement. Tangail Sadar indicated that 80.00% of males and 20.00% of females recognized improvement, while in Nagarpur, 100.00% of females reported enhancement. Daulatpur revealed that 27.78% of males and 72.22% of females perceived improvement. In Shibalaya, 31.08% of males and 68.92% of females reported an increase. Lastly, Harirampur demonstrated that 28.13% of males and 71.88% of females noted an improvement. Overall, the data suggests that a significant portion of respondents across all Upazilas, particularly females (72.98%), perceived an enhancement in their resilience to disaster risks and awareness of risk mitigation measures following the intervention.

Table 44: Enhanced disaster resilience and risk awareness among embankment residents

Upazila	Gender				Total	
	Male		Female			
	Yes		Yes		Yes	
	No.	(%)	No.	(%)	No.	(%)
Sahjadpur	19	26.39	53	73.61	72	100.00
Chauhali	17	20.73	65	79.27	82	100.00
Tangail Sadar	4	80.00	1	20.00	5	100.00
Nagarpur			2	100.00	2	100.00
Daulatpur	5	27.78	13	72.22	18	100.00
Shibalaya	23	31.08	51	68.92	74	100.00
Harirampur	9	28.13	23	71.88	32	100.00
Total	77	27.02	208	72.98	285	100.00

Positive outcomes of training initiatives following GAP target during Project-2

The successful implementation of training initiatives during Project 2 led to the attainment of all outlined indicators, surpassing predetermined thresholds. These initiatives primarily focused on gender awareness, leadership training, and operational and maintenance (O&M) skills enhancement. All indicators were successfully achieved during the implementation of the training initiatives, with each target surpassing the set threshold. The focus on gender awareness and leadership training yielded highly positive results, with more than 30% of women, including members of management committees, reporting tangible benefits. This signifies a significant step forward in enhancing gender understanding and leadership skills among women, potentially leading to their empowerment within their communities.

Additionally, the participation of women in O&M training resulted in a notable increase in knowledge acquisition, with over 30% reporting gaining additional insights. This highlights the effectiveness of the training program in reaching and engaging women, contributing to their understanding of essential operational and maintenance practices, and potentially improving overall community infrastructure management. Overall, these achievements underscore the importance of such initiatives in raising awareness and creating safer community environments.

GBV awareness and redress initiatives

Amidst the myriad challenges faced by communities, initiatives targeting gender awareness, leadership development, and O&M skills enhancement have emerged as critical tools for empowerment and progress. In the context of Project 2, the successful implementation of such training initiatives has not only met but exceeded predetermined benchmarks, marking a significant milestone in community development efforts. Central to these endeavors is the dissemination of information on Gender-Based Violence (GBV) and community-based redress mechanisms. The widespread dissemination of information on Gender-Based Violence (GBV) and community-based redress mechanisms, with over 30% of women in CDMUs reporting benefits from gender awareness and leadership training, exemplifies a proactive stance in addressing GBV issues. This approach underscores the commitment to promoting access to support and justice mechanisms at the grassroots level, with a significant portion of the population benefiting from these initiatives.

3.5 Snapshot from qualitative findings

3.5.1 Community perceptions

Participants recalled meetings held approximately 5-6 years ago that brought together villagers to discuss various natural disasters. Among the topics discussed were floods, river bank erosion, and general preparedness for natural calamities. The FGDs revealed that courtyard meetings were particularly engaging and educational for addressing social change issues, including disaster management, women's empowerment, and flood resilience. Participants expressed a keen interest in these meetings as the topics discussed were directly relevant to their lives, providing practical knowledge and skills that could be immediately applied. Courtyard meetings fostered a sense of community, allowing participants to share their experiences and learn from one another. Discussions on women's empowerment and flood resilience were particularly impactful, as they addressed the community's immediate and long-term needs. The informal and local setting of courtyard meetings made them more accessible and inclusive, encouraging greater participation. It was noted that awareness dramas were performed as a medium to convey information on flood preparedness and actions to take during river bank erosion.

Through discussions with the community, it was found that before implementing the CbFRM project, most people in these communities were unaware of flood-related disaster risk reduction. However, people have significantly enriched their knowledge in the last several years. The FGD participants

noted that the flood markers have significantly contributed to reducing the loss and damage caused by floods. Floods occur almost every year, with some areas typically experiencing overflow. In 2022, however, the flood scenario was different as floods affected many areas where they had never occurred before. Despite this, the presence of flood markers helped keep flood-induced loss and damage lower compared to previous floods. The community members are not only aware of flood markers but also have a good understanding of various early warning systems, such as radio, television, and announcements made by the local government.

3.5.2 Dissemination of flood early warning

In recent years, after receiving early warning messages about floods, community members have implemented various preparedness measures at both household and community levels. The community highly regarded the timely and strategic initiatives of the CbFRM project as instrumental in fostering a culture of disaster preparedness. Most respondents from the study areas reported implementing several actions to respond to and recover from floods. These measures include collecting and preserving safe drinking water and securing water sources by covering tube wells or water points to prevent contamination. Households engaged in discussions and planning their actions before, during, and after floods to ensure everyone is aware and prepared. Special efforts were made to assist vulnerable groups, including women, elderly people, and children, ensuring their safety and well-being. Community communication played a critical role, with neighbors and community members informing each other about the need to take safe shelter and prepare for floods. Financial preparedness was emphasized, with families keeping enough money on mobile devices and managing cash reserves for emergency purposes. Livestock management plans were developed to move animals to safer areas, while household assets were protected by shifting belongings to higher ground or safer locations to minimize damage. Preparing for safe shelter was a key priority, with community members identifying and readying themselves to move to designated safe shelters. Food preservation strategies included stocking up on dry food to ensure food security during floods.

Additionally, fuel storage involved preserving kerosene oil, fuel, dry straw, and other essential items for use during emergencies. Medicine storage was also a critical component, with necessary medicines kept on hand to address health needs during and after floods. Security measures were taken to ensure the safety and security of adolescent girls and women, while special precautions were in place to safeguard the health of pregnant women. These comprehensive measures reflect the community's increased awareness and proactive stance towards disaster management.

3.5.3 Flood preparedness measures

Flood management and reducing flood-induced loss and damage depend on effective preparedness, rescue, and recovery activities. Implementing preparedness measures can significantly mitigate damage during floods while timely actions protect lives and assets. Post-flood actions are essential for recovering from the damages and losses incurred. The courtyard meetings and training sessions organized by the CbFRM project were instrumental in teaching community members about necessary actions to take before, during, and after floods. Drawing on indigenous knowledge, flood-affected individuals have developed various strategies to safeguard their lives and belongings. The end-line study indicates that the community's engagement in proactive measures before, during, and after floods has increased, marking a notable success for the CbFRM project. However, the specific actions taken by community members differ depending on their location and the severity of their flood vulnerability. A significant change noted in the final evaluation, which was not observed before the project, is that a considerable portion of the community is now more responsive to the needs of women. They work to ensure the safety and security of women and girls, providing sanitary napkins, appropriate clothing, and other menstrual hygiene management products. Community members have come to understand the importance of menstrual hygiene management and the need to protect

women and adolescents, especially during floods when water pollution poses additional risks. Community members have learned about flood recovery activities through the capacity-building and awareness-raising activities of the CbFRM project and have actively participated in various recovery efforts. Key practices identified through household surveys and group discussions include boiling or purifying drinking water to prevent waterborne diseases, avoiding consuming polluted water or water from submerged sources, and creating privacy veils for women and adolescents for safe defecation and bathing. Additionally, some respondents have shared their experiences with others who had not yet adopted preparedness measures, further disseminating the importance of these practices.

3.5.4 Strengthening community resilience

One of the main objectives of the CbFRM project is to strengthen and improve the participation of local communities in creating awareness and building their capacity and resilience to reduce risks associated with river floods and riverbank erosion. Community resilience is a newly introduced concept that the CbFRM project brought to these communities, who were previously unfamiliar with the term. Through courtyard meetings, training sessions, and various interventions, the CbFRM project has successfully promoted the idea of community resilience, enhancing the knowledge of vulnerable populations.

The study found that by the end of the CbFRM project, most respondents had developed a solid understanding of community resilience. Respondents provided insights when asked to express their perspectives on community resilience. They defined community resilience as the capacity to respond to disasters, ensure food security, maintain health safety, secure household income, prevent shelters from submerging during floods, protect roads from damage during disasters, safeguard income sources, and preserve WASH infrastructure.

When asked how to achieve community resilience, most respondents provided multiple suggestions. They emphasized the importance of having the capacity to save money for the flood period, recover from flood damage, have a community action plan and a contingency plan, maintain a well-functioning flood early warning system, access information, and develop alternative sustainable livelihood options. Other key factors included community connectedness, having sufficient search and rescue equipment, constructing disaster-resilient houses, and organizing capable community volunteers. Only a few FGD respondents were unsure how to achieve community resilience, indicating a high level of awareness and proactive thinking among the majority.

3.3.5 Building resilience through knowledge sharing

The participants of the FGD unanimously agreed on the necessity of discussing natural disasters, particularly focusing on pre-preparation. They outlined immediate actions to take during disasters and post-disaster steps for recovery. Participants expressed confidence in implementing these measures in their own lives and sharing them with others. They demonstrated a strong commitment to personal application, such as integrating disaster preparedness plans into daily routines and identifying safe evacuation routes, as well as information sharing, which actively informs and educates parents, relatives, and neighbors about disaster preparedness and the importance of early action.

Several participants shared personal stories of how prior knowledge and preparedness had helped them or their families during past disasters, reinforcing the practical benefits of these measures. The participants strongly believed that continuous discussions on disaster preparedness are vital for the following reasons: *(a)*. *Increased awareness*: Regular discussions raise awareness and keep disaster preparedness at the forefront of community consciousness. *(b)*. *Community resilience*: Educating individuals enhances overall community resilience, as informed citizens can support each other during emergencies. *(c)*. *Mitigation of impact*: Preparedness reduces the severity of disaster impacts,

safeguarding lives and property. *(d)*. *Empowerment*: Knowledge empowers individuals to take proactive measures, reducing reliance on external aid.

3.6 Findings on key evaluation questions

3.6.1 Relevance

The Community-based Flood Risk Management (CbFRM) project activities are directly aligned with the targets of the Sustainable Development Goals (SDGs), particularly Goal 13: Climate Action (flood early warning, flood damage, and loss recovery support). The main objectives of the CbFRM project are to strengthen and improve the participation of local communities in creating awareness and developing their capacity and resilience to reduce river flood and riverbank erosion risks through assessment, preparedness, and response. The project significantly contributes to climate resilience and adaptation efforts by focusing on these areas. Additionally, these activities support the objectives outlined in the national development framework, such as the 8th Five-Year Plan, by enhancing disaster preparedness and response capabilities. This, in turn, promotes sustainable development and safeguards communities from the adverse effects of climate change.

The activities related to the selection and training of Community Volunteers, formation of Community Disaster Management Units (CDMU), conduction of courtyard meetings for capacity development and flood risk awareness at local community households, and organizing mock demonstration exercises to check the coordination mechanism among community volunteers for emergency disaster response are directly and/or indirectly contributed to different SDGs and the targets of the 8th five-year plan. In view of the local needs and priorities as well as national development targets and goals, the relevance is found of the project is justified through the appropriateness of the actions/interventions of the project. The project design of the CbFRM is assumed to be based on a thorough analysis of policy and locality context, including the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), National Disaster Management Plan, District Disaster Management Plan, targets of the SDGs (particularly Goal 13: Climate Action), and the 8th Five-Year Plan. By considering poverty levels and the capacity of the beneficiaries, the design of the CbFRM project is highly relevant to the broader policy goals of disaster risk reduction for the poor segments of flood-vulnerable populations.

The project objectives, results, analysis of assumptions/risks, and identification of problems and needs of the target population have been found to be relevant. The intervention logic, verifying indicators, and time frame were practical in view of the operation, monitoring, and evaluation. This comprehensive approach ensures that the project remains aligned with its goals, effectively addresses the needs of the target population, and allows for the successful monitoring and evaluation of its progress and impact.

The beneficiary and project area selection were unique, focusing on the most flood-vulnerable communities and hard-to-reach areas where no other organization was engaged in flood management to the same extent. Moreover, the project specifically targeted the most vulnerable females facing food and livelihood insecurity. This selection process was based on a sound analysis of the beneficiaries' poverty context, ensuring alignment with project results and objectives. Importantly, the selection process was free from any form of bias, ensuring impartiality and effectiveness in addressing the needs of the target population.
The CbFRM project has been fully aligned with the needs and priorities of the target people. The project provided comprehensive capacity enhancement training to CVs to address these needs and priorities. This training covered various aspects such as volunteerism principles, disaster management structure, flood and erosion mitigation, climate change impacts, traditional coping strategies, national warning systems, courtyard sessions, service agencies, gender and social inclusion issues, leadership qualities, and volunteer roles in CbFRM. Thus, a Training of Trainers (ToT) course was conducted to

enhance the capacity of Community Mobilizers to conduct training courses for CVs efficiently. External expertise was sought when necessary to ensure the quality of training.

These initiatives were undertaken to ensure the active participation of the participants in project activities and positively contribute to achieving the expected results. Participants expressed reasonable satisfaction with the relevance, quality, and adequacy of the training, which helped in changing their behaviors, attitudes, and knowledge.

One notable intervention introduced by CbFRM is the flood early warning system known as the "flood marker." This system is particularly relevant for communities where illiterate individuals may struggle to understand scientific flood early warning information.

3.6.2 Efficiency

The CbFRM has developed family and community-level disaster preparedness plans. The Community Volunteers (CVs) developed the Community Disaster Preparedness Plans (CDPPs) in consultation with the representatives of the target households or families. To sensitize the targeted beneficiaries, CbFRM has initiated various key activities: mock drills, cultural functions, courtyard sessions, discussions at Masjids, and discussions at schools. Mock drills effectively engaged stakeholders and community members in flood preparedness and response roles. Cultural events and courtyard sessions, led by trained volunteers, effectively raised public awareness and provided direct information dissemination. Discussions at Masjids during Jumma prayers in Ramadan and awareness sessions in schools further increased community engagement and understanding of flood and riverbank erosion risks. These activities aligned well with project goals, receiving positive participant feedback and enhancing their preparedness, resilience, and knowledge regarding flood risks.

The project structure and management system of the CbFRM project were found to be dynamic and efficient, ensuring high levels of transparency in resource management, both physical and financial. The project maintained an adequate ratio of staff to beneficiaries, which allowed for effective management and oversight. Financial management practices were transparent and focused on achieving value for money, with careful planning for contingencies related to operating costs.

A comprehensive baseline survey was conducted at the outset of the project, and the resulting report provided a valuable benchmark for subsequent monitoring, progress reporting, and evaluation of the project's impact. This baseline data was crucial for setting realistic targets and measuring progress accurately. Enhancing CVs and effective CDMU was a key component of the project, with a strong emphasis on training and capacity building. Training methodologies were well-conceived and delivered by qualified resource persons, ensuring participants received high-quality instruction. Where necessary, external expertise was sought to enhance the training programs. Detailed training reports and modules were compiled and documented, clearly showing the training processes and materials used. Participants in the training programs reported high levels of satisfaction with the relevancy, quality, and adequacy of the training materials. The training effectively changed participants' behavior, attitudes, and knowledge, equipping them with the skills to manage flood risks better. These changes were evidenced through FGDs and KIIs, which highlighted improvements in community preparedness and resilience as a direct result of the training.

3.6.3 Effectiveness

The implementation of different project activities under the Community-based Flood Risk Management (CbFRM) project has generally been found to be effective. Key initiatives such as installing flood marker posts and disseminating flood early warning systems have greatly contributed to disaster risk management. The formation of CDMUs has been crucial, with their primary

responsibility, especially the leaders, being to monitor the performance of CVs and provide them with support and guidance. Additionally, CDMUs ensure the implementation of all union-level activities for the project. These activities include promoting preparedness messages through educational and religious institutions, organizing cultural functions, and supporting mock drills at the Upazila level. The leaders of the CDMUs serve as vital links between the UDMCs and the at-risk communities, ensuring effective communication and coordination. This structure not only enhances community engagement but also strengthens the overall disaster preparedness and response framework.

3.6.4 Impact

The CbFRM project has significantly and positively impacted the targeted flood-vulnerable communities. Developing family and community-level disaster preparedness plans has greatly increased awareness and readiness among beneficiaries. Key activities such as installing flood marker posts and disseminating flood early warning systems have been instrumental in enhancing disaster risk management. These tools have enabled communities to respond more effectively to impending flood threats, thereby reducing potential damage and loss.

The formation of CDMUs has further strengthened community resilience. The leaders of these units have played a pivotal role in monitoring the performance of CVs, providing them with essential support and guidance, and ensuring the implementation of activities. These activities included promoting preparedness messages through educational and religious institutions, organizing cultural functions, and supporting mock drills. The CDMU leaders have effectively bridged the gap between UDMCs and at-risk communities, facilitating better communication and coordination.

The CbFRM project has effectively enhanced the preparedness and resilience of flood-vulnerable communities. The comprehensive approach, encompassing awareness-raising, capacity building, and effective resource management, has substantially improved disaster risk management and community resilience. The project activities have not only met the immediate needs of the beneficiaries but have also laid a strong foundation for sustainable development and long-term disaster preparedness.

3.6.5 Sustainability

The sustainability of the CbFRM project is assured through several mechanisms designed to ensure that its benefits and practices continue even after the project phases out. One of the key factors is the empowerment and capacity building of local communities. The project has instilled critical knowledge and skills in the community by developing family and community-level disaster preparedness plans and training CVs. These individuals are now equipped to manage flood risks independently, fostering a sense of ownership and long-term responsibility for disaster preparedness and response.

The formation of CDMUs is another crucial element of sustainability. These units, led by trained community leaders, are responsible for monitoring the performance of CVs, supporting Union-level activities, and maintaining strong communication links with UDMCs. The decentralized and community-driven structure of the CDMUs ensures that disaster risk management practices are deeply embedded within the local governance framework. This local ownership and leadership mean that the practices and activities initiated by the project will continue to be implemented and evolved by the community itself.

Moreover, the comprehensive awareness-building sessions ensure a lasting impact on community capacity. The CbFRM project has ensured its sustainability by embedding disaster risk management practices within the local community structure, building lasting capacity through training and empowerment, aligning with broader policy frameworks, and establishing transparent resource

management systems. These measures collectively ensure that the community will continue to benefit from the project's activities long after its official conclusion.

However, the sustainability of the CbFRM project relies heavily on the institutionalization of its practices within the broader disaster management framework outlined in the Standing Order on Disaster (SoD). Central to this institutionalization is the incorporation of Community-based Operation and Management (O&M) or Participatory O&M (P-O&M) approaches for water management infrastructures built by organizations like the Bangladesh Water Development Board (BWDB).

Integrating CbFRM and P-O&M approaches into mainstream disaster management institutions is essential for several reasons.

Firstly, these approaches have proven effective in empowering local communities to manage flood risks independently, reducing reliance on external interventions and enhancing community resilience. By institutionalizing these practices, disaster management institutions can leverage the knowledge and capacity built within communities, thereby enhancing the overall effectiveness of disaster response and mitigation efforts.

Secondly, mainstreaming CbFRM and P-O&M approaches ensures sustainability beyond the lifespan of individual projects. By embedding these practices within existing institutional structures outlined in the SoD, Bangladesh, disaster management agencies can ensure that community-driven initiatives continue even after project funding ends. This ensures continuity and long-term impact, safeguarding communities from future flood risks.

Moreover, institutionalization within the SoD framework provides legitimacy and support for CbFRM and P-O&M approaches at the national level. These approaches gain recognition and resources by aligning with established disaster management protocols, facilitating their implementation, and scaling up across different regions and communities.

Furthermore, integrating CbFRM and P-O&M approaches into mainstream disaster management institutions fosters stakeholder collaboration and coordination. By bringing together government agencies, non-governmental organizations, and community representatives, institutionalization promotes synergies and enhances the effectiveness of disaster management efforts.

4. Key challenges

The implementation of the CbFRM project encountered several key challenges that hindered its effectiveness in achieving its objectives. Among these challenges, the short lifespan of the project, lack of specific guidelines for institutionalization, awareness and functionality issues of DMCs, resistance from DMC leaders, insufficient monitoring and follow-up mechanisms, and challenges during political events were prominent.

- *Short lifespan of the project*: The most pressing challenge impeding the achievement of objectives revolved around the truncated duration of the project. Despite the early submission of the EoI and issuance of the RFP, the process of finalizing the contract with the selected INGO was significantly prolonged. The agreement was ultimately signed after a protracted period of negotiations and administrative procedures, resulting in a considerable delay in the commencement of project activities and impacting the overall timeline. The prolonged selection process significantly curtailed the project's initial lifespan from three years to ten months. Remarkably, while the activities outlined in the project plan were designed to span three years, the abrupt reduction in project duration was not accompanied by a corresponding decrease in planned tasks or objectives. Consequently, this unforeseen reduction in project duration posed a monumental challenge for

project staff, severely constraining their capacity to execute the full scope of planned activities within the significantly shortened timeframe. The compressed timeline imposed immense pressure on project personnel, necessitating rapid adjustments, prioritization of tasks, and heightened efficiency to ensure the attainment of project goals within the limited timeframe.

- *Lack of specific guidelines for institutionalization*: There are no specific guidelines in policy and operational documents for institutionalizing community-driven approaches. While the project aims to institutionalize CbFRM practices, the absence of clear guidelines hinders the effective integration of these approaches into existing disaster management frameworks. The project proposed and tried to incorporate formal institutional linkage of the CDMU representatives into the Union and ward DMCs, which has yet to be achieved as a mandate of DDM in its formation article.

- *Lack of awareness and functionality of DMCs*: Many members of DMCs at Upazila and Union levels are unaware of their roles and responsibilities in risk reduction and resilience building. Additionally, some DMCs are only activated post-disaster situations and remain non-functional during normal times. The lack of awareness among DMC members about their duties leads to ineffective disaster preparedness and response efforts.

- *Resistance from DMC Leaders*: Some leaders within the DMCs did not fully grasp the importance of empowering communities to build resilience against floods and riverbank erosion. This resistance from key stakeholders impedes community involvement in decision-making processes and undermines the effective implementation of risk-reduction measures. Insufficient monitoring and follow-up mechanisms: The absence of robust monitoring and follow-up mechanisms presents a significant obstacle. Without effective monitoring, assessing the performance of DMCs at lower administrative levels and ensuring accountability becomes challenging, hindering the evaluation of project effectiveness and impact.

- *Challenges during political events*: Political events, such as elections, challenge the continuity of project activities. The engagement of DMC leaders and community members in election-related duties disrupts project implementation schedules, leading to delays and interruptions in achieving project objectives.

5. Lesson learned

The CbFRM project has provided valuable insights into effective disaster risk management strategies in flood-prone areas of Bangladesh. The project has yielded essential lessons learned through its implementation, emphasizing the importance of policy alignment, community empowerment, efficient resource management, sustainability through institutionalization, and enhanced community resilience, shaping future approaches to disaster resilience and response,. By analyzing these lessons, stakeholders can glean valuable insights into optimizing disaster risk management initiatives for greater effectiveness and long-term impact in similar contexts.

- *Policy alignment for relevance*: The CbFRM project demonstrated the importance of aligning project activities with national and international policy frameworks, such as the SDGs and other national development plans. However, there is a need for a thorough analysis of policy contexts to ensure project relevance and effectiveness in addressing priority areas outlined in policy frameworks.

- *Community empowerment and capacity building*: The project underscored the significance of empowering local communities through capacity-building initiatives. Providing comprehensive

training to community members is important, enabling them to take proactive measures in disaster preparedness and response. More effective training methodologies and tailored programs were crucial for equipping participants with the necessary skills and knowledge.

- *Efficient resource management*: Efficient resource management practices are essential for project success. The CbFRM project demonstrated the importance of transparent financial management and careful planning for contingencies. Dynamic project structures and adequate staffing ratios are needed to ensure effective management and oversight.

- *Sustainability through institutionalization*: The sustainability of disaster management projects hinges on institutionalizing community-driven approaches within broader disaster management frameworks. Thus, integrating project practices into existing institutional structures outlined in disaster management protocols is paramount. By mainstreaming community-driven initiatives, projects can ensure continuity and long-term impact beyond the project lifespan.

- *Enhanced community resilience*: The CbFRM project showcased the effectiveness of comprehensive approaches in enhancing community resilience to floods and other disasters. The study highlights the importance of holistic disaster risk management strategies, encompassing awareness-raising, capacity building, and resource management. These strategies contribute to sustainable development and long-term disaster preparedness, laying a strong foundation for community resilience.

- *Policy guidance for institutionalization***:** The absence of specific guidelines for institutionalizing community-driven approaches highlights the necessity of robust policy frameworks. Developing comprehensive guidelines and protocols that outline roles, responsibilities, and procedures for integrating community initiatives into disaster management frameworks is crucial for sustained project impact and scalability.

- *Empowerment of DMCs:* The project underscores the importance of empowering DMCs by enhancing their awareness of roles and responsibilities. Targeted capacity-building sessions, disaster preparedness training, and collaboration among DMC members are pivotal for bolstering community resilience and effective disaster management at the grassroots level.

- *P-O&M for water management infrastructures***:** The need for Community-based Operation and Management (O&M) or Participatory O&M (P-O&M) of Water Management Infrastructures (WMIs) built by organizations like the Bangladesh Water Development Board (BWDB) is crucial. Fourteen P-O&M community volunteer groups have been formed in the vicinity of various WMIs constructed in Project-1 and Project-2 of FRERMIP. These groups are trained to undertake minor routine O&M of the infrastructures, such as embankments, sluice gates, and regulators. Sustaining the physical integrity of these WMIs is vital to safeguarding the lives and livelihoods of vulnerable communities against floods and flood-induced riverbank erosion risks.

- *Implementing rigorous M&E mechanisms***:** Robust M&E mechanisms are indispensable for assessing DMC performance, enhancing accountability, and gauging project impact. Establishing comprehensive monitoring frameworks, utilizing technology for data collection, and conducting regular assessments are instrumental in identifying challenges, refining strategies, and maximizing project effectiveness.

6. Conclusions and recommendations

The CbFRM project has successfully engaged individuals, communities, Community Volunteers (CVs), and Community Disaster Management Units (CDMUs) in long-term processes of change aimed at addressing flood risks. The implementation of early warning systems has provided communities with vital information, yet there remains an opportunity to enhance these systems further through the adoption of ICT-based information dissemination technologies. Additionally, the project's field-level training, meetings, and community gatherings have played a crucial role in fostering resilience and empowering communities to manage flood risks effectively. Moving forward, it is essential to continue building upon the achievements of the CbFRM project, leveraging technology and community engagement to strengthen flood resilience further and ensure sustainable development in flood-prone areas.

Recommendations

The CbFRM project stands as a beacon of success in constructing flood-resilient communities, surpassing initial expectations in its efforts to support flood-vulnerable areas. While the project has achieved remarkable milestones, it also presents valuable observations and recommendations for further advancing flood-resilient community development. These insights serve as a testament to the project's effectiveness and provide a roadmap for continued enhancement in addressing the evolving challenges posed by floods.

- *Implement further projects to address poverty-disaster vulnerability linkages*: Develop and implement additional projects to address the specific linkages between poverty and vulnerability to disasters among economically disadvantaged communities. These projects should focus on conducting detailed assessments to identify the key factors contributing to heightened vulnerability, such as limited access to resources, inadequate infrastructure, and socio-economic disparities. Based on these assessments, design targeted interventions that aim to alleviate poverty while simultaneously building resilience to disasters. This may include initiatives such as livelihood support programs, access to education and healthcare, infrastructure development, and social protection mechanisms.

- *Prioritize indigenous knowledge*: Emphasize the integration of indigenous knowledge into nature-based flood solutions, recognizing the valuable insights and practices of local communities in mitigating flood risks.

- *Promote comprehensive interventions*: Advocate for the promotion of flood-resilient water and sanitation initiatives, as well as shelter interventions, through broader disaster risk reduction (DRR) and resilience programs, ensuring a holistic approach to community resilience-building.

- *Formalize CDMUs*: Facilitate the registration of CDMUs with government agencies to establish them as legal entities capable of effectively serving and representing their communities in disaster management efforts.

- *Construct community-led flood shelters*: Encourage the construction of community-based, community-managed, and community-led flood shelters designed to accommodate household resources, such as livestock, poultry, and domestic assets, during floods, considering the flood levels and community needs.

- *Introduce flood-resilient forage*: Introduce flood-resilient forage varieties in communities to ensure the availability of livestock fodder during flood events, thereby sustaining livelihoods and food security.

- *Strengthen health linkages*: Strengthen linkages between community-based disaster management initiatives and community-based health centers to facilitate regular health support for beneficiaries, enhancing community resilience in health-related aspects.

- *Allocate funds for household-level resilient shelter construction*: Allocate funds specifically for the construction of resilient shelters at the household level, enabling households to withstand flood impacts effectively and safeguard their inhabitants and assets.

Annex-FGD Participants

DDM

Center for Natural Resource Studies (CNRS)

Community-based Flood Risk Management Support Project (CbFRM)

FGD- Attendance Sheet

Union: Barra **Upazila: Nagorpur** **District: Tangail**

Date : 27.04.2024

Sl#	Name	Mobile #	Village	Age	Occupation
01	Mst. Asam Khatun	01749753217	Atapara	36	House Wife
02	Mst. Sarbanu Khatun		Atapara	50	House Wife
03	Rezia Khatun	01331253511	Atapara	48	House Wife
04	Halima Khatun	01791747247	Atapara	60	House Wife
05	Sorbesh Ali	01788581384	Atapara	62	House Wife
06	Jesmin	01305325632	Atapara	25	House Wife
07	Mst. Sokiton	01305325632	Atapara	70	House Wife
08	Mst. Bulbuli Khatun	01772728388	Atapara	40	House Wife
09	Mst. Daliya	01732098094	Atapara	24	House Wife
10	Nargis	01731031975	Atapara	35	House Wife
11	Mst. Ruma Khatun	01731031975(R)	Atapara	35	House Wife
12	Mst Bedna Khatun	01980812490	Atapara	47	House Wife

DDM

Center for Natural Resource Studies (CNRS)

Community based Flood Risk Management Support Project (CbFRM)

FGD- Attendance Sheet

Union: Kash Wawlia **Upazila: Chowhali** **District: Sirajgonj**

Date : 25.04.2024

Sl#	Name	Mobile #	Village	Age	Occupation
01	Shamsul Haque	01761004152	Kash Kawlia	52	Business
02	Akbor Ali	01741141766	Kash Kawlia	55	Farmer
03	Nurhat Ali	01737375993	Kash Kawlia	70	Farmer
04	Mst. Hasna	01916541037	Kash Kawlia	30	House wife
05	Rebeka Khatun	01670802997	Kash Kawlia	30	House wife
06	Banecha khatun	01984437012	Kash Kawlia	35	House wife
07	Hosneara	01723981512	Kash Kawlia	33	House wife
08	Nazma	01983803673	Kash Kawlia	30	House wife
09	Gulzar Hossain	01794679855	Kash Kawlia	72	Farmer

DDM

Center for Natural Resource Studies (CNRS)

Community based Flood Risk Management Support Project (CbFRM)

FGD- Attendance Sheet

Union: Gopinath pur **Upazila: Horirampur**

District: Manikgonj

Date :01-05-2024

Sl#	Name	Mobile #	Village	Age	Occupation
01	Aklima	01740106253	Charpara-Gopinathpur	35	House Wife
02	Palas	01748393108	Charpara-Gopinathpur	40	Business
03	Sheikh raza	01778418092	Charpara-Gopinathpur	64	Business
04	Morioum	01786020457	Charpara-Gopinathpur	57	Housewife
05	Shikka	01723708260	Charpara-Gopinathpur	50	House Wife
06	Ameli	01731420831	Charpara-Gopinathpur	44	House Wife
07	Sumi	01770505814	Charpara-Gopinathpur	37	House wife
08	Shilpi	01755859375	Charpara-Gopinathpur	30	House wife
09	Sharmim	017166455860	Charpara-Gopinathpur	42	Service
10	Tania	01743432376	Charpara-Gopinathpur	33	House wife

DDM

Center for Natural Resource Studies (CNRS)

Community based Flood Risk Management Support Project (CbFRM)

FGD- Attendance Sheet

Union: Kathuli **Upazila: Tangail Sadar** **District: Tangail**

Date : 25.04.2024

Sl#	Name	Mobile #	Village	Age	Occupation
01	Md. Abdul Mannan	01735046027	Isa pasa	52	Farmer
02	Sanowar Hossain	01785708204	Dubaile	44	Farmer
03	Romjena Khatun	01775995274	Dubaile	37	House Wife
04	Md. Saheb Ali	01714239231	Dubaile	45	Farmer
05	Md. Anowar Hossain	01734605819	Dubaile	45	Farmer
06	Ms. Saimona	01789620737	Isa pasa	40	House Wife
07	Mst. MonJila Begum	01330891584	Dubaile	51	House Wife
08	Nur banu	01755989660	Dubaile	47	House Wife
09	Renu Begum	01789162241	Dubaile	59	House Wife
10	Morium Begum	01775828256	Dubaile	56	House Wife

DDM

Center for Natural Resource Studies (CNRS)

Community based Flood Risk Management Support Project (CbFRM)

FGD- Attendance Sheet

Union: Porjana **Upazila: Sahzadpur** **District: Sirajgonj**

Date : 25.04.2024

Sl#	Name	Mobile #	Village	Age	Occupation
01	Nurul Islam	01719516763	Porjona	35	Service
02	Md. Ali	01754182464	Porjona	40	Farmer
03	Rafiqul Islam	01704528593	Porjona	45	Farmer
04	Sahnaz pervin	01758497367	Porjona	35	Service
05	Caina Khatun	01734097852	Porjona	30	House Wife
06	Hasna Khatun	01754182781	Porjona	29	House Wife
07	Suborna	01873020904	Porjona	32	House Wife
08	Monzila	01700807996	Porjona	33	House Wife
09	Mazeda	01712426451	Porjona	25	House Wife
10	Jorna	01310970361	Porjona	28	House Wife

DDM

Center for Natural Resource Studies (CNRS)

Community based Flood Risk Management Support Project (CbFRM)

FGD- Attendance Sheet

Union: Shibalaya **Upazila: Shibalaya** **District: Manikgonj**

Date : 01.05.2024

Sl#	Name	Mobile #	Village	Age	Occupation
01	Mst. Pervin	01741472286	Uthali ,Shibalaya	30	House Wife
02	Nannu Molla	01760870909	Uthali ,Shibalaya	45	Farmer
03	Mst. Nasrin	01943338829	Uthali ,Shibalaya	30	House wife
04	Mst.Shara	01607402026	Uthali ,Shibalaya	55	House wife
05	Mst. Manowara	01919706652	Uthali ,Shibalaya	58	House Wife
06	Mst. Moriom	01718706652 (R)	Uthali ,Shibalaya	37	House Wife
07	Halim Molla	01725487860	Uthali ,Shibalaya	48	Farmer
08	Jollil Molla	01851294921	Uthali ,Shibalaya	60	Farmer
09	Mst. Marufa	01821539793	Uthali ,Shibalaya	18	House wife
10	Abdus Samad	01943338829(R)	Uthali ,Shibalaya	66	House wife