Research Report

On

Flood Forecasting and Warning System in Bangladesh:
A Study on the Community Level Dissemination in Sirajganj District

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Research Report

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Research Report

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Abstract

Disaster Risk Reduction (DRR) is at the heart of disaster management in Bangladesh. Every year, this riverine country experiences multiple disaster incidents such as flood, flash flood, cyclone, river erosion, landslides, lightening and so on. Flood is one of the major catastrophes and the frequency is the most; two to four times a year. Although Bangladesh has built a strong framework for disaster management, still there is room for improvement. Flood Forecasting and Warning Centre (FFWC) generates flood early warning and Ministry of Disaster Management and Relief (MoDMR), with the help of field level offices disseminates it to the flood affected people. However, the existing message and dissemination system is unable to gratify the needs of flood vulnerable community and disaster managers. Often the contents of the messages are not well understood by the community people and sometimes fail to reach the community in right time or in right way. Considering the fact, the study titled "**Flood Forecasting and Warning System in Bangladesh: A study on the Community Level Dissemination in Sirajganj District**" was conducted. The study was carried to understand people's language preferences and identify the factors related to dissemination through Focus Group Discussion (FGD) and Key Informant Interviews (KIIs). It was found that people prefer warning messages 5-7 days ahead of flood; must be in Bangla using feet/inches instead of metric system. The dissemination should also involve community people for better understanding and preparation. Therefore, the study recommends that dissemination mechanism of warning messages is crucial for reducing loss of lives and livelihoods. A strong institutional network along with community involvement in warning dissemination can play pivotal role in DRR of the flood affected people of Bangladesh.

1.0.   Introduction

Bangladesh is widely known as one of the most disaster vulnerable countries in the world due to its geophysical attributes. Flood is considered to be the major hazard and it causes extensive damages in the rural as well as urban areas. Almost every year one-fifth to one-third of the country is inundated by heavy rainfall and often by overflowing rivers during the

monsoon. Normal floods are considered as blessing for providing fertility through silt deposition in floodplains, but moderate to extreme floods are of great concern, as they inundate large areas (more than two third area) and cause damages to lives, livelihoods, properties and huge loss of economic activities. The impacts of floods are expected to worsen due to several factors including high poverty, environmental degradation, high population growth, urban growth, weak governance and institutional factors. (Hossain, 2009). Flood hazard risks are also changing due to natural and human induced multiple factors. Over the years, the frequency of large floods in Bangladesh has increased along with the damages. Monsoon flood management therefore is a challenge in Bangladesh for its complex nature. The Ministry of Disaster Management and Relief (MoDMR) on behalf of the government of Bangladesh provides relief during flood and recovery funds for post flood rehabilitation to repair houses and other infrastructure damaged there after (Hassan & Shah, 2008). Only relief or post disaster recovery fund is not enough for an effective flood management. Flood forecasting is considered as a major and simple non-structural tool which can be easily applied with little efforts (Hossain *et al.* 2012). Moreover, in order to reduce the impact of floods, the government has been developing flood preparedness program to equip the country with better means to deal with floods. Considering the whole aspect of complexity of floods in Bangladesh, the Government of Bangladesh has taken number of the initiatives for effective flood management.

1.1. Background and Problem Statement

Bangladesh happens to be a lower riparian country of the Ganges, Brahmaputra and Meghna (GBM) basins (Hossain *et al.*, 2012). Monsoon floods are caused by excessive discharge of water by the three major rivers along with heavy rainfall inside the country. Flood Early Warning (FEW)/flood forecasting is a vital component of flood risk management since it is important for saving lives, developing a sustainable agro-based economy, economic stability and the overall development of the people (Al-Mueed *et al.,* 2021). Flood Forecasting and Warning Center (FFWC), established in 1972, under the Ministry of Water Resources is the national institution responsible for flood forecasting activities. It provides forecasts and warnings to many national level organizations. (Hossain *et al*. 2012). Since inception, FFWC has been providing up to 72 hours forecasting and warning services to the country, but it has lots of limitations at the community level due to dissemination system. Although FFWC

forecast matches with the water level change in the river, it does not represent the flooding condition and flood vulnerability of people in the floodplain (EWS study, ADB, 2006; Hassan & Shah, 2008).

The primary goal of a Flood Early Warning (FEW) system is to increase the safety of the people and reduce the harmful impact of floods. Study has found that Bangladesh has a very a sophisticated flood forecasting technology, but local communities cannot avail of the benefits. Because the messages are not translated to the end user's languages. They do not understand the way the messages are produced and disseminated. People need to understand the warning message as it helps them to evacuate the danger zone and to move their valuable belongings to a safer place. In this regard, Bangladesh lacks effective early warning dissemination system for individuals at the community level. Besides, timely early warning, proper dissemination and early response actions are pre-conditions for an effective flood risk management. Moreover, the communities are not well aware of the FEWSs, therefore a gap exists between the supply side and the targeted recipients. It is obvious that local people will prefer 'locally available and easily understandable' warnings and instructions at their end, especially those who are living at the peripheral level. Therefore, a clear and locally understandable FEW and dissemination can be institutionalized so that community people can participate in flood risk management needs of their society which reduces vulnerability and builds a disaster resilient community. (Al-Mueed, *et al*., 2021).

1.2.   Rationale of the study

National Water Policy of the Ministry of Water Resources states, "… through its responsible agencies, the Government will develop early warning and flood proofing systems to manage natural disasters like flood and drought" (GoB, 1998). The aim of flood early warning is to provide improved forecasting and warning services to the marginal people to adopt with any flood situation, build their confidence to fight with. Besides, early warning system provides upcoming flood information so that immediate actions can be taken to protect lives and properties and reduce people's suffering and economic losses caused by the flood. The government of Bangladesh recognized the need for early warning and dissemination to be extended to the end users such as farmers, shopkeepers, small traders, businesses and other groups affected by floods in a timely and understandable format so that they can take action

to reduce the negative impacts of floods. But the main obstacle is the format of the message and the mode of dissemination. The warning message generated by FFWC uses technical language and uses both a context and a format that are hardly understood by the affected community. As a result, people fail to take necessary and emergency preparations. Even it takes longer time to reach to the people of the risk areas. Since Bangladesh is experiencing flood in every year, FFWC should have developed a strong warning dissemination system for the local people. An easy, understandable and time bound warning dissemination can effectively save lives, reduce economic loss and sufferings of the people. The process might be a bit complex, but this will add value to the end user. The message must be short, not in technical terms, but by customs and preferences, so that they can make meaning of it easily. A strong institutional mechanism is to be developed for them, so that proper messages must reach in time and they can respond immediately.

1.3. Research Objectives

Any warning and forecasting system works for the people it is targeted. Success of the system depends on how the end users receive, react and get the benefit from it. In Bangladesh FFWC produces warning message and disseminates it to different government institutions. This helps concerned agencies in taking decisions on emergency basis and mobilizes affected people to plan for reducing risks and saving lives and livelihoods. Therefore, it is necessary for the vulnerable people to understand the message so that they can use it when requires. Unless they understand the message in their own way, the objective of dissemination practically fails to meet the demand of the society. Their response will clearly explain how they receive the message, translate into their own language and use for the emergency needs. This study will focus on the language FFWC generates early warning and the way it disseminates. The study will also try to find out all the possible mechanisms for effective dissemination of flood early warning message to the vulnerable community.

The specific objectives are:
- Study the present forecasting and warning dissemination system of FFWC and
- Analyze the gaps and propose an easy understandable dissemination system for the local community.

2.0. Literature Review

2.1. Existing Flood Early Warning System in Bangladesh

Bangladesh is one of the most flood vulnerable countries, often resulting in high socio-economic impacts (Haque & Zaman, 1993). Early warning or forecasting is a kind of message or notice prior to a disaster. It is targeted for the people who are at disaster risk. Early warning can be produced and used for any recurrent disaster affecting large number of people of a particular community or a geographic location. In Bangladesh, government has established early warning/forecasting system for both cyclone and flood incidents. Cyclone Preparedness Program (CPP) under Ministry of Disaster Management and Relief (MoDMR) with the support from Bangladesh Meteorological Department (BMD) has been successfully providing cyclone early warning and disseminating it for years and appreciated globally for its reliability. In case of flood forecasting, flood forecasting technology plays a crucial role in saving lives and property. The Flood Forecasting and Warning Center (FFWC) of Bangladesh Water Development Board BWDB) is responsible flood Early Warning (FEW) within Bangladesh. The flood forecasting model followed by the FFWC is a one-dimensional modelling software used to stimulate water levels and discharges in the river, produces up to 48 hrs to 72 hrs. deterministic forecast. Due to its probabilistic nature, it has many limitations at the user level for interpretation, translation and and understanding of the early warning message (Fakhruddin *et al.,* 2015). The system works as the following:
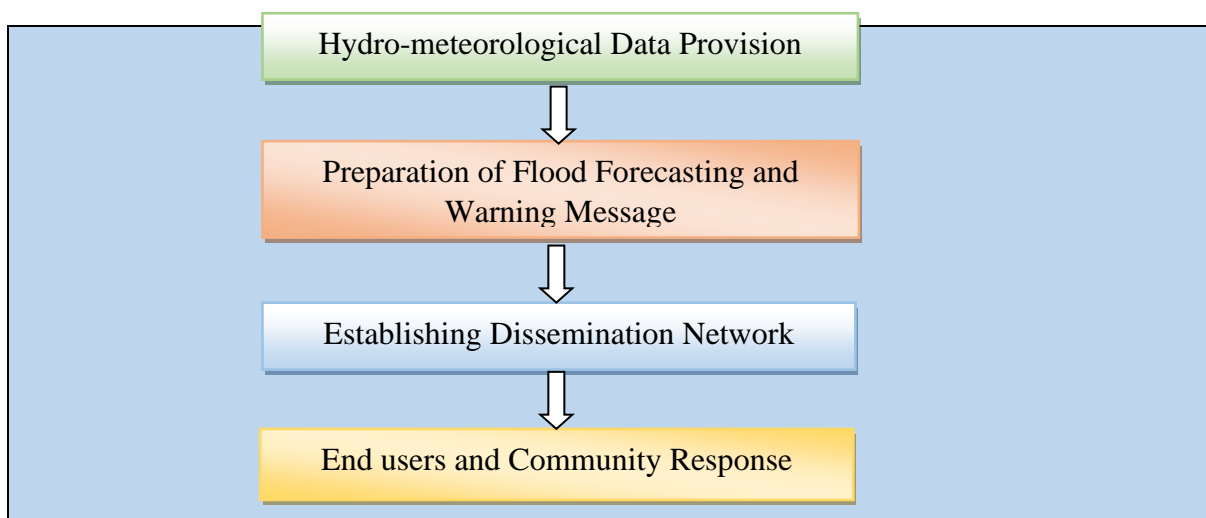

Figure: Present Early Warning System

A complete and effective EWS comprises of four inter-related elements: **a) risk knowledge**, **b) monitoring and warning service**, **c) dissemination and communication** and **d) response capability.** A failure in one of these components determines the failure of the whole system (UNISDR, 2006). In order to predict water level conditions, it uses daily data on actual water level and rainfall from its several field stations, interprets satellite pictures and simulates the water level conditions by use of a numerical model of the Bangladeshi river network. More precisely the forecasting starts during early monsoon when one of measuring stations show a water level 60 cm below danger level. It collaborates with Bangladesh Meteorological Department (BMD) and the Central Water Commission (CWC) of India for additional information support and the Department of Disaster Management (DDM) to disseminate flood forecast and early warning across the country (Rahman, 2022).

2.2. Existing Dissemination System in Bangladesh:

The Flood Forecasting and Warning Centre generates early warning for the Government organizations. This message is forwarded to different Ministires, Departments concerned, Division, District and Upazila level government offices and NGOs, volunteers working in this field and to print and electronic media for broadcasting. As soon as they receive the message, concerned authorities disseminate is through the given channel and finally it arrives to the community. But before that, people of the disaster areas get the message via print and electronic media who have access to television or other media. The message is a template of information containing metric system measurement of danger level and inundation forecasting at certain hard points. Often mobile sms service is available in the vulnerable area, but networks remains down during disaster period or many of them still don't have mobile phones at their housees. It is obviois that the way early warning is generated, dissemination doesn't take place in the same manner. Therefore, people remain on the verge of uncertainty and confusion. However, the dissemination system works in the following way with large daviations:
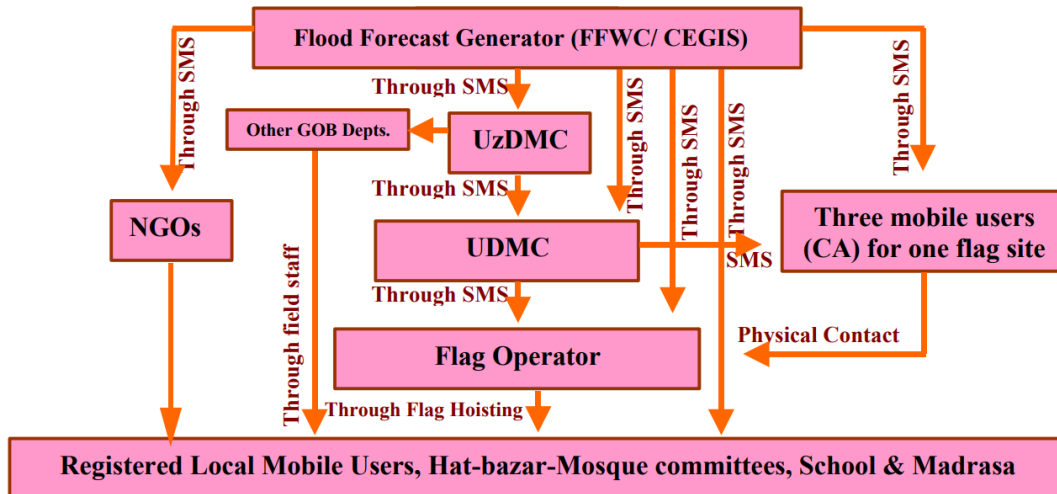
Figure: Dissemination Network for community-based flood forecast (RTi *et al*., 2008)

During monsoon, FFWC provides a range of services on daily basis i.e. they produce flood bulletin twice a day, rainfall situation summary report, 3-days deterministic flash flood forecast, 5-days deterministic and 10-days probabilistic monsoon flood forecast, flood inundation map and flood forecast message. All these reports and documents are uploaded in the website (www.ffwc.gov.bd) and are also accessible via toll-free Interactive Voice Response (IVR) dialing at 1090 and an android mobile based BWDB Flood app. The website and app are available publicly. The bulletins contain flood forecasts and are disseminated to over six hundred recipients, starting from the Prime Minister's and the President's Secretariats and various ministries, government offices at national and district levels, news agencies, development partners, research organizations and non-governmental organizations. When river level forecasts for a particular location cross the danger level, the relevant field offices and key officials are informed by SMS.

2.3. People's Perception on Early Warning

At present, people are getting early warning regarding rainfall and flood through radio and television, which is delivered by FFWC and Bangladesh Meteorological Department (BMD). The accuracy and reliability is high but it's acceptability is very low. People cannot rely on the early warning. However, people are dependent on their own experience about rainfall and flood in some areas. A sample of flood warning messages, broadcast by media, based on the flood bulletins issued by FFWC, is given below:

> *"As per the flood forecast received from Flood Forecasting and Warning Centre in Dhaka, today the water of river Jamuna at Sirajganj will cross the danger level by 30 cm (1 feet) at 2 pm. The water in river Padma at Goalondo will cross danger level by 25 cm and the water of river Meghna at Kishoreganj will cross danger level by 20 cm..............(several other major rivers)".*

From the above forecasting, it is assumed that FFWC's system for preparing flood forecasts and warnings is well established and produces reasonable forecasts. The forecasts are technology driven and accuracy and reliability rate are near 100% in most of the cases. These forecasts are transmitted to all the government institutions concerned. But unfortunately, these are not accessible to the people who are under critical threat of flood. The technical information is of no use to them unless are not converted to local dialects or colloquial languages. In the example, the warning messages mentioned "*the river Jamuna will cross the danger level by 30 cm at Sirajganj point at 2 pm*" (Rahman, 2022)

The explanation elucidates that the common people of adjacent areas are not familiar with the metric system of measurement i.e. centimeter. Even they don't understand the danger level, hard points or gauge stations. Therefore, they need a local and indigenous mechanism for better understanding. Since, dissemination is not the function of the FFWC, Disaster Management Committees (DMCs) can play the role in this regard. As the communities become more vulnerable to floods and other disasters, there is a need to update and improve the warning system so that all elements of the messages provide useful flood information to all potential users as and when needed.

3.0 Research Design and Methods

3.1. Selection of Study Area:

Sirajganj is considered as one of the most disaster-prone districts, (mostly flood-prone) in Bangladesh. It is also a poverty prone area of river Jamuna. Five out of 9 upazilas of the district are affected by river erosion and flood and rest 4 upazilas are part of chalonbeel. The river Jamuna flows through the district dividing it from north to south and it makes the adjacent areas vulnerable to flood and river erosion. Almost every year of this district is being affected by different disaster like flood, river erosion and clod wave. As most of the poor

household are being affected by disaster, so for saving their lives and assets as well as reducing suffering from food, shelters, WASH, relief goods are distributed among them by Government. The Union selected for the study was Kawakola union of Sadar Upazila. The number of populations is around 21000 and the area covered is 36 sq kms. The most significant point of selecting this Union is that the UP has 9 wards, of them 7 wards are at the other side of the river Jamuna and in the charlands. A total 19 villages are there having near 18900 population at the fold vulnerable area. The Union experiences flood at least 2/3 times each year, people suffer a lot and they have the deep insight into the flood situation.
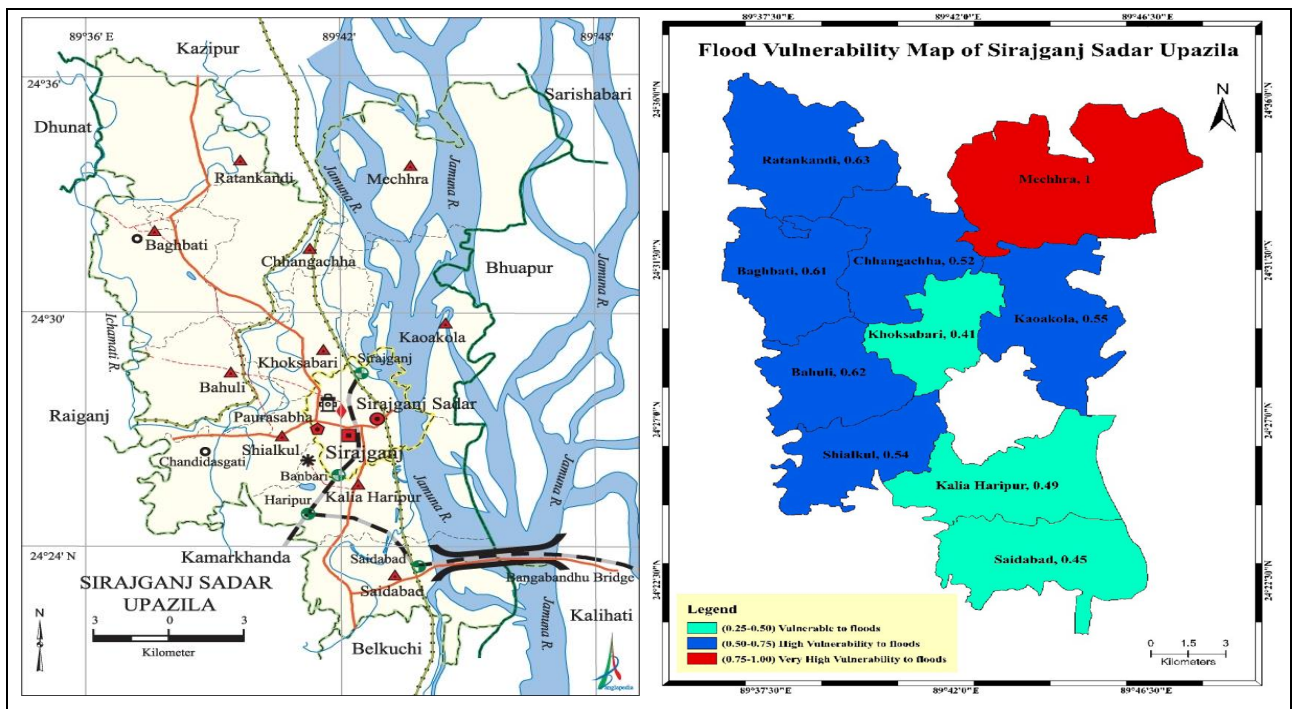

Figure: Sirajganj Sadar Upazila and the Flood Vulnerability Map of Kawakhola UP

The above figure shows the geographical position of Sirajganj District and how the river Jamuna passes through it. Specially the sadar upazila is very close to and exposed to the Jamuna. The second image reflects the flood vulnerability of the study area. The Kawakhola Union is considered as highly vulnerable to floods. That's why Kawakhola UP was selected as the study area which provided lot of information necessary for the research.

3.2. Methodology

The methodology of this study is qualitative based on both primary and secondary data. Group Discussion (FGD), Key Informant Interview (KII) and observation method was followed for gathering adequate information and for analyzing the situation of that particular area.

A semi-structured focus Group Discussion (FGD) was held which focused on:

> ➢ Questions related to flood incidents, knowledge on hard points, gauge stations, danger level and role of Bangladesh Water Development Board.

> ➢ Questions related to their preparation for upcoming flood, their risk factors and recovery actions.

> ➢ Questions related to their knowledge gap on disaster risk mitigation, indigenous knowledge, forecasting system, union disaster management committee and its functions.

> ➢ Questions related to their expectation related to early warning, forecasting, dissemination and preferred language pattern.

3.2.0. Primary Data

Three types of method had been followed for primary data collection.

Focus Group Discussion (FGD) A semi-structured questionnaire was used during the focus group discussion. Questions are mostly made focusing on the flood situation they face every year. 20 respondents participated in the FGD. Amongst 20 respondents, 14 are female and 6 are male. Most of the female respondents were housewives, involved in household works long day and look after their families and children. Two of them were students. The male respondents are engaged in agricultural farming, often do petty business commuting from the charland to main land. At the beginning, some of them were found nervous, shaky and unwilling to talk in a forum. But later on, they showed their interest in the discussion and participated spontaneously. They answered the question very logically and tried to establish their opinions regarding flood forecasting system and its proper dissemination. They have been asked around 20-25 questions related to their knowledge and understanding on flood incidents, early warning, forecasting dissemination, indigenous knowledge, disaster risk, gauge stations, danger level, hard points etc. Efforts were made to identify the knowledge of

the marginal people regarding flood and related factors which affect their daily affairs every year.

Key Informant's Interview (KII) In this study KIIs were used to collect information from respondents who have hands on experience of floods. The respondents are selected based on their involvement and role in the flood warning and dissemination process. Representatives from Bangladesh Water Development Board, Union Disaster Management Committee, members of the Union Parishad, local village police, government employees working in the UP as the key informants. The reason for choosing KII is that these are flexible, accessible, intelligible and can disclose important behavioral characteristics efficiently. Even in KII there are opportunities where further clarification on any complex issue can be made on complex issue. The interview was done separately and each interview took 20 minutes. The participants participated spontaneously and they were encouraged for so. They remain engage throughout the interview. They were cooperative and they provided very useful information related to early warning and forecasting system. Efforts had been made to gather knowledge regarding their hands-on experience and opinion on the forecasting management and dissemination pattern. A semi-structured questionnaire having 25 related questions were used for the interview purpose.

Observation The study area was visited during data collection period. The FGD and KII was organized in Kawakhola Union Parishad which is adjacent to Sirajganj Hard Point. The hard point was well protected so that the city area remained safe during flood situation. A gauge station was also found very close to the bank tied with a rope and supported by a stick on the bank. The other side of the UP was in the charland and it was visible from the hard point. People from the other side commute to the main land by boats and small trawlers very frequently. It takes only 20-30 minutes to travel from the charlands. The charlands were found covered by greens and greeneries. Small houses were visible but not clear. Respondents from those far villages came to participate namely-chak chithulia, hatboira, katenga, khudra katenga, kagmari, singarbill haldia, chithulia, kawakhola, kuripara, dogachi, soyashekha, borokoira, borni, chandal boira, berabari and koigari dorta of Sirajganj Sadar Upazila. All the villages are on the other bank of the river Jamuna.

3.2.1. Secondary data was collected from content analysis reviewing different journal articles, relevant research papers and published documents. Online open sources were also consulted for this purpose with due citation and referencing. Both primary and secondary data will be analyzed in the light of the research questions/objectives to find answers. Efforts will be made to explore local level institutional preferences from the respondents participated in the FGD or KIIs. Recommendations will be brought on the basis of the opinions and suggestions from the respondents and the literature reviewed for this purpose. Finally, all the data messages will be extracted and suggestions will be made for designing of a proper, improved and user-friendly flood early warning dissemination system for all.

4.0. Findings

From the literatures, it is obvious that the Government of Bangladesh has developed both legal and institutional set up for managing flood and other disasters. The Standing Orders on Disasters (SoD), Disaster Management Act 2012, Disaster Management Policy 2015, National Plan for Disaster Management (NPDM) the basic legal tools for addressing disasters. Besides, National Disaster Management Council (NDMC) header by Hon'ble Prime Minister, MoDMR, DDM, Bangladesh Water Development Board (BWBD), Flood Forecasting and Warning Centre (FFWC), BMD are the institutional structure to work in the field. All these actors are intertwined with each other and are supposed to work in a coordinated manner. However, the following issues have been identified in the data analysis:

4.1.0. Language not Understandable:

The FFWC generates warning message and circulates it to concerned institutions. They don't target the vulnerable people. So, the message language is used only for official purpose. Local people's level of education and accessibility is not addressed in this regard. They are informed by print and electronic media, which is still in question of accessibility and level of education. Moreover, local representatives are informed the warning and they translate the message in their own preferred language. Not all representatives are equally exposed to media or networking system. Therefore, a big question rises on the message language of the warning and its accessibility and understandability. Even, the lead time is almost unknown to them for early preparation. They don't have access to gauge stations, if its nearby, they

cannot read the scale. Rather they prefer colored sticks and flags which indicates warning signals and more familiar to them.

Figure: Hoisting of Danger Flag and Flood Pillar Showing Different Flood Level

4.1.1. Less Volunteerism:

None of the respondents mentioned the presence of a volunteer in warning dissemination system. In cyclone prone areas, there are hundreds of volunteers who help the victims in pre, post and during disaster. But in the study area, there is no volunteering developed or any community- based organization (CBOs). The reason might be the vulnerability of the area where majority of the local people get affected, leaving few people to participate in the rescue or recovery mechanisms. Due to lower education level, CBOs couldn't be developed, only a few local/national NGOs are working in a scattered manner. Therefore, warnings are not properly translated or disseminated in due time.

4.1.2. Weakness in Dissemination System

It has been noted that BWDB is measuring water level on ground, compiling the reports and send to FFWC. Based on the field information, FFWC is generating warning messages and circulates to the institutions concerned. Therefore, early warning is on right track. Bangladesh Meteorological Department provides everyday weather forecast. But there is no particular organization which is entirely endowed with the dissemination mechanism. MoDMR with the support from DDM is disseminating the warning at the field level. But the UDMCs are still dormant, the members are not aware of their roles and responsibilities in times of disasters.

The dissemination has in true sense is yet to be institutionalized. It cannot produce expected outcomes, often message not reached in due time or in due morphological interpretation.

4.1.3. Poor Institutional Integration:

There are lots of Government institutions involved in combating disasters in Bangladesh. The Ministry of Water Resources, MoDMR, DDM, BMD, BWDB, FFWC and division, district, upazila, union level offices have their designated roles and responsibilities in this regard. The National Council for Disaster Management (NDMC) at the top plans for disaster recover actions, where other organizations are engaged in implementation process. A time and effective early warning can alert Disaster Management Committees (DMCs) at different level. But this will be of no use if not disseminated to the people who are at the center of disaster/flood risk. It's a common perception that FFWC generates warning, so FFWC should disseminate the message as well. But they don't have local exposure up to ward level. On the other hand, local administration has its ward level set up with local/public representatives, but their roles are not clearly defined. The UDMC members are not aware of their role. The dissemination is still piece meal for particular area and particular disaster incident. There is lack of institutional integration which can help save lives and properties of the affected people. A particular institution should be made responsible for dissemination, or if it is DDM, then there might be some ToR between and amongst institutional level. This indeed will help in strengthening dissemination system in floods and other disaster incidents.

5.0. Discussions:

5.1. Data Analysis:

The study area was selected based on the flood vulnerability. Kawakhola Union of Sirajganj Sadar Upazila is located on the bank of the most treacherous river Jamuna, close to Sirajganj Municipality. The Union was divided into two parts by the Jamuna. Major part of the Union is embraced by the charlands having 18000+ population. Most of the people are engaged with seasonal agricultural production, cattle rearing and gardening. The charlands are inundated every year. The houses which are on the low-lying lands and face flood situation 2/3 times a year. The primary data were collected on the basis of the semi-structure questionnaire. The focus area of the questionnaire cover as such: knowledge on flood early warning, current

practices on preparedness, relations with local representatives, relations with co-villages/neighbors, local level impact on early warning, weakness in dissemination system and their preferences.

Secondary data are used to analyze the present structure of forecasting and dissemination system, how they work, roles and responsibilities of the organizations and the results thereby. The flaws of the existing system are also diagnosed which is validated by the primary data. Therefore, both the data structures were necessary for the study to come to a full proof of the hypothesis that there is a need for the improvement of the dissemination system and there might be possible changes in the pattern in order to bring more effective result.

5.1.0. Current Practices:

In the focus group discussion, respondents are found mostly female and a few of them are male. They said that flood is a regular phenomenon for them. They are not at all scared of it. The female respondents who are mostly housewives answered that they manage the households, take care of their family members and belongings. They can predict the flood through seasonal observation. Some added that they can follow the wind direction and make sense of that. Even the river water, its tides and color, movement of the animals help them to make projection of an upcoming flood or disaster. The male respondents were asked if they have any such knowledge regarding flood forecasting. They answered that it is the indigenous knowledge which really help them to predict the flood situation. Even the senior citizens can predict much batter using the same which they acquired from their forefathers. With the help of them, their family members have adopted to some extent. Although, not very accurate, but they can rely on these forecasting without thinking otherwise. One of the female respondents who is a student, disagreed with them. She told shared that not always the forecasting proved accurate According to her……

> "… … … *maybe from our senior citizens, we come to know of the forecasting where flood might come a few days later, …… … but in the morning we found that our houses are already inundated… … this sometimes creates confusion.*"

5.1.1. Knowledge on Flood Early Warning:

The respondents were asked on their knowledge of early warning of floods. Most of the respondents said that they know about the early warning from radio and television. The male respondents added that they are aware of the early warning as many of them visit local markets frequently, they receive regular information from there. Regarding the terms used in the warning such as 'danger level', 'gauge station', 'hard point', 'metric system', most of them answered that they only know the scale where 'red' color is used for danger mark. As soon as river water crosses the red color, they understand that they are in danger now. The term 'gauge station' is not much familiar, rather they use the same in different connotations, maybe scale or the colored stick which was introduced by some NGOs in their area. They understand hard point as the embankment made for flood protection and most of them are not familiar with the metric system.

Figure: Gauge Station near Sirajganj Hard Point

The gauge station is merely a scale for the respondents. Most of them have heard the name only, a few have seen and none can make sense of it. The station is not available at every village. The Water Development Board has installed the scales in such a manner that they should remain standing in the water by themselves. But in real sense, they are kept standing be the support of a stick and a rope. And the scale uses the metric system which can only be read and understood by the WDB people for generating water level information. The respondents are familiar with the sticks with different color, put by the NGOs in their area.

But many of the families do not have the access to these since the sticks are used in the low land or on the bank. So only people residing near the banks have regular access to these sticks. They said that they met WDB people very rarely. They have heard but not seen how water level is measures. Even the language is also not clear to them for being to technical. They hope to get an easy and understandable message whoever generates it, doesn't matter to them.

5.1.2. Early Preparation

The respondents are well aware that early preparation can saves lives and reduces loss of livelihoods and properties. They said that they are living with the threat of flood and river erosion. Every year, they are supposed to shift themselves from here to there for the sake of living. They often need to resettle in the dams and embankments during flood. They are habituated to live with floods. Therefore, they have some built-in resilience in themselves. As soon as they receive warning from any source, the ladies accumulate at a certain place and plan for evacuation. The houses built in high raised lands are used for this purpose. They take movable goods with them and take shelter to the designated places. Other things, they tie with the ceiling of their houses with a hope to save from flood. Some said that if there is a shelter near their villages, it would be of much help for them to save their properties and domestic cattle. Even if the warning is disseminated before 2/3 days of the occurrences, they would be able to take adequate preparation for combating floods.

5.1.3. Role of Local Representatives:

Among the respondents, there were local government representatives; members of the Union Parishad. Other respondents spoke highly of the lady who represents their village. They said that the member is pro-active in social mobilization. She can motivate people and describe critical factors related to disaster in such a manner that villagers are impressed with her thought. She is vocal and plays important role in organizing people before flood comes to their places. The husband of the member was also present as the respondent. He added that as soon as they receive information gathered from local sources, they remain busy in disseminating to the localities. One of the respondents who is a student, said that flood makes their lives and living worse. Even, forecasting often doesn't reach to their houses since they live in the middle of the char, no/very poor mobile network and they remain ignorant of the

upcoming flood situation. They don't have electricity connection, so they cannot use the television at the time of flood. It is only the time they learn from local members and can have preparation. They try to get connected with the local representatives.

5.1.4. Role of Union Disaster Management Committee:

There are Disaster Management Committees (DMCs) at different levels of government structure. The Standing Orders on Disaster has incorporated DMCs at the Union and Ward Levels also. During FDG, it was found that members of DMCs are not aware of their roles in the committees. Even, some respondents are members of the committee which they are not informed even. The DMCs don't seat for meeting on a regular basis. The Committee members during KII told that the Committee headed by the UP Chairman. He is supposed to invite them in the meeting, or they are not always asked to attend. Therefore, the role of the DMCs are not clearly defined. The DMCs are supposed to be activated when a warning is in action. The members are supposed to disseminate the forecasting information. Even they are supposed to localize the message as well.

5.1.5. Role of Bangladesh Water Development Board (BWDB):

The local officer (Sub Divisional Engineer) has been interviewed during KII. According to him, they are assigned to measure water level twice a day and send it to the FFWC. During flood situation, they measure the level in every six hours and report to the FFWC. They have people assigned for measuring water level from different gauge stations and compile it. They measure the water level manually. But they don't have the mandate to translate it to locally understandable languages. Even they are not assigned to train local people on how to measure danger level from the gauge stations. The SDE pointed out that, BWDB with the help of FFWC generated warning for different government institutions. The concerned institutions receive their message and take necessary information. The representatives from the Ministry of Disaster Management and Relief (MoDMR) said that they collect field information everyday from WDB people and report to the Directorate of Disaster Management (DDM), MoDMR and to the Prime Minister's Office. But they don't have any written document for that. The Union Parishad Chairman said that they have a closed group on social media in the Upazila through which they communicate with each other. It's an ad-hoc arrangement,

nothing institutional. This arrangement is based on interpersonal relations and often is driven by necessity.

6.0. Conclusions

This report builds on the findings from the inputs from stakeholders such as flood victims of the disaster risk area, members of disaster management committees, local government representatives and government officials including water development board officials. A strong preparedness, rescue and recovery system is key to reduce loss of human lives and properties. A warning system is the forerunner of preparedness and timely, proper, easy and understandable dissemination of warning message is crucial for marginal people for early response and early actions. Government players along with CBOs and volunteers can translate the message to locally understandable languages for accelerated disaster risk reduction. Besides, local government representatives and local level disaster management committees must be made pro-active as the dissemination system has the influence on the confidence level of the victims. Therefore, a well-designed, easily articulated and understandable warning message with a coordinated institutional mechanism can contribute a lot to disaster risk reduction and build back better.

7.0. Recommendations:

The recommendations from the study are the followings:

➢ Early warnings must be generated in simple form, easy and understandable language which meets the demand of the local people.

➢ The PIO, Up Secretary and Ward Members should be trained on how to measure the water level from the gauge stations, the danger level and deterministic data.

➢ Community people/organizations must be involved in warning dissemination mechanisms. Volunteerism would be encouraged for effective dissemination of warning messages.

➢ Union/Ward Disaster Management Committees should be activated and members should be trained on their roles and responsibilities.

➢ UDMC members, community volunteers and local government representative should be trained on to translate the warning message to the local preferences.

➢ Institutional integration and coordination and capacity among and between the government agencies must be strengthen producing a reliable warning message and its effective and meaningful dissemination to the affected people.

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