

## An Assessment of Flood Preparedness & Emergency Response: A Case Study on Buraburi Union of Ulipur, Kurigram

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### Abstract

The main purpose of the study was to explore the status of flood as well as its preparedness and emergency response mechanism of people in Buraburi union of Ulipur upazilla of Kurigram district of Bangladesh. Data were collected from December 2015 to January 2016 from among the people who are experienced by flood at least once. Buraburi union of Ulipur Upazila is one of the most vulnerable unions which is prone to flood and riverbank erosion. Most of the houses of the union are located beside river channel of Brahmaputra. Most of the people of Buraburi union are living under poverty level. People of the community make their indigenous knowledge to prepare themselves and make response in the emergency situation. Women play a vital role in the process of preparedness and response and use of technology is not available here. Many of these responses have regional and location specific ramifications. People prepare early, in anticipation of a seasonal hazard flood. People safeguard their lives and livelihoods by following the way of shelter and after the flood people start their regular journey of life recovering the difficulties.

**Key Words:** Flood, Emergency, Preparedness, Responses.

## 1. Introduction

Ulipur is a riverine Upazila in Kurigram district. Three major rivers are passing through the upazila such as Teesta, Dharla and Brahmaputra River. The River system is carrying out huge amount of water in rainy season which are inundated the adjacent area of the River. Besides this, huge amount of water enter into this river due to open of sluice gate from outside the country. Rainfall pattern is changing day by day due to climate change. Monsoon season brings rainfall flood in this area during the month of June to September. Buraburi union of Ulipur Upazila is one of the most vulnerable unions which is prone to flood and riverbank erosion. Most of the houses of the union are located beside river channel of Brahmaputra. Sometimes dam failure brings a flash flood that causes major damage such as loss of agricultural crops and livestock, loss of habitat, hamper transportation system etc. Due to economic condition and lack of communication make them more vulnerable to disaster. Day by day they are going to under threat. During disaster, they are most victims to poor sanitation system and lack of fresh drinking water. There has no effective flood preparedness planning and emergency response that increasing their sufferings.

The Kurigram District is located in the Teesta and Brahmaputra river basin. Beside their chronic poverty and hunger, frequent natural disasters particularly flood and river erosion further add to the uncertainties in their life. Yet,

the people have developed their local knowledge to predict flood and mechanisms to cope with exceptional. Circumstances caused by the floods (Khurshid, 2006). In the hydrologic literature, flood is often defined as the instantaneous peak discharge of a river during a period of observation, commonly the largest flow event in each year (Linsley and others 1982). From August, heavy rains in the main river basins and upstream catchments of India, along with continuous rainfall in northwest and north-eastern Bangladesh triggered flooding in low-lying, vulnerable and densely populated areas. One of the main impacts of floods on the WASH sector is that water points become inundated and latrines are washed away. Issues that relate to water, sanitation and hygiene link closely to other sectors. When houses are destroyed or damaged, there is a high likelihood that household latrines are too. When people are displaced in Bangladesh, past experience has shown they will go to available high ground and reside in spontaneous settlements which are usually without sanitation, without privacy and often without easy access to safe drinking water. All of these issues are borne out in the information reported from affected areas. (JNA, 08 September 2014).

The rivers both big and small gradually became incapable of draining the huge quantity of silt-laden runoff passing through them during the monsoon period and cause floods. Inundation to the extent of 20% area of the country is beneficial for crops and ecological balance. But

the flood more than 20% cause direct and indirect damages and considerable inconveniences to the people. The country is extremely flat with low land relief with only a few hills in the southeast and the northeast part of the country. Floods are often cited as being the most lethal of all natural disasters (Alexander, 1993; French and Holt, 1989). Non-lethal health effects of floods have a wide body of references for physical health effects (Marwick, 1997; Noji, 1993). Flood Forecasting in a deltaic region such as Bangladesh, is a difficult problem. A large amount of data is required in order to initialize the hydrological models. The Climate Forecast Applications in Bangladesh (CFAB) project is developing a series of forecasting schemes for precipitation and flood warning for the monsoon Asia region. These schemes cover short (1-10 days), medium (15-30 days) and long term (1-6 months) time periods. The schemes for the short and long-term forecasts depend on the output of global forecast models. (MDMR, June 2014).

As flood is an annual phenomenon among the villager, they have rich amount of knowledge regarding prediction of rain and flood. Some of the indicators are the behavior of the animals and change in the environmental condition. Thus by observing and interpreting environmental warning signals, they manage to prepare themselves for the impending flood. People already find a safe place for themselves and the cattle and also preserving foods and firewood.

With this skill of identifying the signs, people have been coping with flood (Sumon, 2015). Effective flood control measures consist of structural and non-structural measures. Therefore comprehensive flood management usually requires a combination of both flood control measures (ISDR, 2004; Plate, 2002).

Probably the most critical floods result from the combination of monsoon peak discharges in the main streams with prolonged localized rainfall within Bangladesh. With peak monsoon precipitation in July averaging 13 mm daily, it can be appreciated that rainfall alone can account for the flooding of vast areas of near-level land (Johnson 1982). Normally the Ganges attains a single peak in August or September, whereas the Brahmaputra may have two or three peaks throughout the months of July, August, September, and October. The Meghna attains its peak earlier than either the Ganges or the Brahmaputra, probably due to its shorter length (Johnson 1982). Even though flooding is a regular feature in Bangladesh, however, data on flooding is incomplete, inconsistent and partially misleading (Paul, 1997), because floods are assessed by a number of institutions from different points of view (Chowdhury, 2000).

The purpose of study in this area is to-a) To know how people response in emergency and take preparedness in case of flood disaster and b) How disasters make people approach to take initiatives.

## 2. METHODOLOGY

### 2.1 Study Area

Buraburi union is one of the fourteen (14) unions of Ulipur Upazila (subdistricts) of Kurigram district of Bangladesh which is located at the latitude of 25°40'N to 25°45'N and the longitude of 89°38'E to 89°46'E is one the most affected areas, where serious damage is occurring in livelihood sector due to different

This study utilized purposive/judgmental sampling, a non-probability sampling technique. The sample was preselected according to expert opinion about which subjects were the most useful and representative of those who are living in the Buraburi union. Buraburi union was purposively selected from Ulipur Upazila of Kurigram district of Rangpur division. Households from the area were randomly selected.

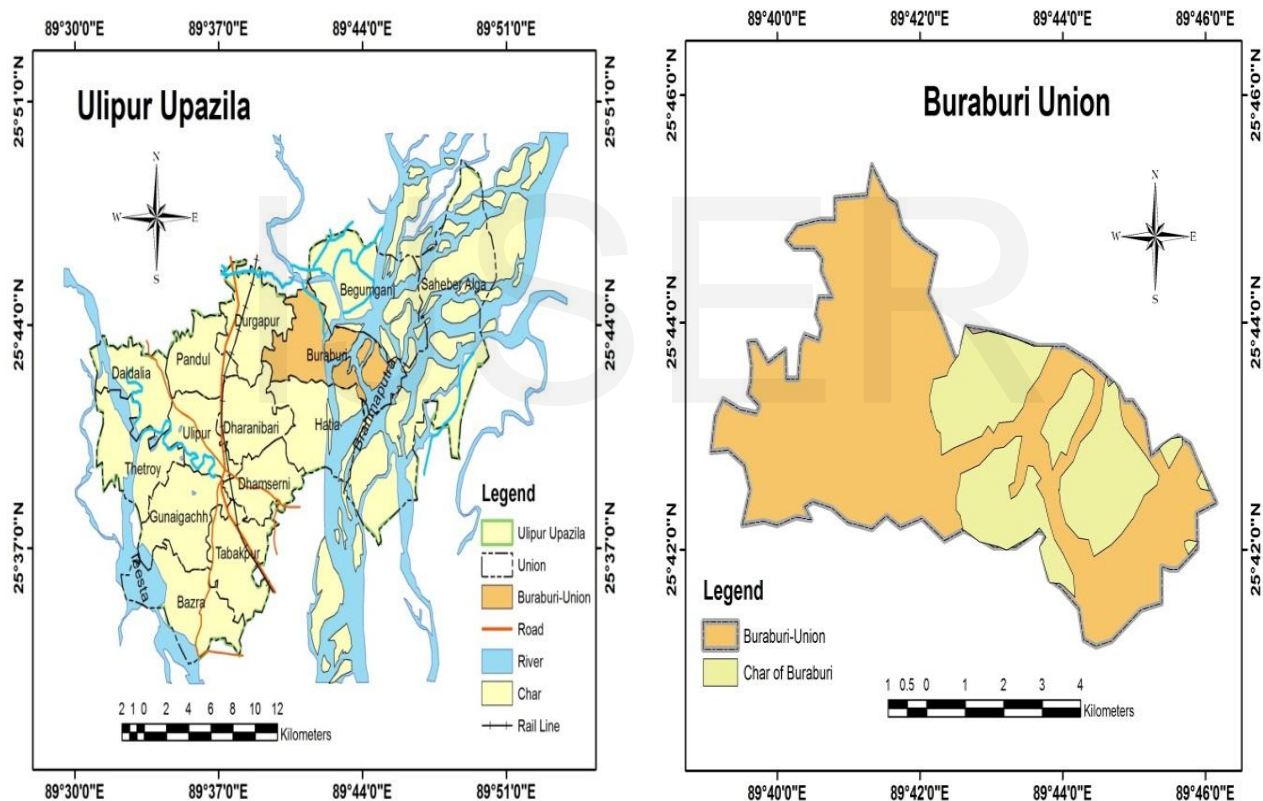


Figure-01: Map of Buraburi Union of Ulipur Upazila (Using ArcGIS 10.1 Software).

disasters such as River bank erosion, flood, dam failure etc.

### 2.2 Data Collection Tools and Techniques

A questionnaire survey was conducted randomly in 100 households in the locality. Ten focus group discussions were done in which 10 to 18

participants were present in each focus group. Five case studies were conducted to gather proper information from the households. Primary data were collected through various methods such as observation, interviewing, transect walk etc. from the local people. Interviews were taken with different professionals for experiencing the impact of different disasters in this particular area.

Secondary resources were mainly used to understand the concept of policy implementation by analyzing definitions offered by various scholars. Moreover the literature reviewed facilitated in chalking out the theoretical framework for the study.

The field observation was done to see the existing emergency response and preparedness and cross check the people opinion with real field.

A questionnaire survey which includes different types of information about the respondents (name, sex, occupation etc.), structure of sample households and their livelihood patterns was followed.

The first method used in this research was that of survey with quantitative data and qualitative interviews, an ideal method for testing the preparedness and emergency response due to flood disaster. As this research was exploratory, qualitative interviews were an appropriate method as they allowed the interviewer to establish a general direction for the conversation and gave freedom to pursue topics raised by the respondents. Qualitative interviews not only

provided information relevant to the targeted objective but also led to the discovery of additional elements those were useful to relate the theoretical framework for long term disaster recovery programs.

The data obtained through informal discussions include conversation with the local people in a hilarious manner as gossiping, ten focus group discussions, five case studies on the local people and finally the data were cross checked through key informants interview. Chairman of the upazilla was included.

Villagers, NGO workers, school teachers and labors were interviewed through the semi structured questionnaires that was prepared before going to the field.

Data were collected from local people of Buraburi union using questionnaire. During the interview of the villagers, all data were recorded properly in a note book. If any data seems to be confused, data was corrected through revisit. We took help from the experienced person to collect information.

### **3. RESULT AND DISCUSSION**

#### **3.1 Linkages among demographic distribution, profession and disaster**

Most of the people of Buraburi union are living under poverty level. Their livelihood pattern depends mainly on agriculture and fishing. Many of them lead their livelihood by boating, animal husbandry, collecting fuel and grass etc. Maximum people are illiterate and few can sign.

Table-01: Demographic information of the study area.

Male	Female	Age	Origin		Monthly Income (Taka)
			Local	Migrated	
55%	45%	30-70	82%	18%	3,000 - 6,000

Figure-02 shows that maximum people are engaged in agricultural activities. Among the rest, there are housewives, teachers. In disaster times, when works are not available in this area, people temporarily migrate to other places. Some people work as a rickshaw puller and day laborer in Rangpur city and adjacent areas and few go to Dhaka city.

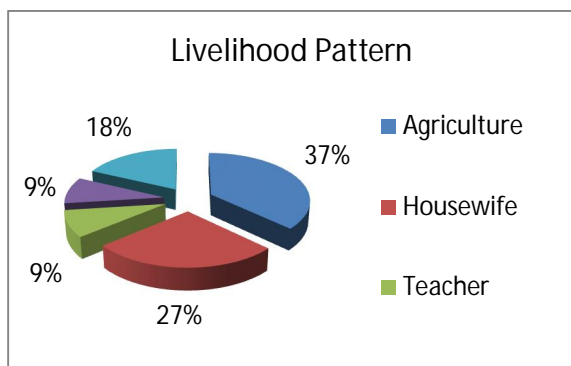


Figure-02: Livelihood Pattern of the study area.

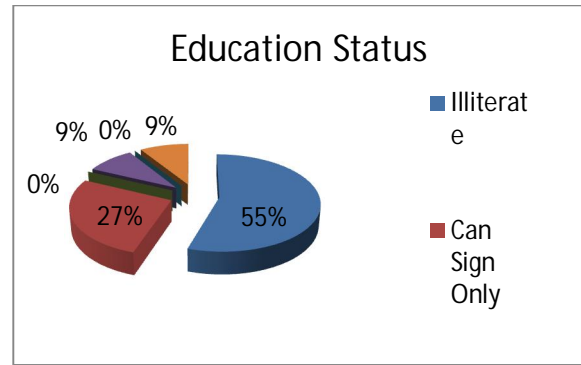


Figure-03: Education status of the people of Buraburi Union

From the diagram, we can say that maximum people in this area are illiterate. Few people can only know how to sign. Only 9% of people have primary education and higher secondary education. The effect of illiterate people and their activities have direct effects on the territory and its environment, including increased frequency and intensity of extreme flood events caused by climate change.

### 3.2 Effect of Rainfall and Flood on the locality.

As change in climatic variables is a global phenomena, Precipitation patterns of Buraburi union are changed due to climate change. Intensity of rainfall increases day by day and thereby timing of rainfall as well as the duration of flooding changes. Maximum rainfall occurs during June to September. Sometimes the duration of rainy season are changed due to early or late coming of monsoon. Generally the area experiences dry season from October to March. At present the flood is more frequent

than the recent past. Flash flood might occur and can bring widespread losses out of these months. As the area is adjacent to rivers, it experiences more frequent and severe flood. Severity of flood is increasing due to climate change and lack of water sharing agreement of trans-boundary rivers.

Most of the people said that the occurrence and frequency of flood has been increased day by day. The trend says that three type of flood occurs in the area such as River flood, Monsoon flood and Flash flood. Major damage is occurred from Monsoon flood. Flash flood occurs less in the area but its effect is more destructive.

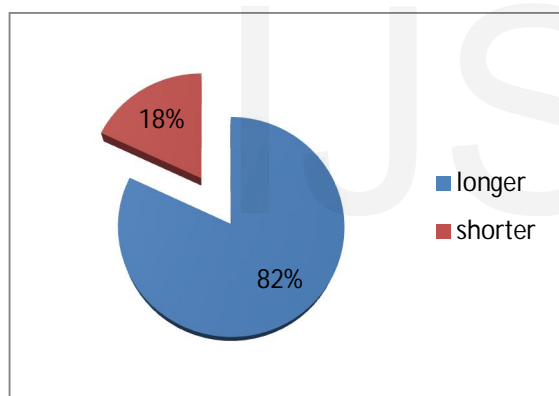


Figure-04: Duration of flood compared to previous flood.

According to our field study, the present flood scenarios are longer duration than previous flood. Flood frequency also has increased than the past scenarios that cause more damages.

Table-02: Flood affected sectors.

Affected Sector	Percent	Rank
Agriculture	100%	1 <sup>st</sup>
Transport	100%	1 <sup>st</sup>
Residence	100%	1 <sup>st</sup>
Health	82%	2 <sup>nd</sup>
Sanitation	82%	2 <sup>nd</sup>
Livelihood	82%	2 <sup>nd</sup>
Cooking	100%	1 <sup>st</sup>

From the table, we can conclude that flood affects several sectors such as agriculture, transport, residence, health, sanitation, livelihood, cooking etc. Of them Agriculture, Transport, Residence and Cooking are affected seriously during flood periods.

### **3.3 Warning and community preparation to face disaster:**

Formally no organization is found involved in forecasting system. People are mainly warned from indigenous knowledge and electronic device such as radio and mobile. Very little numbers of audio visual medium (television) run by solar panel are found here. Some get warning from the personnels of different NGO'S works in charland which occurs in a very informal way. They inform other family members and other people by using mobile or direct conversation. After hearing warning they inform other members of the community, their relatives,

communicate with stakeholder. According to the survey 37% people get warning by electronic device, 31% by indigenous knowledge, 19% get warning from family members, 6% get warning from the personnels of different NGO'S and other 7% don't get any information.

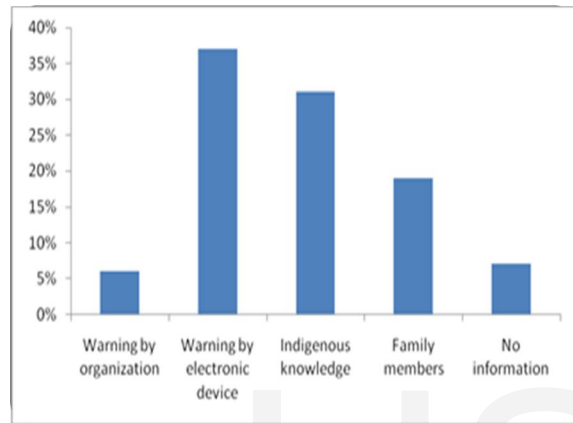


Figure 05: Warning Method

In the studied area, 53% people think they get early warning at proper time and other don't think so. 67% people have no knowledge about shelter place, only 33% know about that because there is insufficient shelter house there. Some people said that they had heard about shelter but even hadn't seen it. Most of the families do not go to shelter during flood. They try to make the bed elevated keeping one bed on another and live there. Very few people go to shelter before flood. Only one primary school is used for shelter house purposes.

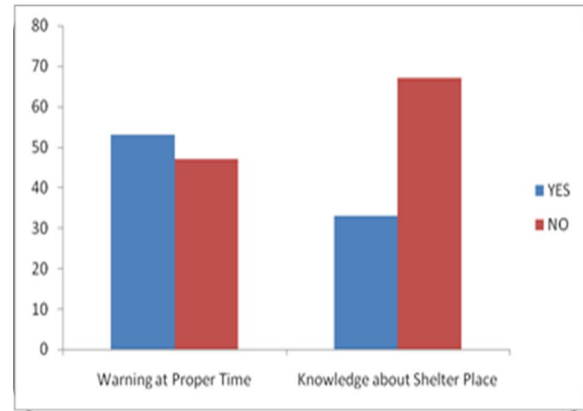


Figure 06: Warning and Shelter

Whenever they are unable to stay at their houses, they migrate to nearby elevated places leaving all the resources but they don't go to the shelter place. So after migration to the new places they are starting a new phase of life.

### 3.4 Community approach to Flood preparedness and its consequences

Buraburi union is a flood prone area. It is most vulnerable to flood due to excessive rainfall, low lying area and river. Most of the people said that they are not prepared for an upcoming flood. People are not taken effective preparedness for flood. There is no flood shelter. They take shelter in high road, dam, matcha, roof, bed etc. Most of the people do not save money for flood periods. As a result monga and food insecurity break out after flood in the area.





Figure 07: Short term vegetable cultivation on bamboo fence.



Figure 09: Short term vegetable cultivation on the roof of house or bamboo fence.

Food insecurity is a common phenomenon during and after flood periods. In Buraburi union, maximum people said that they reserve dry food for flood periods. However people cannot work long time in flood period. The food reserved by them is not enough to meet their need. As a result they are suffering from food insecurity.



Figure 08: Portable stove.



Figure 10: Reserve fuel using Matcha.

Maximum people said that they are used portable stoves for cooking during flood. They reserve kerosin, khori, lakri etc. (local name).

Livestock may also damage during flood periods. In the area, maximum people said that they sale their animal before flood due to lack of flood protected place, possibility of destruction of livestock and for water borne diseases increases. Very few people take preventive measures for storing livestock such as livestock keep in high place.



Figure-11: Mosquitoes protected



Figure-12: Reserve straw on Matcha.  
livestock (i.e. Cow) house.

They also have taken measures to protect the animal place during flood period by heightening the living place of animal, using mosquito net and keep straw in a high place like Matcha.

Water is contaminated during flood in Buraburi. Maximum people said that they don't have technology to store water for flood periods. They use the flood water for drinking purposes through boiling. Some of them collect water from nearby home where safe tub-well has.

Some people are raising to high their tub-well which will not contaminate during flood period.

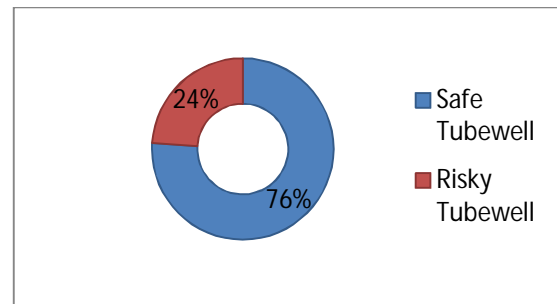


Figure-13: Tube-well condition of the study area

From the diagram, we can note that maximum people uses safe tub-well. These tub-well are well constructed. But some of them use risky tube-well which is inundated during flood periods.

In Buraburi union, maximum houses are not flood protected. Some of the houses were raised with the help of RDRS Bangladesh. Except raised house all houses are inundated during flood period. From our field survey, the people of this area were not forced to evacuate from their dwellings during last flood. This time they stay in their house on bed, shelf (Matcha), roof or banana vela. These types of shelter are not safe due to appear of snake, wetness etc. If worsen scenarios come, they take shelter in high road, dam, or near raised zone. There has no safe flood shelter that increases the suffering of the affected people.

### 3.5 Division of labor in case of flood:

The major activities are done by male and female in different time of flood:

	Activities by male member	Activities by female member
Pre flood	Collecting medicine, Elevation and repair of house	Food processing and preserving, Collection of firewood, Preserving of vegetable seed, Tree plantation Elevation and repair of house, Making matcha and stove
During flood	Collect emergency relief, Some prepare temporary boat with banana tree and some hunts fish, collect feeding materials for their livestock,	Rearing children, Prepared food, Looking after livestock, Collecting pure drinking water, Taking care of old person, Sew kantha (one type of quilt)
Post flood	Earning, House repairing, Return back livestocks from shelter, Plant trees, Some go to another district including Dhaka, commilla for earning purpose who don't have agricultural land.	Tree plantation, Homestead gardening, Raising yard, Collecting relief, House repairing, Repair "dieya" (edge of floor), pyre, sow seeds of vegetables, provides eggs for breeding, help male member in repairing.

Table 03: Division of labor during flood.

### 3.6 Women participation and their role in flood preparedness period:

Flood is a common natural phenomena in this village. Every year the people of this area are affected by flood and most of the times flood is

either riverine or monsoon. In flood preparedness period the vital role is played by women in the family.

At family level women play a central role in disaster preparedness. In view of probable difficulties of disaster they take preparation for processing and preserving of dry food like puffed rice, chira, dry vegetables and dry fishes etc. Dry firewood for cooking during flood is collected by women before flood occurs. Repair of the houses and make the house elevated are executed by both male and female for incoming/future flood. Making matcha (bamboo decorated elevated place) for preserving of food or other useful materials for saving livestock and for themselves during flood and this is regularly done by the women in the charland families. Plantation of trees is performed by both male and female members but most of the times female members are taking care of these. Shrubs like banana and dhol kolmi (a kind of shrub having many branches and leaves) are planted by women for reducing soil erosion around their houses and which are used as fence during flood and as fuel after flood water goes away. Preserving food for livestock, making portable stove for cooking during flood, preserving of diversified vegetable seed and pure drinking water etc.

Women in the charland save some money so that it can be used during flood and post flood but the amount is very little. Some of the women said that they do not have enough money to buy

their regular foods and that's why they are unable to save money for future.

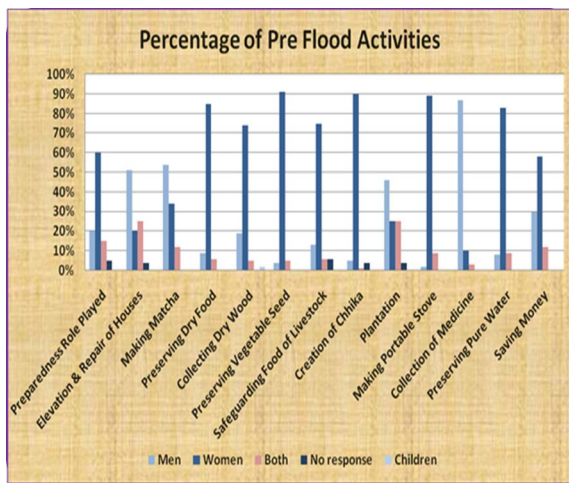


Figure14: Pre flood activities of community people in Buraburi Union (%).

According to the survey, 85% respondent said that mainly women perform the food processing and preserving activities in family level where as only 9% respondent said that male member perform that activities and 6% respondent said that female and male both participate in those activities. In the case of collecting dry fire wood before flood, 74% respondent said that it is mainly carried out by female and 19% respondent said that it is carried out by male member, 5% replied about both male and female and 2% mentioned about children. 91% respondents said that preservation of diversified vegetable seeds generally done by female, 4% respondents said that this work done by male and 5% respondents said that both female and male contribute in those activities. 75% respondents said that safeguarding the food of

livestock mainly accomplished by female, 13% respondents highlighted about male, 6% respondents said that both female and male perform that job and 6% respondents have no livestock. Creation of chhika (jute made hanger from ceiling or wall) mainly performed by female to keep hanging utensils above the floor during flood. In the study area 90% respondent mentioned about female role in Chhika creation. Portable stove or mobile Chula mostly made by female, 89% respondent said that. Preserving pure water mainly performed by female according to 83% respondent. Female member of the family generally save money from income to face the critical situations during or after the disaster.

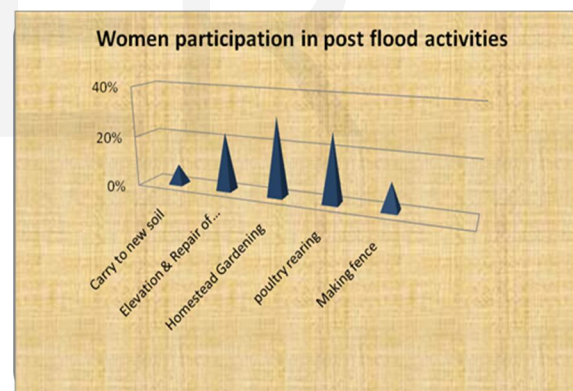


Figure 15: Women Participation in post flood

After flood women play very important role keeping pace with men. Carry to new soil are done by 8% of the women, 23% women are engaged with elevation & repair of houses, 31% women perform in homestead gardening, 27% in poultry rearing and 11% in making fence after flood.

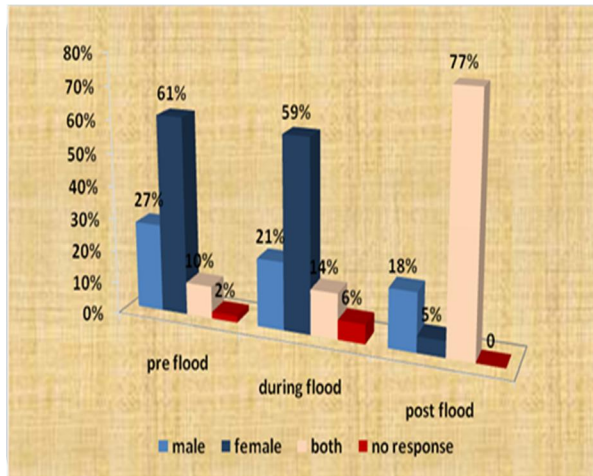


Figure 16: Division of Labor between people

So, this is evident that most of the activities in pre flood, during flood and post flood are accomplished by women. In these three phases majority of the activities are done by women in the family.

### 3.7 Improvisational preparedness and Indigenous Response approaches in flood:

Women play a vital role in during flood by taking care of the health of the old people and children, collection of relief provided by governmental and different nongovernmental organizations, looking after livestock, fetching potable water etc. 70% women take care of health during flood including nutrition and cleanliness. 62% of the women play role in keeping family dignity. Livestock are taken care by the 70% of the women and 85% women are involved with fetching potable water.

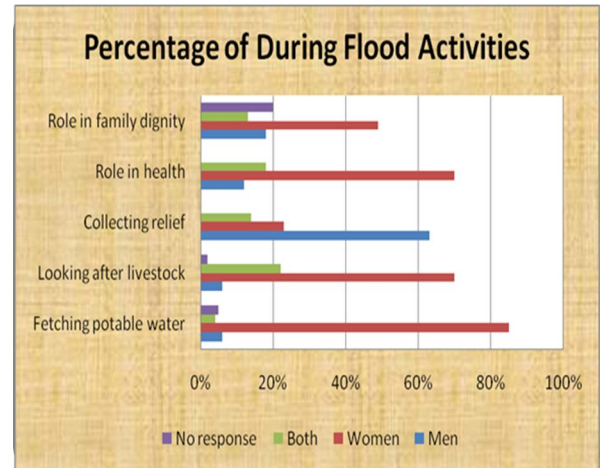


Figure 17: Activities during flood.

### 3.8 Individual to Family Preparedness and Awareness

Before the upcoming of flood, people of the study area take little preparedness measures. The maximum people of the study area know how to swim. The guardian of the family discuss with other family member about flood preparedness and emergency response. The people begin to make vela, small wooden boat and repair boat for communication during flood. Some people take updated hepatitis vaccination. The people know how to make homemade saline. The community is not well prepared for the upcoming flood.

The people of the study area are aware of the upcoming flood. The NGO's arrange awareness generation program in this village.

In this cases RDRS, ASHA, CLP etc. work here and arrange awareness program in the village. The NGOs work also involved in financial support for raising homestead, construction of embankment, raising of livestock’s habitat, raising tube well, construction of sanitary toilet and relief service.

Table-04: Effective way of receiving information for flood preparedness.

Effective Information Source	Percent	Rank
Television	20%	2
Newspapers	0%	6
Internet	0%	6
Alarming by local Government	10%	4
School Meetings	10%	4
Public Meetings/Workshops	5%	5
With Talking to other	5%	5
Radio	15%	3
NGO Awareness Programs	35%	1
Government Awareness Program	5%	5

The people of this area receive information about how to protect their family and prepare their home from flood hazards by NGO’s awareness program, radio and television.

Maximum people in this area are not trained to first aid of disaster. Most of the times they predict flood by various indigenous knowledge.

### 3.9 Community Response in Emergency Situation in Flood Disaster:

Emergency response is an essential phase in a disaster period. Proper response can minimize the vulnerability of people. During the worsen condition of the flood, the people of this area take place in elevated area like road, raised embankment area. People have no ability to drain the flood water from their home. During flood peoples communicate from one place to another by small boat and vela that is made by banana trees. When they suffer from water borne diseases, they go to doctor’s chamber for treatment they do not use short durable HYV crops and they also cannot use any kind of alternative crops.

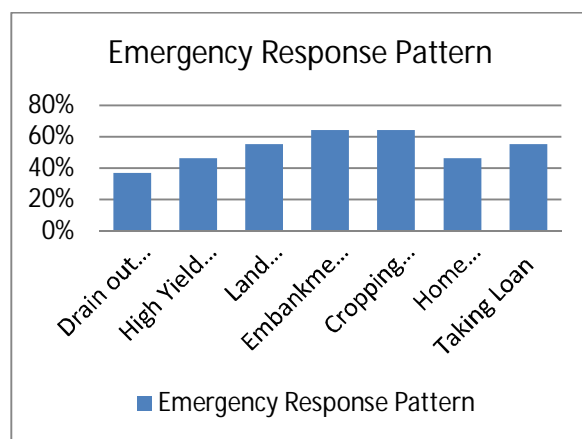


Figure-18: Emergency response pattern of the study area.

In maximum cultivated land, the people make temporary drainage system to release extra rain water. They build flood embankment for flood water protection. Floating vegetables and mulching techniques are not available in the area. They used indigenous coping pattern. In the maximum houses there are no homestead gardens. During the flood period the people of this area take dry food such as muri, chira, gur, ruti etc. they use jute sticks, cow dung, as fuel material which have stored in the raised matcha. They use moveable stove they take their livestock in the save place, during flood.

The dead animals and poultry are dumped into the remote area. During flood the sanitation system is disrupted. They manage safe drinkable water from the area which is not flooded. Maximum people do not take loan to overcome the flood.

From table below we can note that Red colors indicate fatal risky time to disaster. Green color indicates in table that less risky time to disaster. This seasonal calendar helps preparation for incoming disaster in the village community. It also helps to select mitigation time of disaster. So this calendar playing an important role to confront disaster in the village community.

Table-05: Seasonal calendar of disaster.

Hazard risks	B	J	A	S	V	A	Ka	A	P	M	F	C
	a	o	s	ra	a	ss	rti	g	o	a	al	h
	i	i	h	b	d	hi	k	r	u	g	g	ai
	s	s	ar	o	r	n		a	s	h	u	tr
	h	t		n	o			h			n	a
	a	h						a				
	k	o						o				
	h							n				
Flood												
River bank erosion												
Monga												

### 3.10 Treatment and Aid:

The people of Buraburi union are taken some initiatives when someone gets sick. If they have known the way of primary treatment, they treat. But any emergency situation or after primary treatment, they transfer the patient to doctor by boat or vela during flood.

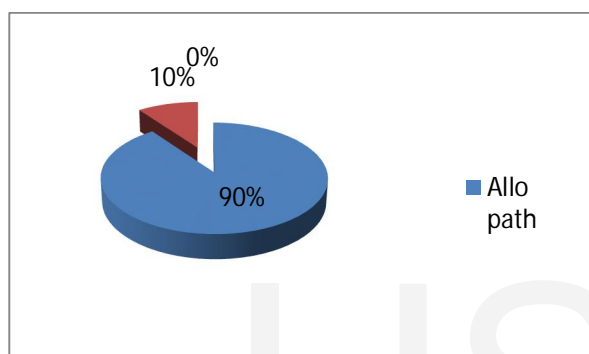


Figure-19: Prefer Treatment of the people of the study area.

The local people prefer most Allopathic treatment (Figure-14). Maximum people said they had proper training about flood hygiene and gets assistance from NGO's, Govt., community people and volunteer groups. But they get most help from different NGO's such as RDRS, ASA etc.

Table-06: Ranking of service provider.

Service Provider	Rank
Community	2 <sup>nd</sup>
NGOs	1 <sup>st</sup>
Government	4 <sup>th</sup>
Volunteer Groups	3 <sup>rd</sup>

According to them, they get enormous help from those organizations where NGO's is rank 1, community is rank 2, volunteer groups is rank 3 and GO is rank 4. Above service providers provide following tasks-

**NGO:** NGO's provide the following tasks -

- Helping and rescue of affected people during flood
- Rising up their residential homeland
- Provide livestock
- Provide solar energy
- Provide safety sanitation
- Flood water protected tube-well
- Awareness rising among flood affected community's people.

**Community:** Community people provides such facilities-

- Rescue vulnerable people during flood
- Repairing their shelter system
- Expand helping hand at the time of crisis.
- Awareness rising among flood prone people

**GO:** GO provides the following facilities-

- Dry food
- Rice
- Medicine
- Warm Cloth during winter season

**Volunteer groups:** Volunteer groups provide-



- Helping to rescue flood affected people
- Helping to repair their shelter

### Factors Affecting the Progress of Overall Emergency Preparedness and Response

According to the people of this union, responsible factors are mentioned below which affects the progress of overall emergency preparedness and response-

- Weak transportation
- Lack of disaster shelter
- Lack of health center
- Absence of electricity for communicable technology
- Spreading of panic, mental shocking, physical injuries
- Indifferent of local Govt. officials
- Indifferent of community people
- Char area near river.

### 3.11 Role of NGO's For Flood Prevention in Buraburi Union:

NGO plays a vital role for flood prevention in the study area. They establish livestock's house as creating Matcha for reducing damage from upcoming flood. It was implemented by RDRS Bangladesh which was funded by Community Climate Change Project (CCCP). They also establish healthy sanitary Latrine with the help of RDRS and funding from CCCP. Community Climate Change Project also funds to create

safety cemented tube well and raising homestead. The NGO Grameen Shakti provides them solar panel that uses as electricity supply for the community people. RDRS helps them to make Vermi Compost which is useful for High Yielding Varieties (HYV) crops. Some figures of NGO's work, we collected from the study area are given below.



Figure 20: Flood protected cattle house.



Figure 21: Flood protected goat house.



Figure 22: Vermi Compost



Figure 23: Cemented sanitary Tube-well

#### 4. Conclusion

Buraburi union under the Ulipur upazila in Kurigram district is flood prone area because of its geographic location. The study area is situated on the bank of three rivers including Dharala, Teesta and Brahmaputra. These rivers carry huge amount of rain water outside from the country. Almost 2-3 times severe flood inundates this area per year. The economic condition of that char people is not good. For this reason, they are more vulnerable to flood. Although different NGO's work there, they have

lack of efficient fund to mitigate flood in the area. Besides, government helps the people servicing food and medicine during flood, it is not sufficient for resilience their life. For improvement their life, community shelter and health center is emergency needed. For these reason NGOs, GOs, community and voluntary group have to work together, otherwise it will not fruitful to achieve their needs.

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