Advancing Climate Change Preparedness and Response in Bangladesh

THE GENEVA CHALLENGE 2018

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THE GRADUATE INSTITUTE GENEVA

Photo credit: DfID/Rafiqur Rahman Raqu

ABSTRACT

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Samantha Farquhar: Samantha is currently studying a Masters in Marine and Environmental Affairs at the University of Washington, USA. Her work largely focuses on the relationship between fisheries and communities, especially as it relates to food security and livelihoods. Presently, Sam is working with the UNFAO and later this year will complete a Fulbright Award to Madagascar to study fisheries development. She hopes to pursue a doctorate in the future.

THE PROBLEM

The effects of climate change will create 35 million displaced people in Bangladesh by 2050. Specifically, events of coastal erosion, severe flooding, and sea-level rise have increasingly devastated and displaced communities This is largely due to lack of information about upcoming weather events and available resources. This lack of preparedness worsens the problem of climate refugees as families who are unaware more often lose everything and do not have the means to adapt and rebuild. While those displaced by climate change are termed, "climate refugees", they are not officially recognized by international law. Thus, national efforts are addressing this issue, but initiatives are fragmented within the country. This leads us to ask: **how can we help mitigate climate refugees and strengthen ongoing aid efforts in Bangladesh?**

THE SOLUTION

We propose to increase the awareness, preparedness, and resilience of Bangladeshis to climate-related disasters and unify national disaster mitigation and relief efforts through the development of a central SMS-based notification system and phone line for climate disaster information. Furthermore, surveys can be sent to users to rapidly collect information so that relief efforts can be better mobilized. While only 50% of the population of Bangladesh have access to the internet, 87.5 % have mobile phones making SMS and cellular network a powerful method of dissemination. This solution would directly contribute to SDG 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries and SDG 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

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Climate Change

Climate Change is one of—if not the most—severe problems of the 21st century. Caused by the anthropogenic increase of greenhouse gases, climate change is significantly affecting normal weather patterns. In fact, the average global temperature on Earth has increased by about 0.8° Celsius since 1880 with the majority of the increased warming occurring after 1975 (Carlowicz 2010). This temperature change has had massive consequences. Species are at a higher risk for extinction (Thomas et al 2004); Severe weather events and sea-level rise are increasing causing mass damage to food production and infrastructure (Rosenzweig et al 200, Nicholls and Cazenave 2010). Although climate change is considered to be a global phenomenon, its consequences are not uniformly distributed. Smith et al (2001) concluded that climate change will increase income inequalities between and within countries—mainly between lower and higher income countries.

Climate Change in Bangladesh

With a population of nearly 160 million paired with its low elevation and location on the Ganges Delta, Bangladesh is ranked as the world's sixth most disaster prone country (UNU-EHS, 2015). Many of these disasters are climate-related. Nishat and Mukherjee (2013) showed that in the past 40 years, the average seasonal temperature has increased between 0.4–0.65 °C. This explains why Bangladesh has experienced increased the intensity of Himalayan glacial melt, precipitation, monsoon floods, and erosion—all of which that have wreaked havoc on Bangladesh by destroying infrastructure such as roads, educational centres, administrative buildings, marketplaces, homes, and agricultural land. For example, in the 2017 floods, a third of the country became underwater affecting more than 8.5 million people (IFRC 2017) (Figure 3). Cyclones have also led to significant damages and deaths. Over 53 percent of all deaths caused by cyclones in the world have occurred in Bangladesh (Rahman and Rahman 2015). In addition to flooding and storms, sea-level rise from the Bay of Bengal and the North Indian Ocean are entrenching upon coastal communities. Through salinity intrusion, this sea-level rise is slowly spoiling the groundwater. Given that 97 percent of the population depend on groundwater as their main source of drinking water, this will likely cause water shortages and conflict

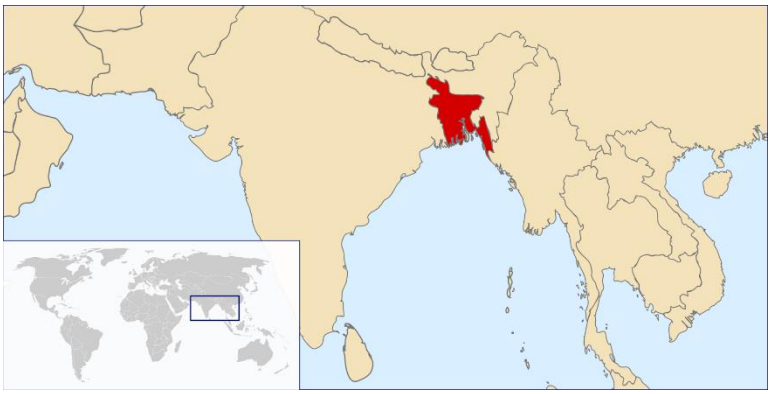

Figure 1. Map of Bangladesh

(Shamsuddha 2013). Furthermore, 30 percent of all of Bangladesh's cultivable land is located in the coastal area. Thus, a significant portion of the country's food production will be lost in the near future (SRDI 2010).

Sadly, the destruction to Bangladesh is likely only going to increase. It is estimated that Bangladesh will lose 17 percent of its land and consequently 30 percent of its food production by 2050. **This will displace 35 million people** (Mallick 2008). Many of those displaced by climate-related events go to Dhaka, other major cities, or neighbouring India in search of work, but end up living in city slums (Panda 2010). Some slums in Dhaka, like Bhola, are even named after coastal areas which have been adversely affected by climate (McAdam 2012). With Dhaka's population estimated to grow to 20 million by 2020 and the majority living in poverty, climate change may exacerbate outbreaks of political unrest or conflict (Sida 2018). Termed 'climate refugees', it is thought that those displaced from climatic events in Bangladesh alone will outnumber all current refugees worldwide (Myers 2002).

Figure 2. Aftermath of 2017 flooding in Bangladesh (Photo Credit: Raqibul Alam, Sajid Hasan and Ika Koeck, IFRC)

There have been numerous studies and news articles examining the problem of Bangladeshi climate refugees, but little have offered real-world solutions to solving the problem. Perhaps this because even though 'climate refugees' are acknowledged in the public domain, they are not recognized officially in international humanitarian law. Thus, they are not eligible for aid, resettlement, and other refugee services as outlined by the 1951 Convention or 1967 Protocol. This is surprising given that the global number of those likely to relocate due to climatic reasons such as sea level rise, increased water scarcity, desertification and other events could be up to 350 million by 2050 (Durkova et al 2012). While there are international organizations working to secure international legal protection for climate refugees, it is a long process that will not likely be in effect in the immediate future. Thus, it is necessary to focus actions on national level.

In its 2009 Climate Change Strategy and Action Plan, the government of Bangladesh set out three long-term action points to address internal and cross-border migration:

- Development of a monitoring mechanism of internal and external migration
- Development of a protocol to provide adequate support for their resettlement and rehabilitation
- Building of capacity through education and training to facilitate their resettlement in new environment

However, the implementation of these objectives is fragmented. In addition to these objectives, Bangladesh has existing policy on disaster management, but they lack specificity, are discretionary, and unenforceable (McAdam and Saul 2010). It has been recommended that there is need for an institutional rapid response mechanism to help those affected by climate change. This includes early warning of climatic events and logistical support to those displaced to pre-determined places where there is food, shelter, healthcare, sanitation, and water available (Abrar and Azad 2004). A number of national initiatives have tried to address this. For example, under the Ministry of Disaster Management and Relief in 2010, a program was piloted in which users could dial '10941' and receive emergency information on weather hazards. During tropical storm Mahasen in 2013, 62,000 people reportedly used this service to help safely evacuated to nearby storm shelters. However, this service is only known of in a few districts in Bangladesh and needs to be scaled massively.

The Problem

The effects of climate change will create 35 million displaced people in Bangladesh by 2050. Specifically, events of coastal erosion, severe flooding, and sea-level rise have increasingly devastated and displaced communities and will only continue. Many of these events happen rapidly and without warning, giving no chances for families to prepare. In other scenarios, families wait until the last minute to flee. This is largely due to lack of information about upcoming weather events and available resources. This lack of preparedness worsens the problem of climate refugees as families who are unaware more often lose everything and do not have the means to adapt and rebuild. Once displaced by such tragic events, despite being recognized as climate refugees, there is little to no assistance provided on the international level. On the national level, despite existing policies, disaster-response efforts are fragmented. There is a number of NGOs and aid agencies that participate in flood relief efforts (e.g. Red Cross, Red Crescent, UK Aid, World Vision, Care, etc...), but these networks need to be streamlined. Thus, **how can we help mitigate climate refugees and strengthen ongoing aid efforts in Bangladesh?**

Figure 3. A breakdown of the problem (photo credit: Aminul Sawon, PTI, Biju Boro)

The Solution

We propose **to increase the awareness, preparedness, and resilience of Bangladeshis to climate-related disasters** and **unify national disaster mitigation and relief efforts** through the development of a central SMS-based notification system and phone line for climate disaster information. While there have been similar initiatives in the past, **our Climate Disaster Information System** or **CDIS** combines learning from and scaling up past initiatives with strengthening and unifying existing efforts (Figure 4).

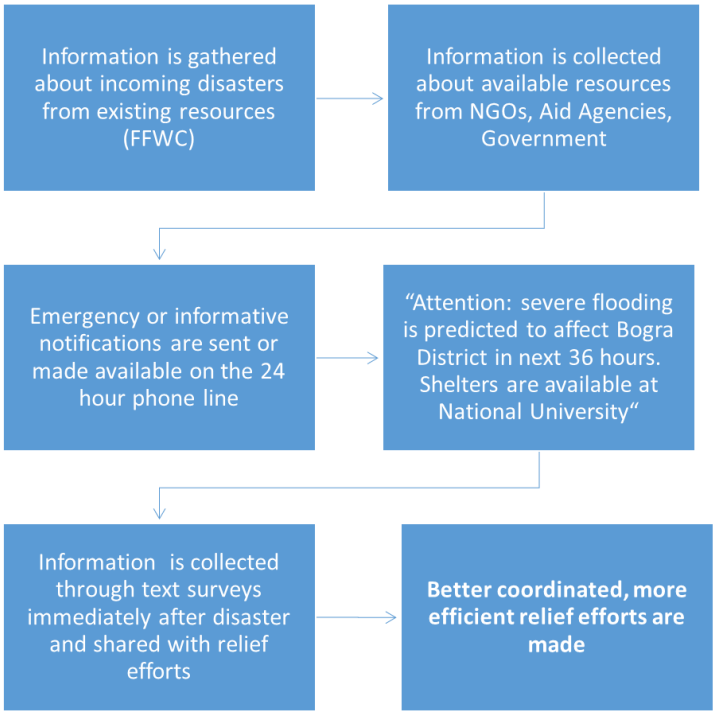

Figure 3. Break down of the operation of CDIS

After subscribing to CDIS, participants will receive text notifications to inform them of upcoming severe weather events and available resources. Users can also call a 24/7 phone line where important updates will be recorded. This is ideal for users who may be illiterate or have a vision impairment.

Weather and disaster information will be sourced from the Flood Forecasting & Warning Centre (FFWC) of the Bangladesh Water Development Board. This centre includes a network of 60 rain gauges and 90 hydrological stations throughout Bangladesh**.** The centre does report having its own distribution methods for this information, but our research shows these services are inconsistent and Bangladeshis are not aware of this service.

A distinguishing feature of our platform is its ability to send out surveys to users. This will allow for the rapid collection of essential information (Figure 6). These surveys can be sent out on behalf of government agencies, NGOs, or relief organizations and responses stored and analysed immediately. This will not only provide valuable information to experts on how people respond to disasters, but more importantly, it will allow relief efforts to be more efficient.

How?

Through the creation of a SMS gateway and toll-free 24 hour phone line, we will create CDIS. Specifically we will utilize the Unstructured Supplementary Service Data (USSD) protocol to give users access a menu-based information service to provide location-based content and aid services (Figure 5). For example, a user enters a predetermined short code into phone (e.g.*121#). The mobile then sends it to the Mobile Network Operator (MNO) through mobile USSD Gateway Channel. An MNO computer dedicated to USSD receives and respond to the users' end phone. The entire process will take only a few seconds.

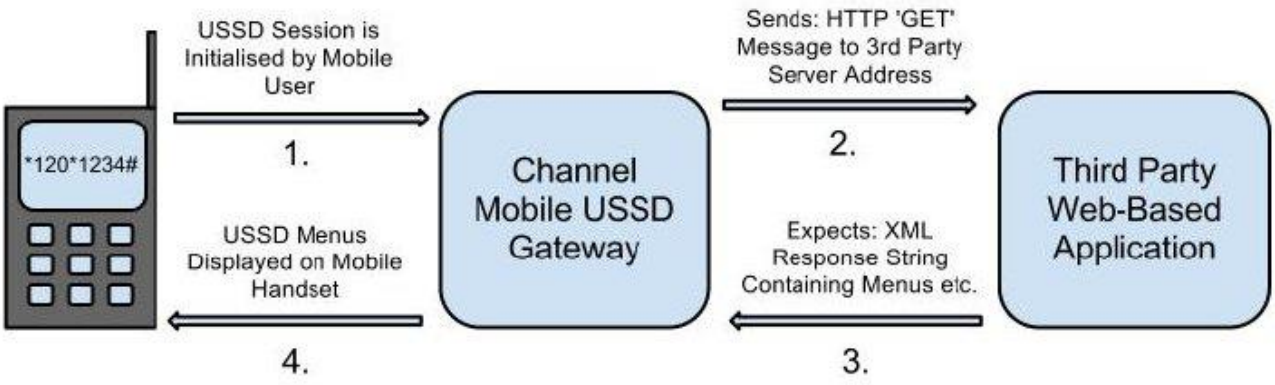

Figure 5. Diagram of flow of a menu-driven USSD application (Photo credit: GitHub Inc)

We have identified that lack of awareness of resources is one of the biggest issues in regards to preparing for and recovering from disasters. Thus, our solution will be accompanied by a far-reaching awareness campaign involving social media, radio, and billboards. We aim to start heavily campaigning in February 2019 and to have our implement this initiative by May 2019 before the next monsoon season (see Implementation Timeline in Annex). Ideally, this service will be 100 percent free through subsidies and corporate partnerships. For example, Grameenphone, the largest of four mobile operators in the country, helped establish the HealthLine, a 24-hour medical call centre to increase the population's access to healthcare (Grameenphone 2007). We aim to partner with Grameenphone in a similar way.

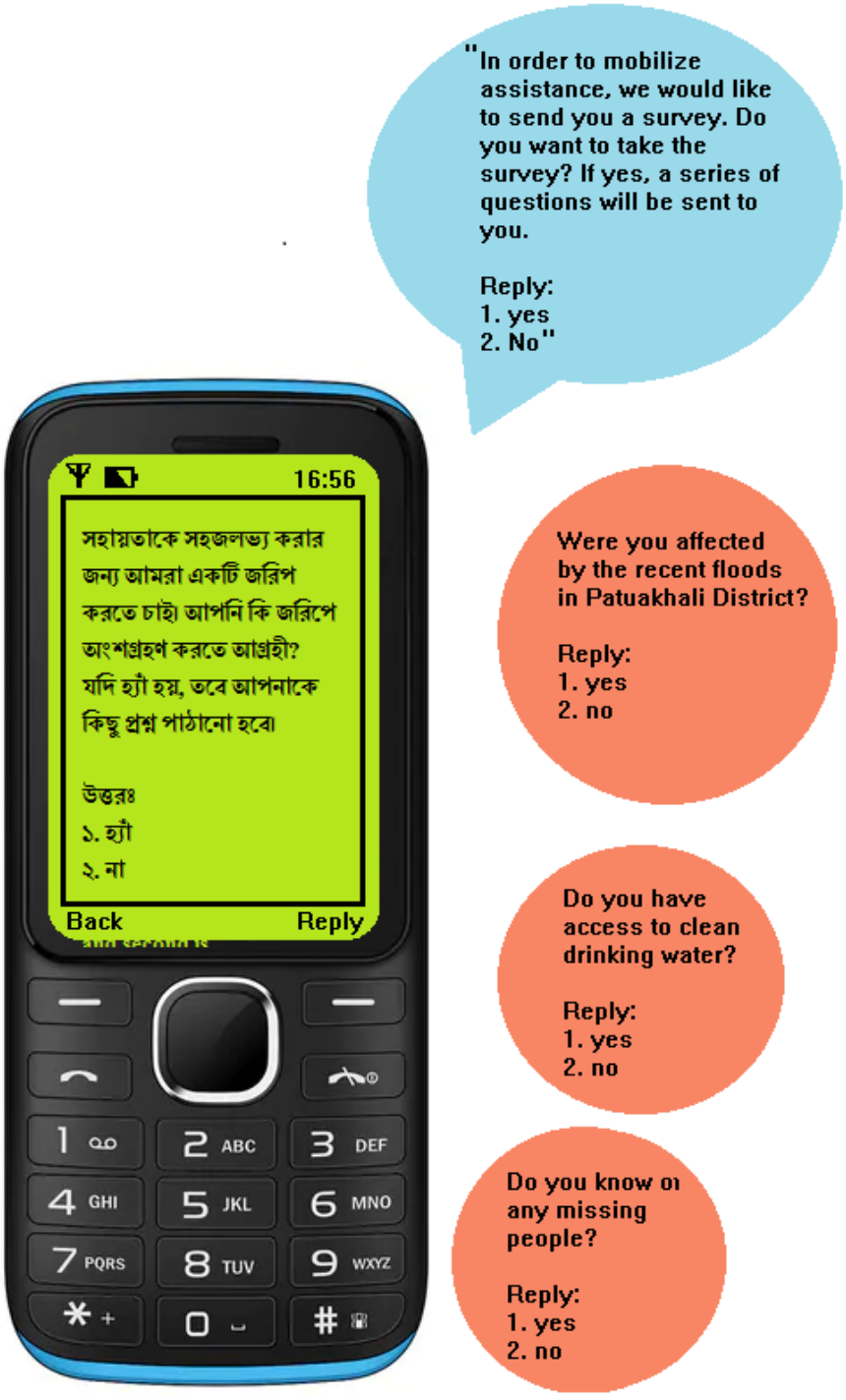

Figure 6. SMS-based surveys to collect rapid information of those impacted by climate-related disasters

Why it will work

While only 50 percent of the population of Bangladesh have access to the internet, 87.5 percent have mobile phones making SMS and phone services a powerful method of dissemination. For example, in 2017, Bangladesh officially launched a national 999 emergency helpline that received over 3.3 million calls in its first 7 months (bdnews24, 2017). This call service was so successful that a year later Bangladesh launched a 333 helpline for government services (bdnews24, 2018). In addition to this information, one member of our team, Ali interviewed community members and experts that had been affected by climate related disasters. From these interviews, we were able to gain insight on what resources people were aware of and what they felt they needed. We recognized a huge gap between resources being promoted and resources being utilized. All of those interviewed commented on the need for clarity about resources and better organized relief and emergency services. This is exactly what our CDIS addresses. A brief interview report can be found in the Annex.

Ultimately, our CDIS will support Bangladesh's national goals from its Climate Change Strategy and Action Plan and directly contribute **towards Sustainable Development Goal 13—take urgent action to combat climate change and its impacts**. More specifically, our solution aligns with SDG 13.1 and SDG 13.3:

SDG 13.1: STRENGTHEN RESILIENCE AND ADAPTIVE CAPACITY TO CLIMATE-RELATED HAZARD AND NATURAL DISASTERS IN ALL COUNTRIES

SDG 13.3: IMPROVE EDUCATION, AWARENESS-RAISING AND HUMAN AND INSTITUTIONAL CAPACITY ON CLIMATE CHANGE MITIGATION, ADAPTATION, IMPACT REDUCTION AND EARLY WARNING

The data that this service collects also has the implications to be used as evidence to further secure the rights of climate refugees. It has been proven that emergency preparedness, response, and recovery increase disaster resilience (Keim 2008). Thus using a solution, like CDIS, to rapidly unify awareness, preparation, and response efforts to climate change disasters will mitigate damage and displacement in Bangladesh and promote resilience.

Annex

Interview Report:

Interview report on Flash Flood (2016, 2017 & 2018)
A case study from Bangladesh
Prepared by: Mohammad Ali

Methodology

- ✓ Interviews were conducted over phone
- ✓ Some data and provided information were verified
- ✓ Summaries of responses were created

Interview Questions

- What happened?
- What did you know before it happen?
- What were you able to bring with you?
- What do you wish you could have brought?
- Where did you go?
- What issues did you face?
- Did you have easy access to your phone?
- Did you get any assistance? Form who? How fast?

Floods in Moulvibazar and Sylhet (June 2017)

- **Saiful Islam, Moulvibazar**
- **Mohammed Serajul Islam, Sylhet**

Moulvibazar and Sylhet had become flooded for the third time this year due to the floods and the following onrush from the hills. **The flood has submerged some 29 unions of the Moulvibazar's Kulaura, Juri and Borolekha upazilas.** Most of the houses, schools and roads are now underwater, stranding 200,000 people. The recent flood has taken a heavy toll on the farmers and fishermen of the surrounding areas as **they had no necessary precautions** for such an untimely disaster. In March, the rivers Sonai, Kontinala, Juri and Kushiara became overflown and caused a flash flood which submerged vast swathes of land in Sunamganj and Moulvibazar. **Local farmers have incurred a huge due to the damage of the Boro crop** caused by the March flood and they didn't get any chance to harvest their crops, mainly Boro. And the recent flood has put another nail in the coffin of their fortune inundating the seedbeds of Aush and Aman crops. The flood in Sylhet **has forced 175 educational institutes to shut down**. Among them, 162 are primary schools and the other 13 secondary schools. The administration was working to set up flood shelters and provide relief to the affected but it was not sufficient. Many had to suffer, especially who lived in the villages.

Place: Sonir Haor _ Sunamganj

Haor area, Northern part of Bangladesh mainly flash flood prone area. Every year this haor are flooded. But this year flood is different in terms of duration, intensity and amount of loss and damage. The lives and livelihoods disrupted due to this flash flood. People were waiting for relief. A large number of people didn't get relief.

Place: Tahirpur Upazila _ Sunamganj

It was looked like an urban slum, the basic services weren't available there. This year flood damages all of their crops, now they are trying to protect their living place. They used traditional technique for protecting their houses. According to the local people, return period of this flood more than 100 years.

Flood in Jessore (July 2017)

Mr. Mizanor Rahman,
Teacher, Shoiampur Government Primary School
Monirampur, Jessore
Mr. Mizanor Rahman cited some information and data from published article and newspaper.

Thousands of people have been experienced from flood in Jessore (July 2017**), at least 115 villages under three upazilas have been flooded**, forcing a number of people to move to shelter centers. **They had no necessary precautions** for such an unfortunate disaster. Thousands of fish enclosures has been washed away and crops of hundreds of hectares of land also got damaged. In the district's Keshobpur upazila, over 5,000 families of 40 villages have directly been affected. At least 31 villages went under water in the Sadar and Abhaynagar upazilas each, while the figure is 44 in Manirampur upazila. Over 1,000 families become marooned in four upazilas in Chuadanga, where crops of scores of hectares of land have gone under floodwater as well. Besides, around 103 schools and other educational institutions remain unofficially closed, as they have been flooded.

Meanwhile, several thousand residents in the upazila are facing food and pure drinking water scarcity as rains and onrush of water from Mukteshwari and Hari Rivers. Respondent told us that most of the villages under knee-deep water and many took shelter on highlands. Many shrimp enclosures and water bodies in the areas were washed away due to the inconstant downpour, said Mizanor Rahman.

As flood is common in Jessore every year so people have learned to raise plinths in cluster which provides safety from floods. Most of the people made their houses on highland or with safety measures.

The district administration has allocated just 10 tonnes of rice for the affected people. After floods the prices of everyday essentials have soared in the face of the continued heavy shower. Vegetable traders are charging higher prices, citing supply shortage in the markets.

Flood in Kishoregonj (April, 2017)

S.M. Tanzim Iqbal,
Kishoregonj

"We had 7 ha of rice in the field. If we were able to know the upcoming flood then we can at least harvest some rice from the field. We had no idea, any message about the sudden flood. Most of our neighbor, friends couldn't save any crop. The dam were broke. We tried to protect the embankment, but we failed. As a result more crop land flooded."

The farmers were at a loss after seeing the destruction of their only single time staple food, boro crop.

"Our entire ripe paddy has gone under water. If the government does not provide compensation, we will face severe hardship," Mafiz Mia, a farmer of Umednager village (uncle of respondent) told us.

Upazila nirbahi officer Titan Khesha said that, 'The government had allocated 16 tonnes of rice, and it was distributed among the farmers affected'. But the farmers claimed that it was very little support.

Floods in Sirajganj (2017)

Atikul Islam Biplob
Sirajganj

Due to rise in the water level of Jamuna river, many portion of flood protecting dam seriously damage in different area in sirajganj district. Heavy rainfall and onrush of water from the upstream has caused the flood situation more vulnerable. People nearby jamuna river cannot imagine how firstly the flood protecting dam collapse and washed away their crop and animal.

"We had no early messages about the flood. It was too quick. I took only two cow and a goat when flood water ran into my house. I wished I could take all my crop at a safe place. I with my family and neighbors take shelter on local primary high school. I faced people were suffering much for lack of pure drinking water, sanitation, food and shelters. Due to disconnection of electricity there is low scope of using mobile phone. I could not use my phone properly. I got some help from union parisad. The chairman provide food, pure drinking water, cloth to the flood affected people. I get help aid lately."

Floods in Kurigram, Lalmonirhat (July, 2017)

Mr. Shahinor Rahman
Local Trader
Chorraihat, Kurigram

Thousands of people were shocked stuck in Kurigram and Lalmonirhat districts in July 2017 due to the raise of water level of Brahmaputra and Teesta rivers following heavy downpour and onrush of water from upstream hilly areas. Lakhs of people have been marooned in the floodwater. Many have been homeless and took shelter in other places. They struggle to find shelter with their belongings and livestock's. Drinking water became scarce. Life turns into nightmares. The suffering continues. In summer drought strikes, making the land barren, turning it unfit for farming.

Wife of Mr. Sahinur told us that, "Every year during flood, we had to move to higher ground with all our belongings including cattle and poultries. The tubewell gets submerged during flood. After water goes down, we clean the sediment from it and drink water. Then diarrhea strikes. Before, we used to raise only one goat and even that died when the flood started. Then there was a time when the goats had to be sold for cheaper price."

Four people died in Kurigram (Kurigram sadar and Fulbari upazilas). One and half year-old child Babu, Lutfur Rahman (35), Hazrat Ali (55), and Jusna Begum (25). Three people drowned in floodwater in Fulbari upazila and a man who was rescued from floodwater after being bitten by snake died at Holokhana area of Kurigram sadar upazila.

Mr. Shahinor told that in the flooding time people really want to save their children, cash money, ornaments, livestock's. Early messages of flood could enable them to save their assets and lives. Most of the time flood was quick and they didn't get any information about that.

A special team of the Bangladesh Army was staying in northern part of the country to monitor the overall flood situation. The district administration used all educational institutions in the 13 Upazilas as shelters.

Prof. Dr. Saidur Rahman

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The flash flood in Kishoreganj and Netrakona districts causing immense sufferings to thousands of farmers. It was triggered by heavy rainfall and In Kishoreganj, about 350 hectares of fresh land in seven upazilas were flooded jus in one day. Farmers lost all their crops and they never faced a situation like this before. All crops washed away under water due to dam break. Thousands of tons fishes are dying – rotting and floating on the water due to water contamination. Thousands of duck farms are affected. School remain closed, at least half million students will drop their regular education for this disaster. Almost all village-level roads, homes & assets inundated for days. Rice were almost ready to harvest.

The flood was too quick and farmer didn't get any early messages about the flood, naturally flood is happen in haor area from April but this time it was March.

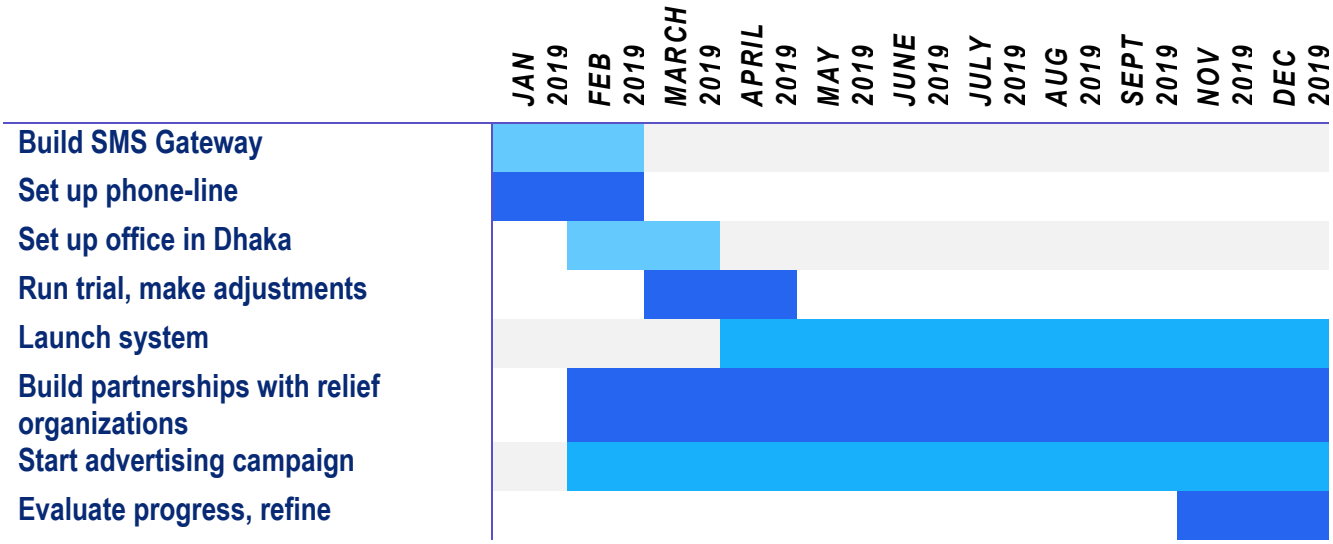
Department of Agriculture Extension (DAE) confirmed that the flash flood has submerged 141000 hectares of farmland in six northeastern districts, affecting around 423,000 farmers. 4.76 lakh hectares of land this year in the division with a production target of 2.49 lakh tonnes rice. Around 73,070 hectares of paddy fields are submerged in flood water in the Netrakona district's destroying around 421,980 tons of paddy. In Kishoreganj DAE had found around 23,300 hectares of paddy fields completely inundated and the harvest loss of about Tk. 291 core.

There was no early messages for the flood, government have some project about early warning but most of the time these project cannot fulfill the main target.

First Year Expenses:

EXPENSE	COST (USD)	QUANTITY	TOTAL COST
USSD Service Set-Up	1500	1	1500
SMS Gateway	500 (per month)	12	6000
Phone-line	50 (per month)	12	600
Radio Advertising	355 (per month)	12	4260
Billboard Advertising	200 (per month)	12	2400
Social Media Advertising	60 (per month)	12	720
Office Space	900 (per month)	12	10800
Employees (2)	400 (per month)	12	4800
		Grand Total (USD)	**31080**

Implementation Timeline:



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