

Vulnerability Analysis of the Cyclone *Aila* Affected Community in the South-West Belt of Bangladesh

Md. Jakariya^{1,*}, Minhaz Farid Ahmed², Md. Tajuddin Sikder^{1,3}

¹Department of Environmental Science and Management (DESM), North South University (NSU), Bashundhara, Dhaka, Bangladesh

²Institute for Environment and Development (LESTARI), University Kebangsaan Malaysia (UKM), Bangi, Selangor, Malaysia

³Department of Public Health and Informatics, Jahangirnagar University, Savar, Dhaka, Bangladesh

Email address:

jakariya@northsouth.edu (Md. Jakariya), jakariya2009@gmail.com (Md. Jakariya)

To cite this article:

Md. Jakariya, Minhaz Farid Ahmed, Md. Tajuddin Sikder. Vulnerability Analysis of the Cyclone *Aila* Affected Community in the South-West Belt of Bangladesh. *Journal of Health and Environmental Research*. Vol. 2, No. 2, 2016, pp. 5-12. doi: 10.11648/j.jher.20160202.11

Abstract: Bangladesh is considered as one of the most vulnerable countries to climate change in the world because of increased intensity and frequency of natural disasters. The southern areas of Bangladesh are comparatively more vulnerable to cyclones. In 2009, cyclone Aila led to tidal surge and salinity intrusion. In order to understand the vulnerability of the population affected by cyclone Aila, Household (HH) questionnaire survey, Key Informant Interview (KII) with different stakeholders and Focus Group Discussion (FGD) tools have been employed. The study finds that the main occupations under the study area are agriculture and fisheries industry. And they became vulnerable because of saline water logging. Saline water logging prevented the local people from agriculture works and fish cultivation. Moreover, the financial aids and supports proved ineffective compared to the dire need of the affected population. As a result, the affected people changed their primary occupation by migrating to nearby, yet remote big cities in expectation of better livelihood mainly through day laboring or engaging in other informal employment sectors.

Keywords: Climate Change, Disaster, Occupation, Migration, Salinity

1. Introduction

"Here in Koyra, we are living just the way the animals are surviving in Sundarban," commented Dilip Kumar, a local fish dealer in Uttar Bedkashi village of Koyra sub-district. This reflects the tragic socio-economic condition of the environmental disaster prone southern part of Bangladesh. Bangladesh is one of the Most Vulnerable Countries (MVCs) not only due to climate change but also owing to a weak natural resource based economy. One of the least emphasized impacts of climate change is migration that can happen both within and across national boundaries. Climate change is now considered as a push factor for which the least developed countries like Bangladesh have been affected from the perspective of urban environmental and health problems. Migration propensity is influenced by disasters' direct impact (e.g., flood, riverbank erosion, cyclone, salinity intrusion and drought, etc.) and indirect economic impact (e.g., lower yield, fishery industries collapse, water scarcity, etc.). Due to climate change and global warming, the sea level is rising fast. It has been suggested that Bangladesh is a low-lying country and it will lose 17 percent of its land to the

rising sea by 2050 along with the displacement of 15 million people (Dorothy 2010). On 25 May 2009, a major cyclone *Aila* ransacked the southwest coastal area of Bangladesh and the accompanying flood caused severe damage to the southern region including life casualties (Bhattacharjee 2010). Consequently, the cost of water supply and sanitation went up which ultimately triggered the water borne diseases (Roberts 2009). Riverbank erosion is one of the reasons for migration of native people. It is now well documented that the frequency of different types of natural calamities have increased significantly in the recent past, which has both direct and indirect impacts on the socio-economic conditions of the people who are living particularly in the southern belt of Bangladesh. As a result, the coastal inhabitants are being forced to migrate.

According to the Climate Risk Index (2011), Bangladesh was the worst sufferer of climate-induced disasters in the decade spanning from 1999 to 2009 (Mehedi 2010). The World Bank also listed Bangladesh among the top MVCs for flooding, cyclone, and storm surges. Global climate change has put Bangladesh in a challenging position with the consequence of sea level rise, flood, drought, cyclone,

salinity intrusion and water logging. Some academics including campaigners are trying to define climate change induced migrants as someone displaced by climate-induced environmental hazards. These disasters are changing the ecological set-up rapidly including increased droughts, sea level rise, and the extreme weather events such as cyclones, flooding, and tornados. The Government of Bangladesh, through the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), has expressed its concern about forced displacement of vulnerable people of the coastal regions of Bangladesh and urged on the adaptation strategy with rights of free mobility within border for these people (Mehedi 2010).

Cyclone Aila severely affected the two main livelihoods of the southwestern coastal people of Bangladesh mostly due to salinity intrusion. The storm *Aila* claimed 300 lives and brought full destruction. Farming and shrimp cultivation became difficult because of the inundation of water bodies and agricultural lands by saline water. Therefore, the government allocated food and aid to cyclone-affected regions and even postponed farm loan collections. Still, the vulnerability of the coast and the need for long-term plans to protect embankments are burning issues. Recently, Bangladesh has claimed a substantial share of international aid to fight natural disasters. Simultaneously, Bangladesh has established a US\$45 million Climate Change Fund and a Multi-Donor Trust Fund of US\$150 million. However, this amount of money may not be adequate to fight with the changing environment (Momen 2010).

The study on population displacement due to climate change is still inadequate in the context of Bangladesh (Siddiqui 2011). The rate of internal migration is so high that slums in cities of Bangladesh including Dhaka are getting overwhelmingly crowded. The slum dwellers are living in inhumane conditions with regards to health and safety issues, lacking even the most essential services such as access to clean water and sanitation. On average, during peak season (i.e. during March and April), about 1000 people visit the International Centre for Diarrhoeal Disease and Research, Bangladesh (ICDDR,B) in Dhaka city alone to get treatment related to water borne diseases (Dorothy 2010). Due to Climate change many people from rural areas of Bangladesh are forced to migrate to the cities, mostly in Dhaka. Therefore, there is a sharp increase in urban population, especially in urban slums.

It is widely recognized that the developing countries are more vulnerable to the impacts of climate change and have less capacity to adapt. Therefore, adaptation to climate change is a growing concern for the international

development community. IPCC TAR (2001) notes that so far the initiatives for adaptation in response to climate change have been very insufficient. The global climate has already been changed, and it will keep changing naturally in the coming decades due to previous emissions of greenhouse gasses. Therefore, appropriate adaptation strategies need to be developed and implemented in order to reduce vulnerability of the coastal community for a changing climatic condition (Burton *et al.* 2012).

2. Methods

The study is based on both primary and secondary information. The unit of this study at rural level was village and according to the Cochran's formula (Bartlett *et al.*, 2001), a total of 161 households have been surveyed from Uttar Bedkasi, Borobari and Katmarchar villages of Koyra Upazila under Khulna district, and Uttar Atulia, Naobeki and Boropukot village of Shyamnagar Upazila under Satkhira district, based on the data of Bangladesh Bureau of Statistics (2011). Besides, for each study village four FGDs and two KIIs with the Union Parishad (UP) Chairman, UP Members, local commoners and the elite have been conducted. The quantitative data derived from the household survey was developed, manipulated and analyzed within Statistical Package for the Social Science (SPSS¹) environment while the qualitative data from FGDs and KIIs have been employed to support the primary data. It is important to note that the range of extreme to moderate poverty for Bangladesh has been measured as the range of daily income less than US\$1.25 to US\$2.00 a day, as indicated by the World Bank.

3. Results and Discussion

3.1. Socioeconomic Status and Capacity

3.1.1. Monthly Household Income

Monthly income pattern reveals the poor economic condition of the study population. As presented in Table 1, only 12% respondents' monthly income was slightly higher than US\$60 while 40% of the respondents earn less than US\$ 37 in a month, falling below the poverty line. However, most of the households (48%) get themselves into earning category of US\$37-US\$63. During the FGD sessions the majority mentioned that the overall economic condition of the villages were drastically affected by cyclone *Aila* and people from all economic strata were the sufferers.

Table 1. Monthly income and Occupation of the households.

Monthly Income (US\$)	Household Frequency (%)	Primary Occupation	Household Frequency (%)
<37	64(40)	Farmer	8 (5)
37-60	77(48)	Day Labor	113 (70)
>60	20(12)	Fisherman	16(10)
		Business	24 (15)
Total Respondents	161	Total Respondents	161

Villagers also brought to attention that large farmers were the worst sufferers as they could hardly cultivate their land due to salinity intrusion; and on the other hand, feeding their ego derived from socioeconomic status, they cannot even beg or seek support from others. For example, a respondent from Koiraupazila, who has large amount of land jeopardized by salinity intrusion, mentioned that one of his college going family members moved to Dhaka to add to the family income.

As to stopping intrusion of saline water, local people tried to repair the breached part of the embankment but could not go far with it owing to lack of technical and financial support. Therefore, the entire area still gets inundated by the regular tides twice a day. Accepting the situation and trying to adapt to it, some of the large farmers opted for cultivating shrimp but due to repeated viral attack they ended in smoke. Thus the overall economy of the entire area is deteriorating fast. As indicated in the Table 1, more than 70% of the total villagers are now day laborers. The FGD sessions reveal that the number of day laborers was less than 40% before the occurrence of *Aila*. They also regard it as a grave concern that the number of day laborers in the entire area would increase fast if no appropriate measure were taken to repair the embankment and to devise appropriate alternative livelihood options.

3.1.2. Household Heads' Education

Data confirm that the level of education of the respondents HH heads was poor as majority of them (52%) merely completed primary level education while about 37% of them did not receive any formal education. Only 10% of the respondents completed education up to Secondary School Certificate (SSC) or Higher Secondary School Certificate (HSC) level. Scarcity of school in the study area (except Uttar Bedkashi village where there is a Government Primary School (GPS) and a registered high school) was considered as a major constraint for the villagers not to send their kids to school. Villagers also mentioned that their children need to travel at least two kilometers on average a day to attend school. KIIs with the school teachers reveal that attendance in the classes reduced alarmingly as the adolescents were needed to help their parents to earn some livelihood to maintain a normal life cycle. For instance, despite having two schools in Uttar Bedkashi village, as per the villagers, majority of the children of that village simply do not go to school; their parents rather prefer sending them to work for some extra income. Besides, the schools are also served as cyclone shelter during emergency and there usually is little or no education in such emergency.

3.1.3. Water Supply and Sanitation

Almost all Water Supply and Sanitation facilities in the study area were destroyed in the aftermaths of the cyclone *Aila*. Despite receiving assistance from government and other Non-Government Organizations (NGOs), the situation has not improved significantly. HH survey indicates that around 55% and 34% respondents of the study did not have proper water supply and sanitation facilities, respectively, at their

homes. Although there are some hand-tubewells in the localities they were never tested for different contaminants. Villagers experienced that water from the existing tubewells contained excess iron and salinity. In few cases, usually female children collect safe drinking water from distant Deep Tube Wells (DTW) free from arsenic contamination.

Virtually every house (94%) had a traditional village latrine and the majority of them replied that they would wash their hands with ash or mud after defecation instead of soap. 90% of such respondents belonged to the income group of less than US\$60 per month. On the other hand, 44% respondents who had a hygienic latrine at their houses belonged to the income group of more than US\$60 a month. Although the NGOs ran awareness raising campaigns and disseminated knowledge on the need for proper sanitation and hygiene practices through home visits and school trainings or campaigns, still 9% and 42% households use open space defecation and different unhygienic types of toilets for defecation respectively.

3.2. Disasters and Impact

3.2.1. Common Natural Disasters

The study area is highly prone to different types of natural disasters. However, the severity of disasters varies widely, mostly due to geographic location, occupation, and the adaptation capacity of the communities, which ultimately are related to economy and most importantly on the perception of the respondents about disasters. In general, the major types of disasters that affect the villagers in the upper regions mostly are cyclone, river erosion and river sedimentation. The villagers reported that the river bed rose in the upper region due to sedimentation; so, there were inundations by saline water in the lower southern parts of the study area. The frequency and intensity of cyclones have also increased remarkably in the region, i.e., cyclone *Aila* in 2009 literally destroyed the southern coast of Bangladesh. The local age-old residents recalled two other devastating natural disasters in that region which are cyclone *Sidr* in 2007 and the cyclone followed by flood in 1988.

Table 2 records the villagers' perception on common natural disasters in the study areas. 40% respondents confirm that water logging from saline water has been the most threatening natural disaster in that area and the severity of which increased due to river bank erosion (second most frequent event backed by 30% respondents) and cyclone (i.e. 24% respondents). Due to river bank erosion, the area gets flooded with saline water every day during the high tide. Tidal surge induced by cyclones also inundates almost entire study areas. Table 2 also reports the highest frequency of water logging in Uttar Atulia village (i.e. 63%) followed by Katmarchar village (i.e. 50%). All the villages except Katmarchar and Uttar Atulia are considerably frequent with river erosion. Flood has been the least common natural disaster in the study areas, with zero occurrences for Boropukot and Uttar Atulia villages. The risk of cyclone is moderately equal for all the villages.

Table 2. Common natural disasters in the study area.

District	Sub-district	Village	Common Natural Disasters				Total
			Flood (%)	Cyclone (%)	Water Logging (%)	Erosion (%)	
Khulna	Koyra	Katmarchar	5 (19)	7 (27)	13 (50)	1 (4)	26
		Borobari	2 (6)	6 (19)	7 (23)	16 (52)	31
		Uttar Bedkashi	2 (7)	4 (15)	7 (26)	14 (52)	27
		Uttar Atulia	0	11 (26)	27 (63)	5 (12)	43
Satkhira	Shyamnagar	Noubeki	2 (15)	4 (31)	2 (15)	5 (39)	13
		Boropukot	0	6 (29)	8 (38)	7 (33)	21
Total			11 (6)	38 (24)	64 (40)	48 (30)	161

3.2.2. Physical Impacts of Natural Disasters

The main problems incurred by the natural disasters in the study area include salinity intrusion, water logging and lack of fresh drinking water source. People were encouraged to plant trees as cyclone Aila had destroyed about 75% of their local plant species including all the fruit plants. The only plants that survived after the cyclone Aila were the coconut trees and few other local trees. The local roads were not as high as earlier and the recent budget allocations to repair the roads and embankment were not adequate compared to the damage. The embankment had been repaired but the works were not up to the mark and as erosion continued through the

embankment, it seemed quite vulnerable. As the norm, the local people used to repair the embankment on their own; however, severely deteriorated economic condition made it impossible for them to use their free labour which they indispensably needed to employ to earn little extra to maintain their family affairs.

The impacts were severe at the individual household level. Table 3 shows the major damage done by natural disasters in the study area. 55.2% households highlighted water supply damage as the most severe impact and only 10% prioritized housing damage.

Table 3. Physical Damage by Natural Disasters.

Impacts of Disasters	Common Natural Disasters				Total (%) vertically
	Flood (%)	Cyclone (%)	Water Logging (%)	Erosion (%)	
Damage to Water Supply	10 (11)	22 (25)	26 (29)	31 (35)	89(55.2%)
Damage to Sanitation	1 (2)	10 (18)	31 (56)	13 (24)	55(35.2%)
Damage to Housing	0	6 (35)	7 (41)	4 (24)	17(10.6%)
Total	11 (6)	38 (24)	64 (40)	48 (30)	161

Moreover, the study areas had been geographically vulnerable to natural disasters. 89% respondents opined that the areas were mostly low lying areas and prone to flood and water logging through tidal surge and only 11% of them believe that they are vulnerable mostly due to river bank erosion (Table 4).

3.2.3. Change of Traditional Occupations

During the severe flood in 1988, there were inadequate relief programs in the region and the local people got very little financial support from the government and other organizations. As a result, many people were forced to lease out their land to shrimp cultivator because of the saline water intrusion or to work as day laborer in the shrimp farms.

Ultimately their profession gradually took a shift from agriculture to shrimp culture. However, after the month of cyclone Sidr in 2007 the local people received better financial and commodity support than that of the flood of 1988. Nevertheless, inevitably after the devastating cyclone in 2007, many people died and a large number of people permanently and a few temporarily migrated. The local people opined that almost 75% land of their locality was deteriorated by cyclone Sidr leading to saline water intrusion through breaching the local embankment. Therefore, agriculture practice reduced drastically and the local people had to engage in shrimp culture to maintain their livelihood.

Table 4. Cause of Vulnerability to Natural Hazards.

District	Sub-district	Village	Causes of Vulnerability		Total
			Low Land (%)	River Bank (%)	
Khulna	Koyra	Katmarchar	25 (96)	1 (4)	26
		Borobari	30 (97)	1 (3)	31
		Uttar Bedkashi	25 (93)	2 (7)	27
		Uttar Atulia	29 (67)	14 (33)	43
Satkhira	Shyamnagar	Noubeki	13 (100)	0	13
		Boropukot	21 (100)	0	21
Total			143 (89)	18 (11)	161

Similarly in 2009, a large number of people were displaced by the cyclone Aila when a large number of houses were destroyed permanently. Despite no weather forecast

available during cyclone Aila, villagers were able to save their valuable lives and assets as the disaster took place during the day time.

Table 5. Change of Primary Occupations of the Respondents.

Previous Occupations	Present Occupation					Total
	Farmer (%)	Fisherman (%)	Petty Business (%)	Housewife (%)	Day Labor (%)	
Fishing	1 (8)	1 (8)	4 (31)	1 (8)	6 (46)	13
Day Labor	1 (1)	4 (5)	12 (16)	42 (55)	18 (23)	77
Farmer	4 (10)	8 (20)	5 (12)	14 (34)	10 (24)	41
Housewife	2 (7)	3 (10)	3 (10)	15 (50)	7 (23)	30
Total	8 (5)	16 (10)	24 (15)	72 (45)	41 (25)	161

Table 5 presents the shifting trend of occupations of the study areas. Only 5% and 10% of the local people are now engaged in the agricultural sector and shrimp cultivation respectively. Around 46% of the fishermen switched to day laboring. Similarly, 24% of the previous farmers opted for informal sector. Of the present 45% housewives, some were previously engaged in other income generating activities such as homestead gardening, dairy, poultry, etc. The local Union Parishad Chairman commented that the agricultural input support was not timely regarding the supply of seeds, fertilizers, pesticides, etc. The local people did not know about the support from the District Commissioner. There were also some supports from the agricultural department and fisheries department. Environmentally affected people received support from international NGOs in the form of

rice, wheat, etc. However, the FGDs reveal that the support could not reach out to them successfully due to corruption in management.

However, in 2012, the economic condition of the local people became very poor as there was no work opportunity for those who were engaged in the informal sector. Villagers reported that around 80% of the earning members of a family were unemployed. Earlier, several organizations had run aid programs in the form of food for work through repairing embankment, roads, etc. However, in 2012, these programs were not available. Moreover, only 3% of the local were getting aid under the government's social safety net programs. The local people were reluctant to comment on social safety net programs as there was political interest regarding the allowance beneficiary selection.

Table 6. Remaining Agricultural Land after Aila.

District	Sub-district	Village	Remaining Agricultural Land of the Respondents		Total
			Yes (%)	No (%)	
Khulna	Koyra	Katmarchar	17 (65)	9 (35)	26
		Borobari	21 (68)	10 (32)	31
		Uttar Bedkashi	23 (85)	4 (15)	27
		Uttar Atulia	26 (60)	17 (40)	43
Satkhira	Shyamnagar	Noubeki	9 (69)	4 (31)	13
		Boropukot	14 (67)	7 (33)	21
Total			110 (68)	51 (32)	161

32% of the respondents mentioned that they had completely lost their farm land due to *Aila* and were forced to change their primary occupation (Table 6). Earlier, these 32% respondents used to practice farming. However, before *Aila* they had already begun adopting new livelihood options due to stagnation in occupation, migration, etc. Table 7 refers that none from the farming communities maintain a monthly income more than US\$60 and a majority of the farmers' (i.e.

88%) monthly income was less than US\$37. Rather dreadful is that only 12% of the farmers are within the US\$ 37 to US\$63 income category and 88% of them are extremely poor. Slightly better yet similar case is observed for the fisherman; most of them (i.e. 75%) fall within US\$37 to US\$60 category. Thus Table 7 confirms that the farmers and the fishermen, the two main occupations of rural Bangladesh, live below the poverty line.

Table 7. Monthly Household Income Based on Occupation.

Monthly Income BDT	Occupation of the Respondents			
	Farmer (%)	Fisherman (%)	Businessman (%)	Day Labor (%)
<3000	7(88)	3(19)	7(29)	47(41)
3001-5000	1(12)	12(75)	9(38)	55(49)
>5000	-	1(6)	8(33)	11(10)
Total	8	16	24	113

3.2.4. Migration

The information related to the frequency of occurrence of natural disasters in the study areas have been measured based

on the perception of the respondents. 63% and 30% respondents respectively ranked the frequency of the natural disasters e.g. floods and cyclones as 'frequent' and 'often'

(Table 8). Table 8 also highlights that there were 24% seasonal migration followed by 8% permanent migration. Therefore, at least 32% (24% seasonal plus 8% permanent

migration) of the total respondents reported migration of their family members due to natural disasters.

Table 8. *Frequency of Disaster and Characteristics of Migrants.*

Frequency of Natural Hazards			Total	Village	Types of Migrants			Total
Frequently (%)	Very Frequently (%)	Often (%)			Permanent (%)	Seasonal (%)	No Migrants (%)	
16 (61)	4 (15)	6 (23)	26	Katmarchar	2 (8)	7 (27)	17 (65)	26
19 (61)	3 (10)	9 (29)	31	Borobari	1 (3)	6 (19)	24 (77)	31
24 (56)	0	19 (44)	43	Uttar Atulia	4 (9)	4 (9)	35 (81)	43
19 (70)	2 (7)	6 (22)	27	Uttar Bedkashi	3 (11)	5 (18)	19 (70)	27
9 (69)	2 (15)	2 (15)	13	Noubeki	0	8 (61)	5 (38)	13
15 (71)	0	6 (29)	21	Boropukot	3 (14)	8 (38)	10 (48)	21
102 (63)	11 (7)	48 (30)	161	Total	13 (8)	38 (24)	110 (68)	161

Similarly, Table-9 indicates that of the all seasonal migrations, 36% and 31% migrations are due to flood and riverbank erosion respectively. Moreover, there were 12% permanent migrations due to cyclone and river bank erosion apiece.

Table 9. *Types of Migration from the Family due to Natural Hazards.*

Type of Migration	Natural hazards in this Areas			
	Flood (%)	Cyclone (%)	Water Logging (%)	Erosion (%)
Permanent	-	5(12)	2(4)	6(12)
Seasonal	4(36)	7(17)	11(19)	16(31)
No Migration	7(64)	29(71)	44(77)	30(58)
Total	11	41	57	52

3.3. External Aid and Intervention

3.3.1. Expand Support

Government of Bangladesh as well as many International and local organizations extended their aid programs to help the local communities after the occurrence of cyclone Aila. Government of Bangladesh allocated BDT 20,000 to a few poor people, the NGOs such as Islamic Relief, Susilan, etc. provided agricultural support and food for work program

(through repairing the local embankment and roads). However, the allotted aid proved inadequate as per the real necessities. As per table 10, only 21% and 12% HHs received financial and in kinds support in farming and housing sector, respectively, from the external organizations after cyclone Aila. Moreover, the highest proportion of support was observed in Noubeki village (i.e. 38%) in case of farming and Uttar Atulia (i.e. 19%) in terms of housing. It is noteworthy that 67% HHs replied of not receiving any kind of support.

Table 10. *Support from External Organization after Cyclone Aila.*

District	Sub-district	Village	Support from External Organization			Total
			Farming (%)	Housing (%)	None (%)	
Khulna	Koyra	Katmarchar	3 (11)	4 (15)	19 (73)	26
		Borobari	5 (16)	2 (6)	24 (77)	31
		Uttar Bedkashi	7 (26)	1 (4)	19 (70)	27
		Uttar Atulia	9 (21)	8 (19)	26 (60)	43
Satkhira	Shyamnagar	Noubeki	5 (38)	2 (15)	6 (46)	13
		Boropukot	5 (24)	2 (9)	14 (67)	21
Total			34 (21)	19 (12)	108 (67)	161

3.3.2. Emergency Medicine Supply and Treatment

The water and food borne diseases spread out in the study area severely after Aila. There were a few initiatives to provide emergency medicine and treatment for the patients. According to Table 11, availability of NGO support in terms of providing emergency first aid such as oral saline was the

highest (i.e. 65%) followed by the government (i.e. 27%). The difference between these two proportions denotes that GO support lies far behind NGO interventions. However, after Aila most of the patients received treatments from the government hospital while the national and international NGOs took care of only a few.

Table 11. Medical Support after Cyclone Aila.

District	Sub-district	Village	Supply of Medicine During Disaster			Total
			GO (%)	NGO (%)	Voluntary Support (%)	
Khulna	Koyra	Katmarchar	12 (46)	12 (46)	2 (8)	26
		Borobari	6 (19)	22 (71)	3 (10)	31
		Uttar Atulia	12 (28)	28 (65)	3 (7)	43
Satkhira	Shyamnagar	Uttar Bedkashi	9 (33)	16 (59)	2 (7)	27
		Noubeki	3 (23)	8 (61)	2 (15)	13
		Boropukot	2 (9)	18 (86)	1 (5)	21
Total			44 (27)	104 (65)	13 (8)	161

3.4. Adaptation Schemes by the Local Community

3.4.1. Preparation for Emergency Situation

Data reports that the largest proportion of the respondents (62%) stock dry food at their household as preparatory measure for any upcoming natural disaster (Table 12). It is

noteworthy that most of the households (75%) are situated in low lying area where water logging is common. The stock of dry food for the upcoming natural disaster was highest in Boropukot village (76%) of Satkhira district followed by Uttar Bedkashi (i.e. 74%) village of Khulna district.

Table 12. Stock of Dry Food during Natural Hazard.

District	Sub-district	Village	Stock Dry Food (Chira, Muri etc.)		Total
			Yes (%)	No (%)	
Khulna	Koyra	Katmarchar	13 (50)	13 (50)	26
		Borobari	19 (61)	12 (39)	31
		Uttar Bedkashi	20 (74)	7 (26)	27
Satkhira	Shyamnagar	Uttar Atulia	25 (58)	18 (42)	43
		Noubeki	7 (54)	6 (46)	13
		Boropukot	16 (76)	5 (24)	21
Total			100 (62)	61 (38)	161

3.4.2. Migration Locations

Table 13 presents that 28% of the villagers (i.e. 16% seasonal and 12% permanent) had to migrate to the big cities such as Dhaka, Khulna, Jessore, etc. and engaged themselves in informal occupations e.g. day labour, rickshaw puller etc. It is also noteworthy that a large number of them migrated to the hilly area such as Rangamati because of availability of work as day labor for hills clearing. Surprisingly, their migration to Rangamati was guided by the notion that living in highland is comparatively safe and that availability of land is higher. Thus, they would not be affected by flood. However, people have been migrating to foreign countries as well. The FGDs revealed that about 28 families out of the total 150 migrated families (18.67%) of Uttar Bedkashi village had to migrate to India; earlier, most of them used to work in the brick fields.

3.5. Need Expressed by the Local People

There were many extended families and almost all of the households used to produce 'Katha' which is the traditional hand made blanket. A large number of women were also involved in tailoring. It is mention-worthy that in such operation they did not receive any support such as training, cash or inputs from government and NGOs. The local people want support in this sector. Moreover, most of the houses were flooded after monsoon rain in this low-lying area and there were little or no drainage systems. They need the elimination of the water logging, and they expect support

from the government. Though they already had electricity, they used wood for cooking while the price of timber ranged from BDT 120 to 200 per month in the locality. Their social bondage as well as the implementation of law and order is good. People are interested to form associations to develop their socio-economic conditions and raise community funds. In Uttar Bedkashi 25 heads of each household formed a fisheries organization and invested BDT 250,000 per person for five years. Each person received BDT 8000 per year as profit. Although they want support from the government, the local population commented that they usually get better support from International NGOs through local NGOs.

Table 13. Destination of the Household Migrants.

Types of Migration	Destination of the Migrants		
	Nearby areas (%)	Semi-urban Areas (%)	Urban Areas (%)
Permanent	3(5)	5(8)	5(12)
Seasonal	15(26)	16(27)	7(16)
No Migration	40(69)	39(65)	31(72)
Total	58	60	43

4. Conclusion

Natural hazards have been a regular phenomenon for Bangladesh in the recent years and they have had serious impacts particularly in the coastal areas of Bangladesh. In Bangladesh the population density is very high in the coastal belt and due to natural disasters these populations will be

more vulnerable for their survival. Saline water logging in the coastal belt has compelled the local people to change their primary occupations from agriculture to day labor. The poor rural inhabitants have become poorer and more vulnerable in terms of losing employment opportunities, physical damage to the environment, deteriorated water supply and sanitation services and inadequate emergency response and rehabilitation support from the GOs and NGOs. The changing climate has severe impacts on the health of the local population. The different adaptation strategies that the local people took in response to the severe impacts prove insufficient and ultimately they are pushed out to opt for migration for their survival.

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