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## **A STUDY ON THE REDUCTION OF DISASTER RISKS FOR THE DEVELOPMENT OF BANGLADESH**

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## A STUDY ON THE REDUCTION OF DISASTER RISKS FOR THE DEVELOPMENT OF BANGLADESH

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### ABSTRACT

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A field level investigation was conducted on the Disaster Risk Reduction for the Development of Bangladesh with the objective to identify the dominant types of events as per Agro-Ecological Zones; the intensities and respective causes; and legal limitations. The results determined the flood as extensive and cyclone as intensive events affecting country's development and livelihood. The Tista alluvium was Tista Active Floodplain Agro-Ecological Zone (AEZ) 2 and Tista Meander Floodplain Agro-Ecological Zone (AEZ) 3 dominated as disaster prone areas specially for flood and drought, the Ganges Tidal Floodplain covering southern coastal belt AEZ 13 and Young Meghna Floodplain AEZ 18 dominated by cyclone related events. Acts and regulations environmental and community rehabilitation and commodity insurance were found to be less working sectors. In this context, it was recommended that the public awareness on legal requirement need more transparent strength. The early warning system requires active participation of community members under administrative and multi-ministry implementation strategies. The local NGOs need direct intervention in conjunction with Local Government through unified disaster management system. More specific Local signaling system should be practiced ensuring its public compliance. Further researches are required on the updating and implementation of the disaster management Acts by the Government and Non-Government Organizations for developing and improving more effective disaster adapting regulations.

**Key words:** *Agro-Ecological Zones, intensive disaster, disaster and environmental Acts*

### INTRODUCTION

Bangladesh is one of the most disaster prone and densely populated countries in the world. Climate change has increased unprecedented threats to life and livelihoods of people living in Bangladesh, particularly in coastal and riverine areas of the country. Over the time, vulnerable population has confronted a number of floods, tropical cyclones and storm surges, and voluminous salinity ingress. It was reported by Amin *et al.* (1990a); Amin *et al.* (1990b); Amin and Anwar (1990c) and Brammer (1971) that the geographical location of the country has itself been manifested with such firsthand vulnerability of people to natural disasters followed by negative impacts on their life. Following any disaster, people always remain less able to cope and continue their regular life supporting livelihood function due to few alternative resource endowments in affected area. Disproportionate resource distribution and access to natural resources and institutional services, particularly landless poor and marginal farmers face extremely vulnerability to disaster shocks.

The sudden hazard occurrence, mainly heavy rainfall and high tide is increasing critical risk to agricultural farming and pond fish cultivation in the area. The subsistence and marginal farmers incurred most significant loss from abrupt weather events that eventually increased their financial burden due to borrow of lands and money. Notably, the sudden risk from weather variability have not been incorporated within community itself or any external institutional support for alternative livelihood measures, by result climate related risks remain to growing up in future. The existing institutional capacity of either govt. or NGO needs to be expanded. The respective department has ample opportunities to provide climatic risk information to livelihood specific groups, irrigation facilities for winter Boro rice cultivation, improved rice and vegetable varieties, financial access of marginal people and landless people and establishing educational institutes.

Bangladesh is a disaster-prone country within the tropics and is the largest delta in the world formed by the mighty rivers namely the Ganges, the Tista, the Brahmaputra and the Meghna rivers. The combined affects of the role played by this special geo-morphological features which has been synthesized in to 30 Agro-Ecological Zones significantly bear the weather and climate systems. The natural calamities now found to cause colossal loss of life and properties. The dominant disasters of Bangladesh were reported to be mainly tropical cyclone, flood, drought and river erosion etc. The adverse impacts of all the natural hazards affecting lively condition need to be reduced for sustainable development. A brief account of major disaster event profile of Bangladesh are mentioned here.

**Cyclone:** The severe cyclone of 12 November 1970 took a toll of 0.3 million human lives in Bangladesh and put property damages to more than one billion US dollars; Yet another worst cyclone which hit Bangladesh coast on April 1991 killed 0.14 million people and property damages were more than two billion US dollars; The cyclone of 1876, 1919, 1961, 1963, 1965, 1985 and 1988 were also of severe nature.

**Floods:** The flood of 1988 during August-September inundated 89,000 sq. Km. Areas of 52 districts of the country and caused loss of 1517 human lives; The 1998 flood in Bangladesh with unprecedented duration of 65 days inundated 53 districts covering about 100,000 sp. Km. Areas and it took lives of 918 people; The severe floods of 1922, 1954, 1955, 1974, 1984 and 1987 are worth mentioning.

**Droughts:** Drought is another severe natural phenomenon which at some intervals visits Bangladesh and causes disastrous crop failures. In 1979 the country was hit by a severe drought, which was termed by many as the worst in the recent past. Droughts of 1957 and 1972 were of severe nature.

**Tornado:** Tornadoes during pre-monsoon period hit Bangladesh and cause localized devastation, both in terms of lives and properties. Tornadoes of 14 April, 1969; 11 April, 1974; 01 April, 1977 and 26 April, 1989 are noteworthy.

The climate database of Bangladesh now expressed as 30 Agro-ecological Zones and 89 sub-zones in all spheres of development having diverse situation as regards temperature regime, humidity, hydrology, land, soil, agro-climate parameters and others. A brief account of the AEZ as outlined for the context of the present studies is mentioned here stating the Geographical Information System (GIS) coverage.

## MATERIALS AND METHODS

The methods and materials included in the studies are summarized below. The studies involved the tools such as: Technical investigation survey; Focus Group Discussion (FGD) and Case Studies. The methods and materials selected for these studies were formulated as per recommendation given by previous workers (Brammer and Khan, 1991; Khan 2008; Mathbor 2007).

**Design of the Study:** Technical investigation survey using one questionnaire and checklist guideline; Focus sessions in group using a guideline and analyzing significant case studies.

**Study Zones and Sites:** Tista Alluvium (AEZ 2 and 3); Greater Rangpur and Dinajpur; Brahmaputra Alluvium (AEZ 7 and 8) Greater Mymensingh and Pabna; Ganges Alluvium (AEZ 10 and 13) Greater Faridpur and Khulna, part of Young Meghna Floodplain (AEZ 18) of greater Barisal and west Noakhali.

### Category of respondent:

Disaster professionals: Extension Professionals: Public representatives:

Respondent: Name .....Address: Profession.....Gender.....Training on disaster .....

### Research questions which were used for the study base and frequency score scale:

- Types of disasters now happening and those have intensive and extensive effects on livelihood: Cyclone, Flood, Drought, Hailstorm, Fog, Excess rain, Cold wave and Hot wave;
- Causes of disasters affecting livelihood: Change of temperature regime, Change of rainfall distribution, River siltation, Change of cross border river stream, Deforestation, Unplanned development, Industrial Pollution;
- Potential main mitigation methods of disaster reduction for a better livelihood: Early warning, Technology based rehabilitation, Environment safe physical development, Changing farming systems, Forestation, Legislation for disaster risks and Climate insurance scheme.

The questionnaires guidelines were developed and adopted for the exploration survey studies, Focus group Discussion (FGD) and Case studies as per above mentioned parameters.

## RESULTS AND DISCUSSION

### Types of Existing Disasters

The results obtained from the present studies on current trend disaster types in Bangladesh are given in the Table 1 and Fig. 1 and Fig. 2. The results as per mean response on the research questions show that among all types of disasters in general, the flood scored 67% highest as a dominant disaster event followed by drought being responded by 60%. Tista Alluvium (AEZ 2 and 3) scored highest as disaster prone area of the country. There were some previous where some these events highlighting hail storm, tornado and excess rain were studied by several workers (Amin 1989; Amin 1992), which broadly conform the present findings on flood and drought.

Table 1. Types of Existing Disasters

Disasters	Tista Alluvium (AEZ 2 and 3)	Brahmaputra Alluvium (AEZ 7 and 8)	Ganges Alluvium (AEZ 10 and 13)	Mean
Cyclone	44	47	64	51.6
Flood	59	68	73	67.0
Drought	82	58	41	60.3
Hailstorm	39	44	27	37.0
Fog	75	51	43	56.0
Excess rain	63	73	42	59.0
Cold wave	84	49	28	54.0
Hot wave	61	54	36	50.0
Mean	63.3	55.5	44.2	54.3

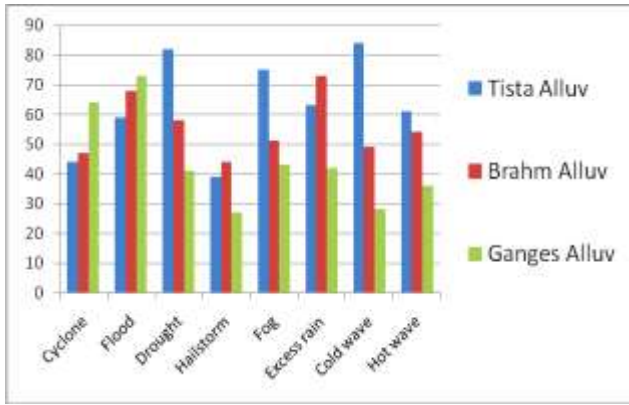


Fig. 1. Types of current major disaster Events

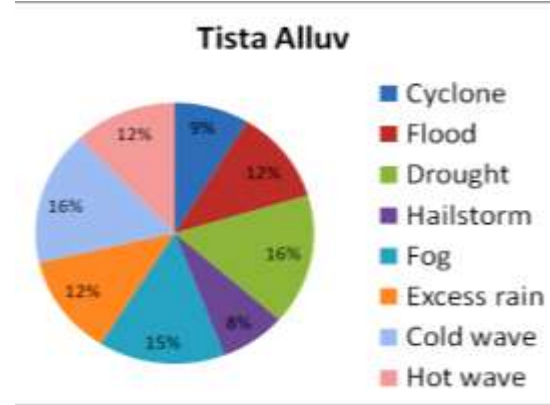


Fig. 2. Percent occurrence of current disasters

**Intensity of Disasters**

The results obtained on the intensity of disaster events in the country zones are presented here in Table 2 and Fig. 3 as intensive effects on livelihood, and extensive effects on livelihood in Table 3. The results on intensive types of disasters as given in (Table 2 and Fig. 3) show that the cyclone scored highest as disaster event (76%) followed by drought (60%). Disaster professional’s response scored highest as disaster prone area.

The results found on extensive types of disasters showed that drought scored highest as disaster event (73%) followed by flood (64%). Extension professional’s response scored highest as disaster prone area.

Table 2. Types of disasters that have intensive effects on livelihood

Disaster	Disaster professionals	Extension professionals	Public representatives	Mean
Cyclone	83	72	74	76.3
Flood	59	38	43	47.0
Drought	42	28	41	37.0
Hailstorm	59	56	67	61.0
Fog	53	51	45	50.0
Excess rain	63	43	62	56.0
Cold wave	64	49	48	54.0
Hot wave	31	54	36	40.0
Mean	56.7	48.8	52.0	52.5

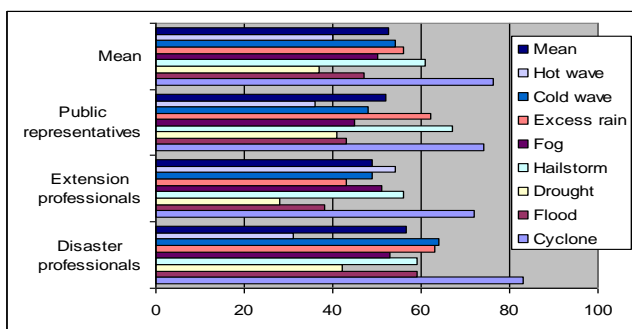


Fig. 3. Disasters that having intensive effects on livelihood

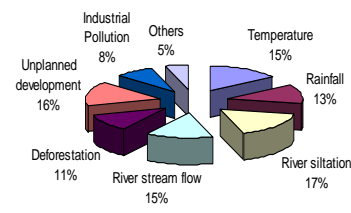


Fig. 4. Causes of disasters affecting livelihood

Table 3. Types of disasters that have extensive effects on livelihood

Disaster	Disaster professionals	Extension professionals	Public representatives	Mean
Cyclone	63	42	54	53.0
Flood	73	54	64	64.0
Drought	72	68	81	73.6
Hailstorm	29	36	47	37.0
Fog	46	31	45	41.0
Excess rain	53	43	67	54.0
Cold wave	54	49	48	50.0
Hot wave	31	44	36	37.0
Mean	52.6	45.8	55.2	51.2

### Causes of Disasters

There were so many causes which were recorded (Table 4 and Fig. 4) from time to time caused disasters at variable degrees and thus affected the common livelihood of the country.

Table 4. Causes of disasters affecting livelihood

Disaster causes	Tista Alluvium	Brahmaputra Alluvium	Ganges Alluvium	Mean
Temperature	78	74	55	69.0
Rainfall	52	65	53	57.0
River siltation	73	81	71	75.0
River stream flow	69	57	69	65.0
Deforestation	66	42	45	51.0
Unplanned development	78	72	63	71.0
Industrial pollution	33	41	36	37.0
Others	39	14	12	22.0
Mean	61.0	55.7	50.5	55.7

The results show that the major causes of disasters were river siltation scoring 75% as highest followed by unplanned and non-integrated development designs (71%) under progress in the country. The said causes were most prominent in the Tista Alluvium zone.

### The Focus Group Discussion (FGD) findings are briefly mentioned here:

The FGD findings surfaced some perceptual facts that legal part of the disaster administration were very limited. The acts and regulation documents found to be available frequently considered were by Schipper and Pelling, (2006); BEP Act (1995); BEC Act (1995); ECR (1997); Dilnahaar (2013); CDMP (2012); DMB (2003), but these were not sufficiently action transparent to the beneficiaries. Thus they recommended for awareness creation among vulnerable people and communities as per updated Act and regulation contents mentioning the rehabilitation strategies and insurance claims.

### CONCLUSION

As per results and the findings obtained from the present studies on Reduction of Disaster Risks for the Development of Bangladesh, it may be concluded that flood and drought were the dominant disaster event in Bangladesh. The Tista alluvium covering Active Tista Agro-Ecological Zone (AEZ) 2 and Tista Meander Floodplain AEZ 3 geographically dominated as disaster prone areas. Cyclone was found the principal disaster having intensive effects. Drought affected seriously the livelihood. River siltation induced disaster events significantly in the Tista alluvium areas. The legislative part of the environmental protection was found to be ignored in many developmental aspects including post-flood community rehabilitation; compensation and insurance coverage etc were less implemented. The public awareness on this legal requirement should be strengthened as per type and causes of the disaster events. Thus it was prioritized that the Early warning system to be strengthened, with active participation of community. The local NGOs direct intervention in conjunction with Local Government might be encouraged in this respect. Specific Local signaling system/early warning message dissemination procedure might be practiced in the area. Existing cross country cooperation on flood early warning systems should be strengthened. The vulnerability of communities living in the most disaster prone areas need to be reduced by the construction of community-managed, women and children friendly cyclone/flood shelters with basic water and sanitation facilities. Further researches are urgently needed on the updating and implementation of the environmental Acts and Government and Non-government disaster regulations.

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Note: Personal views of the author are reflected here.