

Contextualizing Disaster in Relation to Human Health in Bangladesh

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Abstract: The leading cause of health problems associated with environmental disasters in Bangladesh is water. The relationship between health and disaster is a well-discussed issue. However, health outcomes due to water use during and after environmental disasters are a context specific experience influenced by socio-political and economic factors. Although, the concept of social determinants of health are acknowledged, people's perception of relations between health and natural disaster are not documented yet, also being a function of complex socio-cultural processes. In the absence of such knowledge, this paper aims to examine some of the cultural dimensions of natural disasters and their impacts on health. Three disaster prone rural areas specifically relating to flood, drought, and cyclones in the country were chosen for data collection. It is suggested that health impacts on disasters and disaster impacts on health vary between rich and poor, male and female, dependent on the nature of the disaster event. Participants related disaster information with water supply, infrastructure and with illness. The study also shows the various health impacts of disasters on coping mechanisms. For example, people cope with disaster impacts through migration, changes in occupation, low consumption of food, taking loans, surviving on relief, and these mediate health risks. Borrowing food from relatives, neighbours, or shop-keepers is another strategy for disaster victims. The study includes some significant documentation of existing indigenous knowledge and views on this topic.

Key words: Disasters, health, Bangladesh, remedial.

Introduction

Bangladesh is among the most disaster prone countries in the world (ISDR, 2006; DFID, 2006). It has been identified as the most vulnerable country to tropical cyclones and the sixth most vulnerable country to floods (UNDP, 2004). With changes in the global climate the frequency and the intensity of extreme climatic events are likely to increase in Bangladesh (NAPA, 2005). Two successive floods and a super cyclone had hit Bangladesh in 2007 affecting the health and health security of the people.

In a context like Bangladesh where frequent impacts of cyclones, flood and drought are common phenomena every

year, it is no wonder that Bangladesh faces epidemics associated with these disasters. The impact of disaster on population, health and humanitarian actions is also an ongoing concern (Guha-Sapir, 2006). It is estimated that 85 percent of the people exposed to disaster-risks live in countries having either medium or low human development (UNDP, 2004). It is the developing countries that bear the burden of environmental disasters the most, which is probably due to poverty, illiteracy, cultural beliefs, poor governance and geographic locations. Vulnerability to natural disasters is also found to be derived from unplanned human settlements, poor construction, lack of adequate infrastructure, social inequality and poor environmental management (UNDP, 2004).

Background

On the one hand, its geographical location exposes Bangladesh to risks, whilst on the other hand its over population and poverty makes the country more vulnerable to disasters. A study conducted by ECHO shows that of the combined natural disasters in SAARC (South Asian Association for Regional Cooperation) and ASEAN (Association for South East Asian Nations) over the past 10 years, Bangladesh has accounted for nearly ninety percent of them while other countries in the region only ten percent (ADPC, 1990). The United Nations Development Programme (UNDP, 2004) has identified Bangladesh to be the most vulnerable country in the world to tropical cyclones and the sixth most vulnerable country to floods on the basis of deaths per 100,000 of people exposed to cyclone or floods. Bangladesh has suffered from mainly three types of environmental disasters: sea-based cyclones and storm-surges, land-based tornados and frequent flooding. In recent years frequent drought has been included in the list of prominent environmental disasters of Bangladesh (Alam, 1990). According to the Bangladesh State of the Environment Report (2001), other major disasters are flash floods, hailstorm and lightning, erosion, landslide and earthquake. The three major disaster categories of flood, cyclones and drought are water-related and have a direct connection with health. Either water quality or water quantity affects health conditions the most during these disaster periods in Bangladesh.

There is a wide range of impacts depending on the type of disaster the country or population faces. The health impacts are significant ranging from high levels

of deaths, injuries, diseases, disabilities and population displacement every year (BCHEPR, 1999). Some common factors which increase the health problems due to disasters in Bangladesh are communicable diseases, population displacement, climatic exposure, food and nutrition, water supply and sanitation, mental health, damage to health infrastructure and social reactions (Anwar, 2004). Table 1 focuses on a specific disaster, namely the flood during 2007 and its impacts on people and infrastructure. The impact on diarrheal disease incidence is also addressed.

Table 1: The 2007 flood of Bangladesh

<i>Nature of impact</i>	<i>Magnitude</i>
Population affected	7,588,509
Road damage	17,333 km
School damage	3,700
Bridges damaged	860
No. of people in temporary shelter	255,311

Source: Disaster Management Bureau, Government of Bangladesh, 2007

The ICDDR's Dhaka Hospital, specializing in the treatment of diarrhoea, has been serving the Dhaka community since 1962. It saw significant increase in number of patients in August 2007 during the country-wide flood (Figure 1). A record number of daily admissions occurred on 14th August when 1045 patients were admitted. From 1st–31st August 2007, the hospital provided treatment to 21,401 diarrhoea patients; this is almost three times the number seen over the same period in 2006 (7214) with diarrhoea reported from flood affected areas.

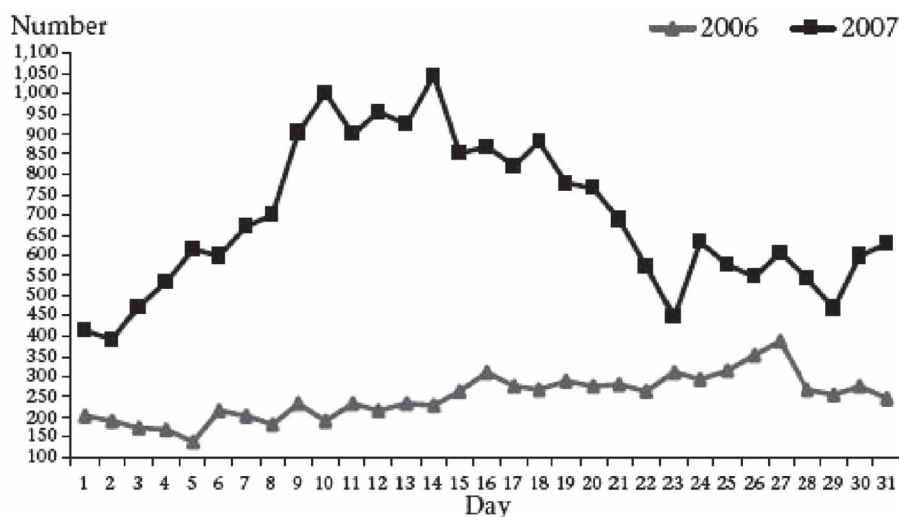


Figure 1: Number of patients admitted with severe diarrhoeal problems (2006-2007).

Source: ICDDR, Newsletter, October 2007

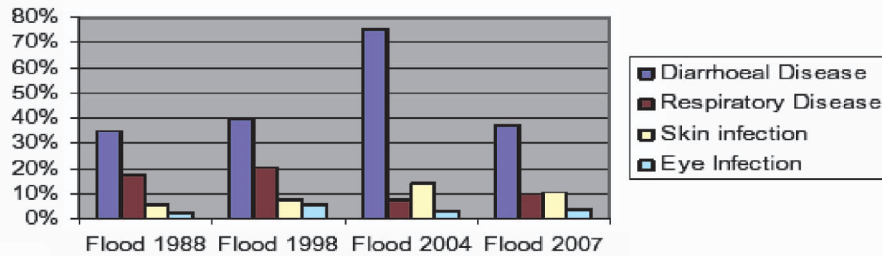


Figure 2: Percentage of major diseases of four big floods – Bangladesh.

Diarrhoea reached above 70 percent among all diseases in the floods of 2004, and in the remaining floods it reached an average of 35 percent (Figure 2). The percentages of other diseases are not included in this chart.

Objectives

It is suspected that health outcomes due to water during environmental disasters are a context specific experience, which is influenced by socio-political, economic and governance factors. However, although the concept of social determinants of health are acknowledged, lay people's perception of relations between health and environmental disaster are not yet documented, remaining to be analysed in terms of complex socio-cultural processes. This paper comments on cultural dimensions of environmental disasters and their impacts on health as a way to understanding these less revealed interrelationships. It should be noted here that as this paper is based mainly on qualitative data, quantification played a subordinate role here. We present people's perceived concerns, views and ideas around health and disaster from a few locations in Bangladesh.

Methodology

This paper is based on a broader study, which aimed to define 'health security' in the context of disaster resilience. In the broader study, mixed methods for data collection were applied using both qualitative and quantitative tools. It included 10 exploratory interviews, 18 focus group discussions, 631 household based questionnaires, 32 further in-depth interviews, 15 open discussion sessions, and 15 household participant observation exercises. The fieldwork was designed and conducted by a research team from ICDDR, B and Northumbria University. The research design included eliciting indigenous knowledge that included the three specific natural disasters addressed by this paper, namely flood, cyclone and drought in relation to health. The study

was carried out in three purposively selected disaster prone areas in Bangladesh – Matlab, Chakaria and Nilphamari (Figure 3). Nilphamari was selected for its known aridity, Matlab for its regular occurrence of flood in that area and Chakaria for its closeness to the coastal belt which makes it susceptible to tidal surge, cyclone and flash flood. Three villages at each of these sites were also purposively selected for data collection. Half of the respondents were assessed as economically very poor whilst the other half were considered non-poor. Among each group, 50 percent were female and the rest were male respondents. Forty percent were older age respondents whilst the rest were in their reproductive age. The field work took place between 2007 and 2008.

The data from the household surveys were analyzed using SPSS and MINITAB as preferred and the qualitative data translated, transcribed and coded using Atlasti.



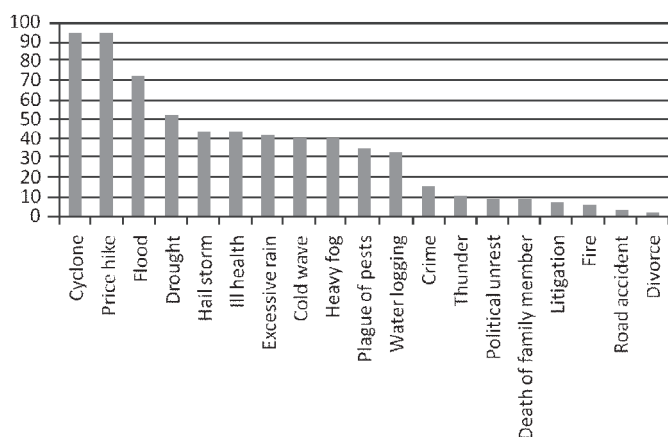


Figure 4: Experience of disaster in three rural areas.

Before discussing health impacts in disaster, this study aimed to conceptualise the issue of disaster and what it meant to people at the local level in terms of their experiences. Figure 4 shows the resultant finding that people consider not only natural hazards but many other problems in their life as disasters, for example, price hike, ill health, crime and so on.

Environmental Disasters in Case Studies

The floods in Chakaria are not seen as typical floods, but rather as “flash floods” that cause numerous problems to the daily life of residents, and are the most commonly occurring hazard in Chakaria. Apart from floods, climatic depressions, windstorms, excessive rain and cyclone are other natural hazards that are affecting the inhabitants in most of the coastal area of Bangladesh. The main reason for these flash floods is the river Matamuhuri that overflows due to heavy rain and introduces several flash floods throughout the year.

Unlike many other places in Bangladesh, people in Domar experience some disasters each year which cannot be thought of as conventional natural disasters. Drought, hailstorm, untimely rain, water logging all result in crop failure and are considered major disasters in Domar. Moreover, these disasters are also directly causing another disaster category called “*Monga*” (famine), the most critical one of all in this region. The residents of Domar

predominantly believe in religious influences on such disasters in this area. They believe that as they are not following the exact way of life prescribed by Allah, these disasters are coming towards them each year as punishment.

Flood is the most recurrent environmental hazard in Matlab. The devastating force of the flood blows away the houses, trees, live stocks and also destroys field crops ruthlessly. Apart from flood, strong wind has also shown a devastating effect causing immense problems to the residents of Matlab. Excessive rain along with water logging during the rainy season, cyclones and hailstorms in summer are the other environmental disasters taking place in Matlab. Floods in Matlab are usually long lasting floods that can stay up to 15-20 days.

The environmental events referred to here have various impacts on victims, including in relation to their health. The impact varies according to the type of disaster, socio-economic status, and gender. The survey sample revealed the distribution of male, female as well as rich and poor in the three study areas as shown in Table 2.

Table 2 shows the poor to be a predominant group in these areas. It was found that during the flash floods of Chakaria the most affected are the poor, women, children and the elderly. It was observed that the women become more severely affected than the men in disasters because of the responsibilities they perform including collecting water, cooking food, taking care of children, looking after the livestock and other assets. The female respondents reported that during flood they have to walk in the contaminated flood water often to distant places to collect drinking water. When flood water enters the house they have to move in the clogged water to carry out household tasks, to take care of children and livestock. This makes them more prone to sickness, including diarrhoea, respiratory infections and skin diseases. Women participants also mentioned that over-work and less food due to disaster make them weak. They referred to sleeplessness, as one has to take care of the small children at home so that they do not get drowned or get sick from the contaminated water. As women, children and elderly people are confined at home, they are notably less mobile than the males, which increases their vulnerability and

Table 2: Wealth distribution by area and gender

	Matlab		Chakaria		Nilphamari		All		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Poor	32 (64)	145 (99.3)	36 (48.6)	117 (96.7)	75 (52.4)	96 (99)	143 (53.6)	358 (98.4)	501 (79.4)
Rich	18 (36)	1 (0.7)	38 (51.4)	4 (3.3)	68 (47.6)	1 (1)	124 (46.4)	6 (1.6)	130 (10.6)

suffering, as an old woman among one of the participants at Chakaria said: "...in the last flood it was raining all night and water was gathering fast. All night I was awake to look after our cow. I was telling the cow not to get scared of being drowned in the flood water because I was taking care of him and I would shift him inside our house if the flood water increased. I remained awake the whole night. It is a big concern for us to move our cattle and poultry to a safe place when it floods and also when wind storms occur."

On the other hand, males were more focused in describing their losses in agriculture, destruction of roads and transportation. Some women were of the opinion that men and women suffer equally during disaster. One poor woman in Matlab said: "Both men and women suffer equally. The men work outside so they suffer in a different way. They have to work in the rain and water on the ground. When crops in the fields get damaged, the men have to sow it again. In such cases women also have to work in the crop fields. Both men and women suffer when a disaster strikes."

The poor people not only face economic crisis but also physical and mental setback. Although, in the questionnaire survey people spoke little about the mental impacts, interestingly in our qualitative data, there were lots of evidence of people speaking of different kinds of mental impacts of disaster incidents. The data show that poverty and falling into poverty are key risk factors for mental stress. Droughts occur in the northern part of the country, leading to failing crops, loss of livestock, food crisis, and impoverishment. The data show that stress due to failing crops, loss of livestock, and impoverishment has mental health consequences in rural Bangladesh. The respondents informed that the frustration, tension, fear and depression that they feel in pre, post and during disaster situations are factors that cause physical illness.

It was found that due to several flash floods in a year, the farmers could not harvest a single crop although they planted four times last year. The main problem that arises during these disasters that impacts on vulnerability to ill-health are food shortages, the poor being kept in a state of near-starvation. The impact of environmental hazards, especially on the water supply and sanitation facilities has added more miseries to the residents in Chakaria. Most of the people have access to tube well water. Although we do not have an estimation of how many tube wells got damaged during the floods, many of our respondents mentioned that tube wells go under water and that people suffer a lot due to lack of drinking water. At that time they are forced to use the flood water

which is contaminated and so acquire diseases. The sanitation system is also challenged at that time and destruction of most of the sanitary latrines cause people to defecate in open space. Since they have no technology to clean flood water to use for daily activities, even when the flood is over, they have to wait for the rain to wash away the stagnant flood water which further increases the health risks. A respondent (a poor female) in Chakaria expressed: "When flood water recedes we use water of the canal and water of the ditches by the roadside. Water of those remains muddy after the flood for two months. When it rains after the flood the mud goes down and the water become clear."

Health problems during the floods include diarrhoea, colds, fevers, skin diseases, pneumonia, malaria, rheumatic fever and additional health complications. Children suffer most from diarrhoea and pneumonia, whilst rheumatic fever is seen mostly in elderly people. Skin disease is very common amongst both males and females who are equally affected. However, the indirect, though critical, affects of flood are the constant weak health of the people due to lack of available food and proper nutrition.

The respondents of Domar mentioned that one of their major concerns during disaster is the loss of their crops. Because of too much rain, all the crops go beneath water and they face enormous food crises in the aftermath. Along with these, thunder and hail storms also result in crop failure. During hailstorm, the roof of the house of poor people often doesn't protect them and some get injured. The *monga*, which is seen immediately after drought, brings numerous sufferings to people in the form of crisis of food and water. The most devastating disasters in Domar, drought and *monga*, are resulting in poor health condition across the community. Undoubtedly, poor people are the most affected. The major health problems during the drought and *monga* here are diarrhoea, cholera, dysentery, and fever.

During *monga*, intake of food varies across the community. The caloric intake of the respondents was not measured. However, from the accounts of the respondents it was evident that in some seasons they eat less than usual, such as when there are environmental disasters and in the more regular cycle of the lean season. It was explained by an elderly female in a group discussion as follows: "There are more food available during the month of Boishakh and Agrahayan (April and November). We call the Agrahayan 'good month' because we harvest paddy and usually people have more to eat at that period of the year. But the month of Kartik is the lean period. In the months of Arshin (September-October)

and Kartik (October- November) there is no work in the field and people wait for the harvest. This is the time of the year when there is less work and money. We sometimes eat once in those days.”

The poor usually take food only once per day or starve during *monga*, which leads to people feeling sick and weak. This ultimately has impacts on their nutritional status. The situation is not the same for the non-poor families. Those who have money lead better life even during *monga* by storing the food. They can buy fruit and vegetables as they have purchasing power, but the poor can't afford to buy those. The primary affect of flood in Matlab is the loss of crops, destruction of shabby, tin-build houses, loss or death of livestock. At that time, they also suffer from the crisis of food, together with shortage of firewood. Because of a lack of firewood, or dry firewood, they cannot cook for the family and feed the children. In addition, price hike poses a serious problem particularly for low income earners. Like *monga* in Domar lack of food causes malnutrition among the people of Matlab. Although most of the people use concrete-made latrines in the village, during flood most of these go under water. Thus the sanitation system faces serious challenges during the floods. The water supply system through tube wells is also disrupted. Management of drinking water during flood is another very crucial aspect that some women handle very skillfully. They store the rain water and use it for household purposes rather than using contaminated open water (pond water or river water).

Health, Water and Disaster

Water contamination and living in the contaminated water during flood are perceived as the main reasons for health vulnerabilities that in many ways define the disaster situation. However, lack of water during drought or injuries during cyclone or tornado also give rise to different kinds of health problems. In people's perception, flood water can be divided into 'new water' and 'contaminated water'. When the water starts to rise at the beginning of the rainy season it is called "new water (*notun pani*)". According to the informants this "new water" causes different diseases like fever, cold, ear infections and typhoid. On the other hand when the flood water stays for days then this water is called contaminated water. According to the respondents this water also causes the same diseases, but in addition it leads to diarrhoea and dysentery outbreaks, and health problems such as jaundice and skin diseases. During floods there is scarcity of drinking water. It is believed that if pure water was available, and people wouldn't have to walk in the water

then they would not become ill. A poor woman said: "People get sick because of the contaminated water during flood. Flood brings different 'colours of water' (*nana ronger pani*) and the latrines also get flooded. There are also increasing numbers of mosquitoes and flies during flood which causes diseases."

Health Seeking Behaviour

When people fall sick during or after disaster, the health seeking behaviour of these people will vary with their socio-economic status. The non-poor prefer to seek care from the local MBBS doctors of the market, but for diseases that they perceive to be less serious, they usually go to a village doctor. The poor female and elderly women usually take herbal medicine like leaves of *bashok*, *nim*, or *pouri* for diseases such as common cold, diarrhoea, fever and skin diseases. They only go to hospitals, doctors or biomedicine shop keepers if they have acquired serious disease. The role of traditional healers in the communities is found to be getting limited slowly and steadily as people have more faith in biomedicine. But still spiritual healers are the first choice for people who are sick due to evil wind (*alga batash*) or witchcraft (*jadutona*).

In Domar, the poor females usually take home remedies first and if the problem persists then go for herbal treatment. Only when the person is severely sick, they usually take him/her to the doctor, since the payment to visit a doctor is very high. But the non-poor males and females prefer to take the treatments of the doctors when it is needed. Some of them also prefer herbal treatment for some diseases. The elderly women still prefer to treat diseases with herbal leaves though they feel that these leaves are not working as they used to work. As an elder woman said: "*Kuranir oshudh*" (herbal medicine) does not work anymore because people do not have faith in it any more."

They believe that people are losing faith in traditional and spiritual healers these days. They also believe that the power or quality of herbal medicines has decreased. There is a belief that the reason for this is an overuse of fertilizer in comparison to previous times. People of Matlab also have similar health seeking behaviour. In most cases, the poor female starts home-based care at first and takes herbal medicines as treatment. In some cases, they take treatment from the pharmacy of the local market and if the disease persists, they finally end up reaching the doctor. In Matlab in general, home remedies in the form of herbal medicine are the first choice of treatment across the community but it is also perceived by most that the treatment offered by the informal sector is decreasing day by day. Availability of various health

facilities in the form of village doctors, pharmacy, MBBS doctors, hospitals, and clinics are playing a role for reducing the demand of traditional healers and other spiritual healers. The health seeking pathway does not differ much between the pre or post disaster period.

Poor Governance

It was found that poor governance is a factor that has impacted on people's health outcomes, whilst potentially playing a role in dealing with health problems. Although we do not have the exact number of tube wells, according to the respondents, they are not enough, and their management inadequate. Respondents mentioned that the government installed tube wells are often not put on higher ground or in a public place such as a school or mosque. It has been reported that influential people in the locality often put the government funded tube well near their house for which it becomes inconvenient for other people to use it. In addition, at Matlab a poor male described that "We have only one arsenic-free tube well in our entire village".

There are irregularities and unavailability of doctors and medicines in government health facilities. It is found that 10.9 percent of the males and 17.7 percent of the females go to the government hospital for treatment and 10.5 percent of the males and 8.3 percent of the females reported to go to the Union Health Complex. 16.9 percent of the males and 15.7 percent of females take health care from Upazila (Local Administrative Unit) Health Complex. The reason why low percentages of people go to government health facilities is due to the unavailability of doctors and medicines. One of the respondents reported, "We have only one public hospital in the whole union. If we go there we have to wait for a long time and usually there is no doctor in that government hospital. So no matter how long it takes we have to go to Matlab main town for treatment even if it takes 4/5 hours. To secure our better health the service delivery system at the government hospitals needs to be improved."

The people who live inside the embankment in Matlab reported that although the frequency and intensity of flooding reduced because of building the embankment they are facing water logging problems now. Government office (WAPDA) has a pump machine to reduce (move away) the water inside the embankment. But they always delay. There is a canal to carry water to the field during the "iri season" and to remove the water during rainy season by using the pump machine. But the government officials do not perform this task when needed. It was reported that the government officials actually sell out the diesel such that they cannot run the pump machine

when needed. In Domar one of the government officials described that for the last 10 years there has been intensification and diversification of agriculture in the region for which there are growing needs of agricultural input including water for irrigation. But these technologies and the seeds of hybrid crops, pesticides, and all the things necessary for cultivation, are arranged by the people themselves. Although people are receiving little support, the government is reported to be not doing much relative to the scale of the need. Some NGOs are providing information and at times seeds or plants, but the rest of the agricultural input is arranged by the cultivators.

Discussion and Conclusion

To examine people's perception of disasters and their impacts on health this study has addressed generic aspects of three water-related environmental disasters in three different sites. It has covered various impacts of the different disasters, related health-seeking behaviour and different disaster-related illnesses. It is found that the leading cause of health problems as a result of environmental disasters in Bangladesh is water. The health problem arises either from water quality or water quantity through increased exposure to risk factors, or through increased vulnerability. In some areas health problems arise from water scarcity, whilst in other places the reason for health problems is water pollution. This gives rise to water-borne diseases. Another health consequence related to water is malnutrition.

The study highlights a strong relationship between environmental disasters, specifically drought and floods, on human health. In case of the rapid onset disasters, such as cyclones, massive injuries and casualties take place requiring immediate medical care, while slow onset disasters such as floods and droughts cause longer term health effects. In the case of floods the risks of increased disease transmission takes relatively longer to develop and diseases spread where there is overcrowding and lower standards of sanitation and disruptions to getting safe water. This study reconfirmed the findings of Rahman and Ahmad (1991) that in Bangladesh the major health hazards caused by floods and drought are increased diarrhoea, dysentery, hepatitis, typhoid, skin infections and other conditions such as worm infestations

Droughts, which impact on water quantity, can cause food shortage which may lead to malnutrition and related illnesses. Flood can also have an impact on people's nutrition as it causes changes in the food habit of the people in terms of frequency of intake, quantity and

quality, mainly due to lack of fuel. Masud et al. (1999) found the same impact in their study. It is interesting to observe that not only rural areas but also similar impacts of flood have been found in studies done in urban slums (Zaman, 1999; Rashid, 1999). It was also observed that the impacts of environmental disaster on health vary between populations depending on their physical, economic, political and social factors and the type of disaster event. Consequently, the poor, women, children and elderly are major victims of disasters here. This finding corresponds with results from Karim (1999) and Kunii et al. (2002). Although in decline, traditional medicine was found to be the major resort in people's health seeking behaviour. However, the possibility of reducing medical, surgical and nutritional consequences of disasters was mainly, if not entirely, with the Government's health sector.

Ensuring health for the affected community during disaster situations, when communications are disrupted, logistics were hindered and the infrastructure support of the health sector itself suffered the turmoil of devastation, was a momentous responsibility for the Government's health sector. It has suffered not only for want of adequate resources, but also for lack of an effective mechanism for disaster preparedness and management of response (Ministry of Health and Family Welfare, Government of Bangladesh, 1992). The current study shows that there are failures in the governance of interventions during disaster. It was found that there are inadequate public health facilities in the disaster affected area including inadequate human resources and a lack of a secure medical supply. As a result it can also be argued that poor governance is a reason for increased health risks in these disaster affected areas, and that this has a negative impact on coping mechanisms. People clearly establish a relationship between health and disaster and people's disaster experience is shaped by his or her socio-economic status. We suggest that in order to develop a suitable disaster mitigation programme it is crucial to take variable contexts, people's experiences and particular perspectives into consideration.

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