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HEALTH AND ECONOMIC IMPACTS OF CLIMATE CHANGE IN RURAL BANGLADESH AND OPTIONS TO GO THROUGH

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Abstract

Bangladesh is one of the most vulnerable countries due to its unfavorable geographic location, flat and low-lying terrain, dense population, and high levels of poverty. This research aims to evaluate the effects of climate change on the availability of water, housing, financial support, sanitation, and health status in Bangladesh's southwest coastal area and to investigate adaptation options. A descriptive cross-sectional study was conducted in a disaster-prone village *Pratapnagar* of Assasuni Upazila in Satkhira, Bangladesh from September to October 2021. A questionnaire survey was conducted to 100 male respondents 30-70 years of age who were suffering because of a breach of the embankment and could not recover from the loss due to supercyclone Amphan (category 5) from May 16 to May 21, 2020. The mean age of the respondents was 42 years (SD = 9.14). Fishing is the main source of income for 46% of the respondents. The study also revealed that 40% of the respondents had lost their dwellings and are still submerged in water, and 32% of the respondents have lost their agricultural land. 55% of respondents have lost their livestock and 35% of the respondents use riverside open toilets; while 55% do use toilets but water submerges the toilets during high tide. During the last 2 months of the study period, 82% of respondents had recurrent diarrhea, 42% had respiratory diseases and 32% have been infected with skin diseases. Assasuni was the victim Upazila, where cyclone Amphan hit, and most of the drinking water sources were devastated. This socio-economic impact falls not only on the people in the coastal belt but also on the people of the whole country.

Keywords: Climate change, Health impact, Protapnagar, Assasuni, Bangladesh

Introduction

Satkhira is one of the most vulnerable districts in Bangladesh and is linked to salinity intrusion, tidal flooding, water logging, cyclones and storm surges, and drought. Satkhira's main sources of revenue include agriculture, fishing, and livestock. However, climate-induced rapid and slow-onset disasters damaged the natural ecology in this area, making life and livelihoods more difficult for the inhabitants (Rahaman et al., 2019; Islam et al.,2013). Temperature variations, unpredictable rainfall patterns, salinity intrusion, droughts, extreme heat waves, and cyclones during the last decade such as Cyclone Sidr (2007), Cyclone Bijli, Cyclone Aila (2009), Cyclone Mahasen (2013), Cyclone Roanu (2016), Cyclone Fani and Cyclone Bulbul (2019), and Cyclone Amphan (2020), has made their lives and livelihoods of the inhabitants miserable (Kabir et al., 2014).

The effects of climate change might be both direct and indirect. It has detrimental effects on human health, fishing biology, aquatic ecosystems, and freshwater resources and also increased incidences of water-borne diseases e.g., diarrhea, cholera, dysentery, etc. The most recent super cyclonic tropical storm, Amphan, caused significant damage in Bangladesh and West Bengal. Amphan began as a low-pressure area on May 13, 2020, around 300 kilometers (200 miles) east of Colombo, Sri Lanka. It soon strengthened into an exceptionally violent cyclonic storm on May 17, 2020. Over a million people were affected in Bangladesh across nine districts in the divisions of Khulna and Barisal, with deaths and damage to houses, infrastructure, livelihoods, and water and sanitation facilities, with

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approximately 18,235 water points and 40,894 latrines destroyed in the most impacted districts. (IFRC., 2020). Therefore, this study's goal is to provide information on how people may protect themselves from climate change and determine its harmful effects on health.

Materials and Methods

A descriptive cross-sectional study was carried out in a most vulnerable coastal village, namely, *Pratapnagar* of Assasuni Upazila in Satkhira district during September-October, 2021. Cyclone Amphan washed away several points of the Kopotakkho and Kholpetua river embankments in May 2020. Approximately 30,000 residents in Assasuni Upazila in Satkhira are still living in temporary huts on the embankments of the upazila's Protapnagar union after losing their homes to the Kopotakkho River. One hundred male respondents 30-70 years of age were selected through judgmental sampling and a structured questionnaires survey was done to understand the financial losses the respondents suffered in the wake of the natural catastrophe, how they dealt with such climate change-related disasters, how the natural calamities affected their patterns of livelihood, their health, and other aspects.

Results and Discussion

The study focuses on coastal households residing at *Protapnagar* village of Assasuni Upazila under the Satkhira district. The result showed that Among 100 respondents, the mean age of the respondents was 42 (SD = 9.14). Fishing is the main source of income for 46% of respondents.

Table 1. Socio-demographic characteristics

Age interval	**Number of respondents**
30-39	49 (49%)
40-49	35 (35%)
50-59	08 (08%)
60-69	08 (08%)
Total	100 (100%)
Source of income	
Fishing	46 (46%)
Brickfield	24 (24%)
Van puller	14 (14%)
Labour	16 (16%)
Total	100 (100%)
Monthly income (Taka)	**Numbers of family**
<10000	62 (62%)
>10000	38 (38%)
Total	100 (100%)

Table 2. Economic loss for breaking the embankment

Economic loss	Number of respondents
Loss of Home	
Submerged underwater	40 (40%)
Washed away in the river	18 (18%)
Tidal water comes into the homes	30 (30%)
Being repaired	22 (22%)
Total	100 (100%)
Loss of agricultural land	
Yes	32 (32%)
No	68 (68%)
Total	100 (100%)
Loss of livestock	
Yes	55 (55%)
No	45 (45%)
Total	100 (100%)
Loss of ponds	
Yes	25 (25%)
No	75 (75%)
Total	100 (100%)

Water, sanitation, hygiene, and healthcare facilities are crucial for human health and well-being because their absence impairs quality of life and impedes basic human rights. In the present study, 40% of the respondents' houses are still underwater, and 32% of respondents have lost their agricultural land. 55% of respondents have lost their livestock. Around 30,000 residents in Assasuni Upazila in Satkhira are still living with high tides nearly 15 months after supercyclone Amphan. Coastal embankments are important for protecting human habitats and croplands. As well they are important in increasing agricultural yields and enhancing coastal livelihoods. The coastal region has a larger proportion of the population living below the absolute poverty line than the rest of the country (Imam et al., 2021).

The result showed that during the last 2 months after Amphan hitting the region people in the *Protapnagar* and *Kurikaunia* villages have been more affected by various diseases. Due to several natural calamities, the weather was not favorable for keeping people healthy. In the present study, 82% of the respondents had suffered from diarrhea during the last 2 months after Amphan presumably because of contamination of potable water due to salinity (Kabir et al., 2014). Similar findings were recorded in West Bengal's Midnapur area, where diarrhea was the most prevalent morbidity among flood-prone residents. The incidence of diarrhea, other enteric disorders, and respiratory infections was found to be considerably greater ($p<.05$) among cyclone-affected residents compared to those who were not. (Biswas et al., 1999).

Table 3. Number of responders who had a sickness in the previous two months

Disease	Number of respondents (%)
Diarrhea	
Yes	82 (82%)
No	18 (18%)
Fever and respiratory infection	
Yes	
No	42 (42%)
	58 (58%)
Skin disease	
Yes	32 (32%)
No	68 (68%)
Conjunctivitis	
Yes	40(40%)
No	60(60%)
Ear infection	
Yes	35 (35%)
No	65 (65%)
Total	100 (100%)

In the present study, 75% of respondents developed fever and respiratory infection during the last 2 months after the Amphan respectively. They did not classify the fever whether that was dengue or typhoid fever. Overcrowding, inadequate ventilation, and poor nutrition can all raise the risk of respiratory illnesses, especially in crowded shelters during the winter. The current study shows, that 62% of respondents had skin disease where in most cases, superficial fungal infection and bacterial skin infection were responsible. Several of these illnesses were identified clinically and lack microbiologic or laboratory validation. Bacterial colonization on macerated skin may have risen due to excessive exposure to polluted water, friction, high humidity, and an unsanitary atmosphere.

Table 4. Number of respondents according to the source of drinking water and condition of latrine

Source of drinking water	Number of families (%)
Tubewell	75 (75%)
Pond+Tubewell	19 (19%)
Rain water	06 (06%)
Condition of latrine	**Number of families (%)**
Riverside open toilet	35 (35%)
Tidal water comes into the toilet	55 (25%)
Repaired but unhygienic	10 (10%)
Total	**100 (100%)**

The sanitary status of the coastal region differs from that of the rest of the country in many ways. Many villages are still far from having complete sanitary coverage. Assasuni represents one of the rural communities with inadequate sanitation. According to the field study results, 35% of respondents used the riverbank open toilet, and 55% utilized the toilet, but water enters the toilet during high tide. The coastal area's drinking water supplies are harmed by topographical disadvantages and are frequently subjected to natural hazards. According to the current study, tube wells constitute the primary drinking water source for 75% of the households in the study region. Despite the fact that these

individuals face several issues as a result of natural disasters, they travel long distances seeking better drinking water in locations where tube wells are plentiful.

Conclusions

The coastal zone of Bangladesh is very prone to natural disasters. People on the coast almost yearly lose their valuable property and lives due to the cyclone. Early recovery and reconstruction efforts will be required for a medium to long term (06 to 12 months) to repair damaged infrastructure, particularly embankments, roads, buildings, safe drinking water supplies, sanitary facilities, etc. Priority should be given to restoring livelihoods, rehabilitating agricultural land affected by saline water, and enhancing preparedness and community support mechanisms.

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Conflict of Interest

The authors declare no conflict of interest.

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