

## Climate change and its impact on health and livelihood within Hatiya Island of Bangladesh

**Md. Rafiqul Alam**

Executive Director, Dwip Unnayan Sangstha (DUS), Hatiya, Noakhali, Bangladesh, E-mail: dusdhaka@gmail.com

**Abstract:** The coastal region in Bangladesh is characterized by a constantly changing geographic and geomorphologic volatile situation which is extremely vulnerable to natural disasters triggered by climate change. Geographically, Bangladesh, being the largest delta in the world is situated in the mouth of the Indian Ocean and the Bay of Bengal, one of the toughest bays in the world generating terrible natural calamities i.e. cyclonic storm, tidal surge and floods. The coastal zone which is about one-fourth of the total land frequently become prey of the terrible natural disasters leaving devastating impacts on life and livelihood of many coastal habitants for thousands years past. The study has been carried out to assist the policy makers and the program managers of both public and private sectors, to gain an in-depth understanding of the perception of the community and individual about different aspect and impact of climate change. In order to conduct the aforesaid study, both quantitative and qualitative approaches of social research have been adopted to capture a comprehensive picture of the adversity of the natural calamities affecting socio-economic condition, life and livelihood pattern and health hazards of the island residents induced by climate change.

**Key words:** Coastal zone, climate change, livelihood, migration, health, Hatiya island.

### Introduction

Climate change is not just an environmental issue it is also a health issue. The major health threats due to climate change are caused by changing patterns of disease, water and food insecurity, vulnerable shelter and human settlements, extreme climatic events, and population growth and migration. The recent study conducted by HASAB (HIV/AIDS and STD Alliance Bangladesh) showed more terrifying figure of climate change induced forced migrants that one in every 45 people in the world and one in every seven people in Bangladesh may be displaced by climate change by 2050 (Ahmed 2011). Migration of people to a newer place will adversely affect their basic needs like food, health, education etc. With appropriate climate change adaptation policy, we can lessen their sufferings and protect their basic rights.

The major health threats posed on climate migrants due to poor air quality, inadequate safe water, improper sanitation, untreated solid waste, agro-chemical and industrial effluents and overuse of renewable resources such as forests and fisheries. Health includes physical, social and psychological wellbeing. Populations with high rates of disease and debility cope less successfully with stresses of all kinds, including those related to climate change. Malnutrition is another major health consequences suffered by the migrants. Due to dislocation they lose their job which drags them into serious food insecurity that ultimately leads to malnutrition. Following natural disasters such as flood and cyclones, the condition triggers further.

Policies on adaptation and mitigation need to focus on reducing people's vulnerability to climate change, supporting them by moving away from marginal areas and arranging alternative livelihoods to make them more resilient.

This study tries to examine the empirical evidence on the nature of present and possible climate change induced health and migration challenges and vulnerabilities of the coastal people of Bangladesh with emphasis on women children, as well as to understand their adaptive capacity to climate threats. The specific of the study include the followings:

1. To compile patterns and evidence on the impacts of climate change and disaster effects on health and migration in the coastal islands of Bangladesh.

2. To understand people's vulnerability, their adaptive capacity and how national programs and policy influence can improve their ability to cope with future climate change.
3. To assess human insecurities caused by climate-change induced migration including impacts on livelihoods and income, loss of social capital, impact on traditional coping mechanisms, impact on already marginalized groups.
4. To provide recommendations for further research on the availability and appropriateness of data, gaps in knowledge, and relevant policy gaps relating to health, migration and climate change.

### Methodology

A comprehensive methodology incorporating both quantitative and qualitative approaches of social research was followed for the purpose of undertaking the study. In order to collect and manage information, the following methods were adopted to carry out the study:

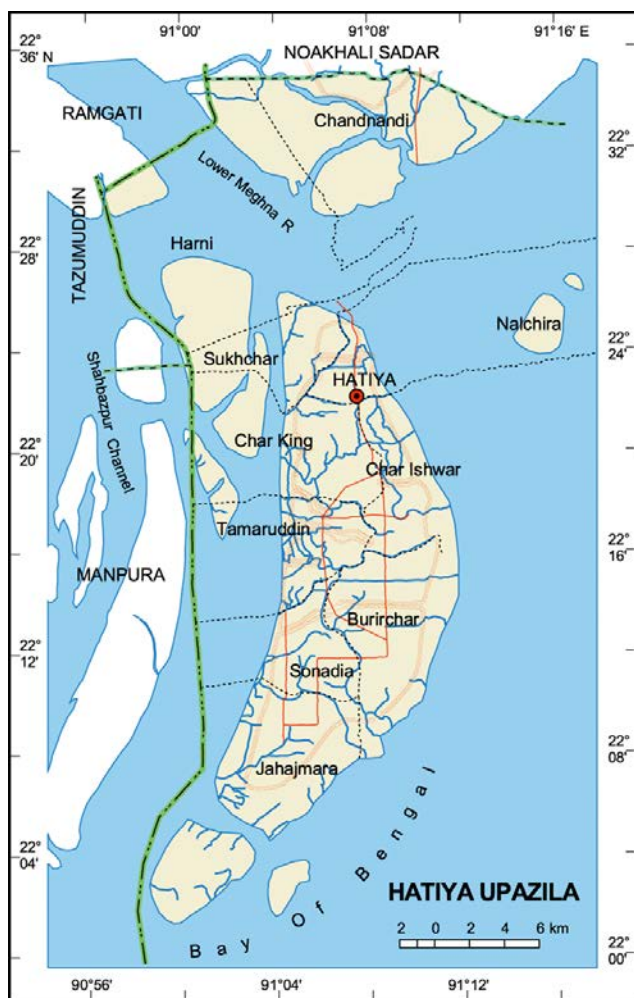
1. Data/information collection from 450 households during December 2011 and different secondary sources.
2. Focus Group Discussions (FGD), interviews with Management and Policy makers of various Govt and non-Govt departments/stakeholders/service providers, staff, beneficiaries and other relevant stakeholders directly and indirectly associated with climate related issues/situation.

**Study Area:** Hatiya is an island also an Upazila of Noakhali District having 10 Unions and 69 villages (Fig. 1). The 1991 census of Bangladesh Bureau of Statistics (BBS) shows Hatiya has a population of 295,501. Males constitute are 50.73% of the population, and females 49.27%. This Upazila's 18+ population is 125,512. Hatiya has an average literacy rate of 21% (7+ years), and the national average of 32.4% literate. It has 47,970 units of house hold and total area 1,508.23 km<sup>2</sup>. Subarnachar is one of the 11 upazillas of Noakhali District. It has 8 unions. Monpura island is a upazila under Bhola district. About 1 lac people reside in this 373 square kilometer island. There are 4 unions under this upazila.

The common characteristics of the Hatiya and adjoining Islands are as follows.

1. Crossed and influenced by the Meghna river system and Bay of Bengal.

2. Many river basin char lands where flood, wave, diseases, crop losses, safe water security etc. are problems and hazards.
3. Highly vulnerable to cyclonic storm, tidal surge and riverbank erosion. Cyclone SIDR in 2007 and AILA in 2009 caused heavy destruction and damages to people (30% of households were heavily affected and over 25,000 households comprise over 100 thousands population lost homes, crops, movable assets, livestock and including means of income).
4. Many people became landless, extreme poor and the other common population depends mainly on agriculture, agriculture related trading, fishing and livestock rearing.
5. Infra-structures, safe water, sanitation, health care facilities, children schools and communication are inadequate. There are minimum safe shelter where people can take shelter during emergency situations.



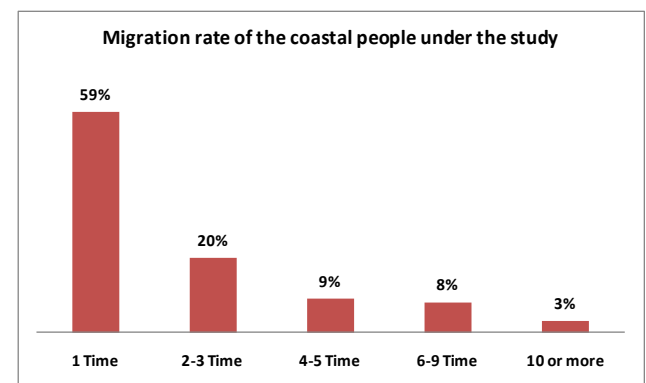
**Fig. 1.** Hatiya island, Source: Hatiya Upazila Parishad (Ministry of Land, 2011)

### Major Findings

**Socio-economic condition:** The socio-economic condition of the coastal area is very unsatisfactory, mostly they are deprived of modern amenities of life and livelihood. Most of the respondents' average monthly income is between BDT 2,500 to 4,999 while 32% have BDT 5,000 to 7,499, (1 USD= 80 BDT). Among the respondents 11% have an average monthly income of BDT 7,500 to 9,999. Only 6%

respondents said they had an average income of BDT 10,000-15,000 and the least 2% have only more than BDT 15,000 as monthly income. The condition of the living houses is also miserable in the coastal areas since they have to repair or re-build their houses frequently since they are regular victim of cyclones, tidal surge and riverbank erosion off and on. 89% houses are roofed with CI sheet (tin) while 11% are made of straw. The floor of the most of the houses (89%) is also made of earth while only 11% have a brick and cement composition. The study reveals only 44% of the respondents have their own cultivable land whereas 24% have to depend on 'Borga' (share cropping). Of the respondents 5% have some leased land while 44% could not respond in this regard meaning they have no land of their own. Most of the marginalized family are out of NGO credit system where middle class and lower middle class have joined micro-finance programs under cooperative and NGO services.

**Frequent Shifting and Migration:** The study shows severe adverse effects of climate changes on the life and livelihood of many households living in the coastal islands. Most of the respondents have mentioned that they had to shift their dwelling houses due to severe river erosion, abnormal flooding, tidal surge and regular cyclonic storms that affected the island community. It is revealed from the study that 59% respondents in average have mentioned that they were forced to migrate many times due to sternness of major natural disasters triggered by the adversity of environmental hazards (Fig. 2).



**Fig. 2.** Migration frequency of the coastal people under the study, Source: Household survey (N=450)

The study further shows, 14% women respondents have mentioned that as the main earning members of their families have to leave to work outside the island for which they migrate temporarily to a new place in search of work for bread and butter. The temporarily migrant family-heads usually moved to the major cities i.e Dhaka, Chittagong or Noakhali for searching work. Finding no other alternatives, a number of HHs who have no link to move for cities, have to migrate from their own locality and move towards south in new accreted charlands which is further open to major natural disasters as there are no embankment or cyclone shelters and other means of livelihood accept catching marine fish, damaging mangrove forest for fire-woods or collecting green grass for maintaining cattle heads. As such in many cases, in

absence of male many women headed HHs face many problems and difficulties to maintain their life and livelihood. Unemployment and poverty are constant scenarios of the new settlers who mostly reside under open sky in govt. khasland and waiting for a new allotment of govt. land for years together. These families are the first victims of all the major disasters that occur regularly in the island locality. However, there are some positive impacts of temporary migrants which are mentioned as follows:

- i. Build communication and relationship for employment generation in lower price.
  - ii. Outsourcing new types of works which creates new skills.
  - iii. Gathers new information and involving alternative income generation and create work opportunities
  - iv. Save other family members from adverse effect of the disasters and join in group activities to survive.
- The problems faced by the migrants are as follows.
- i. Adjustment with new place and environment where life use to be very hard to cope.
  - ii. Living under open sky, mostly without trees and fresh water sources.
  - iii. Physical and mental ailment including insecurity.
  - iv. Scarcity of schools and break up of studies for children and living amidst on uncertainty.
  - v. Lack of community linkage and always deprive of human rights by land grabbers and powerful class.

The study further noticed that the women and children are lagging behind in the process of climate change adaptation. It is revealed from their discussion that the health hazards are common due to climate change effects. Women are experiencing new health hazards due to excessive heat, cold, rain, drought etc. Compared to health hazards and risks, the facilities of the treatment are quite inadequate by the service delivery personals.

#### Health Hazards

38% respondents answered health hazards have been increased due to adverse effects of climate change impacts while 57% respondents had no idea of the same. The 'new diseases' are Jaundice (Hepatitis), Lever disease, Asthma, influenza, viral fever and other viral complexities, Diabetes, Heart Attack, Stroke, Gastric Ulcer, Cancer etc.

It is revealed from the study that breathing problem increased, some people dies suddenly without proper identification of disease. For change in season system, health hazards have been increased in recent days. It is also revealed from the study that pregnant women are facing safe delivery problem along with waterborne diseases. They are under health risk due to scarcity of safe water and sanitation as well as poverty. Facilities of vaccination are limited and inadequate.

#### Condition of Water, Health and Sanitation

The island inhabitants are surrounded by water but it is a fact that they have to deal with severe crisis for drinking and useable water. The findings show that all the major unions under study have the same problem in similar manner since a total of average 68% of the respondents have no safe water sources at their locality while only 32% have the same nearest to the HH (Fig. 3). Out of 32% safe source of water, 14% have tube-wells while the left 18% have deep tube-wells.

The HHs members have to collect water from a distance of 0.25 to 2 km, resulting the severe problems of safety and security. Moreover, 13% respondents informed that they have to face harassment in collecting tube well water from the private sources. 17% respondents argued that the availability of underground safe water has decreased in recent years due to impact of climate change effects.

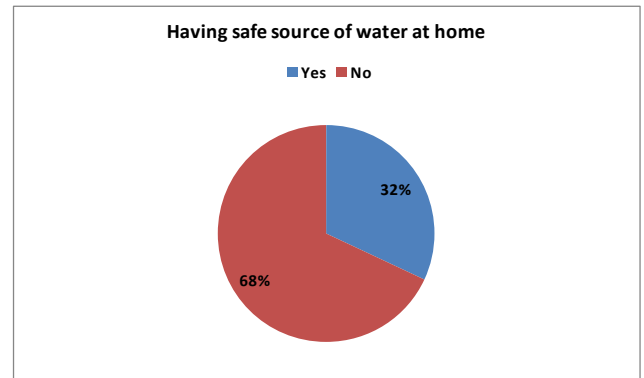


Fig. 3. Having safe source of water at home, Source: Household survey (N=450)

In case of sickness, 86% respondents consult with village doctors while only 12% visit skilled doctors at the Upazilla Health Complex. In case of latrines users, 55% told that they use unsafe open latrines whereas 45% use Ring-slab latrines (Fig. 4). None of the respondents agreed that they use open places for defecation.

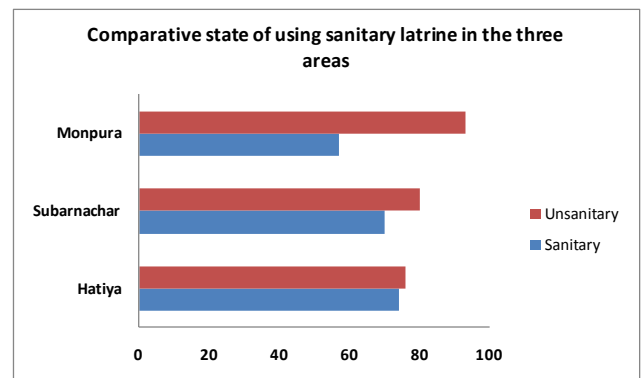


Fig. 4. Comparative state of using sanitary latrine in the three areas, Source: Household survey (N=450)

The study further reveals that 31% respondents uses foot-wear during using of latrine while 68% use the same as practice. The settlers of charlands in high numbers use foot-wears occasionally. Majority of the respondents (59%) informed that they had not washed their hands with soap after use of latrine while 39% practice the same occasionally.

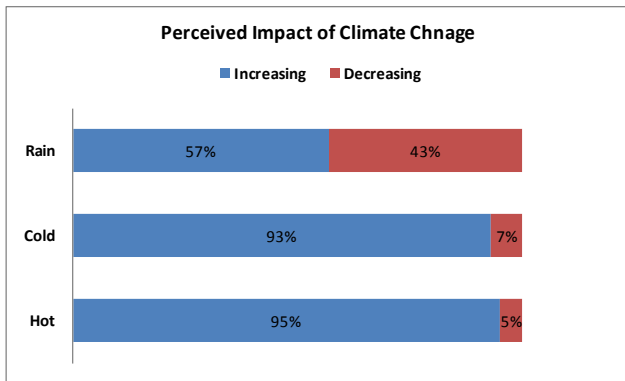
#### Awareness of climate change impacts

The study shows that majority of the respondents (56%) did not hear about the climate change impacts while the rest of the respondents (44%) told they had heard about the same in a limited scale. Mass media like Television and radio have played significant role in informing the people of the climate change issues while local govt. authorities and private bodies did not play any significant role about the same. The television was the major media for dissemination of climate change related information to the community.

#### Perceived Impacts of Climate Change

The respondents possessed mixed ideas about climate changes impacts (Fig. 5); 95% answered that climate change impacts raised warm weather while 5% reply the reverse. 93% response that cold weather has increased in the locality while 7% reply the reverse. 57% respondents argued that the

climate change increased rainfall while 43% answer that the rainfall has decreased.



**Fig. 5.** Perceived impact of climate change, Source: Household survey (N=450)

43% respondents argued that the climate change effects decrease the agriculture production, while 36% did not know about the impacts. However, 21% directly opposed the impact of climate change. 28% respondents argued that they had noticed major changes in agriculture production in the last five years while the rest 72% responded reverse. Most respondent argued that, fertility of land has been decreased, rain does not occurs timely, and these are affecting agriculture production. Community believes the adverse impacts of the climate changes have brought major changes of 'Season Cycle' of the coastal islands of Bangladesh. As a result, people are suffering due to imbalanced situation in the 'eco-system' in the area.

#### **Problem of Maintaining Livestock**

In maintaining livestock, 31% respondents told they face numerous problems in growing livestock while 32% said reversely. The rest 37% do not know about the impacts. Most respondents mentioned the following problems for livestock development: i) Scarcity of grassing field and other fodders, ii) Saline water-logging in agriculture field, iii) Non availability of medicine and skill caretaker, iv) New diseases and over hit/ excessive cold, v) Blistering.

**Problem with Fish Capture:** In catching fishes, 33% respondents said that they had to face problem due to climate change while 36% of the same opposed and the remaining 32% respondents mentioned that they had not known about this. The people inhabited around embankments are less affected with the problems of the fisher-folk those live in far-flung areas. The problems mentioned include: i) Non-availability of fish in open water bodies, ii) Water pollution in coast lines and canals, iii) Increasing salinity within island periphery, iv) Irregular rainfall and overfishing, v) Over flooding and non availability fingerlings, vi) Catching juvenile by children.

Apart from these, the sudden disasters causes damage of fishing boats and claim lives of many fishermen every year. Regular bad weather also creates barriers and uncertainty for smooth fishing in coastlines.

#### **Changes in homestead gardening**

36% respondents mentioned that they had noticed changes in homestead gardening while 22% responded reversely and 43% said that they had no idea about change situation. The changes mentioned are: 1. Major cyclonic disaster in each

year, 2. New diseases of crops, 3. Poor growth and less rainfall, 4. Insect attack and no paste management is available, 5. Immature fruits and green fruits fall down.

#### **Availability of Social Infrastructures**

All the respondents said that they had schools in their villages and most of the families under survey have school going children who are the regular students. Only 39% respondents mentioned that they had community clinic in their localities while most of them told that the community clinic have no appropriate treatment facilities. The services of the community clinics are only limited to rendering primary health care facilities. Most of the government offices perform their routine jobs rather serving the community people. Most of the respondents (65%) had mentioned that they did not receive government services easily while only the 35% received them same in a limited scale.

Only 15% respondents said that they know about the govt. steps/guidelines regarding disaster management while the most of the respondents 85% have no idea about the same. Only 14% respondents felt minimal satisfaction about the govt. services. Only 23% respondents said that there had been NGO activities in their village for disaster management or climate change. They mentioned the following NGO services: Micro credit operations, Mass Awareness, Water supply through DHT, Sanitary latrine installation, Relief distribution, Disseminate disaster signals, Construct safe houses.

#### **Conclusion and Recommendations**

The people of Hatiya and adjacent islands are facing huge problems due to migration. The adverse impacts of climate change have increased the vulnerabilities of health and livelihood manifolds. In this situation we recommend as follows.

1. Developing embankments and social infrastructures like construction of modern shelter houses, rich community clinics, education and training centers for supporting the disaster-hit people
2. Creating of greenery through proper afforestation activities under the existing 'green belt' initiatives, promoting disaster resilient crops
3. Development of communication and signaling system for accurate and timely weather forecasts
4. NGOs, civil society and mass media should work collaborately on community wise disaster preparedness
5. Generate alternative employment opportunities by the GO-NGO partnership
6. Building more cyclone shelter houses in the most gender friendly atmosphere which will ensure facilities for the children, carrying and lactating mothers, elderly people and adolescent girls
7. Setting up sanitary latrines and campaigning on good practices of health and sanitation

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