

Climate Change Impact on Migration Situation in Coastal Delta Belt of Bangladesh: A Qualitative Explorative Study

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Abstract: Climate change is one kind of erratic behaviour and hazards of environmental consequences such as floods, flash floods, drought, heat & cold waves, cyclones, high and low tides, river bank erosion, salinity intrusion, etc. The household survey and qualitative study approaches were performed to explore the changes in vulnerable peoples' ecological migration perspective in disaster-affected southern part of Bangladesh. People usually move to the nearest town and peri-urban areas to seek jobs due to concurrent cyclones, storm surges, and floods in the coastal areas. Again, heavy rainfall and flash-flood conditions usually create intra-district temporary migration to maintain their daily livelihood smoothly. In the char lands, this migration takes place due to riverbank erosion where family members were forced to relocate to a new residence. It occurs when the income-generating activities of people are disrupted by ecological events. Families leave their homes during the disaster period and return, once the conditions are back to normal. Movement for rural people needs constant land management systems including governance, ownership rights and access and technical support for financing land use and making productive use of land to cope with frequent natural calamities. The government of Bangladesh therefore must consider these challenges and gradually improve its capacity to prepare its technology to renovate the vulnerable local people into a climate resilient one.

Key words: Climate; Disaster; Move; Migration; Government of Bangladesh; Climate resilient.

Introduction

Over the last several decades the world has experienced very frequent/unusual natural and technological disasters that have impacted massively on the lives and livelihoods of people all over the world. Climate change has been proved as the major cause for increasing intensity and frequency of disasters. Global climate transformation, and predominantly the influence of human actions on earth's bio-geographical atmosphere, is of gigantic socio-economic and conservation significance. It is the regional consequence of global conversion, however, that weighs most severely on

individual lives because of the difficulty of local response to a world-wide spectacle. Climate change distresses all the world's populations and is a persistent concern for all civilisations (Barua and Mitra, 2024; Barua and Barua, 2023).

Bangladesh is identified as the country of the highest risk, and vulnerability to climate change has placed the country as one of the most susceptible in the world. It leads the top ten countries in the Asia Pacific region for floods; fifth for storms and eighth for earthquake due to its physical exposure (UN ESCAP, 2010). Bangladesh has been playing a crucial role in raising voices in climate change negotiations and taking the

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initiative to mitigate and adapt to the changing climate (Nasreen, 2021). The scale of the climatic disasters that Bangladesh has been for a long time will continue due to the sea level geography of the coastal area, the high density of population, and a lack of coastal protection, along with its location at the head of the triangular-shaped Bay of Bengal. About 40% of the total storm surges and deadliest cyclones, in terms of deaths and casualties, in the past 50 years have been recorded in Bangladesh. It is estimated that about 10 million Bangladeshi citizens are impacted by natural hazards annually (Barua, 2023).

Climate change distresses an extensive array of populations in Bangladesh such as populaces living in coastal zones, drought-prone areas, immigrants on unsteady slopes and climate migrants in municipal slums (Alkindi, 2009). Climate-associated flooding in the Nile Delta and the consequent decline in agricultural production will also push down occupation in the agrarian segment (REMA, 2018). Bangladesh is one of the countries which is mostly exposed to climate change, with its low-lying delta belt region being mainly at risk. The delta belt region of Bangladesh is home to millions of people who depend on productive land and water sources for their livelihoods. However, the impact of climate variation, including rising sea levels, increased flooding, and life-threatening weather events, has led to substantial conservational and socio-economic changes that have influenced migration outlines in the region. Climate change is usually a major impact of recurrent disaster-prone country Bangladesh (Stojanov et al., 2017). It is normally familiar that river delta structures around the world are at risk from a variety of anthropogenic accomplishments. These happenings occur at the local delta scale, at the provincial river and watershed measure, and at the global scale (Tessler et al., 2016). Climatic risks, such as interrupted and unpredictable droughts and flooding can affect expressively ecologies and biodiversity across the province (Karki et al., 2018). Extreme happenings include, for example, floods, soil moisture discrepancies, tropical and other tornadoes, irregular temperatures, and fires. The effects of life-threatening occasions often are large locally and could strongly distress specific segments and areas (Smith et al., 2001). Bangladesh is documented as one of the most calamity-prone countries of the world and is extremely exposed to climate change. Due to climate change, river erosion is becoming increasingly repeated and penetrating, subsequent in noteworthy human and economic damage (Rahman and Gain, 2020).

In recent years, migration escalation due to natural catastrophes has acknowledged a lot of consideration both from the media and the political world (Barua and Rahman, 2016). Migration from Bangladesh to the developed countries of the West was familiarly linked to British colonialism. People from Sylhet, Noakhali and Chittagong started professions from British merchant vessels as Lashkar, Khalashis, Cooks, and Cook mates (Paper, no date). Forced migration impedes extension in at least four ways; by increasing pressure on urban substructure and facilities, by undermining economic progress, by increasing the threat of conflict and by leading to worse well-being, educational and social indicators among emigrants themselves (Piguet, 2008). Migration is one of the adaptation options that individuals and households may indicate in the face of such challenging circumstances (Mallick and Schanze, 2020). As concern for community displacement rises, it is significant to comprehend the factors that impact movement and what role migration might performance in adaptation to environmental pressure (Best, 2019). The understanding concerning male out-migration due to climate variation and large-scale, rapid-onset calamities and their influences on left-behind relations is well recognised (Chumky et al., 2023). Migration for health is uniquely influenced by issues that replicate community-level settings, such as the minimum level of education that a community member would be able to obtain (Best, 2019). Though livelihood variation through temporary relocation is very primitive and outdated, it has been cumulative due to the effects of climate change consequences, globalisation, and development (Biswas and Mallick, 2021). The BIDS Sample Panel Household Survey Bangladesh recording rural immigration over the period has initiated that above the last era, there has been a momentous escalation in international relocation (Paper, no date). The role of weather variables in the explanation of the intra-district provisional movement is slightly different compared to other categories of temporary migration (Kumar and Viswanathan, 2013).

When there is a cyclone in the coastal areas, people proximately interchange to the adjacent urban town to seek jobs, and then to the next larger municipality. This is a seasonal trend of migration (Stojanov et al., 2017). It is not easy to go into the exposed and deep sea for fishing. For such kinds of journeys, a well-equipped boat along with lots of financial capital is mandatory (Iqbal and Abro, 2021). Internal migration is vital to comprehending the inhabitant's dynamics and the multidimensional affiliation between inhabitants and the expansion of a country (Alam and Mamun, 2022).

Seasonal migration has been a well-known trend in Bangladesh for decades, whereby people temporally migrate during the agricultural lean period and come back to their homes at the inference of the period (K.M, 2016). Impermanent refugee fishers relocated to urban parts of Cox's Bazar to seek engagement in the informal division (such as rickshaw-pulling) or to rural spaces to take up service as labour on salt farmhouses, grocery shops, ramparts, and so onwards (Barua et al., 2020). Migration, straight forced replacement, is not typically just a creation of an ecological "push" from a climate procedure like sea level increase. Except in cases of environmental happenings, where people escape for their survives, it does need some kind of "pull": be it conservational, societal or financial (Piguet, 2008). In addition, climate-stressed immigrants could pressure available sources in host zones and would eventually generate violent confrontations between themselves and communities of the constituency (Gakpey, 2022). Families leave their homes during times of hazard and return once the situation is back to normal (Mallick and Etzold, 2015).

Mobility for rural people needs stable land management systems and governance, clear tenure and ownership rights, rights of access, and support instruments for financing land usage and making productive use of land (Rabbani et al., 2022). The effect of cyclones on relocation is conditional on the living sector of the household head and the gender of the migratory (Carrico et al., 2017). Transitory immigration was an outdated appliance for sustaining maintenance during phases of ecological uncertainty (Stefov and Tomlinson, 2009). Relocation has become a persistent adaptation approach for the exposed Bangladeshi inhabitants as a consequence of the incapability of the government to effectively articulate and implement viable strategies to respond to climate variation and its effects (Gakpey, 2022). The everlasting movement was habitually led by provisional migration and was perceived as the clarification only after all substitute coping tools were fatigued (Barua et al., 2020). Compared with non-migratory fishers, a smaller number of migratory fishers sold their assets, took casual credit, and exaggerated fishing and expanded their living (Khan et al., 2018). The migratory refers to the fishers who keep shifting their fishing location seasonally and voluntarily, whereas the non-migratory fishers fish in the same zone (Khan et al., 2018). This type of migration occurs when the income-generating activities of people are disrupted by environmental events and people are no longer able to maintain their livelihood activities

(Mallick and Etzold, 2015). The category, rigorousness and reversibility of the ecological singularity at hand effects the migratory consequence – for example, sudden-onset natural catastrophes tend to result in provisional relocation, while severe forms of slow-onset conservational deprivation are more prospective to lead to permanent movement (Paper, 2011). Despite confronting severe climatic hazards, many people prefer to remain in climate hazard-prone areas rather than migrate. Non-migration is an adaptive approach that has acknowledged little attention in conservational relocation studies (Mallick et al., 2022).

Coastal people are very reliant on the climate conditions, specifically in rural parts, with employment in the fisheries, agriculture, livestock, or forestry segments (Nurzaman et al., 2020). The coastal zone encompasses over 47,150 sq. km area and has a population of 3,85,17,698 (BBS, 2011; Sarker and Ahmed, 2015). Currently, further than 60% of the urban population is focussed mostly in the five municipal cities of Dhaka, Chittagong, Khulna, Sylhet, and Rajshahi. By the year 2030, this predisposition toward relocation from rural to urban dwellings will be supplementary certain (Barua and Rahman, 2022). This paper aims to explore the climate change impacts on the migration situation in the delta belt of Bangladesh, using a qualitative explorative study approach. Therefore, this qualitative explorative study aims to fill this research gap by exploring the lived experiences of people affected by climate-induced migration in the delta region of Bangladesh. By undertaking so, the study aims to contribute to a better understanding of the human magnitudes of climate change and migration and inform policy responses that are more responsive to the requirements of affected communities.

The migration aspect usually connects with multidimensional social, political, and environmental climatic factors which normally engage the pattern of temporary & permanent migration including socio-economic consequences for local communities in Bangladesh. Yet, migration-environment connections are affiliated with long-term historical processes from the ancestor subsequently. This qualitative study was performed to assess the innovative approaches for understanding the intergenerational perspectives of the environmental migration scenario of Bangladesh.

Methodology

This study was conducted in four different coastal Upazilas, namely Banskali Upazila under Chattogram

district and Kutubdia, Pekua and Chakaria Upazilas under Cox's Bazar district. These areas are highly susceptible to climate-induced disasters in the southern coastal belt of Bangladesh. A total of 270 households were surveyed and 80 households were from Kutubdia, Pekua and Banshkhali each of the total household numbers (Table 1). Another 30 households were from Chakaria Upazila which corresponded to 11.1% of the total surveyed households.

Table 1: Location-wise respondents

<i>Survey Areas</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Kutubdia	80	29.6
Pekua	80	29.6
Banshkhali	80	29.6
Chakaria	30	11.1
Total	270	100.0

The research was conducted using a mixed method, which included both qualitative and quantitative analysis. Initially, it followed a comprehensive literature review, consultation meetings with ward councilors & secretary of the ward councilor office, sardars, leaders and key persons of service delivery who could identify the tenants of 'Climate-Induced Migrants' hotspots among the city corporation wards, sampling method, and sample size selection as well as data collection techniques and data analysis, respectively.

At the very beginning of the research, an intensive literature review was conducted by the experts of the study team. After conducting the comprehensive literature review, the study team conducted consultation meetings with the respective ward councilors & secretary of the ward councilor office, sardar, leaders and key persons of service delivery who could identify the tenant of 'Climate-Induced Migrants' hotspots among the city corporation wards. Subsequently, the study team tentatively estimated the 'Climate-Induced Migrants' in slum areas and prepared a 'source list' which helped to identify the hot spots of the CIMs among the wards in the city corporation. Afterward, the study team physically visited these wards where CIMs accumulated and conducted field data collection.

Literature review educates a researcher, enhances his/her knowledge, and increases confidence, which ultimately contributes to preparing an appealing proposal (Islam, 2014). The data/information were extracted from secondary sources. These sources were classified into two broad categories, such as web or online-based

sources, like reports, peer-reviewed journal articles, books, and book chapters, and institutional-based sources, for instance, both Govt. and Non-Govt. offices, research cells, and academic institutions respectively. The comprehensive literature review assisted in finalising the primary data collection tools, survey methods, and survey procedures. The literature review also cited previously published scientific documents to best justify the proposed research methodologies and findings achieved from this study. Nevertheless, the comprehensive literature review mainly focussed on:

- Patterns and drivers of climate-forced displacement and rural-to-urban migration in Bangladesh.
- Socio-economic, environmental, and demographic impacts of climate-forced displacement and rural-to-urban migration in both source rural areas and destination urban areas.
- Effectiveness of existing policy frameworks and interventions in addressing the needs and rights of climate migrants and promoting sustainable urban development.
- Role of various stakeholders, including the government, NGOs, and community organizations, in facilitating adaptation and resilience among climate migrants in urban areas.

The research team organised one-to-one consultation meetings with the local government representatives, community leaders and key persons of service delivery to identify the urban 'Climate Induced Migrants' hotspots among the city corporation wards. In the meantime, the study team shared the findings of the comprehensive literature review with these experts for selecting city corporation wards where CIMs were accumulated. To complete the above-mentioned tasks, the study team prepared a checklist before the consultation meeting and operated it with them.

After both a comprehensive literature review and a consultation meeting, the study team identified the slums where climate change-induced migrants were accumulated. Then study team conducted a discussion meeting with sardar, leaders and key persons of service delivery to double-check the earlier findings. Subsequently, considering every finding, the study team prepared a 'source list' for accelerating the sampling procedure. Finally, the study team identified the 'Urban Hotspot' of climate-induced migrants and possible survey locations effectively in the entire city corporation.

As per the earlier prepared source list, the study team divided every slum into five clusters. These clusters

segregated on the presence of Climate-Induced Migrants as per their density, such as <10 HHs, 10-24 HHs, 25 – 49 HHs, 50-99 HHs, and > 100 HHs. Subsequently, for sampling determination, the study team selected the slum from these clusters randomly. After that, the authors developed a structured questionnaire with a set of questions for household data collection. The survey questionnaire covered the research objectives. Afterwards, the questionnaire was uploaded on KOBO Tools. Besides, the research team developed the KII & FGD checklists for qualitative data collection.

The authors developed a structured, open-ended questionnaire for collecting household data. The survey questionnaire was addressed in line with the research questions and objectives. Before conducting this field survey, the survey tools were tested on the ground. Afterthought, the study questionnaire was finalised and demonstrated to the research team and field data collection fellow. Subsequently, the questionnaire was uploaded on KOBO Tools. Simultaneously, the research team also developed the checklists for KII and FGD surveys.

The household survey was conducted on 100 slums in the entire city corporation wards where maximum CIMs are accumulated. To conduct a statistically representative and authentic survey, Cochran's Sample Size Formula was applied for appropriate sampling size selection for the Target Population, Islam (2014) & BBS (2011) presented the following formula.

Formula,

$$\text{With, } n_0 = \frac{p(1-p)Z^2}{d^2} = \text{deff. (Design effect)}$$

where,

n_0 is denoted desired sample size.

p is a proportion of the required characteristics in the population. Theoretically, when p is unknown, $p = 0.5$ gives the safest sample size since $p(1-p)$ takes the highest value for $p = 0.5$.

Z^2 , the value of the standard normal deviate usually set at 1.96 out of 95% confidence level.

d is the allowing margin of error. The allowable margin of error is $d = 0.05$ will be used. d is the margin of error (level of accuracy) to be tolerated at the 95% level of confidence which is considered as 5% margin of error ($d = 0.05$) in our study.

deff is the design effect used for complex surveying using multistage cluster sampling. deff can be taken as 1.5-2.0. In the current study, multistage sampling will be done, here the deff is considered as 2.

So,

$$n_0 = \frac{(0.5) \times (0.5) \times (1.96)^2}{(0.05)^2} = 384 \times 2$$

$$\text{Total desired sample size } n_0 = \frac{768}{\sim 770, \text{ convenience for sample distribution}}$$

The research team used a mixed research approach which includes multistage cluster sampling, nonprobability sampling, purposive sampling, and random sampling. In the first stage of sampling, the nonprobability approach was used to select the city corporation wards and slums where climate-induced migrants were accumulated. After identifying the slums, the purposive sampling approach was used to estimate climate-induced migrants, and this was done in consultation with ward councilors and relevant watchdog bodies. In the third step, the research team made a source list where all climate migrants were chronologically enlisted. This process was done with the help of 'Sardar' (the gateway of the slum). Subsequently, the research team divided city corporation wards and slums where climate-induced migrants were gathered into certain clusters. Finally, the research team selected city corporation wards and slums in which areas were easily accessible, easy access to authentic data collection, available time to data collectors, and so on.

KIIs were conducted with the ward councilors, secretary of ward councilor, Sardar, leaders and relevant urban watchdog bodies to identify wards and slums where climate migrants accumulated. Nearly, 50 KIIs were conducted in the entire study. FGDs were conducted with climate migrants at 100 urban hotspots where (slums and wards) climate migrants accumulated.

The data were obtained from secondary and primary sources as well as qualitatively and quantitatively. Qualitative data were interpreted with 'Narrative Analysis', and quantitative data were interpreted with Statistical Package for The Social Science (SPSS: version-20). Cluster basis analysis was conducted in tabular and graphical format. Continuous quality control measures were taken during the data collection procedures. The study supervisor monitored and supervised interviewers. He checked the collected data for any missing information, logical inconsistency and misreporting and corrected it on the spot. Where major problems were identified, the interviewers were asked to re-interview the participants. In addition, the supervisors also interviewed five percent of the sample to assess the accuracy of the information collected by the interviewers.

Results and Discussions

The study explored the impact of climate change on migration situations in the delta belt of Bangladesh through a qualitative explorative approach. The results indicate that climate change has a significant impact on migration in the region, with people forced to move to alternative locations due to the effects of natural disasters such as floods, cyclones, and riverbank erosion. In the respondent group surveyed, the majority of the participants never went to school (67%). It has also been found that about 15.9% of the total respondents found to have done with their primary education. Few participants completed their secondary education. Approximately, 8.5% of the total respondents finished their secondary education, and about 6.3% of the respondents could sign only. In this study, half of the respondents were male and the other half of the respondents were female having 135 respondents in each group totalling up to 270 respondents (Table 2).

Table 2: Gender of the respondents

<i>Gender</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Male	135	50.0
Female	135	50.0
Total	270	100.0

Table 3 demonstrates the occupational status of the respondents. It reveals that about 38.9% of the total respondents which is 105 in number were housewives. Fifty other respondents were fish farmers (17.5%) and another forty-eight respondents were day labourers (17.8%). Ten of them said that they had petty business and eight of them said that they drove a Rickshaw, Van or CNG occasionally. Another eight respondents said that they did salt farming (3%). Some other professions of the respondents found were dry fish trader, boatman, guard, net maker, tailor and so on.

The majority of the respondents corresponding to about 40% of the total respondents said that they had no source of income while 28.9% of the respondents confirmed that they had an income between 1000 and 4000 taka and 24.4% had an income between 4001-8000 taka. It could be said that the maximum number of respondents depended on only one earning member in their family (86.7%, $n = 234$). About 11.1% of the respondents said to have two earning family members (Table 4).

Table 3: Occupational status of the respondents

<i>Occupations</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Fish farming	50	17.5
Fish fry collection	1	0.4
Day labourer	48	17.8
Rickshaw/ Van/ CNG driver	8	3.0
Salt farming	8	3.0
Builder	3	1.1
Petty business	10	3.7
Dry fish trader	3	1.1
Boatman	2	0.7
Housewife	105	38.9
Guard	1	0.4
Net maker	8	3.0
Unemployed	3	1.1
Beggar	5	1.9
Work at another's house	9	3.3
Tailor	1	0.4
Teacher	2	0.7
Imamati (Religious preaching)	3	1.1
Total	270	100.0

Table 4: Earning Member of the family of the respondents

<i>Number of earning family members</i>	<i>Frequency</i>	<i>Percentage (%)</i>
1 person	234	86.7
2 persons	30	11.1
3 persons	3	1.1
4 persons	3	1.1
Total	270	100.0

Climate change-induced displaced people could be at stake of further displacement. So they built their houses using mud, bamboo or polythene. It is a clear scenario that more than half of the total respondents live in a house made with mud/bamboo walls/thatch leaves while 28.5% of population live in a house made with mud/mud wall/thatch leaves. About 13% of the total respondents are said to live in polythene houses. During the study, respondents were asked about their ownership of the house. In response to this question, about 54.8% of the respondents said that they built their house on government *khas* land which is not allocated

(Table 5). On the other hand, about 24.1% of the respondents confirmed that they made their house in the government-allocated *khas* land. About 10.0% and 9.3% of the total respondents informed that they were living in their own and relative's house respectively.

Table 5: House ownership of the respondents

Type of ownership of the house	Frequency	Percentage (%)
Own land	27	10.0
Government <i>Khas</i> (fallow) land (allocated)	65	24.1
Government <i>Khas</i> (fallow) land (not-allocated)	148	54.8
Rented	1	0.4
Relative's house	25	9.3
Roadside/on the Embankment	4	1.5
Total	270	100.0

As displaced people are more vulnerable than any other people, this survey tried to find out the time duration of their living in the current place which included 7 categories. About 22.6% of the total respondents have belonged to the 5-10 years group while 21.2 % of them listed themselves in the more than 20 years group. Another about 21.1% of respondents said that they had been living there for 2 to 5 years.

Tube well, well and ponds were the available sources of water in the survey areas. Table 6 shows that the maximum number of respondents used tube wells to fill up their water necessities (95.6%). Only 3.7% of the respondents depended on water collected from wells, and two respondents said that they had ponds for daily use.

Table 6: Water sources of the respondents in the current living place

Sources of water	Frequency	Percentage (%)
Tube well	258	95.6
Well	10	3.7
Pond	2	0.7
Total	270	100.0

More than half of the participants (54.1%) mentioned that their toilet were *kancha* which was made of mud while about 17.0% of their respondents confirmed that they had no latrine. Approximately 10.4% of them responded that their toilet was made with a ring slab

and some others used open places for their defecation (10.0%).

This study includes the climate change-induced displaced people as the survey respondents. They were asked about their losses due to climate change-induced calamities such as floods, cyclones, river bank erosions, salinity, rise of sea level, and so on. They were also asked about why they were displaced and how many times they were displaced. This information is discussed in this part. All the respondents in this study mentioned that they are sufferers because of climate change which caused them different types of losses. The majority of them stated about losing their house due to climate change (31.5%, $n = 260$). About 24.3% of the respondents said that climate change took away their agricultural land, and another about 24.2% of the respondents said that they faced loss of inheritance of property. Some other losses included as loss of family members (9.7%), casualty (9.7%) and cultural aspects (0.6%) (Table 7).

Table 7: Respondents' loss due to climate change

Types of Losses	Frequency	Percentage (%)
Family members	80	9.7
Casualty	80	9.7
House	260	31.5
Agricultural land	201	24.3
Loss of inheritance property	200	24.2
Cultural	5	0.6
Total	Total 826 out of 270	100.00

N.B: Multiple Answer Considered

Natural disasters and man-made disasters forced the respondents of this study to be displaced that was what came out from the study findings. Basically, a large portion of the respondents blamed both natural disasters for making them displaced (94.0%), however, only 6.0% of the respondents indicated both natural disasters and man-made disasters as reasons behind their displacement. Several types of natural disasters such as floods, cyclones, river bank erosion, salinity, the rise of sea level and tide were responsible for the participants' displacement as it has been seen in Table 8. As most of the respondents pointed out the natural disasters for their displacement, the majority of them were displaced due to river bank erosion (29.4%, $n = 256$). Cyclone was the

cause of 241 respondents' displacement in this study. Flood was another reason behind the displacement of 18.5% of the respondents surveyed in this study.

Table 8: Types of natural disaster that cause the respondents' displacement

<i>Types of natural disaster</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Flood	161	18.5
Cyclone	241	27.7
River bank erosion	256	29.4
Salinity	128	14.7
Rise of sea level	74	8.5
Tide	10	1.1
Total	Total 870 out of 270	100.0

Although most of the respondents said that they were displaced due to several types of natural disasters, few of them also stated about the man-made disasters as the part of their displacement as well. The kind of man-made disasters they talked about were lack of relocation centers (2.2%), forceful land grabbing by the local elites (1.9%), development work (1.5%) and illegal occupation of government *khas* (fallow) land (0.4%) (Table 9).

Table 9: Types of man-made disaster that cause the respondents' displacement

<i>Types of man-made disaster</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Forceful Land Grabbing by the Local Elites	5	1.9
Development Work	4	1.5
Illegal Occupation of Government <i>Khas</i> (fallow) Land	1	0.4
Lack of Relocation Centers	6	2.2
Not Applicable	254	94.1
Total	270	100.0

The respondents were asked about how many times they were displaced in their lifetime. It is visible that most of the respondents were displaced about three times in their lives (36.0%). About 31.0% of the respondents said that they had to move from their place four times or even more. Displacement two times happened in the life of about 26.0% of the participants in this study.

Out of the total study population of 270 respondents, only about 20.0% of the respondents were satisfied with their current living place and its facilities. The majority of the respondents revealed that they were not that satisfied with their living place. About 80.0% of the total respondents who expressed their dissatisfaction about the facilities in their current living place also stated the causes behind their dissatisfaction. These causes included house problems, no latrine and drinking water crisis (23.0%), not having land (22.6%), risk of cyclone and river bank erosion (17.4%), communication problems and lack of school and college (10.7%) and others as illustrated in Table 10.

Table 10: Causes for the respondents' dissatisfaction with the facilities in the current living place

<i>Causes</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Risk of Cyclone and River Bank Erosion	47	17.4
Communication Problem and Lack of School and College	29	10.7
Not Having Land	61	22.6
House Problem, No Latrine and Drinking Water Crisis	62	23.0
Lack of Job	11	4.1
Financial Deficit	3	1.1
Risk of Being Attacked by the Wild Elephants	4	1.5
Not Applicable	53	19.6
Total	270	100.0

Displaced respondents of this survey were asked whether they sought any assistance after their displacement. Based on responses, it has been found that the majority of the respondents did not seek any assistance after displacement ($n = 194$, 71.9%). In contrast, about 28.1% of the respondents said to had sought assistance after their displacement.

A large portion of the respondents thought that the government, namely Union Parishad, could provide rehabilitation assistance to them (51.2%, $n = 213$). Some other respondents stated that non-governmental organizations (16.6%, $n = 69$) could be of help in providing rehabilitation assistance. About 12.7% of respondents named YPSA in this regard (Table 11).

Table 11: Types of organisations that the respondents thought could provide rehabilitation assistance

<i>Organization</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Respondents Did Not Know	28	6.7
Government (Union Parishad)	213	51.2
Member of Parliament	3	0.7
Upazila Chairman	19	4.6
Thana Nirbahi Officer (TNO)	12	2.9
Non-government Organizations	69	16.6
YPSA-Young Power in Social Action	53	12.7
Agrajatra	1	0.2
Mukti	6	1.4
COAST	4	1.0
BRAC	5	1.2
Action Aid	3	0.7
Total	Total 416 out of 270	100.0

*Multiple answers considered

When the participants were asked about what types of assistance they expected that the people or organisations could provide to them for their rehabilitation, they said that that assistance could be helping economically (41.5%), building houses (37.4%), setting up tube-well (5.9%) and giving cash money and furniture (4.8%). From the responses, it is evident that they needed economic help to survive in their lives. The majority of the respondents were not getting any support from the government initiatives. Around 78.5% of respondents claimed that they did not receive any government support as climate change induced displaced people. Only 58 respondents said that they got some form of government support after their displacement.

Among the 58 respondents, 56.9% of the respondents complained that they applied for government support but it was declined ($n=33$). Only 12 respondents said to receive cash money. Other types of government support they stated to be received were shelters, *khas* land allocation, houses in *Gucchogram* and so on. Other respondents who did not receive any support indicated nepotism, corruption, and lack of proper monitoring

as the reasons behind not receiving support from the government after their displacement. Some of them were also found not to be aware of such support.

The climate-induced displaced people may get involved in the new area selection for their rehabilitation. When asked how they could engage themselves in such a process, they said that they might help by giving physical labour (81.9%, $n = 221$), finding out the place (13.7%, $n = 37$) and so on. Social and cultural adaptation is a necessary concern for the displaced people for rehabilitation. In this study, the respondents presented their views about the types of social and cultural challenges that they think they would face in the new area for rehabilitation (Table 12). They apprehended that they might face problems with adapting to the new social set-up (34.8%, $n = 94$) and marrying their boys or girls off (19.3%, $n = 52$). The rise of social oppression was another challenging concern for them as well (17.8%, $n = 48$).

Table 12: Types of social and cultural challenges that could be faced in the new area for rehabilitation

<i>Challenges</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Rise of Social Oppression	48	17.8
Adaptation Problem	94	34.8
Problems with Marry the Boys/Girls off	52	19.3
Problems in Negotiation	5	1.9
Problems in Religious Worship	21	7.8
Possibility of Breaking Relationship with the Relatives	10	3.7
Torture by the Locals	2	0.7
Movement of Girls	38	14.1
Total	270	100.0

Most of the climate-induced displaced people live in the same sub-district after being displaced (32.6%). From Table 13, it has also been observed that they also chose to live in the same union (26.7%), same district (24.1%), same village (12.2%), and same division (4.4%) after their displacement.

The majority of the respondents expressed that they relocated themselves without the help of any media (51.2%). About 28.5% of the respondents also talked about relatives and about 20.3% of the respondents said that they got help from family members for the after-displacement relocation (Table 14).

Table 13: Places where the most climate-induced displaced people live

<i>Places</i>	<i>Frequency</i>	<i>Percentage (%)</i>
In the Same Village	33	12.2
In the Same Unions	72	26.7
In the Same Sub-district	88	32.6
In the Same District	65	24.1
In Their Own Division	12	4.4
Total	270	100.0

Table 14: Media of the climate-induced displaced people's relocation

<i>Media</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Self/No Media	192	51.2
Family Members (father, mother, brother, sister)	76	20.3
Relatives	107	28.5
Total	Total 375 out of 270	100.0

*Multiple answers considered

It has been found that the majority of the respondents wanted to be relocated to their preferred new area because they would expect to live with relatives over there (42.6%, $n = 115$). Another good portion of the respondents expressed their desire to relocate to the new area for communication facilities (22.6%, $n = 61$). Some of the respondents would like to be relocated to the new area as they thought they would get education facilities in the new area (11.5%, $n = 31$). There were some other reasons as well that are highlighted in Table 23 along with the major reasons.

The sectors that were affected by climate change were observed. When asked about sectoral impacts, 94.8% of the respondents reported that agricultural sector was greatly affected by climate change. Other sectors referred by the respondents were household (87.3%), health education (78.4%), road and infrastructure (74.8%), forestry (61.9%) etc. (Table 15).

The effects of climate change on human life and infrastructure are the physical environment, ecosystems and human societies. They also include the economic and social changes that stem from living in a warmer world. Human-caused climate change is one of the

Table 15: Respondent statements about the sectoral based impact on climate change in the study areas

<i>Sectors</i>	<i>Comments</i>	<i>Responses</i>	<i>Percentage</i>	<i>Total</i>
Agriculture	Very High	293	74.18	100.0
	High	47	11.90	
	Medium	55	13.92	
	Low	0	0.00	
	Very Low/No Impact	12	3.04	
Water	Very High	124	30.47	100.0
	High	79	19.41	
	Medium	106	26.04	
	Low	75	18.43	
	Very Low/No Impact	23	5.65	
Fisheries (i.e. Shrimp)	Very High	28	6.90	100.0
	High	152	37.44	
	Medium	144	35.47	
	Low	36	8.87	
	Very Low/No Impact	46	11.33	
Livestock	Very High	79	19.46	100.0
	High	119	29.31	
	Medium	146	35.96	
	Low	29	7.14	
	Very Low/No Impact	33	8.13	

Forestry	Very High	44	10.84	
	High	162	39.90	
	Medium	147	36.21	
	Low	18	4.43	
	Very Low/No Impact	35	8.62	100.0
Infrastructure	Very High	104	34.10	
	High	11	3.61	
	Medium	137	44.92	
	Low	17	5.57	
	Very Low/No Impact	36	11.80	100.0
Health Education	Very High	72	17.69	
	High	189	46.44	
	Medium	119	29.24	
	Low	4	0.98	
	Very Low/No Impact	23	5.65	100.0
Salt Cultivation	Very High	33	8.09	
	High	74	18.14	
	Medium	204	50.00	
	Low	13	3.19	
	Very Low/No Impact	84	20.59	100.0
Road and Infrastructure	Very High	116	28.64	
	High	164	40.49	
	Medium	113	27.90	
	Low	11	2.72	
	Very Low/No Impact	1	0.25	100.0
Household	Very High	156	38.42	
	High	163	40.15	
	Medium	77	18.97	
	Low	10	2.46	
	Very Low/No Impact	0	0.00	100.0
Others	Very High	81	19.80	
	High	63	15.40	
	Medium	207	50.61	
	Low	21	5.13	
	Very Low/No Impact	37	9.05	100.0

threats to sustainability. From Table 5, it is seen that in the research the highest level of affected area stated by the respondents was agriculture (very high, 74.2%).

The study found that climate change has a significant impact on the migration situation in the delta belt of Bangladesh. The impacts of climate change on the natural environment, including rising sea levels, saltwater intrusion, and riverbank erosion, have led to reduced agricultural productivity and fishery resources.

As a result, many farmers and fishermen have been forced to migrate to urban areas in search of alternative livelihood options. The study also found that women and youth are particularly vulnerable to the impacts of climate change and are more likely to migrate due to limited access to resources and opportunities.

The authors found that salinity mainly affects land and water in the coastal areas. The main causes of salinity intrusion, propagation and expansion in the

coastal area are critical geographical settings, the upstream diversion and reduction of freshwater flow in the Ganges and Gorai rivers, faulty management of coastal polders, saltwater intrusion due to sea level rise, cyclone and storm surges, backwater effect, the expansion of shrimp culture and the increased practice of agricultural irrigation along with natural and environmental processes like river salinity, loss of wetlands and interaction with groundwater, tidal surge and storm surge inundation and water logging and so on.

Due to increasing salinity in the water and soil, the people of the coastal area are suffering from the scarcity of safe drinking water, irrigation, agriculture, and other uses. Soil salinity is considered a major constraint to food grain production in the country. The increased level of water salinity affects the livelihood and insecure water availability and pushes poor people's lives to a more vulnerable position than earlier. Water salinity also increases soil salinity, which further deteriorates soil fertility. Saline water is needed to cultivate shrimp culture. So, saline water is intruded into the shrimp pond which results in the increase of salinity in the surface and groundwater is also expanding because of continuous shrimp cultivation in the fresh agricultural land. High salinity in water and soil also decreases crop yields and local communities suffer low economic conditions and they are forced to migrate to other places from unfertile crop field living places in the study areas.

Riverbank erosion is a natural phenomenon that displaces millions of people all over the world and negatively affects their lives and well-beings. Geographic and geologic settings, soil composition and river morphology result in a high risk of riverbank erosion in Bangladesh. The authors found that riverbank has a direct impact on the livelihoods of rural society, downgrading the socio-economic status from solvent citizens to homeless extremely poor farmers or labourers. Since riverbank-affected regions lack ability to develop into industrial units, job opportunities are highly dependent on the agricultural sector, which reduces after erosion. Migration and displacement become a common coping strategy. Short-term temporary relocation to the adjacent villages and long-term permanent migration to urban areas are the types of movement mostly seen among erosion victims. However, these migrants reach their destination with little savings. Big loans for several movements and unsecured shelter or income sources, make their resettlement more difficult in a new culture and into traditions. Lack of skill, information and opportunities become constraints to get jobs whereas negative behaviours of the residents create harsh

realities for the migrants. Sometimes, a portion of these homeless people depend on illegal earnings for survival; different crimes are found to be increased in society. The study revealed that riverbank erosion brings a significant amount of negative social consequences into the everyday lives of victims as well as the most devastating aftermath compared to any other natural disaster.

The authors conducted the Focus Group Discussion and Key Informant Interviews with stakeholders of the Kachia Union of Bhola Sadar sub-district of Bhola district which is a coastal island of Bangladesh. The size of the Union has lost a large portion of its land into the river Meghna. Most residents are severely affected by the natural events. They had to change their residence more than once, even up to 15 times to cope with this disaster. The authors found that 56% of the families moved 1-5 times, while 35% had moved 6-10 times and 9% had moved about 11-15 times. Before even settling in one place, they have to move to another place. It shows the unstable and unsecured lives of the victims. They have been on the move for years with their families, which include children, older people and female members. The study revealed that the erosion-hit families primarily move within the village when they lose their homestead. They try their best to stay within their village or move to the nearby village. Migration is a coping strategy for some families or for some members of the family in this case, their destinations are mostly the nearest cities like Dhaka or Chittagong. Inhabitants also experienced occupational change, increased loans and poverty along with losing agricultural lands into the river.

The interviewer was able to report that cyclone Amphan had dumped a significant amount of sediments in the lower segment of the river as well as on the higher soil lands, causing the overflow of river banks, during a certain period of the FGD. The river Shatghati was broken when too much water from the Bay of Bengal flooded it, forcing salty sea water to invade high and forcefully before hitting the river's embankments in both directions. Additionally, wealthy persons are excavating large holes inside coastal belt highways to allow saline water to seep in so that it may be used to grow shrimp. This is how the saline water enters the farming area. Due to the severe lack of green shrubs, grasses, and hays, they claimed they were unable to plant crops or raise domestic animals. Additionally, the extreme salinity of the water was causing a shortage of Desi-MAS, a local name for sweet water fish.

During the study, the authors found that most of the displaced inhabitants of the study area are in debt (from 620 to 3,500 USD), due to the extra cost of changing residences: a huge amount of money is needed to change the living place. About 58% of the victims needed up to 6,250 USD, 27% needed 6,251 to 13,000 USD and about 15% needed more than 13,000 USD. However, they have to take loans to meet this cost. About 85% of the victims took loans to change the places, which ranged from 250 USD. They could not get loans from one source. About 61% of the residents took loans from NGOs, 58% from relatives, *Mohajon* (locals who lend money with high interest), friends or neighbours and 42% from banks or associations. However, it is alarming that 71% of loanees took loans with interest, which is very high in some cases. The loans provided for the change of houses create a double effect for riverbank erosion victims who lost their agricultural lands and had to change their occupations. The authors found that most of the people have changed their occupation from agriculture to other sectors after being affected by the riverbank erosion. Nearly 25% of the residents were farmers before the riverbank erosion whereas only 5% are employed in this sector now. Many wealthy farmers became marginal farmers or landless after the erosion. At present 46.46% of the residents work in the fisheries sector; mostly are employed in other boats (32%), whereas 37% worked in this sector before the erosion. Numbers of daily labours, small businessmen and unemployment have also increased among the survivors.

The authors found that poverty levels increased among the survivors of riverbank erosion. Per person income shows that 85% of the survivors earn less than 25 USD monthly and 93% of them are living below the poverty line in the study area. Poverty has a direct impact on the land ownership status, at present 66% of families are living on rented or fellow lands and only 34% are living on their own lands. Change in occupation, loss of agricultural land, house rent costs and additionally big loans with interest created huge economic pressure on the survivors of the riverbank erosion. This economic change highly affects the social status and mental health of the victims. The erosion takes people's homesteads and their permanent addresses. However, losing their land means losing their address and identity. Survivors are collectively identified as the "*Nodi Bhanga Manush*" (people who lost everything in the river) or refugees by the locals. According to erosion survivors, it is always very difficult to cope with a new location, occupation and environment. However, the hardest part is to face the

social attitude towards the riverbank erosion victims. Md. Hafiz (50), a local businessman said '*We are always treated as the floating people without any root, as if we are guilty for our fate.....losing home, losing everything*'. Firoza Begum, a student of a local college said '*They always look at us with suspicion.....they do not believe us, do not want to employ us easily*'. Further a housewife, Karima Begum said that '*it is difficult to arrange a good marriage for our daughters as we do not have a permanent address*'. The present study reveals that symptoms of psychological problems such as depression, anxiety, and fear among the victims of riverbank erosion are similar.

During the interview, the authors spoke with Ms. Roksana Begum (30), who lives in West Baribadh under the Mongla sub district of Bagerhat district since 2010. Currently, she lives on Government Khas land. Roksana is a housewife. Fishing is the best source of income in the study area. However, river bank erosion is the single most common problem in Mongla. In 2019, Cyclone Bulbul caused severe flooding in Mongla and bank erosion in the Pasur River. Roksana used to live next to the Pasur river where the erosion partially took her land, damaged her home and had her displaced. Like Roksana's family, more than 100 families have been displaced from the same union. Roksana and her family took shelter in the cyclone center. For three days the Government through union Parishad chairman and the member had provided dry foods. NGOs had provided BDT 9,000 and pitcher, soap and other necessary things for rebuilding their house. After three days, Roksana and her family moved as guests to a relative's home, which was next to her partial land. With bamboo, bamboo fence and polyethylene she rebuilt her home again. Roksana said "*over the past decade, there has been a dramatic increase in river bank erosion and we are living with it. Bank erosion occurs continuously without warning signs, and has been a serious issue. Bit by bit our land is taken away and we kept on being displaced*". The case of Roksana allows us to rethink developing support strategies to minimize the risks caused by bank erosion and ensure provision for planned relocation services in order to be better adapted to specific erosion-prone areas.

During the discussion with local communities while conducted FGD said that personal connections to the members and the chairman greatly influence people's access to governmental resources and people get relief "*because of connections*" and because "*they have power, they are communicating with the political leader*" indicating that *access to political capital*

is central for getting governmental resources, as in having *governmental interaction* with this outcome. Participants furthermore link their perception of political leaders to this access, with one participant stating: *“The government, she said the chairman and the members are not good ones. They give to the ones with the power and the right communications.”* The connections those elected have upwards within the political hierarchy furthermore influence the support. One participant noted: *“They have no political leader that helps them, no good one. Because the local political persons are actual link up to the government could give relief. But they have no good one.”* A clear illustration of this is the dam that was constructed in the study areas. The reason was that the MP for study area *“is also the minister of land”* and he initiated the project as these interview excerpts illustrate: *“The MP actually passed the budget of the project. He was involved. He gave the order and passed the budget. Without the order of the MP it wouldn’t have happened.” “It’s the difference in the minister of parliament issue, because the project is under the tender of the Anwara region. Because of member of parliament here, pasted the tender. So, it started here not there”.*

Access to political capital also influences livelihood after resettlement. Something that was observed in the 20-household community that had lost most of the land allocated to them by the government due to the local chairman who *“has his own farm”* there. Below are two participants talking about the issue. *“Same land, the government sectioned the 20 families. They got from here to there, that type of area. But they didn’t get that type of area. They only get like 200 time 50 feet, they gave to each family, the government. The government sanctioned that. But right now they only have 40 times 20 feet. The actual point is that the government just sanctioned the area, but the government didn’t mark that. Didn’t mention if it’s for you people, you people or you people. That is why the other locals are forcing them, mentally or something by power, by the local government. You should live in that place, the little on. You don’t have, you don’t have permission to go to the other place.” “So, the actual problem is the government made the papers for them. For this land. They made the papers. The government just made the papers for this one. The government just gave them this area. So, if the government gives them again, the whole area. And they mark it with this is yours. Then they can get it, otherwise they can’t”.*

One participant in the 20-household resettlement community mentioned the lack of *unity*, explicitly

comparing it to the 50-household resettlement community, as a key reason for the way they were not able to get the land they were promised. This as their local leader *“he has an alliance with them, the chairman and the local people”*. This is in contrast to the 50-household community and the fisherman in the study areas that have successfully used *community unity* to improve their livelihood. The ability to influence the political leaders thought community organisation is therefore a vital *strategy*. This study has shown that climate change has a significant impact on the migration situation in the delta belt of Bangladesh. The study highlights the need for policies and interventions that address the root causes of climate change and its impacts on vulnerable communities. The study also emphasizes the importance of gender-sensitive and youth-focused approaches to address the gender and age-specific impacts of climate change on migration. Further research is needed to explore the long-term impacts of climate change on migration and the effectiveness of policies and interventions in addressing these effects. The study also emphasizes the importance of alternative livelihood activities for vulnerable populations during periods of displacement. It is essential to support and promote alternative income-generating activities, such as farming, fishing, and natural resource extraction, to help these communities sustain themselves during the period of displacement.

Review of National Policy, Plan and Strategies Related on Climate Change Adaptation Issues

Though climate-induced migration is common in Bangladesh, there is a lack of specific policy intervention in this regard. However, Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 and Mujib Climate Prosperity Plan 2022 addressed some issues. For example, it recognized the relation between climate change and displacement while also addressing some of the implications of climate change, such as erosion of river banks, frequent drought, drainage congestion, scarcity of fresh water and food playing as “push factors” to migrate people from rural to urban areas. The BCCSAP 2009 mentioned that declining livelihood opportunities and deteriorating agricultural production will drive “hundreds of thousands” of people to relocate, particularly from coastal zones. 20 million people may be uprooted by 2050, according to this projection. Slums in large cities have also been articulated as a high destination for people who migrate. This presents a pressing issue in light of Bangladesh’s ongoing, rapid, and uncontrolled urbanization. Despite the fact that

BCCSAP 2009 acknowledges that climate change has led to massive migration, no clear policy guidelines for migrants have been provided. Significantly, the Mujib Climate Prosperity Plan 2022 stated climate change as a humanitarian issue and has the greatest impact on human inhabitants, it did not provide any outline of policy initiatives related to climate-induced displacement. To some extent, National Housing Policy 2016 incorporated reconstructing and rehabilitating disaster-affected areas where it did not mention rural-to-urban migration and response to this phenomenon. On the other hand, the National Strategy on Internal Displacement Management 2021 constituted a broader aspect of climate-induced internal displacement. Though it acknowledged pre-displacement, displacement and post-displacement measures, it did not consider some critical socio-environmental perspectives.

Another issue is the clear disparity in policy notes. According to the Eighth Five Year Plan, land and natural resources are experiencing significant strain due to the presence of migrants. On the other hand, the primary objective of the Outline Perspective Plan is to modify migration trends and introduce regulations to oversee its flow. Moreover, the local government agencies do not have a clear understanding of their responsibilities when it comes to adapting to climate change¹. Some of the projects can be relevant, for example, the Climate Victims Rehabilitation Project (Gucchogram), and the Polli Janapad project which were said to rehabilitate vulnerable people, not very specific to climate-induced displaced communities. Besides, there is no context-based policy guideline that can be fit for specific climatic events. Because the climate change implications are not the same in every area and the trend of climate-displacement is also different. In Chittagong city, few local climate-change implications have been assessed, and neither the government agencies nor the city corporation have any intervention related to climate-induced rehabilitation. Though the city is increasingly facing rural-to-urban migration, there is not initiative to tackle the incident in a sustainable way.

Some policy instruments:

1. National Adaptation Program of Action 2023-2050
2. Bangladesh Climate Change Strategy and Action Plan 2008/2009
3. National Housing Policy 2016

4. National Strategy on Internal Displacement Management 2021
5. Climate Change Trust Fund 2009
6. Mujib Climate Prosperity Plan 2022
7. Bangladesh Climate Change Resilience Fund (BCCRF)
8. Climate Victims Rehabilitation Project (Gucchogram)
9. Outline Perspective Plan (Vision 2041)
10. National Plan for Disaster Management 2012-2025
11. Nationally Determined Contribution 2021
12. Bangladesh Delta Plan 2100
13. Dhaka Glasgow Declaration
14. Local Government Initiative on Climate Change (LoGIC)
15. Palli Janapad Project

National Adaptation Plan of Bangladesh (2023–2050)

highlights the need for a multimodal strategy to address the issues raised by migration brought on by climate change. It places a high priority on infrastructure development and disaster preparedness, seeking to build cyclone and flood shelters, early warning systems for different climate-related calamities, including lightning and landslides, and a resilient environment overall. The strategy also highlights the significance of security measures and social safety nets to assist vulnerable groups, such as programmes to reduce early marriage, domestic abuse, and violence, and to provide access to necessary social services. In addition, it highlights the necessity of long-term adaptation planning and cooperation, coordinating with medium- and long-term development plans and supporting transboundary cooperation to efficiently handle the issues associated with migration and the effects of climate change. The policy attempts to increase resilience and decrease vulnerabilities among impacted communities, promoting sustainable development in the face of migration brought on by climate change, through a combination of research-based indigenous adaptation practices, social inclusion initiatives, and infrastructure development.

Climate migration in Bangladesh is driven by several factors, including high population density and vulnerability to natural hazards intensified by climate change. With approximately 160 million people living in a small land area, Bangladesh faces challenges from tidal surges, flooding, river erosion, and cyclones. In response to these challenges, the Bangladesh Delta Plan 2100 (BDP 2100) has been developed as a long-term strategy. The plan aims to achieve upper-middle-income status, eliminate extreme poverty, and ensure sustainable management of water resources, ecology, environment,

¹Ahammad, R. (2011). Constraints of pro-poor climate change adaptation in Chittagong city. *Environment and Urbanization*, 23(2), 503-515. doi:10.1177/0956247811414633

and land in the face of natural disasters and climate change. Post-migration, individuals and communities experience significant lifestyle changes. Climate migrants often relocate from hazardous regions to safer areas within the country, seeking protection from floods, cyclones, and river erosion. However, their displacement can result in the loss of traditional livelihoods and increased vulnerability. Climate migrants may face social and economic challenges such as limited access to basic services, job opportunities, and competition for resources in their new locations. Adaptation and resilience building become vital for migrants to cope with their new circumstances, necessitating the adoption of new livelihood strategies and the development of resilience to future climate risks.

Climate change-induced displacement and migration pose significant challenges globally, with Bangladesh standing out as one of the most vulnerable countries due to its geographical location. The nation faces many hazards such as floods, tropical cyclones, storm surges, and droughts, resulting in substantial population displacement. In response, the Bangladesh Government developed National Strategies on Internal Displacement due to Climate Change (NSIDC) in 2016 which has undertaken various measures to ensure the safety and sustainability of those affected by climate-induced displacement. Efforts include the construction of disaster-resilient housing for resettlement purposes and the implementation of the National Strategy on Internal Displacement Management, which aims to integrate displaced populations into the development process by focusing on prevention, protection, and post-displacement solutions.

Bangladesh's climate migration policies are comprehensive and informed by international frameworks and agreements such as the Sendai Framework for Disaster Risk Reduction and the Global Compact for Safe, Orderly, and Regular Migration. These policies aim to fill protection gaps for disaster and climate-induced displacement, emphasising the importance of preventive measures and humanitarian assistance. The National Strategy on the Management of Disaster and Climate-Induced Internal Displacement, aligned with international standards, further demonstrates Bangladesh's commitment to addressing climate-induced migration through strategic planning and implementation based on normative frameworks.

Conclusion and Recommendations

Bangladesh is highly vulnerable to climate change

impacts due to its geographic location and low-lying deltaic landforms. The coastal region of Bangladesh is especially prone to the adverse impacts of climate change, including sea-level rise, flooding, and cyclones. These impacts have led to displacement and forced migration of people from the delta belt of Bangladesh. This study aims to explore the impact of climate change on the migration situation in the delta belt of Bangladesh. The study used a qualitative explorative research design to collect data from key informants and participants through in-depth interviews, focus group discussions, and observations. The study found that climate change has a significant impact on the migration situation in the delta belt of Bangladesh. The study identified several factors that contribute to migration, including flooding, salinity intrusion, waterlogging, erosion, and cyclones. These factors have led to the loss of livelihoods, displacement, and migration of people from the delta belt to other areas of Bangladesh. The study also found that women and children are more vulnerable to the adverse impacts of climate change and forced migration. The study concludes that climate change is a significant driver of forced migration in the delta belt of Bangladesh, and policy interventions are necessary to mitigate the adverse impacts of climate change on vulnerable communities.

There are clear pieces of evidence by scientists that climate change is happening and it is real and that the world is getting warmer. Evidently, the frequency and intensity of natural disasters are increasing; glaciers are melting and sea levels are rising rapidly. As a result, climate change has become one of the most challenging issues for the international community. The impacts of climate change also have many effects on human beings' development and well-being. Natural disasters destroy lives, properties and livelihoods and force community people to flee from their area of origin.

Bangladesh is one of the most climate-vulnerable countries in the world and suffers from regular natural hazards including drought, cyclones, increase in salinity, frequent floods, and river bank erosion. The consequences of climate change are loss of life, land, homes, and livelihoods and force-displacement. Bangladesh is the third most vulnerable country to sea-level rise and top ten in terms of the percentage of the population living in low-lying coastal zones.

This study intended to investigate the needs of displaced people in four different locations – Banshkhali, Kutubdia, Pekua and Chakaria. Digging out their expectations was also another concern of this study. This study also explored the respondents'

opinions on how they could engage themselves in the entire relocation process if any organisation would do it for them. Accumulating all the findings, some recommendations have been made based on that to prescribe resilience procedures for sustainable relocation of climate-displaced people along with making them capable and aware of handling the displacement situation. These recommendations are mentioned below:

- Prepare a database for the existing climate-displaced people and analyse those data to identify the displaced people to rehabilitate and relocate.
- Find out the most vulnerable climate-displaced people and give them support in their temporary setting with the intention of long-term sustainable rehabilitation and relocation.
- Establish a link with livelihood for the climate-displaced people to have income-generating activities. If necessary, provide skill training and letting the climate-displaced people realise the importance of having skill training.
- Potential land selection for relocation with the involvement of respective displaced households and community teams should be ensured.
- Social arrangement support should be ensured in new communities involving different stakeholders by making awareness and discussion meetings.
- The representatives of local government and local administration need to provide awareness to the new community about the displaced people's acceptance.
- Organise meetings between relocated families and the host community to ensure social cohesion and harmony.
- Forming a small community team and social committee to make awareness in the community and ensure security for the climate-displaced people.
- In the newly relocated community, space for practicing the religion of climate-displaced people should be ensured.
- Community engagement events to ensure the rights of climate-displaced people could be arranged such as rallies, human chains, letter writing, signature campaigns, demonstrations, press conferences and so on.
- Orientation to local media for general awareness and play their role in favour of climate-displaced people.
- Meeting with the related stakeholders including government officials, locally elected members, NGOs and others to let them be concerned about the climate-displaced people.
- Ensuring the education, communication, sanitation

and hygiene facilities for the climate-displaced people in the newly relocated areas.

- Arranging different awareness programmes to make the people including the potentially climate-displaced people cope with natural disasters to minimise the harmful effects of those disasters.

The study highlights the need for a comprehensive approach to addressing the impact of climate change on vulnerable populations in the southern part of Bangladesh. This requires the development of land management systems, support for alternative livelihood activities, and government intervention to support these communities in becoming climate-resilient.

References

- Ahsan, M.N., Khatun, A., Islam, S.M. and Vink, K., 2020. Preferences for improved early warning services among coastal communities at risk in cyclone prone south-west region of Bangladesh. *Progress in Disaster Science*, **5(2)**: 120-140
- Ahsan, M.N., Khatun, F., Kumar, P., Dasgup, R. and Johnson, B.A., 2022. Promise, premise, and reality: The case of voluntary environmental non-migration despite climate risks in coastal Bangladesh. *Regional Environmental Change*, **22(1)**: 50-70.
- Alam, M.Z. and Mamun, A. Al., 2022. Dynamics of internal migration in Bangladesh: Trends, patterns, determinants, and causes. *PLoS ONE*, **17(2)**: 1-19.
- Bandyopadhyay, N., Bhuiyan, C. and Saha, A.K., 2020. Drought mitigation: Critical analysis and proposal for a new drought policy with special reference to Gujarat (India). *Progress in Disaster Science*, **5(3)**: 50-55.
- Barua, P. and Rahman, S.H., 2016. Indigenous Knowledge Practices for Climate Change Adaptation in the Southern Coast of Bangladesh. *IUP Journal of Knowledge Management*, **15 (1)**: 44-60.
- Barua, P., Saeid, S. and Rahman, S., 2020. Climate change vulnerability and responses of fisherfolk communities in the South-Eastern coast of Bangladesh', *Water Conservation and Management*, **4(1)**: 20-31.
- Barua, P. and Mitra, A., 2024. Climate smart agriculture: Global perspective. *Journal of Climate Change*, **10(1)**: 45-65.
- Barua, P. and Barua, M., 2023. Indigenous knowledge practices by farmers in response to salinity intrusion in coastal Bangladesh. *IUP Journal of Knowledge Management*, **21(3)**: 50-65.
- Barua, P. and Rahman, S.H., 2022. Urban Management in Bangladesh. In: The Palgrave Encyclopedia of Urban and Regional Futures. *Disaster Management*, **40(3)**: 60-80.

- BBS, 2011. Bangladesh Bureau of Statistics, Ministry of Planning, Government Republic of Bangladesh, Dhaka.
- Best, K., 2019. A data-driven analysis of environmental migration in coastal Bangladesh. *Coastal Management*, **10(3)**: 60-80.
- Biswas, B. and Mallick, B., 2021. Livelihood diversification as key to long-term non-migration: Evidence from coastal Bangladesh. *Environment, Development and Sustainability*, **23(6)**: 70-95.
- Carrico, A.R., Donato, K.M. and Piya, B., 2017. Cyclone impacts on migration in coastal Bangladesh. *Coastal Research*, **30(3)**: 55-65.
- Chumky, T., Basu, M., Onitsuka, K., Raihan, M.L. and Hoshino, S., 2023. How Do Left-Behind Families Adapt to the Salinity-Induced Male Out-Migration Context? A Case Study of Shyamnagar Sub-District in Coastal Bangladesh. *Sustainability*, **15(1)**: 2756-2570.
- Gakpey, E.E., 2022. Understanding the Dynamics of Climate Change, Migration and Conflict: The Case of Bangladesh. *Disaster Management*, 2093, 65-75.
- Islam, M.N., 2014. An introduction to Research Methodology, Third Edition, Mullick and Brothers, Dhaka New Market, Dhaka – **1205**: 163-165.
- Kumar, K.S. and Viswanathan, B., 2013. Weather, agriculture and rural migration: Evidence from state and district level migration in India. *Environment and Development Economics*, **20(4)**: 469-492.
- Mallick, B. and Etzold, B., 2015. Environment, migration and adaptation - Evidence and Politics of Climate Change in Bangladesh. Bangladesh: A H Development Publishing House, pp. 1-17.
- Mallick, B., Rogers, K.G. and Sultana, Z., 2022. 'In harm's way: Non-migration decisions of people at risk of slow-onset coastal hazards in Bangladesh. *Ambio*, **51(1)**: 114-134.
- Mallick, B. and Schanze, J., 2020. Trapped or voluntary? Non-migration despite climate risks. *Sustainability*, **12(11)**: 1-6. Switzerland. Available at: <https://doi.org/10.3390/su12114718>.
- Nurzaman, A., Shaw, R. and Roychansyah, M.S., 2020. Measuring community resilience against coastal hazards: Case study in Baron Beach, Gunungkidul Regency. *Progress in Disaster Science*, **5(2)**: 56-65.
- Piguet, C., 2008. Climate Change, Migration and Adaptation in Funafuti, Tuvalu. *Global Environmental Change*, **19(1)**: 105-112.
- Rabbani, M.M., Cotton, M. and Friend, R., 2022. Climate change and non-migration – Exploring the role of place relations in rural and coastal Bangladesh. *Population and Environment*, **44(2)**: 99-122.
- REMA, 2018. Environmental Management Strategies for National Strategy for Transformation (NST1). Kigali: MINECOFINE.
- Tessler, Z.D., Vorosmarty, C.J., Grossberg, M. and Gladkova, H., 2016. Profiling risk and sustainability in coastal deltas of the world. *Science*, **349(3)**: 638-643.
- Yamashita, R., 2020. Relationship between citizens' risk perceptions formed by disaster information and migration decision-making: Evidence from Japan. *Progress in Disaster Science*, **5(2)**: 70-90.