



Spatio-temporal Dynamics of Riverbank Erosion and Accretion and Their Socio-economic Impacts: A Case Study from Bhola Island of Bangladesh

Papri Hazra^{1*}, Marzia Sultana Shefa², Mawya Siddiqua³, Shanjida Tanzim Mim⁴, Md. Jahid Hasan⁵ and Dibakar Chandra Das⁶

¹Department of Environmental Science, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Email: papri@pstu.ac.bd

²Department of Disaster Risk Management, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Email: shefa7390@pgs.pstu.ac.bd

³Department of Geo Information Science and Earth Observation, Patuakhali Science and Technology University, Dumki, Patuakhali-8602 Email: mawyageo@pstu.ac.bd

⁴Department of Environmental Science, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Email: pg6222060212@pgs.pstu.ac.bd

⁵Department of Environmental Science, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Email: ug2006019@esdm.pstu.ac.bd

⁶Department of Business Administration, Global University Bangladesh, Barishal, Email: dibakar2edu@gmail.com

*Correspondence: papri@pstu.ac.bd, Tel: +880 01721478552

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Abstract: Riverbank erosion and accretion are natural and ongoing geomorphological processes in the huge delta of Bangladesh, driven by the mighty Ganges-Brahmaputra-Meghna river systems. The turbulent rivers of Meghna and Tetulia are posing serious threat to two high-risk erosion unions of Hasanagar and Pakshia in Burhanuddin Upazila of Bhola district. In these coastal tracts, high tidal surges and faster monsoon floods are continuously eating up homesteads and farmlands. The long-term fluctuations of seven reference years (from 1995 to 2025) were chosen with only images captured during the month November to February were used. The most significant erosion occurred between 1995 and 2000, with a loss of 3,055 ha of land. Erosional activity decreased afterward to its minimum of 973 hectares between 2015 and 2020. In 1995 it was 16,852 hectares and increased to maximum of 20,305 hectares in 2005 due to significant widening of the channels as a consequence of erosion. The water area reached its peak in 2005 and then decreased until 2020, which shows a stage of erosion-accretion and channel occupation, after which there was a minor increase in 2025. Over 70 per cent of the people surveyed stated that riverbank erosion had caused them to change their farming methods. Erosion has affected half of the respondents from low-income sectors. River bank erosion is responsible for almost 70% of the total displaced population. A vast majority of traditional social institutions and organizations like family and relative community of vulnerable regions like the river Meghna, are living with a threat of how long will their lives continue being survived in slums; hence there should be an appropriate understanding of the process that can build up effective management policies for the rivers under investigation. It is suggested that further investigations should concentrate on the efficient usage of newly added land by accretion and possibilities to diminish the negative impact of river erosion.

Keywords: Riverbank erosion; Accretion; Displacement; Population; Income.

INTRODUCTION

Riverbank erosion, accretion, and channel shifting represent significant global resource management

challenges (Muzahid et al., 2024). Particularly, erosion and accretion processes, river dynamics play a vital role in determining the geomorphology and socioeconomics of deltaic regions. Riverbank erosion represents a single

component of the broader channel system and is closely linked to processes such as sediment transport and deposition (Hooke, 1979). In Bangladesh, the extensive and dynamic network of rivers and channels contributes to the frequent occurrence of riverbank erosion as a major natural hazard (Rabbi et al., 2013). Several variables, including rainfall, soil composition, river shape, topography of the river and adjacent areas, and floods, have an impact on it (Hasan et al., 2018). Bangladesh is a riverine, low-lying deltaic nation and is primarily located in the Bengal Basin, where the main rivers flow into the Bay of Bengal through the Meghna estuary (Ahmed et al., 2025). Multiple natural and anthropogenic factors affect spatio-temporal variability in the Meghna estuarine system's rate of erosion and accretion. The Meghna River, which continuously changes its course as a result of erosion, deposition, and migration, has demonstrated more instability and operated more dynamically than any other river (Ahmed et al., 2025).

The lower Meghna River regions are now at risk to strong tidal forces caused by the Bay of Bengal due to rising water levels from upstream rivers like the Ganges and Brahmaputra. As a result, the combined effects of these processes are causing significant erosion along the river banks during both the dry and wet seasons (Fahad & Mahmood, 2024; Rahman et al., 2013). Due to the massive volume of water and sediment, the Meghna River has become a region of active erosion and accretion as well as dynamic water (Ahmed et al., 2014). According to recent studies, uncontrolled sand mining in the lower Meghna River exacerbates morphological instability by modifying the river's bathymetry and increasing bank erosion (Joly & Islam, 2024). These hydromorphic processes, which are always changing the locations of bank lines and creating new land within riverine and coastal regions, leave these areas with a high potential for erosion. Bank erosion is a naturally occurring erratic phenomenon and occurs throughout the year.

The effects of bank erosion include significant loss of land and forests to the river, the displacement of many communities, and a rise in landlessness (Rahman & Gain, 2021). Each year, thousands of people will migrate as a result of this type of erosion, and many suffer from psychological distress (H. & Najnin Maria, 2021). Approximately 2,400 kilometers of riverbanks undergo significant erosion each year (Ahmed et al., 2014). Annually, millions of individuals suffer from the loss of agricultural land with crops, and homes due to this erosion. Over the past three decades, the combined movement of the banks of the three principal rivers (Jamuna, Padma, and Lower Meghna) has led to an estimated loss of 100,000 hectares of floodplain. Around 800,000 individuals have lost their land as a result of this bankline shift (Sarker, 2009). This makes the river bank erosion a recurrent and extremely unpredictable hazardous event and is often also called a "Silent disaster" (Hasan & Mahmud-ul-Islam, 2016).

According to recent satellite-based analysis, it appears that there has been a substantial amount of land change over the years in the Meghna Estuary, with large areas of land being eroded and significantly added to all at once (Khatun et al., 2024; Zishan et al., 2026). For example, studies show that in the Meghna- Tetulia estuarine area, there have been thousands of square kilometers of land change over time, indicating the rapidly changing coastal environment (Mahmud & Sultana, 2023).

Rapid coastline changes and frequent land loss are characteristics of the northern portion of Bhola, which includes regions like Pakshia and Hasan Nagar unions. According to research, Bhola has high levels of erosion on its eastern margins and deposits (known as sediments, or accumulations) primarily occur in specific areas of the northern edge of the island as a result of the interplay of sediment transport and hydraulic conditions (Biswas & Islam, 2017). The geological processes described above will continue to alter the face of the landscape through processes like land degradation and new land formation over time.

However, monitoring of erosion and accretion, especially in these areas, is still lacking. For addressing these lacking, this study targets to enhance contemporary monitoring of erosion and accretion by ultimate compilation, also analyzation of a composite layer of data, including: total erosion and accretion of Bhola Island over the past 30 years, and how these morphological (river bank) changes have affected the economic, social, and environmental conditions of the community within this geographic region. This data will be compiled from GIS-based analysis of Landsat satellite images obtained during 7 benchmark years (1995, 2000, 2005, 2010, 2015, 2020, and 2025) at 5-year intervals to examine the long-term morphology changes of the riverbank. By integrating these aspects, this research intends to provide a thorough assessment of river dynamics and the human component of those dynamics, so that the results can be utilized to assist decision-making regarding how best to manage and adapt to a rapidly changing riverine environment.

MATERIALS AND METHODS

Study Area

We selected two unions Pakshia & Hasan Nagar from Burhanuddin Upazila, Bhola as study area of the Meghna River. Within this area are the active floodplain lands and primarily alluvial landforms that are developed by both seasonal flooding and sediment movement over time (Alam & Khan, 2022). The Meghna River is known for being an active river with high rates of erosion, accretion, and char formations (Valentine & Wilson, 2023). The rapid rate of change is due to both the flow of water within the river and the sediment being transported downstream (Simons & Şentürk, 1992). Many of the people within the Bhola rely on agriculture and on the natural resources from the river (Bosu & Kobir, 2017); therefore, this area is not only

geographically active but also vulnerable socio-economically (Hoque, Haque & Islam2022).

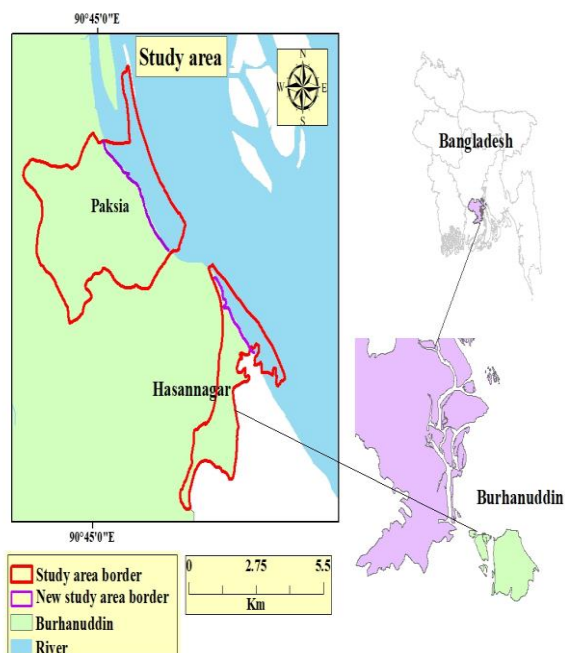


Figure 1. The study area of the research

Data Collection

Satellite data collection

Accurate evaluations of erosion and accretion, along with their spatial distributions and trends, are essential for understanding the morphological dynamics of rivers and for tracking these processes (Hasan et al., 2017). The use of multispectral Landsat satellite imagery provides an opportunity to understand how a region changes over time through an analysis of temporal changes.

The analysis relied on seven reference years (1995, 2000, 2005, 2010, 2015, 2020, and 2025) to represent long-term variations. Landsat 5 Collection 2 Level 2 data were used for reference dates prior to 2016, while Landsat 8 or 9 Collection 2 Level 2 data were acquired for the years since 2016. Images from only the dry seasons (November-February) were used to maintain seasonal consistency and to limit the effects of flooding associated with monsoons.

Table 1. Satellite Data and Sensors Used for Multi-Temporal Analysis (1995–2025)

Year	Satellite/Sensor
1995	Landsat 5 TM

2000	Landsat 5 TM
2005	Landsat 5 TM
2010	Landsat 5 TM
2015	Landsat 8/9 OLI
2020	Landsat 8/9 OLI
2025	Landsat 8/99 OLI

Survey data collection

Both primary and secondary sources were used to collect data for this research. The primary data were collected through household surveys, Key Informant Interviews (KII), Focus Group Discussions (FGD); direct observations, and consultations with local communities regarding their conditions in the study site's communities, primarily Paksia and Hasannagar Union of Borhanuddin Upazila.

A structured questionnaire was developed for the needs and situations of the sample population on socio-economic status, livelihood activities, displacement, and the effects of riverbank erosion. Secondary data were collected through academic journals, research papers, government publications, BBS, articles, maps, and any or all other relevant documentation.

Image processing

All the images that were selected were pre-processed using Google Earth Engine software. Contaminated pixels were removed using the QA_PIXEL band and their removal helped with classification accuracy. Surface reflectance was adjusted to conform to each sensor standard. For each reference year, median composite images were created in order to reduce residual cloud affects, noise and short term variability.

To extract river water bodies, NDWI (Normalized Difference Water Index) was calculated from the Landsat composite images using their bands (i.e. Landsat 5 NDWI = band 2 + band 4, Landsat 8/9 NDWI = band 3 + band 5) (Kshetri, 2018). The NDWI water & non-water pixels were separated using a threshold value of 0.0 (i.e. NDWI $\geq$ 0.0 = water; NDWI $<$ 0.0 = non-water) (Guo et al., 2017). The resulting NDWI pixel layer has been converted to byte format (8 bit) and then converted into a single water mask that is 1 (water) and 0 (non-water) and clipped to the buffer area of interest. This aerial water extent layer will be of the same size & dimension for each of the other time periods.

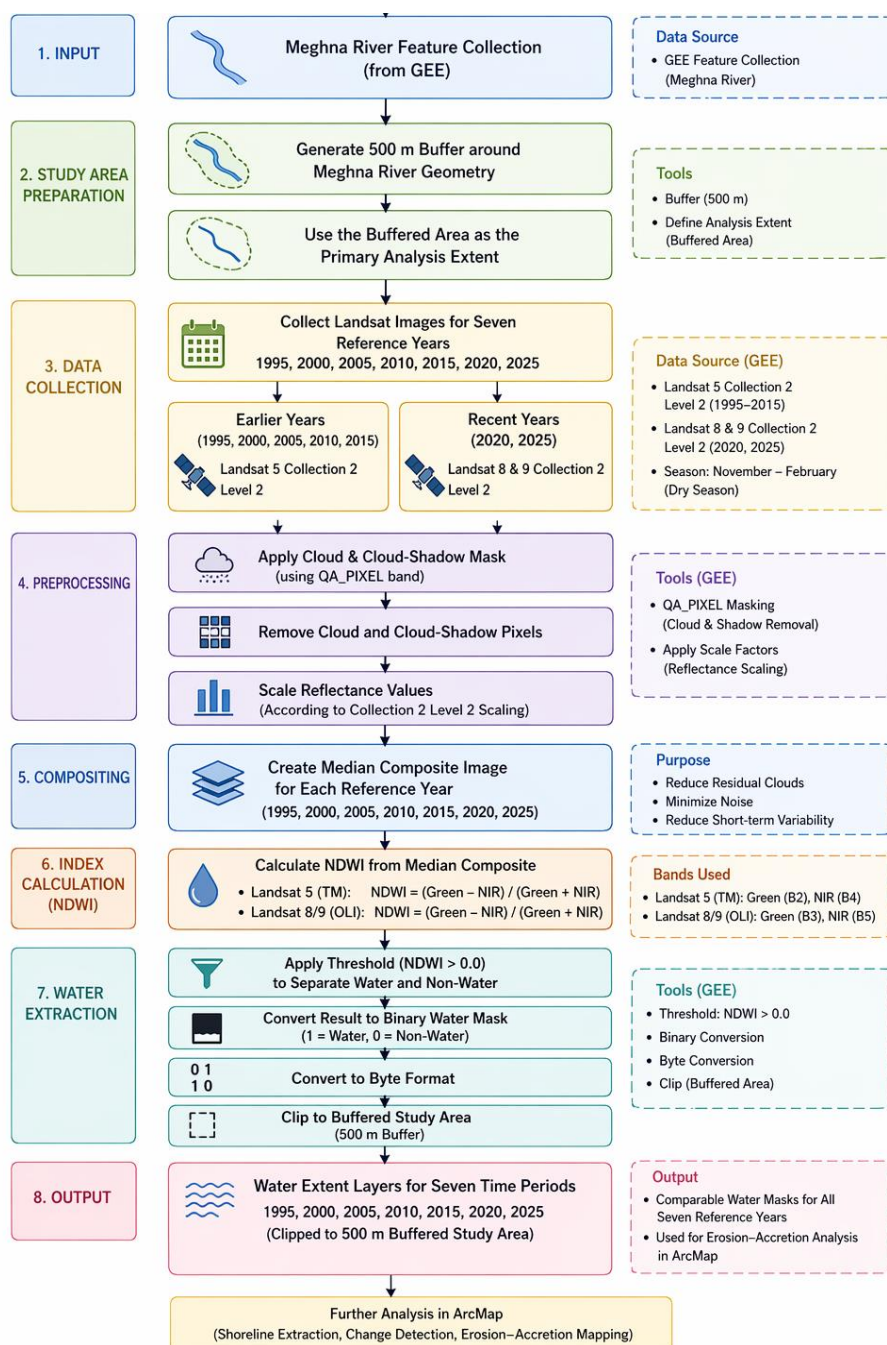


Figure 2. Flowchart of the methodology

Sample size

The sample size was calculated using the following equation (Del Águila& González-Ramírez, 2014):

Paksia Union

$$\text{Sample size, } n_0 = \frac{z^2 \times p \times q}{e^2}$$

$$= \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.1)^2} = 96$$

Hasan Nagar Union

$$\text{Sample size, } n_0 = \frac{z^2 \times p \times q}{e^2}$$

$$= \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.1)^2} = 96$$

Adjusted sample size,

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

$$= \frac{96}{1 + \frac{96 - 1}{23681}} = 95.6 \approx 96$$

Where, total targeted household, N=23681
Confidence level=95%
Margin of error, e= 10%

Adjusted sample size,

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

$$= \frac{96}{1 + \frac{96 - 1}{14808}} = 95.4 \approx 96$$

Where, total targeted household, N=14808
Confidence level=95%
Margin of error, e= 10%

Data analysis

To understand overall long-term trends, erosion, accretion and stable land values were assessed both periodically as well as cumulatively using a summation of data points to assess future trends. A comparison of the data was also performed to assess whether erosion or accretion was more prevalent in the river system, and to assess the general geomorphological responses of each of these features within each section of the river system.

The collected data were analyzed using both quantitative and qualitative techniques. Quantitative data were processed using simple statistical tools such as frequency and percentage and presented in tables and figures. Qualitative data from FGDs and KIIs were analyzed thematically to identify key issues such as livelihood loss, migration, and social impacts.

RESULTS AND DISCUSSIONS

River dynamics

The spatio-temporal analysis of riverbank changes along the Meghna River in the Pakshia and Hasan Nagar area from 1995 to 2025 reveals a highly dynamic fluvial environment characterized by alternating phases of erosion and accretion (Table 1).

Table 2: Spatio-Temporal Changes in Erosion, Accretion, and Stable Land Area (1995–2025)

Time Period	Erosion (ha)	Accretion (ha)	Stable land (ha)
1995 - 2000	3,055	529	8,554
2000 - 2005	2,485	1,558	6,598
2005 - 2010	1,308	1,846	6,849
2010 - 2015	1,926	2,655	6,769
2015 - 2020	973	1,889	8,452
2020 - 2025	2,567	1,549	7,774
1995 - 2025 (Full 30yr)	8,095	5,809	3,515

Although erosion showed a lot of different patterns throughout the observation period, there were two significant periods of high erosional activity. The highest level of erosion was seen during the observation years of 1995-2000 with the loss of 3,055 hectares of land, which indicates severe instabilities along the riverbanks at the beginning of the observational period. Following this, there was a general decline in erosional activity, which reached its lowest point of 973 hectares in between 2015-2020. However, construction of a large new industrial complex after 2020 resulted in a substantial increase in erosional activity (2,567 hectares lost), indicating that erosional activity is once again on the rise.

Temporal fluctuations in the intensity of erosion were observed in the report (Ahmed et al 2014) with discharge conditions and the location of the river channel affecting the variability of the amount of erosion. However, the present study displays that the sharp decrease followed by a quicker increase in erosion for the previous data indicates a greater amount of localized instability compared to more estuary-wide trends.

On the contrary, Accretion showed a general upward trend across the major portion of the study period. The year with the least amount of recorded Accretion was 1995, with 529 hectares, and the most Accretion occurred during 2010-2015 with 2,655 hectares. This means that the amount of sediment deposited on these lands was higher due to higher deposition; this compensates for some of the Land Loss during the earlier 1995-2000 period when there was a higher amount of sediment being removed than deposited. The amount of accretion decreased in the end of the study period (2020-2025) with 1,549 hectares of recorded accretion. Studies of Delta Rivers in Bangladesh (Ahmed et al., 2025) show that intermittent sediment deposits can counter erosion temporarily, but do not completely compensate for the long-term loss of land.

The stable land areas also changed from 1995-2000, when there was a total of 8,554 hectares, to 2015-2020, with 8,452 hectares, and from 2000-2005, when there was only 6,598 total hectares. This reflects the change of the riverbank as rivers move back and forth. Stable areas are constantly being moved between these areas due to erosion and deposition. Additionally, evidence of fluctuating periods has been reported from lower Meghna River's GIS-DSAS based studies (Mamun et al., 2020) with bank stability being ultimately affected by channel migration and sediment redistribution.

The total entire erosion that occurred over the entire 30 year period (from 1995 to 2025) is 8,095 ha; the total entire accretion is 5,809 ha. The net land loss during this period is 2,286 ha. Therefore, erosion has clearly been the dominant geomorphic process in this study area. Evidence of erosion predominance aligns with Ahmed et al., 2018, which define areas nearby to the Meghna River as highly sensitive to erosion due to high levels of sediment movement and hydrodynamic activity.

There is also evidence that 3,515 ha of land have remained stable during this time, indicating that only a small part of the entire area was resistant to change. In relation to very dynamic confluence areas like Chandpur (Ahmed et al., 2014), the fact that there are significant amounts of stable or semi-stable land would suggest that there have been and may continue to be some forms of stabilization occurring in selected sub-reaches. Throughout the study period, there was an obvious fluctuation of total water area of these unions from 1995 to 2025. The water area began with an area of 16852 ha in 1995, increased to a maximum area of 20305 ha in 2005, indicating a significant erosion-induced widening of channels.

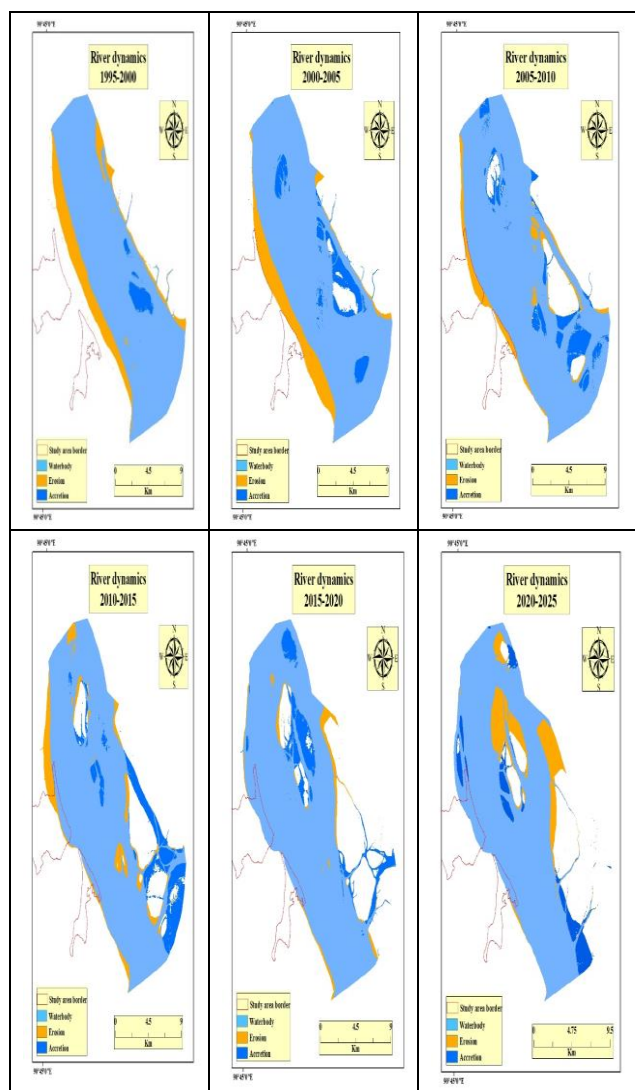


Figure 3. River Dynamics of the Study Area in the periodic interval of (a) 1995-2000, (b) 2000-2005, (c) 2005-2010, (d) 2010-2015, (e) 2015-2020, and (f) 2020-2025

After reaching the peak area in 2005, the area of water had decreased over the time period to 2020, suggesting a phase of erosion-accretion enhanced and channel occupation had occurred, followed by a slight increase in area of water at 2025.

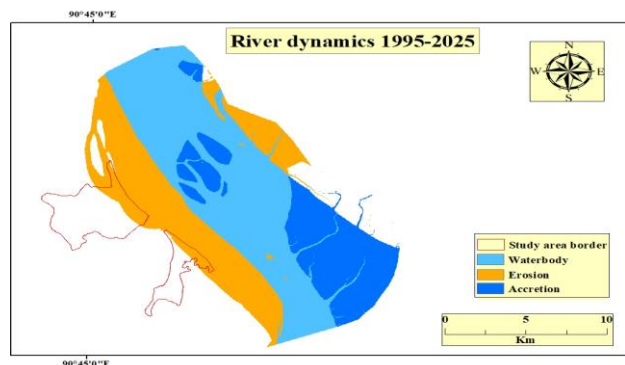


Figure 4. Overall River Dynamics of the Study Area (1995-2025)

These variances provide evidence of channel behaviors related to erosion-accretion and provide information about the dynamic nature of the Meghna river system.

Table 3: Temporal Variation of Water Area (1995-2025)

Year	1995	2000	2005	2010	2015	2020	2025
Water (ha)	16852.24	19378.43	20304.58	19766.35	19036.77	18120.16	19137.87

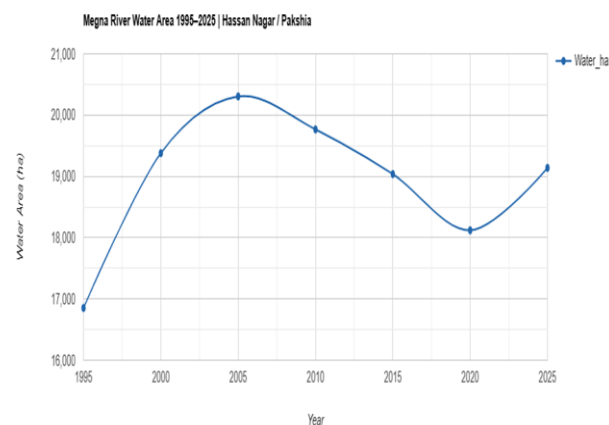


Figure 5: Temporal Variation of Water Area (1995-2025)

Socio-economic Impacts caused by Riverbank Erosion in the Meghna River Basin

The findings of the survey and field observations validate the impacts of riverbank erosion on the socio-economic conditions of the local communities residing along the Meghna River. During the peak rain season (July-September) the river does overflow its banks and contributes to soil fertility through the deposition of sediments on the banks. However, abnormal flooding due to excess rainfall, inadequate drainage, and surge from storms can create significant damage to crops, homes, and public infrastructure. Most respondents view erosion as a natural phenomenon, but others regard it as a phenomenon caused by divine intervention. Regardless of this perspective, the impact of river bank erosion on local communities is quite severe as it is a primary contributor to poverty as well as increasing the vulnerability of these communities. Losses resulting from river bank erosion include land occupied by homes, agricultural land, and the physical structures of homes, livestock, and household possessions. The study indicates that, in the long-term, losses due to land from erosion will outweigh those resulting from soil accretion and will continue to worsen the Economic Conditions of local communities.

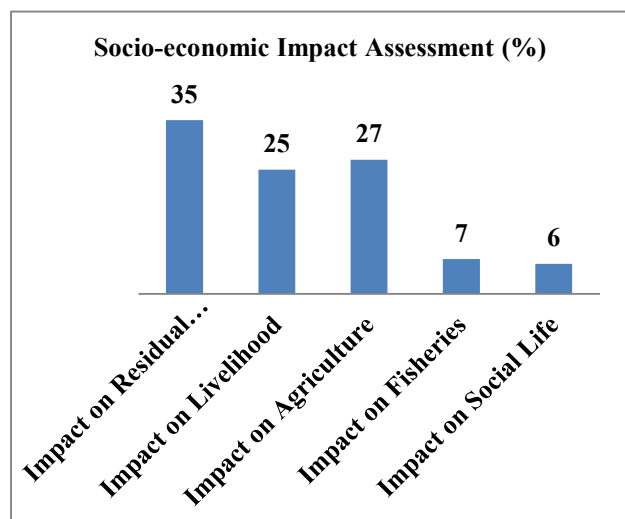


Figure 6: Different Socio-economic Impact of River Erosion in Study Area (Source: Field Survey, 2025)

Impact on Residual Land

Loss of Homestead and Assets

Loss of homestead land is one of the direct effects from erosion. Study results show that approximately 66% of respondents have lost less than one bigha of land while others suffer greater losses of land (Table 4). While the loss of small amounts of land is important for subsistence families, due to the financial constraints most families will not have been able to re-locate from the erosion before total destruction of their home and assets occurs. Because erosion-induced land loss disproportionately affects marginal populations and accelerates poverty (Begum 2025, Alam et al. 2024).

Table 4: Amount of lost land of surveyed area (Source: Field Survey, 2025)

Amount of lost land	Percentage
>5 bigha	2
2-5 bigha	6
1-2 bigha	18
< 1 bigha	66
Did not loss land	8

Impact on Livelihood

Occupational Structure

A breakdown of household income shows 80% of respondents have incomes below 8,000 BDT per month. This indicates that most of the study population is low income and therefore at high risk of experiencing environmental risks. The occupational data indicate that fishing is the most common form of livelihood (30%); 15% engage in day labor, 17% operate a small business, and 13% work in agriculture (Table 5). This demonstrates a shift away from traditional farming because of the continued loss of land. Erosion reduces access to

agricultural land and force households into alternative income generating activities (Hasan et al., 2023).

Table 5: Occupation of the surveyed household (Source: Field Survey, 2025)

Occupation	Percentage (%)
Agriculture	13
Day laborer	15
Fisherman	30
Service	6
Rickshaw/AutoDriver	8
Business	17
Carpenter (Boat Maker)	4
Others	7

Impacts on Agriculture

Agriculture has been greatly affected by riverbank erosion. Over 70% of individuals interviewed indicated that they have changed farming practices because of riverbank erosion (Figure 7). Sand deposits are rendering fertile rice-growing lands unusable, resulting in soil fertility declining and productivity deteriorating (Shad et al., 2025).

Due to sedimentation, farmers are rapidly expanding their cultivation of rice and other crops (i.e. jute, corn, betel nut, pulses and groundnut) into new char land created by the river, but some of this newly formed land is not very productive, which has reduced diversity in crops and reduced the ability to perform multiple crops (Haque & Jakariya, 2023, Sarker et al, 2003). Loss of agricultural land is very crucial in the study area. Many families are mostly dependent on agriculture, which means that any loss is an additional risk to their survival. Survey responses indicated that the majority of individuals who responded to the survey lost less than 100 decimals of land, while others lost much larger areas.

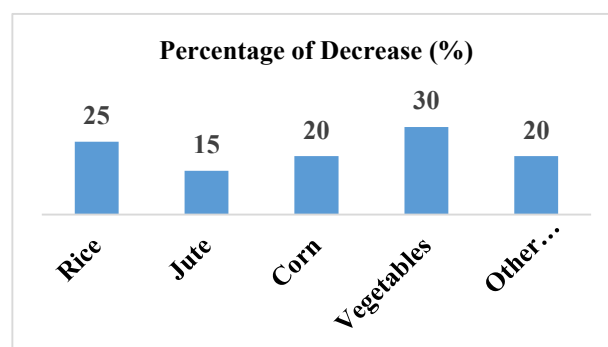


Figure 7: Decrease of agricultural production rate in the study area (Source: Field Survey, 2025)

The decline of agricultural land causes many individuals to fall into poverty and creates uncertainty for their means of subsistence (Hossain et al., 2024, Begum, 2018).

Abnormal flooding and riverbanks being eroded have collectively decreased agricultural productivity, even though seasonal flooding normally improves soil fertility. A significant amount of agriculture has been lost to the river, causing farmers to have fewer cropping opportunities and more often have to farm at a subsistence level. Sand and unpredictable flooding have both contributed to the decline of agricultural output.

Impacts on Fish and Fisheries Resources

Fish Species in the River Meghna ecosystems are the key contributors to the subsistence economy of the fishing communities.

The migrations of fishes occur with seasonal changes in river water flow; many fish species move between rivers and flooded areas/flat fields at different times of the year for spawning and feeding. In many species, flooded areas represent some of the richest breeding areas for larvae and juvenile fish during the monsoon season.

Currently, fish species have been impacted by erosion, sediment deposition and changes in river water flow which has reduced the historical migratory patterns of fishes. Hydrological alteration and habitat degradation have reduced fish diversity and productivity (Haque et al. 2026). This will, in turn, affect the number of fish produced, thus having an irreversible effect upon the viability of the fishery.

Impact on Social Life

Displacement and Migration

The main cause of displacement in the area of study is riverbank erosion, of which approximately 70% is due to riverbank erosion alone (Table 6). Many of the households reported having been displaced several times, with some having been re-located at least five times. Repeated relocation leads to chronic vulnerability and long term poverty (Islam & Rashed, 2011). Most displaced families are able to re-settle in either adjacent areas, embankment areas, or slums of the city, where they live under poor living conditions. Environmental displacement pushes rural populations into low-income and insecure urban or informal jobs (Etzold & Mallick, 2016). Many female-headed households are also quite vulnerable and suffer extreme socio-economic disadvantages.

Table 6: Factors influencing displacement and migration patterns in the study area (Source: Field Survey, 2025)

Reasons	Percentage (%)
Displaced by River Erosion	70
Family Problem	6
Land Scarcity	3
Occupational Problem	4
Natural Calamity	15
Social Conflict	2

Changes in Jobs and Livelihood due to Erosion of Riverbanks

Erosion of riverbanks results in major interference with people's ways of living. Most respondents stated that they have lost homes as well as land they could farm (their only way of making money); as a result, many families have become poor. About 40% of the people affected had to change occupations to informal types of work (e.g., day labor, transport, or a small business), indicating a significant decrease in economic stability and lack of vocational skills.

Social Consequences of Erosion and Destruction of Communities

This research shows that erosion creates many social issues for people. Fifty percent people of the respondents are in low income sector (10000tk<) are affected by erosion. The majority of traditional social structures (e.g., families living together, community networks) are being destroyed. Moving to the city because there are no jobs in their area has destroyed, or at least weakened, the social ties between members of a community.

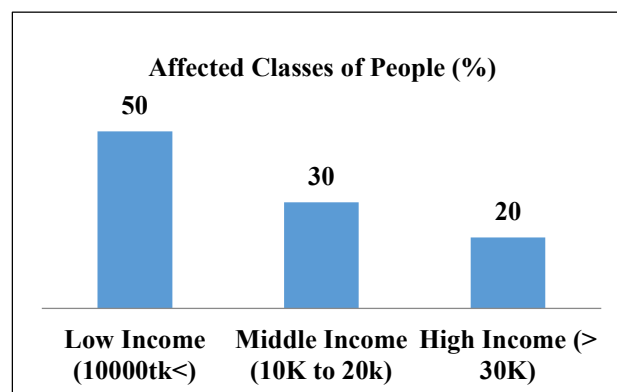


Figure 8: Vulnerability of different income generating people in the study area (Source: Field Survey, 2025)

Environmental displacement not only causes economic loss but also leads to long-term social fragmentation and reduced community resilience (Islam, Schech & Saikia, 2021). People who live in char areas experience great difficulties because they cannot easily obtain health care, transportation, or emergency services due to their isolation.

CONCLUSION

This research shows that the Meghna River along the Pakshia- Hasan Nagar reach of northern Bhola Island is a very dynamic fluvial system where the riverbanks are continuously changing between erosion and accretion, and these transitions happen quite quickly. During the 30 years from 1995 to 2025, the majority of time was spent in erosion, with major losses of land from erosion occurring in two distinct time periods 1995–2000 and then again after 2020. There was a slight reduction in erosion from 2015 to

2020, but the subsequent increase shows that river banks remain unstable and will likely continue to deteriorate due to further human impacts. In contrast, while accretion increased generally throughout most of the study time replacing many of the earlier land losses particularly during the 2010 to 2015 timeframe, the declining trend of accretion in more recent years shows this compensatory process is neither stable nor adequate to offset the long-term average erosion rates. The stable land and water area's analysis supports that there is an evolving river system and that means the stable land fluctuates due to continuous channel migration and redistribution of sediments. The water area has varying amounts of total water at any given time throughout the analysis, with the greatest amount of total water being present in 2005 and a decrease in total water after that year. The change in water area has occurred due to erosion/accretion processes and has produced a cycle of channel expansion and contraction throughout time. Overall, these patterns show that the study area does not have a single trajectory that is uniform or predictable, but instead, it has localized instability and short-term dimensioning with regard to wider estuarine dynamics. River bank erosion on the Meghna River has had a significant impact on the socioeconomic vulnerability of low-income households.

The majority of respondents reported loss of land (approximately 66%), a decrease in agricultural output and a change to less productive char-based agricultural systems. Fisheries have also declined because of the changes in river current and sedimentation. Erosion has been one of the primary causes of displacement (approximately 70% of respondents had been displaced), with many of these households having moved multiple times and approximately 40% of these households moving to informal or more unstable forms of income generation. All of these changes have led to a decline in economic security and disruption of traditional social and community networks. The research shows that there is a need for regular and precise monitoring with combined methods to provide more accurate understandings and management of the dynamics between erosion and accretion. Understandings of these dynamics are critical to the development of successful management strategies for river systems, particularly in some of the most vulnerable areas, such as the Meghna, where river systems have a direct effect on the people who live there, stability of the land, and the risk of disasters. Future research should look into what works to reduce the detrimental effects of riverbank erosion. It should also check how land that forms, from accretion can be used in an efficient way.

Conflict of Interest

There are no conflicts of interest declared by the authors.

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