



Climate Change: River Erosion in Bangladesh

1. Background

Bangladesh is one of the most populated countries in the world having 32% coastal area that is 47,211 square kilometres. According to the population census in 2001, some 35 million people live in the coastal area which is 28% of the total population. Inter-governmental Panel on Climate Change (IPCC) reveals that in 2001 20 and 40 per cent of the total population of the world live within 30 and 100 kilometres accordingly in the coastal areas.

According to the geographic position and Biodiversity, it is to say that the coastal ecosystem is the most diversified and ever changing. It has a vibrant potentials as well as jeopardy and hazards. Through last couple of decades development activities of mankind, especially, the over exploitations and pollutions of the water resource and biodiversity have increased the risks of the disasters as a result of climate changes. Especially, river erosion, flood, tidal waves, cyclones become ever related to these regions.

Land ownership is the principal indicator of socio-economic actualisation in the rural coastal communities. Per capita land availability in the coastal area is relatively less than that of in the mainland of the country. In the interim period of 1991 through 2001, the yearly increasing rate of birth in the coastal areas was 1.29%. According to this rate the total population of the coastal area by 2020 would be 45 million.

Mr. Bob Makenro, the regional chief of the International Federation of Redcross and Red Crescent Society (IFRCS) in 2000 identified the river erosion is the largest concern of Bangladesh. According to him, river erosion causes much more destruction to the socio-economic mechanism of Bangladesh than any other natural disasters. But very few people are concerned about it. He mentioned that the complexity of the issue is critical enough to be addressed in the mass media properly. According to him, this is a slow, silent disaster.

In a research DFID (in association with Disaster Forum) identified the river erosion as the topmost disaster concerning the losses. According to the World Disaster Report 2001 published by IFRCS, 1 million people are distressed and 9 thousand hectares of land are inundated by the river erosion each year.

Continuing river erosion and increasing birth rate on the other hand made the coast inhabitants vulnerable and homeless.

According to some analysis, it is seen that the livelihood standard, average age, per capita land, access to education, health service, social security in the coastal areas etc are much less than those of mainland. As a result, the social and economic vulnerability is increasing with the natural calamities, especially, river erosion.

2. Coastal River Erosion

River erosion and submerging of the coastal lands are the national phenomenon being one of the

main natural disasters. Centre for Environment and Geographic Information Services- CEGIS shows in a recent research that 0.1 million people become homeless every year in the country due to river erosion.



In the last 34 years submerging of river side lands are 219286 acres in *Jamuna*, 69135 acres in *Ganges* and 95119 acres in *Padma*. To be concerned that, erosion in the *Jamuna* would cause 3408 acres of land, 543 localities, 3360 metres of embankment, 5160 metres of roads, 4 educational institutions, and 2 market place to be submerged by 2007.

In the mean time, the *Ganges* would cause 1778 acres of lands, 136 acres of localities and 570 meters of roads while the *Padma* would cause 1600 acres of lands, 370 acres of localities, 3930 metres of roads, 9 educational institutions, 5 market places and 1 Union Council office to be submerged in the river by recent rate of erosion.

Geography and Environmental Science Department of the Jahangirnagar University presented a chart of the losses of river erosion between 1996 to 2000, that is as follows,

Year	Financial Loss	Affected areas	Affected population
1996	5809 m	71680.4 Acres	10103635
1997	33012 m	7756 Acres	173090
1998	2201 m	41519 Acres	321000
1999	10535 m	227755 Acres	899275
2000	3286 m	219310 Acres	415870

Loss of life may not be happened due to erosion but it makes people undone. It causes a massive financial loss. Huge erosion is seen in the coastal islands such as Bhola, Sandwip, Hatya, Kutubdia etc. Coastal estuaries, especially, the basin of Kutubdia Channel, Hatya Channel, Sandwip Channel and Karnafulli filled with about 30868 cubic metres of tidal water from the Bay of Bengal and again carry down the fresh waters from 38896 km² of coastal and mid areas of Bangladesh. The immense pressure of the downwards tide, current force and swirl, waves and tides, lack of trees on the riverbank causes erosion to the coastal islands every year. However, the highest rate of the erosion is on the Bhola mainland with some islands including Kutubdia.

3. Major reasons of the erosion

- Coastal estuaries and Channels are filled with about 30868 cubic metres of tidal water from the Bay of Bengal and again carry down the upstream flow of almost 38896 km² of coastal and mid areas of Bangladesh. The immense pressure of the downwards tide and the intensity of waves causes erosion to the coastal islands every year.
- As the result of the GHG emission the atmosphere are getting warm day by day resulting the glacier liquefy. The huge quantities of melted water from Himalaya are speeding up

through the Ganges and Brahmaputra and crashing to the coastal estuaries of Bangladesh. The intensity of tidal waves causes erosion in the south-western coast of Bangladesh.

- Lack of national forecasting system for the erosion.
- Lack of planned and necessary embankment along with the coast.
- Coastal areas of Bangladesh are being submerged gradually due to the global warming and sea level rise. The collision between downwards current of fresh water and uprising sea level creates strong twirling that cause erosion to the coast.
- Due to combined sudden flood, heavy rain, and downwards freshwaters causes collision to the riverbank and cause erosion to the coastal areas.
- Due to heavy siltation in the south-western part of Bangladesh and newly formed *charland* the flows of rivers get changed to another direction. As a result the bank of rivers are facing newly stress and expose to erosion.
- Deforestation and lack of mangrove plantation in the coastal areas.
- Unseen change in the tidal surge due to the climate change.

It causes deep submerging through the riverbank and thousands of people are being evicted.

Bhola and Kutubdia under threats of continued erosion

Sea Island Kutubdia is now on the face of being submerged due to erosion and natural disaster. Kutubdia was a land of 250 square kilometres. Being eroded continually it has lost 40% to the sea by 1980 to 1990 and now has only 58 skm. 65% of Kutubdia has been submerged to the sea in the last 100 years. More than 60 per cent of the inhabitants have migrated. The current density of population has become now 2700 per skm due to the decreased area. On the other hand, Bhola, the island district of Bangladesh, was of 6400 skm in area in 1960s. 3000 skm of it have been inundated in the last 40 years only. The renowned growth centres like Old Daulat Khan, Mirja Kalu, Molong Chora, Swarajanj, Choumuhony, Taju Miar Hat etc are totally submerged to the sea. Now also any one of the localities is being eroded. If this rate of erosion continues entire Bhola would be lost within the next 40 years.

4. Steps to prevent erosion

Government initiates for embankment construction and maintenance every year in association with the Water Development Board in order to protect the coastal erosion. It is true that, the fund allocation is much less than the need, moreover, there is lack of proper implementation for mobilization of this fund.

In 2004, it is seen in Tojumuddin in Bhola that localities are being eroded and on the other hand, new embankment is being built very nearly. According to the local people this embankment would not sustain long and soon it would be submerged to the river. The suppliers never maintain the proper size and quantity while making sand bag for the protection of

embankment, they usually report and claim bill for 1000 bags against only 100 bags provided.

On the other hand, Water Development Board built 40 kilometres of embankment to protect Kutubdia from erosion, of which 24 kilometres have been damaged in the cyclone of 1991. In the re-tender of the embankment reconstruction, Rajakhali, Khudiar Tek and Tabaler Char were deducted from the list of protected area by the embankment.

It brings the total area of the Kutubdia Island to only 36 square kilometres. Though the damaged length of the embankment is around 10.5 km but reconstruction is only going on for 0.42 km. Under this situation nothing could save Kutubdia in any disaster.

The risk of submerging of Kutubdia is gradually increasing, but no protection measures are taken yet. Some marginal level of mangrove plantation and embankment construction have been so far done out of government initiatives. Mangroves are being destroyed gradually by the Shrimp culture and Salt fields. If this rate sustains, it will not take more than 45 to 50 years to erode completely.



4.1 Local Level

- Infrastructure development such as coastal embankment and ensure their regular maintenance
- More consultation and discussion on climate change related consequences
- Training on disaster preparedness involving local institution/ local government
- Coastal afforestation and mangrove plantation with the experience of local knowledge and its maintenance.

4.2 National Level

- Forecasting river erosion using satellite images.
- Stern action against destruction of mangrove forests.
- Increase plantation of tress like Coconut, Palms, Bamboos etc instead of monoculture.
- Sustainable embankment construction and its maintenance.
- Form an alliance among SAARC countries in order to ensure water distribution within the subcontinent.

4.3 International Level

- Make an alliance with the countries, which will be affected more due to climate change and GHG emission and lobby with the industrially developed countries to reduce GHG emission.
- Claim compensation (Carbon tax) from the countries that are liable for increasing GHG emission and causing threats to environment.

References

Centre for Environment and Geographic Information Services-CEGIS, IFRCS, Disaster Forum, COAST Trust.

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