

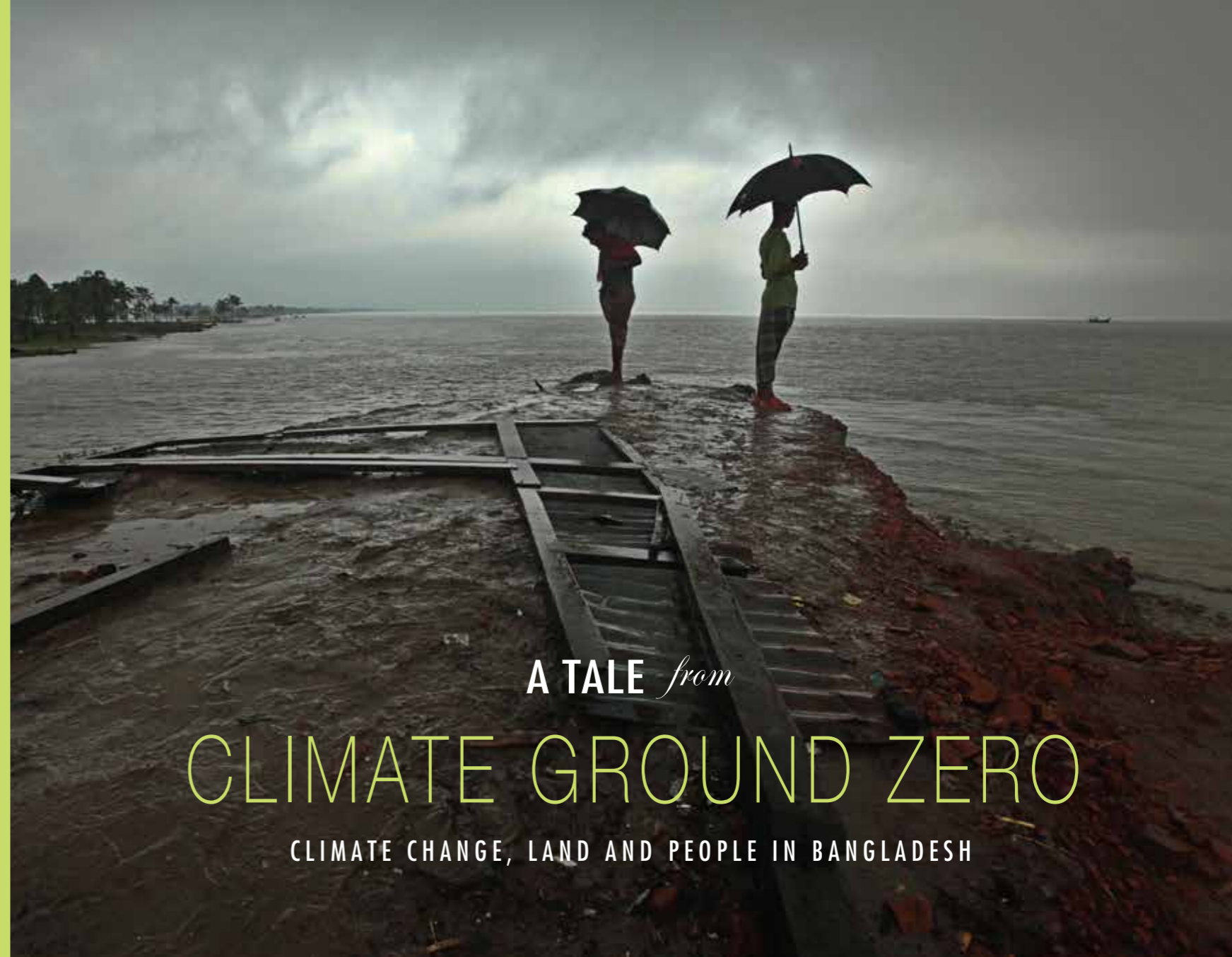
A TALE *from*  
CLIMATE GROUND ZERO

CLIMATE CHANGE, LAND AND PEOPLE IN BANGLADESH

Dhaka, Bangladesh, 2015

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Photo: BSS/ Saiful Islam Kallol

Bangladesh Prime Minister Sheikh Hasina receiving the coveted UN Champion of the Earth Award for her exemplary global leadership at policy level, from Dr. Achim Steiner, Executive Director, UNEP (New York, 27 September 2015)

“ Six decades back, I was growing up in Gopalganj in southern Bangladesh. My father, Father of the Nation, *Bangabandhu* Sheikh Mujibur Rahman, used to narrate the values of pristine nature. He recounted how lives and livelihoods of people were intricately linked to land, rivers, wetlands and sea in our riverine delta of Bangladesh.

People across our villages still believe that conservation and protection of environment is a time-honoured ‘responsibility’, not just a necessity. The concept of ‘Mother Earth’ is imbibed in the ethos, arts, culture, and living of Bengali people. In 1971, we fought our War of Liberation to uphold their values, ethos, principles and to keep our motherland safe from exploitation and destructions. That spirit is still nurtured deep inside Bengali minds and living over centuries – through the works of poets like *Tagore*, *Nazrul*, *Jibanananda* and *Jashimuddin*.

Our hardworking, innovative people and home-grown solutions have brought spectacular results: in spite of many climatic challenges, our agriculture growth continues to surpass population growth ensuring food security for 160 million

people in Bangladesh. It is indeed a miracle that we are now surplus in rice production while preserving environment.

As one of the most climate-vulnerable countries, Bangladesh is moving with innovative ideas to address complex climatic challenges in a sustainable manner. We do not see any conflict between environment and pursuing sustainable development. We are ready to share our modest innovation and experience with others. That is our contribution to turn ‘vulnerability’ into ‘resilience’.

We are ready to redeem our bit of shared commitment to protect, benefit from and nurture ‘Mother Earth’ in order to realize *Sonar Bangla*, as dreamt by our Father of the Nation.”

**Sheikh Hasina**  
*Excerpts from Acceptance Speech at the UN Champion of the Earth Award, New York, 27 September 2015*



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*This book comes out of one decade's observation of changes in the land, lives and livelihoods in deep south of Bangladesh. The proceeds out of this book's sale will go to further works towards the people-on-the-move impacted by climate change in coastal Bangladesh.*

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*Dhalchar, Bhola, 2003*

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The wide coastline of Bangladesh has been developed over the ages and emerged as one of the sizable riverine delta in the world. Each year, the three major river systems carry a substantial share of sediments that end up in the Bay of Bengal. In the process, sandy islands i.e. river shoals emerge, vegetation entrench their roots into the soil along with human habitations and settlement grow. The diligent and resilient millions fight out habitation on the margin of nature – battling so many uncertainties, risks and vulnerabilities along a dynamic coastline. They continue for generations.

Bangladesh coast has a very modest gradient – thanks to the riverine delta that shapes and lead it to the Bay. As many as 75 islands that dot Bangladesh coastline, should illustrate the unique manner that Bangladesh delta interface with the Bay of Bengal.

Life is much beyond the beauty the nature offers! While nature offers its bounty, millions of people continue to be challenged in the wake of hazards like cyclonic storms by steady flows mega rivers like the Meghna devouring people's precious habitats. As the sea gets warmer, normal tides tends to devour more lands.

*The Meghna, Bhola, September 17, 2014*

## CLIMATE CHANGE: CHALLENGING DEVELOPMENT IN THE DELTA

Bangladesh, one of the developing countries, is striving to graduate as a Middle Income Country by 2021 and is ranked as a Lower Middle Income Country recently by World Bank<sup>1</sup>. It is one of the top five populated nations in coastal low-lying areas that are developing and newly industrialized countries<sup>2</sup>. The poverty level of the country has been decreased from 59% in 1991 to 25.6% in 2014<sup>3</sup>. The population growth rate has declined from 2.9% per annum in 1974 to 1.2% in 2011 and the economy has grown at around 6% in last 10 years<sup>4</sup>.

But still, more than 38.4 million people live in poverty. Many of them live in remote or ecologically fragile areas, such as river islets, flood-prone northern zone and cyclone-prone coastal belts, which are especially vulnerable to natural disasters. The government is formulating Seventh Five Year Plan (2015/16-2020/21) with broad principles of ensuring climate resilience through faster rate of poverty reduction taking climate vulnerabilities into account.

Climate Change severely challenges the country's ability to achieve the high rates of economic growth that is needed for poverty reductions. It is predicted that frequent and severe floods, cyclones, storm surges and droughts will be increasingly to disrupt the life of the nation and the economy<sup>5</sup>. Bangladesh is bound to spend about \$1.0 billion per year, which is more than 1% of its GDP to fight the impacts of climate change directly or indirectly<sup>6</sup>. Only cyclones cost the country over USD \$25.0 billion<sup>7</sup>. Supporting coastal people to adapt with the changed climate will pose further impacts on economic development<sup>8</sup>.

The Inter-Government Panel on Climate Change (IPCC) in its 5th Assessment Report, estimated that Bangladesh lost 5.9% of its GDP to storms since 1998 to 2009<sup>9</sup>. It says, under a scenario of low crop productivity, Bangladesh could experience a net 15% increase of poverty by 2030<sup>10</sup>. Bangladesh could have a very high impacts on GDP due to the climate change related damages and adaptation costs as it is a low-lying country<sup>11</sup>. Unless the existing coastal embankments are strengthened and new ones are built, sea level rise could result displacement of millions of coastal people and have huge adverse impacts on livelihoods and long term health of a large proportion of the population.

Under the leadership of Bangladesh Prime Minister Sheikh Hasina the Government formulated Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009<sup>12</sup> and Nationally Appropriate Mitigation Actions (NAMA). It is now in the process of preparing National Adaptation Plan (NAP) to fight adverse impacts of climate change. The government also formed Bangladesh Climate Change Trust Fund (BCCTF) with an amount of USD \$300 million<sup>13</sup> from revenue budget and Bangladesh Climate Change Resilience Fund (BCCRF) with USD \$130.2 million<sup>14</sup> from the development partner countries. A number of micro and macro level projects have been undertaken under BCCTF and BCCRF along with regular programmes, some of which are examples of sustainable adaptation practices<sup>15</sup>. Through regular and special projects, Bangladesh provides good examples on awareness raising, disaster warning and control, and protective building measures<sup>16</sup>.

To aggregate the efforts of the Government and civil society, Bangladesh needs extensive supports from development ►



*Gabura*, a village in south-western *Satkhira* district, saw saline water trapped permanently after cyclone Aila (2009). All the cultivable lands gradually turned infertile. Most of the families have left in search of better livelihoods. Even the trees have been unable to stand on increased water salinity. All economic activities and communication structures have broken down. *Gabura, Satkhira, November 05, 2009*



*Porir Khaal* i.e. Canal of Fairies is no longer any pretty. Today, this image doesn't exist in reality: the image exists only in the memories of the people of *Dhalchar*, many of whom claim that they had witnessed fairies here! Sea-water has overtaken the entire place here, including the school building.  
*Dhalchar, Bhola, February 20, 2011*



Farmer Azimuddin's wife, holding her son, stares at the *Brahmaputra* river towards the horizon. There is no water for growing crop in the adjacent land. While the land is ready, and awaiting rains. Growing food is largely dependent on the nature's blessing i.e. rain. The irony is: they had to raise their homestead being afraid of sudden onrush of flood water. Flood in 2004 killed this boy. *Char Chowmohon, Gaibandha, 2003*

► partners, especially the industrialised and developed countries. To strengthen disaster management, research and knowledge management, capacity building and public awareness programmes and essential investments such as cyclone shelters and drainage management in the next five years could be the order of USD \$5.0 billion<sup>17</sup>.

According to the Long Term Global Climate Risk Index 2008-2015, Bangladesh is one of the 10 most climate vulnerable countries of the world<sup>18</sup>. The country is facing severe negative impacts of coastal flooding, river erosion, decreasing crop production, loss of fish and livestock, scarcity of potable water and risk of declining biodiversity along others.



Cyclone Mahasen passed over them just a few nights back. Children like Sharmin (11) in the small islands in the Bay of Bengal grow up witnessing the devastating cyclones and tidal surges. The deadly cyclones here first landfalls on tiny sandy islands like *Char Kukri Mukri*.

Sharmin borrowed fire from the next door in the evening to lit thier burner and candles.

*Char Kukri Mukri, Bhola, June 03, 2013*



*Char Monpura* sits almost on the estuary between *Meghna* River and the Bay of Bengal. There is a long spine-like road in the middle of the island. Kutu Mia (60) is found just 200 yards into the island. He lamented that two kilometers within hindsight from where he was standing, once had his farmland. The land has since gone into the river. Kutu Mia (60), *Char Monpura, Bhola, October 23, 2012*



## RISING SEA LEVEL: EXISTENTIAL THREAT

Bangladesh is one of the most vulnerable countries to sea-level rise. The inhabitants are already severely affected by tidal surges. Catastrophic events in the past damaged up to 100 km inland. It is hard to imagine to what extent the sea-level rise would accelerate these catastrophes in future. Digital terrain modelling shows that 17% land masses of the country is most likely to be inundated and 35 million people to be affected by 32-88 centimetre sea level rise by 2050<sup>19</sup>.

Scientists are witnessing unusual sea level rise in the Bay of Bengal in last 45 years and this trend is getting faster<sup>20</sup>.

Since this is calculated in 1989, the expected rate of sea level rise has been changed. At present expected rates, this will occur by the next 30 years.

Different parts of coastal zone like Bagerhat, Barguna, Bhola, Cox's Bazar, Khulna, Noakhali,

Patuakhali and Pirojpur districts have already experienced long lasting inundation than last decade<sup>21</sup>. Crops in pre-monsoon (Boro) and monsoon (Aman) are damaged even by regular tides.

Dasgupta et al. (2010) report that by 2050 Bangladesh will face incremental cost to flood protection (against both sea and river floods) of US\$2.6 billion initial costs and US\$54 million annual recurring costs<sup>22</sup>.

To meet this challenge, the Government of Bangladesh has been implementing several projects to build mass-awareness, strengthen embankments and reconstruct protective infrastructures. Different partners including International Financial Institutions are providing loans and technical supports for the projects. But a massive program should be taken to build coastal dikes considering the projections of sea level rise for the next 50 years at the least.



*Bhola*, the southern-most Bangladesh district harbors a small island, *Dhalchar*. The cyclones of 1991 and 2009 neatly devastated the island. Thousands of lives were lost. But, islands like *Dhalchar* saved millions of lives in the mainland. Planned forestation is mandatory to ensure the existence of such islands. A rising sea, which is a key impact of climate change, can put the island on the verge of extinction. *River Meghna, Dhalchar, Bhola, February 21, 2011*



It was the Eid day in 2011 when the fragile and neglected embankment, that used to protect the villagers from the sea, collapsed and the entire village was washed away with saline tide. Like hundreds of other families, they took shelter in another local cyclone shelter cum primary school. ▶

▶ As all the homesteads have been washed away, some of the families have taken shelter in this school. They have to wait on the roof until the school time is over. Every student is present, they earn a packet of glucose biscuit at the end of their class. Their school is on the brink of getting devoured by the sea. No books were seen on the tables. The students explain, they are floating on the sea! Excessive carbon emission elsewhere cause the sea water to rise, due to which the children might soon lose their schools to learn from.

*Shoraitola, Dholghata, Moheshkhali, Cox's Bazar, September 13, 2011*



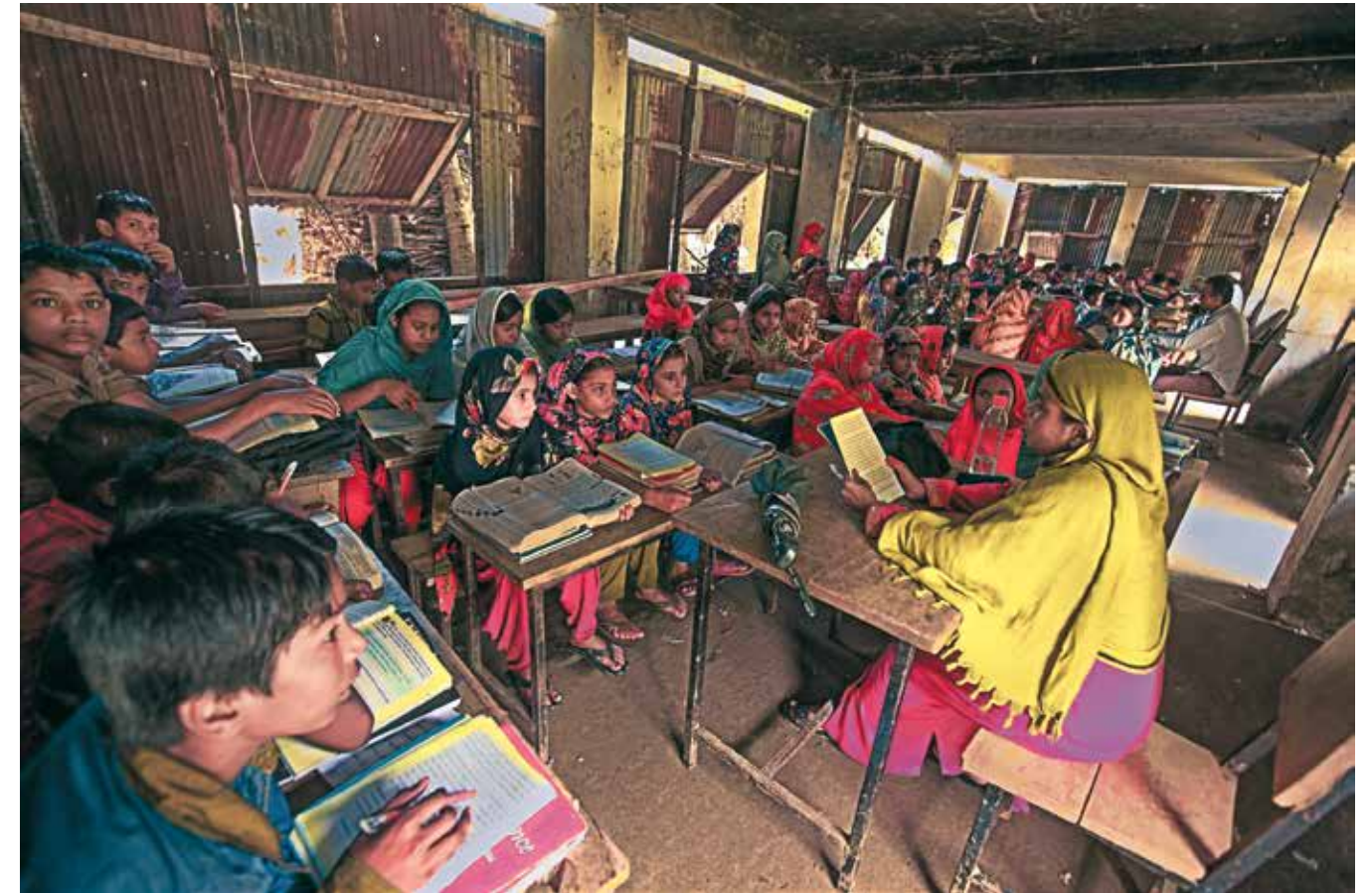
Dudu Mia (58), a resident of *Shoraitola* village. A former crab seller, he lost everything to the sea. The place he is fishing now, used to be a greenery even five years back. Now-a-days, normal tides frequently submerges his village.

*Shoraitola, Dholghata, Moheshkhali, Cox's Bazar, May 04, 2015*



The River *Meghna* ends up in the Bay of Bengal, touching *Dhalchar* (Bhola District) and carrying some of its soil along with. *Dhalchar* has only one crop a year – sowed after monsoon and harvested before November. Two images are taken from the same place in the island: the left one on September 2014, and the one above in May 2015. The regular tide, twice a day, overflows the part of *Dhalchar* and seems like sea all over!

*Dhalchar, Bhola, 2014 & 2015*



This cyclone shelter cum primary school (left) in *Dhalchar* was inaugurated in 2003. By 2014, the school building along with the bazar, canal and field adjacent to it, are devoured by the sea. The last remains are being collected.

The school is shifted to another cyclone shelter to the west side of the island. It is rebuilt with some old tin walls, having no partitions between different classes to protect their ear to listen to the other lessons. Rising sea level destructs the school building and also fades away their future.

*Dhalchar, Bhola, September 13-14, 2014*

## PRECIOUS LAND: EROSION DEVOURS HABITATS

Bangladesh is called a land of rivers. There are hundreds of dynamic rivers crisscrossing the country with their tributaries and distributaries deposit around 1.6 billion tons of sediments per year. But due to excessive upstream flow and for not having any rock-solid layers in the soil, the rivers are grabbing lands from both banks. Aktar, M. N. (2013) shows that, people lose average 2,000 hectare of land by riverbank erosion each year<sup>23</sup>.

Only the Jamuna and Padma Rivers have widened more than three kilometres and destroyed about 130,000 hectares of floodplain land in last 30 years. Another study reveals that erosion affects 25,000 hectares of land and 450,000 people each

year<sup>24</sup>. It not only reduces food production and livelihood options but also displaces around 200 thousand people from their ancestral homes each year<sup>25</sup>.

Bangladesh Water Development Board (BWDB) has been implementing different programmes and projects on drainage, flood control, riverbank protection, embankment strengthening and river training to protect people from erosion and taking financial and technical assistance from national and international experts<sup>26</sup>, but those are not enough to meet the huge challenge. Bangladesh calls international communities to support national initiatives with a master plan for at least 100 years<sup>27</sup>.



Gopal and his family lives just on the bank of the *Meghna*, which silently erodes like a monster. The river was far away their homestead. Today, it is just a few yards away! On top of it, the cyclone *Mahasen* (October 2012) left them no time to react. Gopal's mother sighs in despair: she says, she had spent 60 years in this homestead with all her forefathers' soul sleeping beneath.

*Char Monpura, Bhola, October 24, 2012*



Hundreds of thousands of trees are rooted in these islands in the Bay of Bengal. The vegetation form the crucial coastal green belt. But, every year, they get submerged along with the land and its habitats.

The palm tree stood erect in the morning when the photo was taken. It was assumed to be lost soon though. In the evening, it started falling down with the locals yelling at and leaving no time to set the exposure to photograph it. The pictures came out under-exposed, depicting sheer desolation.

One can barely imagine how what ordeals the families go through.

*Dhalchar, Bhola, 2011*





Abul Hossain (55) is one such individual affected in the wake of intense destruction of his abode on the river bank as global warming silently takes a turn for the worst. His home had been devastated six times. Yet, he did not give up: he settled elsewhere, only to be displaced again. People like Abul Hossain are not poor, they are endowed with perseverance and resilience. *Abul Hossain (55), Manush Mara Char, Rajibpur, Kurigram, September 03, 2006*



This used to be a fish market of *Char Fashion*, southern-most *Bhola* district. Home to over 50 artisanal fisher, three days of repeated high tides totally gobbled up this property up, even submerging an ice mill in the process. *Samraj Bazar, Char Fashion, Bhola, June 26, 2015*

## FISH: VITAL PROTEIN SOURCE VANISHING

Climate Change seriously affects the natural fish resources also. Production from open-water capture fisheries is reported to have declined in recent years due to lack of optimum flow of water in dry seasons, siltation reducing water flow and causing habitat degradation, loss of spawning ground and reduction of natural seed production<sup>28</sup>. Fish migration routes, spawning and feeding grounds and fishing seasons are likely to change, and the impacts on fishing communities are uncertain<sup>29</sup>.

Negative impacts of climate change has already been observed on Hilsa (*Tenualosa ilisha*), the most important anadromous fish species of Bangladesh. Hilsa is not only an economically important species in Bangladesh but also the

integral part of the culture of the country. This flag-ship species alone contributes 10.82% of the total fish production of the country and about 75% of world's total catch of Hilsa comes from Bangladesh. Climate change, e.g. salinity intrusion, sea level rise, temperature rise, impact of fresh water flow, altogether are severely damaging the Hilsa stock and its habitats<sup>30</sup>.

The Government of Bangladesh is trying to increase Hilsa production not only by conserving jatka (young Hilsa) but also protecting the brood Hilsa during the breeding seasons by imposing seasonal ban on fishing, restricted mesh size etc. The Government also promoting combined fish and crop production to boost cultivated fish production in the country.



Yusuf Majhee, a fisherman resides in *Dhalchar*, a tiny island in the Bay of Bengal. While fishing for *Hilsha* in 2003, he recalled to have observed the sea-water getting warmer. Scientists later assessed that the Sea Surface Temperature (SST) had indeed risen over the past decade by 4 degrees, resulting in formation of frequent low pressure in the Bay of Bengal. Most often they turns into devastating cyclones. Yusuf Majhee, *Dhalchar, Bhola, November, 2003*





Most of the coastal localities offer the same picture: the fishermen have to get into fishing boats even in rain or storms in the sea. These days, the sea is changing and harvest is no longer good. Rising frequency and intensity of cyclones and storms in the sea most often bar them to go for fishing. In the wake, they again turn to take *Dadons* (local loans, with steep interest), with earlier ones unpaid in fish markets.

Samraj Bazar, Char Fashion, Bhola, June 26, 2015



Yusuf Majhee's sons are now fishers. After 6 hours fighting with water, net and wind, just 4 Hilshas have been caught. This is not enough for the investment and labour given. Jamal Majhi's page on the debt book shows his debt ever increasing.

Dhalchar, Bhola, September 15, 2014



The market in *Dhalchar* can no longer be found in the map. The side of the island lost 2 kilometers length to the sea over the past 11 years. This market was established here 5 years back, and now very small part of it remains. *Dhalchar Bazar, Bhola, September 13, 2014*



Tiger prawns farming is quite popular in the south-western region of Bangladesh (districts of *Khulna, Satkhira, Bagerhat*). Farmers keep the seed prawns at the lower part of their land during the summer when water bodies dry up. They grow rice on the upper part at that time and harvest before monsoon. Water gets back in the monsoon and it starts the prawn again. Using the same piece of land in different season for different purpose is an innovation for the local farmers to cope with the changed circumstances. *Bagerhat, March 26, 2015*

## FALLING CROP PRODUCTION: GETTING TOUGHER FOR FOOD SECURITY

Bangladesh had been a net food importing country since its independence. As a result of promoting innovation and agricultural extension services, country's food production increased almost three fold than 1972 and Bangladesh has become one of the food-sufficient country<sup>31</sup>. The contribution of agriculture was 19% of GDP and the crop subsector alone contributed 11% to GDP at constant prices in 2014-15<sup>32</sup>. More importantly, 48% of the country's workforce directly involved with agriculture. But this achievement could be wiped out by slow onset and rapid impacts of Climate Change. Erratic change in weather seasons and pattern, severe and frequent floods, drought, riverbank and coastal erosion, salinity intrusion, excessive fog and irregular cold seriously hamper crop production in Bangladesh<sup>33</sup>.

Rahman et al. (2009) mentioned that sea-water

inundation has become another major problem for traditional agriculture in Bangladesh<sup>34</sup>. Climate change, as has been estimated, will reduce overall rice production in Bangladesh by an average of 7.4% every year over the period 2005-2050 (Yu et al., 2010)<sup>35</sup>. A severe drought can create more than 40% damage to the broadcast while every normal cyclone can damage 35%-45% of Aman or Boro production<sup>36</sup>. Considering population growth, this shortage will create serious problem in food security of the country.

Bangladesh Government took a number of initiatives to meet the challenges which include developing flood, drought and saline tolerant varieties by Bangladesh Rice Research Institute (BRRI), Bangladesh Agriculture Research Institute (BARI), Bangladesh Institute for Nuclear Agriculture (BINA) and other agencies.



*Datiar Char*, a newly-emerged island on the Brahmaputra, northern *Kurigram* district. It is a most iconic image of traditional agricultural Bangladesh: farmers preparing the land with cow and a manual plough. The land is fertile, the soil is rock solid. The lady has carried hundred pitchers of water and poured down to soften the soil. Agriculture in Bangladesh continues to be dependent on nature. *Datiar Char, Kurigram, September 02, 2009*



Patuakhali, a coastal district. It is a bird's eye view of the typical farmlands adjacent to the rivers across Bangladesh. The horizon of the landscapes always look green for the green crops on it. But, the rivers in the coastal area are getting wider day by day. They quietly gobble up thousands of hectares of precious agricultural lands every year. *Patuakhali, June 17, 2015*



A piece of land in the *Brahmaputra* - where the soil was not hardened yet. A farmer puts paddy seedling hoping that, four months later, he would be able to harvest a handful of golden rice if the 'river god' is kind. *Datiar Char, Kurigram, September 02, 2009*



Mahbub Ullah's (58) homestead was 3 km away from the place he is (*top left*). Now, it is in the middle of the *Meghna*. He lost his boats, nets and two of his children to the big cyclones over the past 20 years. The last piece of land on which he is working will be eroded soon, for sure.

**Mahbub Ullah (58), Dhalchar, Char Fashion, Bhola, October 22, 2012**



Paddy plants were about to bloom in Shahjahan Miah's farmland in the west coast of *Dhalchar*, against the deadly dancing waves of cruel *Meghna*. He got lucky to harvest in November 2014 before the erosion (*right*). But, this time, the river got a big bite on it (*left*).

**Dhalchar, Bhola, September 16, 2014**



It is a common sight across village homes. Abul Hossain was asked: why the rice seedling are grown in the courtyard? He replied: he had to sow them on the crop field immediately after the floods water recedes. They do not have the luxury to spare a place for rest and recreation anymore – entire space is occupied for growing seedlings. **Abul Hossain (58), Datar Char, Rajibpur, Kurigram, September 02, 2009**

## SALINITY AND POTABLE WATER: MILLIONS AT RISK

Through a number of initiatives Bangladesh Government ensured 97% people's access to safe drinking water noting that potable water sources are limited historically in the coastal zone<sup>37</sup>. But in the recent years water scarcity took a permanent character due to excessive salinity intrusion in groundwater and simultaneously contamination of saline in surface water reservoirs during cyclones and storm surges<sup>38</sup>. Irrigation, as well as potable water sources shifted to dry due to drought in the northern zone. So, people, especially women and children, have to walk 10-15 kilometres to collect drinking water every

day. UNICEF (2009) estimated that 1.6 million children dies in the world for the want of safe water while 30% of them are from Bangladesh<sup>39</sup>. Along with the local government institutions, Department of Public Health Engineering (DPHE) is working in the country to ensure safe drinking water for all. The DPHE is providing Pond Sand Filters (PSFs), Rainwater Harvesting Systems (RWHS) and Aquifer Recharging techniques along with installing new tube-wells and repairing existing ones in the water crisis stricken areas.



Water, water, everywhere, but not a single drop to drink! One may enjoy the songs by the river, the rhythm of streams. But, the same turns cruel and monstrous when it scrapes out the uplifted soil of their homestead. If one sits where the old woman is, the gentle breeze and the kissing water on the feet would soon leave a shivering shrill. It is no longer nice or gentle, it haunts the muted faces. They have lost sleep. *Gabura, Satkhira, July 31, 2010*



Many travel to this place - from as far as 15 kms - in search of drinking water. At least two members of each family need to dedicate themselves to this task. Years pass by, life goes on. *Satkhira, November 05, 2009*



*Chaitra* and *Jaishtha*, the Bengali months of summer, has the worst weather for the people of *Paranpur* (*Shyamnagar* sub-district, *Satkhira*). The men are busy searching for drinking water. As the shrimp industry booms, the saline water does not leave much else for cultivation. Cyclone *Aila* destroyed their water system. *Gabura, Satkhira, July 31, 2010*



Every household seems like separate islands - disconnected from each other. Cyclone *Aila* (2009) tore the embankment. Many unions are left flooded with saline water (*Shyamnagar, Shatkhira* District). Hundred thousand of families lost everything to the flood. The water stayed for five years and forced at least two hundred thousand families to migrate.

*Gabura, Satkhira, August 01, 2010*

In summer, this region of *Satkhira* looks as if it somehow got burnt: the soil heats up, tree leaves faded, salt water takes over even the graves. Salinity submerges the horizon.

*Gabura, Satkhira, August 01, 2010*





## HEALTH HAZARDS: WORSENING

Due to temperature raising, vectors and waterborne diseases, including diarrhoea, dysentery, skin diseases, are common in Bangladesh. In addition, mental disorders, malaria, dengue, and malnutrition problems is likely to affect many people of the country<sup>40</sup>. Among the climate induced diseases, 80% people suffer from jaundice, skin disease or diarrhoea in the watershed areas. Moreover, waterborne diseases are responsible for 80% of illness and deaths<sup>41</sup>. Coastal people, especially women and children, are the worst section of victims who are subjected to hard work to collect water and are drinking excessive saline water<sup>42</sup>. Women of Passur river basin in southwest region are taking

excessive salinity in drinking water and consequently facing high blood pressure, eclampsia, miscarriage and premature birth. Rate of miscarriage is highest in the coastal zone in Bangladesh<sup>43</sup>. The Government of Bangladesh established 18,000 community clinics (1 for every 6,000 people) to provide health services at the door of rural people. Besides, different projects are initiated under Health Population and Nutrition Sector Development Program (HPNSDP) to provide climate resilient health services to most vulnerable areas. But these initiatives will not be sufficient compared to climate driven epidemic vector and waterborne diseases.



To date, the community clinics have helped reduce female and child mortality rates in rural Bangladesh. But, sparse communication facilities, due to the riverine topography, makes it harder to reach health services across the thousands of shoals and islands in the rivers and the Bay of Bengal. *Lalmonirhat, 2006*



The contribution of the non-government organizations has enabled the women and children of rural families in distant locations to receive basic health care. Remarkable progress came through modest initiatives focussed on creating awareness about food intake and health issues e.g. use of toilets, providing vaccines, etc. *Lalmohirhat, 2006*



*Kazir Char* in Sirajgonj district. This region, next to the *Jamuna*, is primarily made up of silt (fine sand), making it very fragile. As men embark on work, only the women and children are left behind in the *char*. Men often cannot come back from the city in less than a week, leaving their women and children folk devoid of any health care, risking mortality and malnutrition. *Kazir Char, Sirajgonj, March 09, 2009*



This one-day old infant was lucky to be born safely for the mother visited the community clinic on a regular basis. Although this baby made it, infant mortality is still high in rural and remote coastal areas of Bangladesh.

*Lalmonirhat, June 01, 2010*

## FLOATING PEOPLE: FORCED MIGRATION

The last 200 years have seen 70 major cyclones hitting the coastal belt of Bangladesh, and nearly 900,000 people have been killed by the cyclones and disasters in the last 35 years<sup>44</sup>. Risk of lives, damage of houses and cultivable lands, loss of livelihoods and health hazards created by salinity intrusion, erosion, cyclones, floods and tidal surges force the people to migrate to the cities from the climate hotspots of Bangladesh. The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 estimates the displaced people may exceed 20 million by 2050<sup>45</sup> while recent studies shows that the number is likely to be more than 350 million<sup>46</sup>. In fact, more than one million people have already lost their homes and 70 percent of them became landless by only river erosion<sup>47</sup>. At least 123,000 people had to migrate temporarily while 15,600 migrated permanently after cyclone Ayla (2009)<sup>48</sup>. These people are forced to migrate to peri-urban

areas and slums of coastal cities like Chittagong, Cox's Bazar, Khulna, Barisal, Jessore and the capital city, Dhaka. These areas don't have sufficient drainage, water, electricity and sewerage services to cover them. The forced migrated people don't get dignified jobs and have to live an inhumane life. The population of Dhaka is increasing at a rate of 500,000 each year and pushing the city to become unliveable<sup>49</sup>. Bangladesh Government has been taken several programs to reduce push and pull factors of forced migration. The programs include One House One Farm, Ashrayan Programme, Khas (state owned) Land Distribution among the landless etc. But these programs are quite insufficient than the flow of floatsomes. So, Bangladesh argues to the international community to take a distinguished UN protocol for the Climate Forced Migrants<sup>50</sup>.



All in this crowd from the south, have been forced to come to the capital. These locally made launch-boats are the main transport for the southern coastal districts to connect to the capital. During the big vacations, the city fast gets empty and filled up again as the holidays are over: the people take the opportunity to go back to roots, meet their families and return to work in cities. Global warming contributes to displacement of people in the coastal districts. As a result, people move to the cities. In a democratic state, it is not possible to block such quiet movement of people. Surely, the cities and urbanizing Bangladesh face a challenge in providing housing to the extra population moving to the cities.

52 *Sadar Ghat (River Port), Dhaka, 2004*



They could say: this was their second life. 150 of them, on an engine boat, to come to *Bhola* island for work, were floating away to nowhere across the Bay of Bengal as the propeller broke down. A rescue boat came out of the blue - much unexpected in that route when all the passengers already started to expect a confirmed death or permanently lost in the open sea. They were from *Monpura*, an island sub-district in *Bhola*. A 900-year old populous area, repeatedly pricked by the *Meghna*, is getting skinned this island off its arable land. South of this island gives direction to another char-isle, *Kalatoli*. A 40-minute journey by trawler has to abide the law of high and low tides and depend on the mercy of the nature even in this digital age. *Char Monpura, Bhola, July 21, 2014*

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In Kurigram district, this school was deconstructed, brick by brick, as massive floods (2007) hit. They hope to save as much building materials as they could, so that it could be restructured at a convenient time. *Flood 2007, Kurigram, July 31, 2007*



During the tides, both the coastal lands and the surface of the *Meghna* assumes the same length. As the coastlands gradually erode, the sea ports do not last long. As a result, most of the capital-bound launches can harbor anywhere; and anyone can leave for the cities for alternative earnings. *Bhola, July 18, 2014*



*Dhaka*, the capital of Bangladesh is now one of the world's most populous city. Around five thousand climate-induced people gets added every year as permanent residents. Dhaka is already beyond capacity with a population of 20 million. More migration, however, is obvious as the coast keeps eroding.

*Gulshan, Dhaka, April 16, 2009*

## FOREST AND WILDLIFE: PROTECTORS AT RISK

The Sundarbans, largest single tract mangrove forest of the world, is one of the World Heritage Site. It is a natural guard against cyclones and storm surges for the coastal people live in the upper north of it. But the mangrove forest is in severe risk due to frequent and increasing salinity, cyclones, coastal erosion and storm surges. It has lost 130 kilometres of land due to coastal erosion between 1970 and 2010<sup>51</sup>. Besides, increasing salinity intrusion in the swamps by tidal surges creates risk for mangrove flora and fauna. Scientists estimate that excessive salinity caused top dying of Sundari (*Heritiera fomes*) and other white mangroves<sup>52</sup>. IPCC

predicts that tiger habitat is likely to be declined 96% in Bangladesh's Sundarbans mangroves with a 28 cm sea level rise if sedimentation does not increase surface elevations<sup>53</sup>. Due to lack of freshwater and habitat shrinking along with other causes<sup>54</sup> population of Bengal Tiger, one of the world's endangered species, has already been reduced from 440 in 2004 to 106 in 2015<sup>55</sup>. Other forests including Sal Forest (*Shorea robusta*), Rainforest (Lauachhara) and Hill Forest (Chittagong) are also under threat due to change in weather pattern, especially change in precipitation<sup>56</sup>.



The deadly cyclone *Sidr* (2007) devastated one-third of the *Sundarbans* – the largest mangrove forest and world heritage (UNESCO). The same devastation was repeated in 2009 by cyclone *Aila*. It would take at least 30 years to re-generate naturally. Five years following *Sidr*, the rampant effects over millions of trees are still widely evident in the *Sundarbans*. *Kotka, The Sundarbans, September 02, 2013*



The amount of seed plantations, made by Abul Kashem Howlader, is simply uncountable during his 38 years of employment at *Dhalchar* forest division. In 2014, he alone planted over three million seeds at *Dhalchar* nursery. Thanks to these grassroots efforts, the coastal green belt has been made possible to thwart future landfall of cyclones and tidal surges, including contributing oxygen to the environment along the way.

*Bhola*, June 03, 2013



## DISASTERS AND DISASTER RISK REDUCTION

Considering severe, increasing and frequent disasters, Bangladesh Government has spent more than 11 billion USD to make the country more climate resilient and less vulnerable to natural disasters. Besides the Government has endorsed National Disaster Management Policy, Disaster Management Action Plan and Disaster Management Act with provision of roles and responsibilities from community level to the head of the country. As a result, the number of fatalities

from natural disasters has declined. Through this process community level disaster management committees and volunteers create an example of people-oriented risk management in the world. But rapid changes and increasing severity requires more investment and infrastructural development at community level, which is the demand of Bangladesh to the international communities, along with reducing global warming.



The massive flood in 2007 devastated northern districts of *Kurigram* and *Gaibandha*: river waters rose to such a level that the food chain of this region was completely destroyed. Food security was at risk. They took the raft (*made of banana plants*) around in search of food. **Flood 2007, Kurigram, August 01, 2007**



September, 2004. BBC reported that "...worst floods in decades hit Dhaka. Many roads are waist deep in water. Bangladeshi authorities have closed all government offices in the capital, Dhaka, as the worst flooding in decades hit the city."

*Mugda, Dhaka, September 13, 2004*



September 2004: incessant rain over one week had once immersed Dhaka city. Some areas became inaccessible without getting over by boat. Dhaka never witnessed it before. But, this has been happening ever since. Global warming is visibly changing intensity and periodicity of rainfall patterns and even onset and departure of monsoon.

*Farmgate, Dhaka, September 11, 2004*



The *Ganges - Brahmaputra – Meghna* (GBM) river systems are the principal source of river water in Bangladesh. Building barrages upstream of the *Ganges* and the *Teesta* are affecting the climate across northern Bangladesh. Sizable tracts in northern Bangladesh resemble desert-like scene. Many tributaries of the GBM rivers have dried out and made much of the basin barren. Sharply contrasting flow leads to siltation and the rivers losing carrying capacity. During the peak of monsoon, the dried up rivers fail to respond to surge of water. Vast plains get flooded, causing massive devastation.

The River *Jamuna, Sirajgonj*, March 06, 2010



The monsoon flooding in Bangladesh is caused mainly due to upstream overflows of the *Ganges* and *Brahmaputra* river systems. After monsoon flood begins as soon as the stream subsides. The 2007 floods saw national rice production lost by 5 million metric tonnes. Peoples' meals in the flood-hit areas often shrink down to merely rice and dry red chillies. Men take raft rides in search of food; and women are left behind marooned.

Flood, *Kurigram*, August 01, 2007



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**Sheikh Hasina**  
Honorable Prime Minister  
Government of the People's Republic of Bangladesh

“For millions of our people, climate change challenges their lives and livelihoods. Rising intensity and frequency of flooding, storm surge, salinity intrusion and gradual changes owing to climate change are affecting millions along our coast. Many of them are compelled to move out; and even change traditional means of livelihood. Most of our development efforts and gains are at stake due to climate impacts. In recent years, Bangladesh has taken a number of key steps e.g. we have installed 3.2 million Solar Home Systems, provided over 1.5 million Improved Cook Stoves across Bangladesh. We are working on development of stress-tolerant crop varieties. .... Despite being a climate-vulnerable LDC, we allocated 385 million US dollars the Fund for adaptation and mitigation, with our own resources. Many eco-system based community-based adaptation measures have also been put in place.

If we are not ambitious about climate ‘mitigation’, adaptation costs will be much higher than is estimated today. For Bangladesh, ‘adaptation’ is key. We cannot be left to adapt to ‘degradation’ because of climate change. We expect robust commitments from most others - who can make changes - particularly the developed countries.

We must stress on ‘adaptation’ as well as ‘loss and damage’. We ask for maintaining critical balance among adaptation and mitigation and also in regard to support for finance, technology development and transfer, capacity building, transparency of action and support.

The Intended Nationally Determined Contributions (INDCs) must be clear, measurable, verifiable. We will need support for their implementation. Carbon budgeting and de-carbonization pathways in our countries would also merit attention.

As a responsible member of the international community, Bangladesh will never exceed the average per capita emission of the developing world. It is our firm commitment to low-carbon, climate-resilient development path. The large emitting countries should reciprocate such a voluntary commitment from a climate-vulnerable Bangladesh

Support to wider capacity building is equally crucial. Same is true for ‘technology’. For LDCs, IPR must be facilitated. What Bangladesh asks for is access to ‘life-saving technologies’ and support to developing ‘adaptive technologies’.

Bangladesh has learned much on adaptation front. We are ready to share our modest experience on climate-resilience.”

**Sheikh Hasina**  
*Excerpts from the Statement at the UN Climate Summit,  
New York, 23 September 2014*

**A TALE** *from*  
CLIMATE GROUND ZERO  
CLIMATE CHANGE, LAND AND PEOPLE IN BANGLADESH

Dhaka, Bangladesh, 2015