

## Climate change: Disappeared South Talpatti, what next?

Once set in motion, perhaps it is impossible to stop sea-level rise. The only chance we have to limit sea-level rise is by reducing emissions very quickly. This effort needs natural and social scientists to work together and to find out an integrated approach to how we project our future to unfold.

DR. MD. MIZANUR RAHMAN

THE South Talpatti measuring 81 square miles in the Sunderbans has disappeared due to sea level rise and soil erosion. Its disappearance was confirmed by satellite image and sea patrols. Sugata Hazra, a professor from the School of Oceanographic Studies at Jadavpur University in Calcutta, told reporters, "There's no trace of the island any more." He noted that temperatures in the region had been rising at an annual rate of 0.4C. Until 2000, the sea level rose about 3mm a year, but over the last decade it had been rising about 5mm annually, he said. He warned that another ten islands could be at risk.

Another study showed that at Sunderbans island chain, where South Talpatti was situated; sea level has been rising by about 3.14 centimetres a year. A nearby island, Lohachara, was submerged in 1996, forcing its inhabitants to move to the mainland, while almost half of another island, called Ghoramara, is now under water. South Talpatti is the fifth island in the Sunderbans to sink into the sea preceded by Bedford, Lohachara, Kabasgadi, and Suparibhanga (Rice 2010). Another five inhabited islands in this delta region, where South Talpatti is located, could disappear in the next 10 years (Hazra 2010). The Namkhana island about 8 square kilometers while Sagar



Disappearing South Talpatti

island has lost about 12 square kilometers. The study says that about 15% area of Sagar Island will be lost in the next 14 years (ITN 2009).

Bangladesh, a low-lying delta country will be highly affected by global warming. It is assumed that 18% of its coastal area will be submerged and 20 million people will be displaced if sea levels rises 1 metre by 2050 as projected by some climate models. 84% of the Sunderbans, the world's largest mangrove swamp, located between Bangladesh and India, would be inundated by 2050 even at conservative estimates such as a 32cm rise (IPCC reports 2009). The net sea level rise in the Sunderbans territory is about 3.1 mm per year for being a subsiding delta, while the sea level rise is only 2 mm per year globally. A sea level rise of 45 cm will lead to the destruction of 75% of the Sunderbans mangroves (New UNESCO report 2010).

Actually there is no way to measure the cause and effect of small islands ending up in the ocean accurately. It is difficult to assume the future sea-level rise. Melting polar ice and the expansion of ocean water as it gets warmer are the two main causes of this rise. Both are the result of global warming. Considering the satellite and other data, it has been assumed that 50% to 80% of the rise is due to melting of ice. It will be not a smooth curve as we don't know how individual sea basins will react. But it is true that we are travelling on a path towards less ice and more water in the oceans. Ice-melt is accelerating in between 'fast and faster' rates (Rahmstorf 2009).

The current level of atmospheric CO<sub>2</sub> is 385ppm, and could exceed 450ppm; if left at that level, all the ice will melt causing an enormous sea-level rise (Hansen 2009). The rising of atmospheric CO<sub>2</sub> level occurs largely from burning fossil fuels. It's noteworthy to mention that changes in sea level do not occur uniformly round the globe. Sea level rise differs from place to place due to ocean circulation and wind pressure patterns.

The severity of storm surges and spring tides need to be kept in mind to evaluate the sea level rise impacts.

The occurrence of El Nino or Southern Oscillation phenomenon has intensified since the 1980s. New studies have projected a higher and faster sea level rise by the next century. The new projections in sea-level rise caused by accelerating rates of ice loss from poles hint increase of global temperatures very quickly. The sea level rise because of melting of ice, glaciers and icebergs causes thermal expansion of water. Sea levels rose 2cm in the 1700s, 6cm in the 1800s and 19cm in the 1900s (UNEP Year Book 2009). A sea-level rise of 50 cm projected for the next 100 years is expected to occur mostly in the second half of the next century (Natural Environment Council of UK 2009).

Dutch Delta Commission also projected a high sea level rise ranging from 0.55m to 1.10m by 2100 and from 1.5m to 3.5m by 2200. The impact of the sea-level rise is gradually coming into broad daylight. About 70 percent of the world's population lives on coastal areas, and 11 of the world's 15 largest cities are located on the coasts or estuaries.

Island states such as the Papua New Guinea have been already feeling the impact. During 2005, 1,000 residents on Carteret atoll of Papua New Guinea had to be shifted as the rising sea level was slowly drowning their land. Tuvalu, a tiny island country in the Pacific Ocean midway between Hawaii and Australia has experienced lowland flooding as sea level has risen. Saltwater intrusion has adversely affecting its drinking water and food production. Coastal erosion has been eating away the nine islands that make up the country. At last, Tuvalu people have conceded defeat in the battle with the rising sea by abandoning their homestead.

The Maldives, an island nation in the Indian Ocean, has been losing her land mass to the sea for years. During 1987 the President of the Maldives declared his country as "an endangered nation" due to rising sea level. Even cities like London, Bangkok and New York will be disappeared below sea level if current warming trend continues. The historical city Alexandria of Egypt will be inundated by a one meter sea level rise.

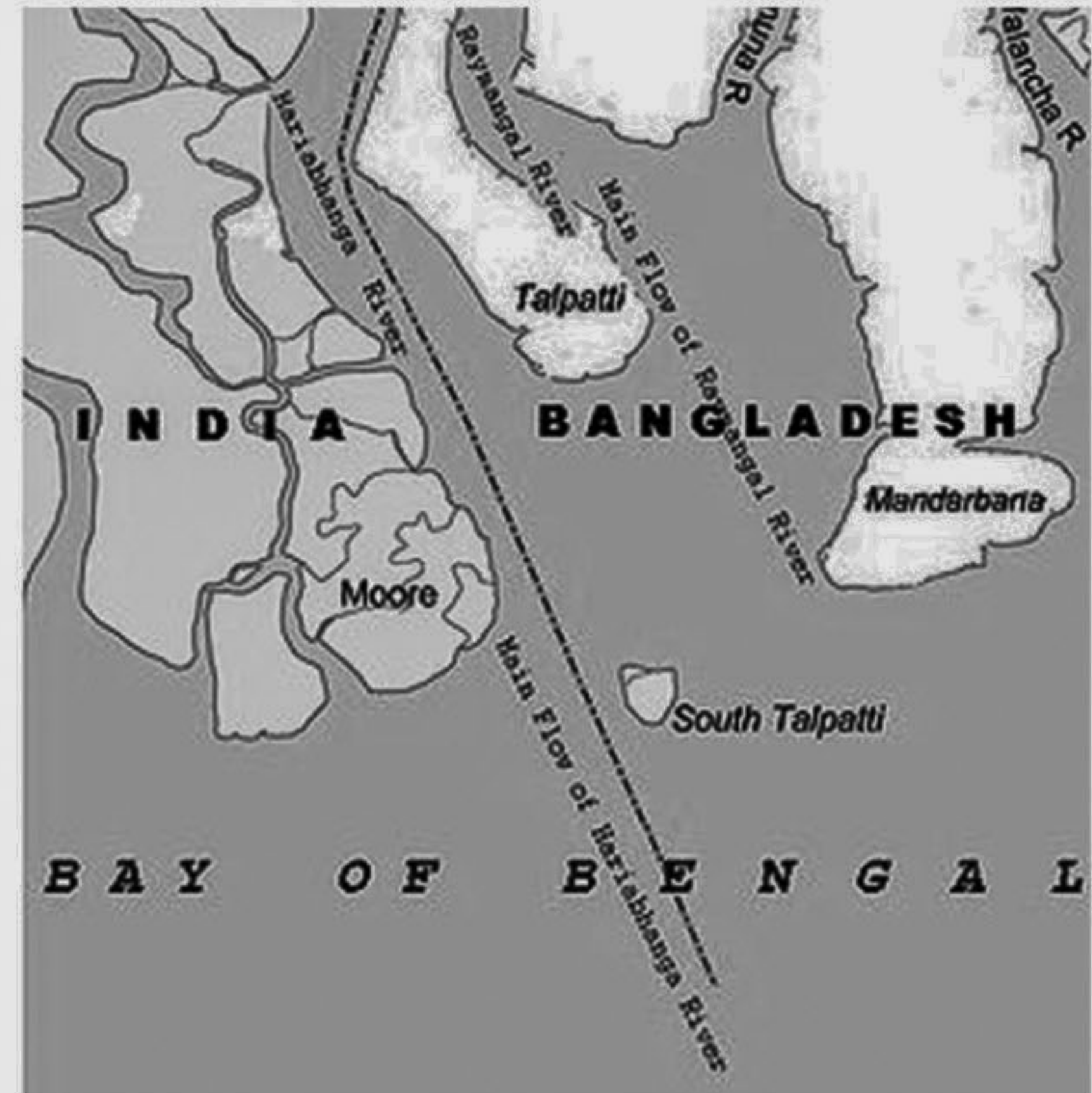
The survival of the Sunderbans delta would be in jeopardy with even a 1-meter rise in sea level in the event of a storm

surge. During 2000 World Bank published a map showing that a 1-meter rise in sea level would inundate half of the rice land of Bangladesh. The Ganges delta (Sunderbans) comprises of a network of 108 swampy and low-lying islands (Cockburn 2010). This area is unique both ecologically and culturally. This region of low elevation above sea-level and its proximity to the coast made it vulnerable to storms. Climate change and human interference will destroy much of Sunderbans in India and Bangladesh as well as 25 other World Heritage site.

Sea-level rise is the greatest threat and challenge for the Southeast Asia. Minimum sea level rise will cause flooding of low lying islands, intrusion of salinity, acidification of soils and change the level of water tables. The ecosystems of swampy mangroves and the dune biodiversity will be fully destroyed. The problems due to climate change will be made much worse by more severe storm surges, droughts and floods in the Sunderbans territory (Harrabin 2007). Currently, 12 sea facing islands in this delta are experiencing erosion. The tides have increased in number, leading to breach of river embankments and saline water intrusion (ITN 2009).

Once set in motion, perhaps it is impossible to stop sea-level rise. The only chance we have to limit sea-level rise is by reducing emissions very quickly. This effort needs natural and social scientists to work together and to find out an integrated approach to how we project our future to unfold. The integrated approach may include the following steps:

- Adopting an integrated approach to issues of environmental preservation and sustainable development
- Assessing vulnerability through analysing ecosystem sensitivity and adaptive capacity of both people and biodiversity
- Using human-environment models such as LPJ-DGVM for analysing sensitivity
- Determining the changes in habitat-biomes relationships by using GVM simulation model
- Mapping the native and endemic species of this territory
- Initiating a database system of biological responses to climate change
- Examining the change of species distribution, the rate and direction of spe-



cies dispersal, population density ,growth, dispersal distances and the location of 'refuges' to climatic amelioration

- Examining the temporal variation of the responses of the biota in changing environmental conditions to find some indication of the predicted responses
- Using Dutch technology to prepare dam in the coastal areas
- Working with the flow of sediment and accelerating the accretion of new lands
- Investing to make seawalls and other coastal protections to reduce vulnerability sharply
- Developing vulnerability information system which can guide stakeholder approaches to understanding the future for ecosystem services, coping mechanisms and interactions, and facilitate sustainable management
- Examining changes in biome areas under two scenarios: 1) shifts in

biomes kept pace with shifts in climatic conditions and 2) biomes fail to shift to new areas due to migration limitation

- Finding ways to exploit the eroding Himalayas as a way to counter the erosion of the coasts
- Reducing CO<sub>2</sub> emissions, and nitrogen and phosphorus deposition at all levels
- Adopting the triage approach of prioritising species and habitats conservation
- Exploring habitat restoration opportunities
- Emphasising on reforestation and afforestation to accelerate carbon sink
- Initiating dialogue between scientists and different stakeholders
- Planting appropriate mangrove species, as a bio-shield

Dr. Md. Mizanur Rahman, a biodiversity specialist, NDC, Jhalakathi Collectorate. E-mail: mizan\_peraj@yahoo.com

## Urban poverty and environmental degradation: Vicious cycle

Blaming poverty as a principal cause of urban environmental degradation will be one-sided narrowly focused conclusion. If poverty is a major concern in urban environment, conversely environmental degradation needs to be of great concern as well for further ill being of the poor. The poor are caught in a vicious cycle.

YOUSUF JAMIL

'GREEN' issues are spearheading discussions on resource management, biodiversity and global warming, while the environmental problems known as 'Brown Agenda' have been neglected for a long time. Challenges in addressing and meeting the brown agenda in the cities have acquired prominence among the planning and development professionals around the world. It is well accepted that rapid urbanisation has aggravated problems like sanitation and drainage, solid waste management, degradation of soil and land, uncontrolled emissions from the domestic and industrial activities, street and abode congestions and improper disposal of hazardous waste resulting in poor health of people. Cities and towns have been hubs of economic development but how this economic development must be achieved in the first place? Do the rapid industrialisation, urbanisation and development of communication network add impetus to economic development at the cost of environment?

The root causes of environmental degradation in urban areas are the

unplanned and hardly coordinated interplay of socio-economic, institutional and technical activities. There are many factors, which may have greater impacts on the urban environment but poverty still remains at the root of several environmental problems. Let us try to understand the urban poverty and environmental degradation before blaming each other.

Urbanisation and industrialisation have provided livelihood and opportunities to the millions of people but at the same time they have brought in the accompanied problems such as waste disposal, environmental degradation, accumulation of problems in homes and work places, disease-causing agents and pollutants, contamination of air, soil, surface water etc. The more we achieved rapid growth of industrial production, the more we experienced problems related to industrial pollution.

Urban environmental degradation in the least developed countries (LDCs) is associated with households and businesses those are not served by sewers, drains and solid waste collection facility. Lack of or improper sewage treatment plant is contributing to the water pollution problem. Sources of air

pollution are uncontrolled emissions from industries and increasing number of motor vehicles which are often without catalyst converters and have poorly maintained engines.

The answers to basic reasons for persistence of poverty can be traced to environmental degradation in urban areas. The urban poor are usually the most exposed to weather and thus most affected by environmental pollution. Again attempts to tackle environmental problems without addressing poverty are likely to fail for the helpless poor would habitually pollute it. Poverty reduction and effective environmental management is mutually dependent. Poverty is both cause and effect of environmental degradation.

This relationship between poverty and environmental degradation is of course an extremely complex phenomenon. Inequalities and lack of opportunities, social exclusion, lack of access to essential utilities foster un-sustainability among a section of population which results in environmental degradation because they do not find any other way but to using the available alternatives e.g. drains for toilet, live in a place which is already polluted, use contaminated water, generate waste vitiating the environment further.

It is well accepted that large population puts stress on the environment, society and resources. This not only requires destruction of more and more natural resources but also generates large number of waste which is associated with environmental stresses like loss of biodiversity, water pollution, air pollution and increased pressure on arable land. Over-consumption and unsustainable

development may have the greater impacts and that is why the choices of how to use the resources and for what purposes are critical issues.

Furthermore, economic opportunities in the urban areas and their absence in the rural have created a huge urban-rural gap. Lack of opportunities for employment and associated stresses are leading to ever-increasing migration of rural poor families to the towns. Urban slums are expanding due to increasing population in the cities.

This rapid and unplanned expansion of the cities has resulted in the degradation of urban environment. The city of Dhaka is a classic example of this. Huge pressures have been created on the infrastructure and utilities such as energy, housing, transport, education, water supply, sewerage system and recreational amenities. These in turn speed up the deterioration of urban environment and the proliferation of slums contributes further to urban poverty.

If we look for some of the envisaged actions such as improved provision for water and sanitation, less crowded, better quality housing, improved provision for storm and surface water drainage, avoidance of hazardous sites for settlements, promotion of cleaner household fuels and improved provision for solid-waste management then probably financial needs would stand in the front row and one would argue that due to lack of money the poorer countries cannot build these infrastructures.

Well, they have to choose the model of economic growth, which requires exploitation of natural resources for expanding production. In rich countries,



mass production and consumption is a major cause of environmental degradation and destruction of natural resources. In the poor countries, the creation of value and access to subsistence are typically linked to sacrificing environmental quality for short-term economic gain.

Poorer nations are introducing the neo-liberal policies, which turn rich people even richer, while the poor become poorer. Material consumption has also increased as a result, so there also more resources are being used to produce/purchase these goods than in meeting the needs of the majority poor. This has further led to 'blaming the victims' for their poverty.

Blaming poverty as a principal cause of urban environmental degradation will be

one-sided narrowly focused conclusion. If poverty is a major concern in urban environment, conversely environmental degradation needs to be of great concern as well for further ill being of the poor. The poor are caught in a vicious cycle.

By both renewable and non-renewable resources, causing waste generation and green house gas emissions high-income groups are far worst than low-income groups in creating environmental degradation.

Ameliorating urban poverty and preventing further environmental degradation or vice versa, the government needs to focus on the urban infrastructure development with urban environmental management.

Yousuf Jamil is a UK-based environmentalist.

## A silent icy river in Dhaka!

The accelerated industrial discharge of large amounts of untreated liquid has rendered water bodies polluted and agricultural land barren and the ecosystem threatened. The impact of water pollution is massive and multi-dimensional.

M RAFIQUIL ISLAM

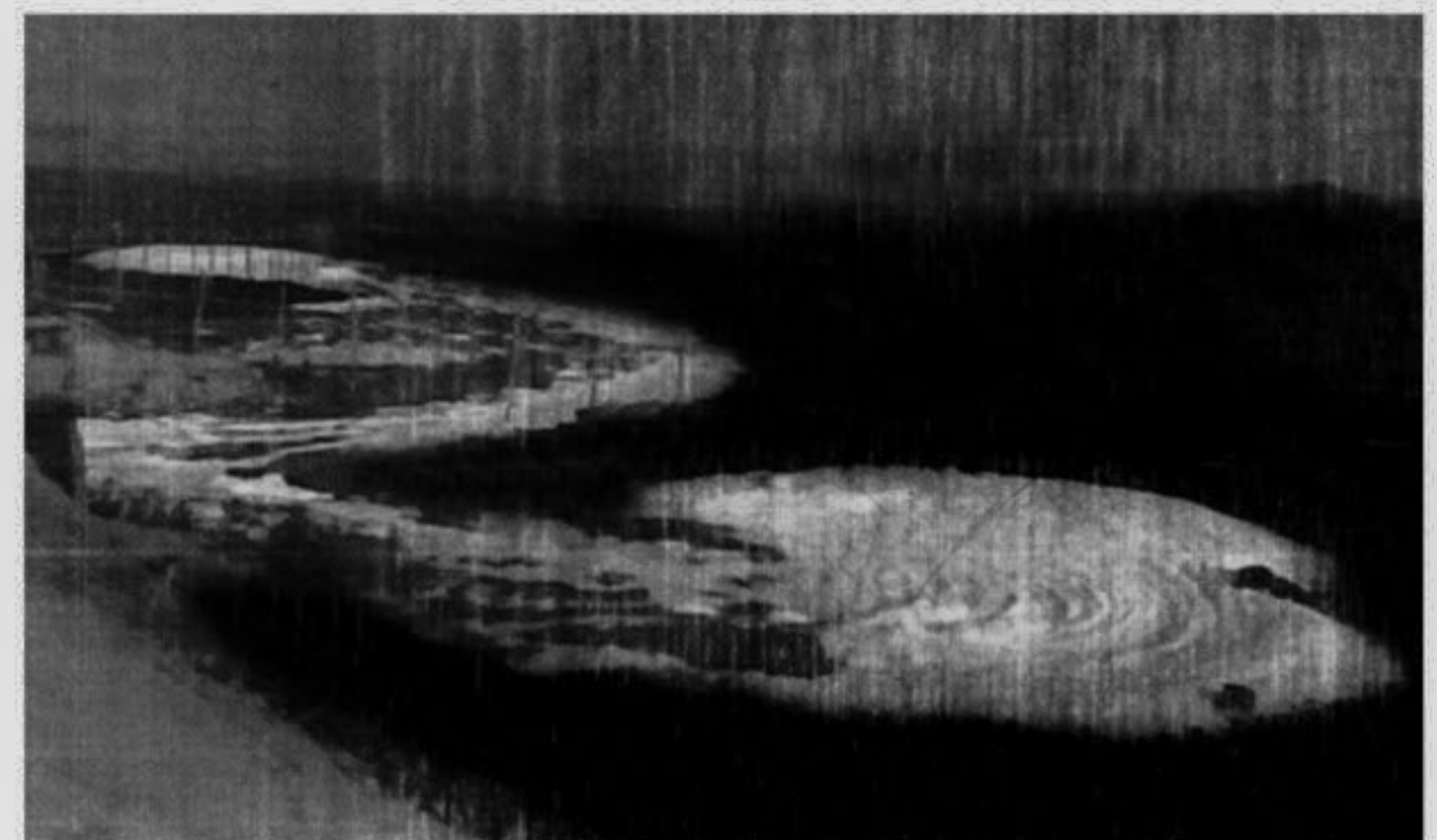
YOU will certainly not believe any snowfall in Dhaka! But what about an icy river? And that even not in the winter, just in the month of April, 2010? In fact it is a common scene since long. And what about thinking of a north-bound river? You must be thinking something has gone wrong with me.

Not exactly. I invite you to accompany me in my morning walk upto the middle of the Mirpur-Manikdi (Uttara) link road under construction. A branch of the river Turag flows here, surprisingly, in the northern direction, under a temporary culvert built to facilitate the bridge construction. Would you believe from the culvert up to about 200 metres downstream, it is all icy? Torn, scattered, 1-2 feet icy layer and some snow-balls rolling in the gentle breeze will widen your eyes. But, your nasal will obviously respond averagingly to the severe sulphuric smell! Then you may easily assume that some

chemical waste discharged from the nearby garment industries and the sewerage run-off caused these icy foams. And the huge amount of disposed liquid and probably some blockage in the south made the little river flow north. A dreamy outlook in reality is a foamy dirty brook!

To set your mind in the normal course of thinking, you may sing a popular British song 'Silent Icy River' released in 2005: "...time is a ribbon/a silent icy river fools us all..." Yes, the river fools us all, superficially being looked icy, but practically an aspect of environmental pollution.

A monitoring watchdog of environmental statistics, nationmaster.com shows that textile industries hold 64.18% share of the total BOD (biochemical oxygen demand) emissions in Bangladesh. Surprisingly it is the 2<sup>nd</sup> highest (following Macau) percentage in the world! And this BOD contribution is close to the rate of foreign exchange contribution by the particular sector of the country. It implies to more foreign



exchange through more industrialization, and also the more BOD emission!

A study "Methodology for Performance Analysis of Textile Effluent Treatment Plants in Bangladesh" stated in December 2009 that "a semi-automated composite textile industry of 10 tonne capacity produces 1250m<sup>3</sup> of effluent each day, which contains an assortment of chemicals including salts, dyes and bleaches." It also stated that most of the plants are not able to treat the

waste, and though some have treatment plants, they are not running due to unwillingness of management and also lack of experience to some extent.

According to newspapers referring to the Department of Environment sources, the number of most polluting industries was 903 in 1986 and 1176 in 1997. A World Bank study says that Dhaka river-boundaries made with the Buriganga, Shitalakhya, Turag and Balu take 1.5 million cubic meters of waste water every

day from 7,000 industrial units in surrounding areas and another 0.5 million cubic meters from other sources.

The accelerated industrial discharge of large amounts of untreated liquid has rendered water bodies polluted and agricultural land barren and the ecosystem threatened. The impact of water pollution is massive and multi-dimensional. Chemicals like cadmium, chromium, and especially mercury carried by the industrial waste are taken by the fishes, and some of it is also invading into the ground water, as well.

The dangerous thing is that fishes are being cultivated in the Mirpur-Manikdi road-side polluted water. A serious health concern implies to eating fishes caught from these areas. Since the last rainy season, I saw at least two mass fish deaths in the road-side fishing enclosures caused by, apparently, want of oxygen.

Hope policy level tasks have been done so far for protecting the environment of Bangladesh. Scores of laws, policies, rules, circulars, ordinances and orders have been adopted and issued. For example, Environment Policy, 1992 sets its objectives, as: 2.7 industrial usage of heavy and harmful metals like mercury, chromium and lead are to be discouraged to pave the way to their final prohibition; 3.2 discharging municipal, agricultural or

any other waste to the rivers, canals or other water bodies is to be strictly controlled by adopting laws and implementation thereof; 5.3.3 discharging household, industrial or any other waste to water reservoirs before its treatment, is to be strictly controlled by adopting laws and implementation thereof. But of them, the major ones are practically not in force, as the 'icy' branch of Turag makes us think!

With current resources and settings and with their optimum use, Dhaka is, at best, able to accommodate only 10 million people. The urbanization specialists expect Dhaka with an area of 580 sqkm and a population of 23 million in the next 10-15 years would be holding the rank of the second largest city in the world. We are not sure yet what consequences will welcome our next generation if we do not implement the policies and commitments regarding our environment, as well as climate change impact.

The afore-mentioned song 'Silent Icy River' was released in the album 'What Happens Tomorrow'. And I also want to finish my write up asking, what happens tomorrow?

M. Rafiquil Islam is Material Supervisor, Directorate General of Family Planning.