

Unabated pollution: People at risk

MD JAHANGIR SARKER

AS populations in the world continue to grow and pressures on environment from land-based and marine human activities increase, land, atmosphere, river, coastal and marine living resources and their habitats are being lost or damaged in ways that are also affecting human lives on earth. There have been severe pollutions already recorded to date by the industrially developed countries. But environmental issues can never be local or regional, must be global.

For the present, let us have a look at how the pollution process is being taken place in the aquatic ecosystem.

Phytoplankton: Phytoplankton is considered as the heart of water bodies (primary energy and food source). Planktonic algae are waterborne single-cell algae. Planktonic algae (algae bloom) usually occurs as a result of increased levels of nutrients and carbon dioxide in water, combined with the energy of sunlight.

Effect of increased nutrient level in surface water

A. Surface water environment (Pelagic ecosystem): Because of their tiny sizes, total oxygen production and carbon dioxide uptake are often thought half of the global plant production and uptake respectively. Nutrient loads (nitrogen, phosphorous and silica) from various sources (land fertilizer usage for rice and other food grains, often urea mixed water directly from different fertiliser companies, raw chemicals directly from garment industries, leather industries, hospitals etc.) are being daily loaded. These increased nutrient loads taken up as dissolved form of nitrogen, phosphorous and silica (nitrate-nitrogen, ammonia-nitrogen, phosphate-phosphorous and silicon dioxide) by phytoplankton cause phytoplankton bloom. Water colour gets changed (red tide) with noxious smell and water body becomes toxic. Excess growth of such phytoplankton help create phytoplanktonic species shift (diatom – primary food source of fishes, zooplankton, shrimps and other animals shift to dinoflagettes) that severely affects in aquatic ecosystem's food chain, lowers the dissolved oxygen, increases dissolved carbon dioxide. Massive surface water environmental pollution taken place by such increased nutrient levels especially by nitrogen, phosphorous and silica has been an important issue for global warming and public health.

B. Bottom water environment (Benthic ecosystem): Excess growth of surface water phytoplankton owing to increased nutrients is being sunk to the surface of sediment as particulate organic matter in the benthic ecosystem. This accumulated organic matter is being released to the water column as inorganic nutrients (nitrate-nitrogen, ammonia-nitrogen, phosphate-phosphorous and silicon dioxide) available again for phytoplankton growth after bacterial decomposition. Therefore sediment and water column bacteria take up sufficient oxygen for the degradation of the produced organic matter that in turn cause benthic animals suffer from oxygen. In Bangladesh, the recently measured surface water oxygen

content in different rivers is about 3-5 mg L-1 (minimum level must be 5 mg L-1 for the existence of life in water body). Besides, sedimentation rate each year in Bangladesh is very high. Such hazardous condition cause death of benthic animals (fishes, mollusks, bivalves, polychaetes, shrimps etc.).

Interestingly, some attached phytoplankton (morphology and physiology is different from surface water phytoplankton) inhabiting on the few millimeter surface sediment provide not only important food source for benthic animals but also produce oxygen. Attached phytoplankton algal management has lately been initiated by the first world countries. Therefore, it is still a long way for Bangladesh.

Effect of heavy metals

The Hazaribagh tannery complex and other industries, primarily the



Polluted waterbody at Hazaribagh tannery site

glue and paint industries in the same general location, have affected water and air quality in a large poorly drained area locked behind a nine meters high flood control embankment constructed in 1989-1990 in south-west Dhaka City. Up until the time of embankment construction, the contaminants were washed to the Buriganga river by annual flooding. At present, the existing sewage outfalls, the sewage lift operations consisting of 16 pumps and local residential drains are not adequate to properly and efficiently remove all the waste products generated by the factories and population of the area. This is partly a maintenance problem but an environmental problem has been created by the discharging of wastewater with an excessively high solids content and a dangerous level of chromium among other heavy metals and toxic materials.

Beginning in late 2000 an unknown quantity of the tannery effluent which previously had remained in stagnant waters and drains in the lowlands behind the Dhaka Flood Protection Embankment was being released through large underground pipes into the Buriganga River at Katsur near the Rayerbazar memorial. Tannery solid wastes have accumulated in the sludge deposits of drains since the construction of the embankment. However, these drains are flushed during the rainy season, the sludge being carried along as suspended sediment. During the dry season the area is submerged by tannery wastewater and the contaminated wastewater pond areas are now approximately 8-10 times larger than that of the pre-embankment period. It is quite possible that toxic sludge is accumulating on the bottom of the large ponds where it is unlikely to be

Chromium, one of the most common elements in the earth's crust and seawater, exists in our environment in several oxidation states, principally as metallic (Cr0), trivalent (+3), and hexavalent (+6) chromium. The latter is largely synthesized by the oxidation of the more common and naturally occurring trivalent chromium and is highly toxic. Trivalent chromium, found in most foods and nutrient supplements, is an essential nutrient with very low toxicity. However, hexavalent (+6) chromium (VI) [Cr(VI)] is a ubiquitous environmental and industrial contaminant loading from the tannery and absorbed in our body (through drinking water, eating fish, vegetables, fruits and other food grains) is strongly associated with a higher incidence of human lung cancer. It also affects in human renal system particularly of diabetic patients.

Therefore, it is very easy to come up with a conclusion that the toxic discharge from factories in Bangladesh had worsened the quality of life and have a serious affect on public health (out breaks of different diseases).

Effect of pesticides

Pesticides are designed to (in most cases) kill pests (insects). But indiscriminate use of pesticides (over doses) especially in the agriculture for high yield and DDT in dry fish industries has posed a serious threat to the environment. Many pesticides can also pose risk to humans. However, to determine risk, one must consider both the toxicity or hazard of the pesticide and the likelihood of exposure. A low level of exposure to a very toxic pesticide may be more dangerous than a high level of exposure to a relatively low toxicity pesticide.

Pesticides commonly use in Bangladesh are, Furadan (Carbofuran pesticide) is in the category of highly hazardous. Moderately hazardous pesticides are Marshal 6G & 20EC (Carbosulfan), Sontap 50SP (Cartap), Ripcord 10EC (Cypermethrin), Sumithion (Fenitrothion), KAP 50EC (Phenthoate), Sevin 10% Dust (Carbaryl), Ustad 10EC (Cypermethrin), Simbus 75EC (Fenitrothion + BPMCS) and Thiovit 80WP (sulfur) in the category of

nitrophenol, toluene diamine, 2, 4, 5-trichlorophenol, zinc hydrosulfite, zinc sulphate, tert-butylamine, among others.

Chromium solutions are used to tan leather and most of the tanneries in the Hazaribagh area, save one or two, do not recover their chrome although this can be done at relatively low cost. Chrome can be recovered using MgO as an alkali to precipitate chromium as a thick high density slurry while the supernatant fluid is decanted. The recovered chromium is reused in many Indian tanneries. This system was introduced in India under a TNO (The Netherlands)-CLRI (India) cooperation agreement. The chrome recovery cost is only 30-40 per cent of the cost of fresh chromium and the pay back period of the entire system is 2-4 years. Chromium solution is however being loaded to the ponds and open waters through drains, channels and rain water. This certainly affects aquatic and terrestrial ecosystem in addition to ground water.

Government should get amended existing environmental policy and implement environmental management techniques practically with the development of annual monitoring system and evaluation for each section (for example fisheries, livestock, agriculture, coastal, marine, river, underground water, meteorology, geology etc).

- Coordinate each section with data sharing followed by top down/bottom up method.
- Get all municipal corporations involved very much actively in the environmental issues providing particular urbanisation planning for the real estate companies.
- Help create public motivation through mass media – television, radio, rally, advertisement, meeting, festivals etc.
- Make it obligatory for all NGOs, industries and companies to get themselves involved environmental issues and its protection following the environmental policy.
- Provide financial aid (small scale) to NGOs and other environmental companies with a proper monitoring system.
- Suggest each national and public university to conduct applied research on environmental issues for future decision making.
- Make a proper plan to keep sustainable environmental ecosystem in the Bay of Bengal.

acute hazard. Most of them are categorized as moderately hazardous. In addition, the excessive applications of these pesticides create further threat to the safety of the human and animal health.

Let us go back to newspaper reports published in the Manabzamin (6th September, 1999), Bhorer Kagaz (1st September 1999) and Inqilab (2nd September, 1999). The day was 31st August, 1999. In the village Dakatia of Jessore, people watched mass death of sparrows in vegetable fields. A preliminary estimate of the villagers said that bodies of about 5,000 sparrows could be counted. There were more. In the early morning, it was seen that in the eggplant field, several hundreds of sparrows were lying in a restless condition, flickering wings with no strength. It was a painful process of death that brought tears in the eyes of many people around.

These include vector-borne infections including malaria and dengue fever, and food-borne infections, like salmonellas, which peak in the warmer months. Human health all over the world will be affected also by global warming. The rise in temperature will favour pathogenic activities and human health will be at higher risk, increased risk of Dengu, Malaria and Diarrhea etc.

The Munich Re Foundation estimated weather-linked economic losses due to disaster like tropical storms and forest fires at more than US\$ 200 billion, with insured losses at more than US\$ 70 billion in 2005.

Remedial measures:

There are various options available to avoid catastrophic climate change. These include worldwide improvement in energy efficiency and a shift to renewable resources. Popularising the use of renewable energy sources such as solar and wind power, bio-energy and geothermal energy can reduce green house gas emission considerably. Trees can slow climate change by absorbing carbon dioxide as they grow. Deforestation must be stopped and more trees planted to slow down the process. A number of analysts consider that nuclear power could play a significant role by meeting electricity demand without emitting CO2. But a low greenhouse gas future will also need to include social changes. Without massive campaign it is not possible to make people aware of the imminent disaster.

Conclusion:

It is now crystal clear to all that polar ice sheets are melting due to global warming. The ongoing global process will bring about very harmful effects not only upon the biota of polar region or people near the Arctic or Antarctica, the melting of polar ice berg is precursor of a great disaster that victimises the whole mankind. Each and every body of this planet has his/her role to play for tackling the disaster. The motto should be "Think globally, act locally."

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If precautionary and curative measures are not taken against these pollution, days are not far that an unpredicted catastrophe may occur in Bangladesh and we follow the sparrows.

Some proposals

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- Suggest each national and public university to conduct applied research on environmental issues for future decision making.
- Make a proper plan to keep sustainable environmental ecosystem in the Bay of Bengal.

Dr. Md. Jahangir Sarker, Ph.D. is a Post Doctoral Researcher, National Institute of Advanced Industrial Science and Technology (AIST), Ministry of Economics and Trade, Japan.

Melting ice: A global warning

MD MAHFUJUR RAHMAN

GLOBAL warming and sea level rise are most discussed and debated global issue now. The comprehension of global warming like other environmental banes is not important for scientists only; rather it more concerns mass people both for plausibility of publicity about it and implementing remedial measures thereof. The melting ice in the arctic is the precursor of a global disaster that should be understood well and immediately.

Global warming: Natural or human induced? Examination of ice cores shows that there is more CO2 in the atmosphere than at any time in the past 600,000 years. Between 1960 and 2002, annual anthropogenic global emissions of CO2 approximately tripled. They rose by about 33 per cent since 1987 alone. At the same time we find 11 of the most warm years in the past one and a quarter century since 1990, with 2005 the warmest on record. From the period of industrialisation people are using more and more energy than ever especially from the fossil fuels. Fossil fuel produce CO2 upon burning which directly increases the amount of CO2 in the ambient air. At the same time mankind destroyed huge area of forests to create more living space for them. Till now, natural forests are being cleared all over the world. Plants absorb CO2 to prepare their food and ultimately maintain the balance of CO2 in atmosphere. So shrinking of forest cover means higher concentration of CO2 in the ambient air. So, it is very easily understood that the global warming is more human induced than natural resulting in increased thawing of permafrost, and melting of polar ice masses, with profound world-wide environmental, economic, social, cultural and political implications.

Sea level rise accelerated: In the past 100 years, global sea level rose between 1 and 2 millimeters a year. Since 1992 the rate has increased to about 3 millimeters a year, primarily through thermal expansion of warming oceans and then by freshwater flowing into the oceans from melting ice. Melting ice is responsible for a significant portion of the observed sea level rise, with the Greenland and Antarctic ice sheets the largest contributors. The Greenland ice sheet is melting faster than new ice is being formed. In the Antarctic, three large sections of ice shelves in the peninsula have collapsed over the past 11 years, followed by a marked acceleration in thinning of glaciers that were held back by the shelves.

Adverse effects on Arctic and Antarctic: Arctic and Antarctic zones are considered as the last frontiers of global unaltered natural



ecosystems. Polar environments are among the most extreme on the planet, with limited sunlight, extreme temperatures, short growing seasons, sea ice, snow cover, glaciers, tundra and permafrost. Global climate models indicate that global warming induced by the greenhouse effect will be most acute in Polar regions. Parts of the Polar regions are already warming at a rate of two to three times of the global average. Most of these areas are in the Arctic but the Antarctic peninsula is also warming. Each summer has been shrinking the area of the ice covered Arctic Ocean and the remaining ice is becoming less thick.

Keystone species in arctic, polar bears hunt seals on floating ice and use ice corridors to move from one area to another. Pregnant females build winter dens in areas with thick snow cover. They need good spring sea-ice conditions for their own and their cubs' survival. During the past two decades, the body weight of adult polar bears in the Hudson Bay area in Canada has declined between 15 and 26 per cent. The number of cubs born is also declined between 1981 and 1998.

Precursor of grim global disaster: Melting ice in the Polar regions and glaciers will drive changes elsewhere on the planet. The process of melting ice will lead to sea level rise about 3 millimeter annually. By the year 2050 sea level will be raised by about 13 cm. Intergovernmental Panel on Climate Change (IPCC) projections for the years 2050 and 2100 establish that the small island states (AOSIS), less developed countries (LDCs), the arctic region and low lying coastal states will be more vulnerable to the inundation process. Low lying countries will be inundated making a huge number of people refugees. In December 2005, a small community living in the Pacific island chain of Vanuatu became perhaps the first to be formally moved as a result of climate change.

Continued global warming is expected to cause shifts in the geographic range and seasonality of certain infectious diseases.

These include vector-borne infections including malaria and dengue fever, and food-borne infections, like salmonellas, which peak in the warmer months. Human health all over the world will be affected also by global warming. The rise in temperature will favour pathogenic activities and human health will be at higher risk, increased risk of Dengu, Malaria and Diarrhea etc.

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There are various options available to avoid catastrophic climate change. These include worldwide improvement in energy efficiency and a shift to renewable resources. Popularising the use of renewable energy sources such as solar and wind power, bio-energy and geothermal energy can reduce green house gas emission considerably. Trees can slow climate change by absorbing carbon dioxide as they grow. Deforestation must be stopped and more trees planted to slow down the process. A number of analysts consider that nuclear power could play a significant role by meeting electricity demand without emitting CO2. But a low greenhouse gas future will also need to include social changes. Without massive campaign it is not possible to make people aware of the imminent disaster.

Conclusion: It is now crystal clear to all that polar ice sheets are melting due to global warming. The ongoing global process will bring about very harmful effects not only upon the biota of polar region or people near the Arctic or Antarctica, the melting of polar ice berg is precursor of a great disaster that victimises the whole mankind. Each and every body of this planet has his/her role to play for tackling the disaster. The motto should be "Think globally, act locally."

Dr. Mahfujur Rahman is studying Environmental Sciences at Jahangirnagar University.

Chemical fertiliser and pesticides deteriorating soil fertility

DR. MD SHAHJAHAN ALI

IT is reported that the use of chemical fertilisers for a longer period along with pesticides may deteriorate the quality of soil and creates health hazard. The views were expressed by various experts on agriculture and researchers in a seminar on "Management of organic-farm" in Bangladesh and a key note paper was also presented there on the issue. It has been brought to light that there is lot of difference between management of organic-farm and the existing system of using chemical fertilisers along with application of pesticides. This type of management depends completely on the available organic sources, which control the bed effect on soil and pollution of environment and help improve physical, chemical and biological characters of soil.

Therefore, for sustainable agricultural management, practice of application of biomass in soil is imperative to augment the yield of crop. This is true and not a new thought in this line but the question naturally arises why steps were not taken as such in serious consideration by the learned researchers and agricultural scientists? Everybody in our country agrees that soil has become very much deficient in organic matter content and there is no concrete suggestion or advice as to how the content may be enriched to get a better fertility status and maximum crop yield. Unless the efficiency of our soil is enhanced, no better output of crop production and vegetables

can be achieved.

This is true that the people across the world have now become very much conscious of their health and prefer to choose vegetables grown under the judicious application of organic manures along with chemical fertilisers. The farmers may be acquainted with the importance of organic manures and other farm residues as a source of plant nutrients also due to short supply and five fold increase in price of fertilisers. The organic manures can increase water holding capacity and play an important role in the activity of the microbial population and base exchange capacity in soil. No doubt, chemical fertilisers are instrumental for increasing crop yield but the production of these fertilisers cannot fulfil the demand of the users also from both supply and economic points of view.

Moreover, it should be clarified that the use of chemical fertilisers in soil undergoes various chemical reactions resulting in the state of synergistic and antagonistic relationship among and between the nutrients for their availability to the plants. The increase in nitrogen and phosphorus content in soil due to excessive use of N and P fertilisers may interfere with the uptake of other nutrients like zinc and sulphur by the plants. It is a matter of great concern to know that pesticides which are internationally identified harmful have been used indiscriminately in Bangladesh. This is very ironic to note that though most of the poisonous chemicals produced in foreign countries are restricted to use in their own countries, but are sold to developing countries to earn

money and keep the producer countries safe from environmental pollution.

Over use and misuse of pesticides affect the environment to a large extent with serious implications on public health, will life, useful insects, food, prey animals, aquatic food chains and other habitats. There is definitely a need of application of insecticides in the country in order to eradicate insects which damage the crop yield. Actually the use of pesticides cannot be avoided but at the same time organic insecticides should be used and the scientists may come forward to conduct further researches on the production of bio-insecticide for use with chemical fertilisers. This will be helpful to reduce health hazard and may add substantial organic residues towards conserving the desired characters of soil.

A farmer in southern part of Bangladesh has recently prepared and applied in his soil organic insecticides instead of using chemical insecticides, could make optimum yield of rice and maintain safety of the environment especially of soil which is one of its component.

Concerned about the range of inter-connected problems, there is a need to set up an international research and development network on perception and management of pests and pesticides (PMPP). The awareness may be created among the people about the application of organic manures to compensate the loss of fertility of soil due to addition of fertilisers when their use cannot be avoided overnight. Another important

organic fertilizer may be the waste from biogas plant using cow-dung mixed with other such materials.

The fermented material or in other words, degassed manure flown out as a slurry or effluent from the gas plant might be used as manure which retains the manorial value.

It is an accepted fact that direct application of cow-dung as organic manure for better crop yield and increasing quality of soil is not so effective like the slurry obtained at the end of the production of biogas because it contains more N, P and K contents. These are the considerations to be taken into account of the sources of organic matter required to accelerate the rate of biological activity maximizing crop yield.

It should be urged that under the pressure of multinational companies and donors our present popular government should not take any decision which may not serve the interest of the country. Priority should be given first to make a correct policy for security of agriculture and organic matter and immediate promulgation of bio-diversity act maybe declared in order to ascertain our food and bio-security and if needed, help from new technology maybe sought. The problem of adulterated fertilisers now allegedly sold in the market is a serious one and threaten security of agriculture. The government should take stern measure against those responsible.

Dr. Md. Shahjahan Ali is Professor, Department of Agricultural Chemistry, Bangladesh Agricultural University.

A HASIB

FIRST of all I very much appreciate the consistent efforts made by journalists and other writers in The Daily Star to prevent the rivers in and around Dhaka city, the Dhanmondi Lake, Gulshan Lake, Banani Lake and other water-bodies from being encroached upon by powerful grabbers, developers, the river and lake side house owners in collusion with a few corrupt Rajuk officials.

Dhanmondi Lake is now more or less safe from encroachment except the south western part from bridge near the police outpost on the east to Road No. 27 (Old) on the north. Here there is no walkway barrier resulting in encroachments by the lakeside owners. It is necessary for Rajuk/Ministry of Works to see how much land was originally allotted to such owners and how much each of them has encroached. The water of Dhanmondi Lake is less polluted compared to any other lakes or rivers in or around Dhaka city.

In this write up I want to say a few things about Gulshan, Baridhara and Banani lakes. Towfique Ali (Star City June 10) mentioned about de-requisition of some land in the lake and other waterbodies. I personally know of de-requisition of some acquired land in Gulshan Lake and nearby water-bodies from Mariam Tower on the north to middle of Badda on the south and the owners, taking advantage of this de-requisition, paid requisition money back to government and immediately sold most of the de-requisitioned lake land and water-bodies to different persons. Some developers bought most of the de-requisitioned lake and part of wet land from Mariam Tower to middle of Badda at a throwaway price. However, could not take possession due to government's prompt steps. Consequently, a housing project of Shine Pukur and a joint venture project with a Singapore firm failed. This was a clear mistake to de-requisition the water-bodies which gave rise to many writ petitions and suits in courts when the government prevented the developers to acquire the lake and wet



land by earth filling.

In my opinion government should requisition it even if it has to pay more money at present rate and develop this vast stretch of wetland into a lake from Mariam Tower to middle of Badda.

Our people, even most of the rich and educated class, do not appreciate what the rivers and the lakes in the city bring to our health and mind by way of recreation besides money for the government. Those who visited even nearly Burma or Thailand must have felt how much local money and foreign exchange those countries earn from the lakes, water-bodies with flowers and river cruise with restaurants, band parties, music etc. Balu River, Shitalakha River, Turag River, Dhaleshwari River, Buriganga River in and around our Dhaka city are invaluable lifelines for us. Our leaders, businessmen, the rich and the well-to-do people go to other countries. They can keep their eyes open to see the all round developments in lake sides and river sides of those countries. Facilities on sea sides in those countries go without saying.

We appreciate Rajuk for demar-

cating and making walkways on the lake banks including the western bank of Gulshan lake even though the alignment, say from Shooting Club on the south to Gulshan-Badda Road on the north of Gulshan lake and other places are not straight and go in a very zigzag manner causing difficulty for the walkers. They should also see that rubbish is not thrown by the sides of the lakes in a tricky way for grabbing the water bodies inch by inch.

I would also suggest to make walkway on Badda sides also to prevent the narrowing of the lake by the grabbers making houses right on the lake. In this respect some photographs were earlier published in The Daily Star. They should also see that a walkway is not converted into a drive way as an approach road to some influential leaders' buildings as has been done from the western end of Road No. 55 of Gulshan-2 to Kemal Ataturk Avenue on the eastern side of Gulshan/Banani lake resulting in the construction of a few houses whose approach road otherwise should have come from the western side of Road No. 50 running from Kemal Ataturk Avenue. This

can still be prevented by making an approach road from Road No. 50 and restore the original layout plan of DIT (now RAJUK).

The present non-political government trying to develop a road map for democracy through various reforms and not merely a road map for holding an election for creating the same scenario as we witnessed before, are demolishing illegal structures encroaching on different lakes and rivers, deserve our appreciation. I urge upon the Ministry of Works (under which RAJUK works) to order to make immediately a walkway on the western side of Badda, that is on the eastern side a Gulshan Lake from Gulshan-Baridhara Bridge up to the extreme south of Gulshan Lake opposite shooting club to save it from further encroachments by way of making houses, sand/earth filling by the land grabbers. It is not enough to merely arrest these grabbers without fair and speedy impartial trial.

The motto is 'save the lakes and rivers' around Dhaka city at any cost to augment environment of the metropolis.

A Hasib is a freelancer.