

AQUATIC ECOLOGY AND DANGEROUS SUBSTANCES: BANGLADESH PERSPECTIVE

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Bangladesh had always been predominantly an agricultural based country and in early days pollution was never even felt in this region. Since early sixties, of necessity, industries of various kinds started to spring up slowly. It appears in a survey that ecological imbalance is being caused continuously due to discharge of various industrial wastes into air and water bodies. It has also been found that the intensity of pollution caused by the factories and industrial units depend on their type, location, raw materials, chemical effects, production process and discharge of gaseous, liquid and solid pollutants to the natural environment.

All of Bangladesh's sewage and industrial wastes are flushed directly into Ganges and Brahmaputra Rivers. There are wide spread fears that as the region develops in industrial infrastructure, industrial pollution will accelerate, compounding the problems posed by raw municipal wastes. About 900 polluting industries in Bangladesh dispose of untreated industrial wastes directly into rivers, although the effluents contain 10 to 100 times the allowable levels permissible for human health.

The Ganges-Brahmaputra delta is the largest delta in the world and the rivers contribute one-third of the global sediment transport to the world oceans. The rivers flow through 10 per cent global population and carry untreated rural, urban, municipal and industrial wastes to the Bay of Bengal. Neighboring India ranking the tenth largest industrial country of the world but most industrial plants use outdated and polluting technologies. The river Ganges flows through more than 700 cities and about 120 million liters of waste water added daily. DDT factories, tanneries, paper and pulp mills, petrochemicals and fertilizer complexes, rubber factories and host of others use river to get rid of their waste. 70 per cent of surface water in India is polluted. About 6,000 large and medium industries and 24,000 small industries are operating in Bangladesh discharge untreated effluents directly to the rivers without any regard to environment.

Unfortunately the rivers of this subcontinent have become the garbage of the nations. The Ganges in particular is full of toxics, including decomposing bodies tossed into it along most of its length. Out of India's 3119 cities, only 209 have partial sewage facilities and eight have full facilities, besides DDT factories, tanneries, paper and pulp mills, petrochemicals and fertilizer complexes, rubber factories and a host of other use the river to get rid of their wastes. It is likely to have the same trend in Bangladesh.

The flood plains of Bangladesh provide one of the most productive and diverse freshwater faunas in the world. Seven hundred rivers and numerous open water bodies seasonally amount to more than 50 percent of Bangladesh's land surface, providing an area of some 3 million hectares of permanent waters. This unique but vulnerable aquatic biodiversity is a precious national heritage, and the birthright of both present and future generations. Over 3000 species of plants and 400 species of fish and other aquatic fauna depend on wetlands for whole or part of their life cycle. Freshwater fisheries in particular make an invaluable contribution to the national economy. They also form an intrinsic and essential part of Bangladesh's cultural tradition. They provide a renewable food resource on which the nutritional well being and the livelihood of millions of rural Bangladeshi households depend. They also represent a unique resource of genetic material which, must be safeguarded for the future nutritional and economic well being of generations to come. Forming an intrinsic part of the ecosystem, fish play a key role in recycling nutrients and in the complex flood plain food web.

The seasonal flood waters inundating the plains of Bangladesh have renewed this aquatic life support system for millennia, enriching the soils and washing away pollutants. This has enabled the rural population to enjoy open access rights to common property fishery resources - without having to worry about their future availability. Diversity of seasons and habitats (rivers, wetlands, water bodies, and flood plain and dry land areas) provides for a seasonal diversity of available fish species. This in turn provides the basis for diverse livelihood and food production options. As this diversity is depleted, so becomes the food and livelihood security of the rural population increasingly vulnerable.

It is feared that these natural resources are in decline (in both diversity and number), thus jeopardizing the prospects for sustainable development. The transformation of the aquatic habitats and loss of wild species is increasing this vulnerability of Bangladesh's food production systems. It is further undermining the traditional rights of the rural population to open access to common property resources. The sustainable development of millions of people, whose nutrition and livelihood depend on continued open access to the common property resources of the flood plain, is inextricably linked to protecting and conserving Bangladesh's renewable aquatic biological resources.

Surface water pollution in Bangladesh occurs mainly by human sewage coupled with municipal garbage and industrial effluents. Industrial discharges along with municipal and urban wastes are creating special problems that completely destroy the microbial-based systems of decomposition.

About 6,000 large and medium industries and 24,000 small industries are operating in Bangladesh which discharge effluents directly to the rivers or nearby canal or waterbed without any regard to environment.

Pollution in Buriganga River: The River Buriganga, which runs past Dhaka City, is at present one of the most polluted rivers in Bangladesh. Dhaka City is very densely populated and considered to be one of the ten 'Mega Cities' of the world. However, only a small fraction of the total wastewater being generated in the City is treated. Consequently, the amount of untreated wastes, both domestic and industrial, being released into the Buriganga is tremendous and is increasing day by day.

The river is seriously polluted by discharge of industrial effluents into river water, indiscriminate throwing of household, clinical, pathological & commercial wastes, and discharge of fuel and human excreta. In fact, the river has become a dumping ground of all kinds of solid, liquid and chemical waste of bank-side population. These activities on the Buriganga have caused narrowing of the river and disruption of its normal flow of water. The water of the river has become so polluted that its aquatic life has almost been extinguished.

A survey in 1999 revealed that the water of Buriganga, Turag, Dhaleshwari, Balu, and Narai flowing around the greater Dhaka city had been completely polluted. The report concluded that the water of these rivers posed a serious threat to public life and was unfit for human use. People, living near the rivers, use the water because they are unaware of the health risks and also having no other alternative. This causes incidents of water borne and skin diseases.

A cruise on Bangladesh's historic Buriganga River used to be a must for visiting dignitaries; but these days they are confronted with foul smells and rotting fish resulting from massive pollution. Hundreds of years ago, the banks of the Buriganga were a prime location when the Mughals made Dhaka their capital in 1610. The house-turned-museum of the Nawab (ruler) overlooks the river, which is the country's main waterway for trading and ferry travel. It was once the main source of drinking water for Dhaka's residents and an hour downstream from the capital city the river is still crystal clear. But as it flows through the capital, waste from sewers and factories especially tanneries pour into it.

Up to 40,000 tones of tannery waste flows into the river daily along with sewage. About 12 sq. km area of Hazaribag and adjacent area are full of offensive odors of various toxic Chemicals: hydrogen sulphide, ammonia, poisonous chlorine and several nitrogen based gases to mention a few. According to an expert, "an average of 19 cubic liter water containing more than 300 different chemical compounds is being discharged daily from these industries." The relative acidity or alkalinity of this liquid toxic waste flown through the drainage system has been observed as between 1-15-13 not only that, traces of chemical elements also remain. Detergent increases the PH level in water. Although treating the water for toxic chromium, sulphuric acid, and salt and chlorine compounds is seriously being considered the practice is yet to start.

According to a recent estimate, about 70,000 tons of raw hides and skins are processed in these tanneries every year polluting the environment and the quantity of untanned solid wastes namely raw trimming, we lime fleshing, pelt-trimming generated in these tanneries is estimated to be 28,000 tons. Statistics provided by various sources suggest that a big tannery of the Hazaribagh area releases 2,500 gallons of chemicals wastes each day, polluting the city's air in addition to contaminating the water of the river Buriganga.

Effluents and solid waste generated at different steps of leather processing trekking through the low-lying area of Hazaribagh contaminated by chromium, the old wounds take a longer time to heal. Long term chromium contamination may cause cancer. Laboratory tests carried out by DoE (Department of Environment) show that chromium, a carcinogenic agent, has seeped into the aquifer at some places of Hazaribagh flow into the Buriganga River. Liquid waste is contaminating the waters of the Buriganga River on the surface as well as the ground water resource base. During the lean season, the Buriganga River turns deadly for fish and other sub aquatic organisms. When solid waste and effluents run into the river, the Biological Oxygen Demand (BOD) in the water rises, creating oxygen is calamitous for the sub aqueous life. Among others, effluents of tannery factories lower the dissolved oxygen (DO) content of the river water below the critical level of four milligrams per liter.

Sitalakhya River: Besides wastes from Dhaka urban population the river receives untreated industrial wastes from urea fertilizer plants, textile mills and other industries. The principal polluting agent in the region is the Urea Fertilizer Factory of Ghorasal and the concentration of ammonia dissolved in water has increased over time causing fish-kills.

Balu River: The River near Tongi (15 miles north of Dhaka) receives untreated effluents from industries such as textiles, lead batteries, pulp and paper, pharmaceuticals, paints, detergents, iron and steel, rubber etc.

Bhairab/Rupsa Rivers: The principal industries of Khulna (south-east of Bangladesh) are jute mills, oil mills, newsprint mills, cable, shipyards, tobacco, match factories, hardboard and others dispose molasses, starch, oil, sodium-sulphide, ethane, lissapol, soda ash, dye, sulphuric acid, salicylic acid, lime, ammonium sulphide, and chrome etc. A few studies at

Bhairab River show a very alarming water quality data (Nov.-April 1988-89) - conductivity 390-9500 Micro-mhos/cms, total solid 260-3500 mg/l, TDS 260-3200 mg/l. The pollution aspects of Bhairab and Rupsa Rivers is very critical - the Rupsa River does not receive a continuous flow of fresh water from the parent river, on the other hand, the Bhairab River, being subject to tides, has marked backwater effects which reduce the purification capacity of the river.

Karnaphuli River: The polluting industries of Chittagong, the second largest city of Bangladesh, such as 19 tanneries, 26 textile mills, 1 oil refinery, 1 TSP plant, 1 DDT plant, 2 chemical complexes, 5 fish processing units, 1 urea fertilizer factory, 1 asphalt bitumen plant, 1 steel mill, 1 paper mill (solid waste disposal hourly 1450 m³), 1 rayon mill complex, 2 cement factories, 2 pesticide manufacturing plants, 4 paint and dye manufacturing plants, several soap and detergent factories and a number of light industrial units directly discharge untreated toxic effluent into Karnaphuli river. From the survey of effluents from different industries, it has been found that the discharge is generally composed of organic and inorganic wastes. The organic wastes are the effluents from the tanneries, fish processing units, degradable wood chips, pulps and untreated municipal and sewage (about 40,000 kg BOD daily) etc. The inorganic wastes are chemicals used by the industries such as various acids, bleaching powder, lissapol, hydrogen peroxide, alkali, salts, lime, dyes, pigments, aluminium-sulphate and heavy metals etc. The DDT factory and fertilizer factory disposing of DDT, toxic chemicals and heavy metals to the Karnaphuli River and ultimately to the Bay of Bengal. Some survey show about 220 ppm of chromium, 0.3-2.9 of cadmium, 0.05-0.27 ppm of mercury, 0.5-21.8 ppm of lead entering river and sea water much higher than allowable limits and extremely alarmingly to aquatic flora and fauna and through food chains to human beings. It may be mentioned that Bangladesh obtain table salt from solar drying of sea water and consequently increase pollution of sea water shall create a serious national health hazard situation.