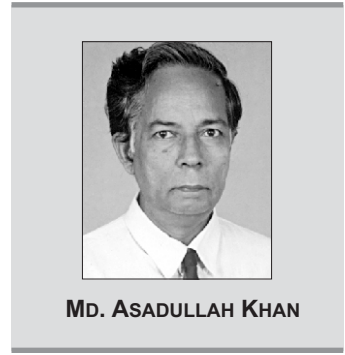


## Bio-diversity in peril



who visited the densely packed forest areas. "The devastation is just unbelievable. It's one of the great tragedies of all history."

### How is biodiversity affected?

Damage to intact forests, specifically when they are broken up into isolated patches when partly logged or when fires are set (as has happened in Brazil and Indonesia) directly threatens biodiversity. While covering only 6% of the Earth's land surface -- about the same as the 48 contiguous United States -- the world's forests are losing an area of half the size of Florida, USA each year. With other rich environments under similar assault, including coral reefs (two-thirds degraded) and salt marshes and mangrove swamps (half eliminated or radically altered), the extinction rate of species is rising everywhere.

Not all threatened species disappear immediately. Most suffer loss of their habitat ranges and gene pools to dangerously low levels, eventually descending to what biologists call the "living dead." Throughout the world 976 tree species are classified as critically endangered.

### Why should we care about biodiversity?

Undeniably true, humanity's food supply comes from a narrow sliver of biodiversity. Throughout history, people have gathered or cultivated about 7000 plant species for food. Today only 20 species provide 90% of the world's food with maize, wheat and rice supplying more than half.

Natural pharmaceuticals offered by biodiversity are also underutilized. Only a few hundred wild species have served to stock our antibiotics, anticancer agents, painkillers and blood thinners. The biochemistry of the vast majority of species is an unfathomable reservoir of new and potentially more effective substances. Caught in an endless struggle for survival, these species have devised myriad ways to combat microbes and cancer-causing runaway cells. As the enhancement of agriculture and medicine become the mainstay for the survival of exploding populations in the world, there is hardly

an alternative to conserving the forest. Furthermore, the biosphere gives us renewed soils, energy, clean water, and the very air we breathe, all free of charge. The more species that compose wild communities, the more stable and resilient the planet becomes as a whole.

The Bangladesh part of the Sunderbans spans about 6000 square kilometers, including a water area of about 1700 square kilometers. There is hardly a doubt in the researcher's claim that here might be hidden a variety of life forms that are yet to be catalogued. Researchers rarely brave trips to the densely-packed forest areas, teeming with wildlife, in absence of a suitable and safe river transport system in the interior forest lands. Yet loggers are reaching these parts, cutting down trees, destroying the very resources that support human life. Consequently, the forest area and the life forms that depend on them are disappearing at a faster rate than ever before.

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### The forest as nutrient recycler

The forest functions like a delicately-balanced organism that recycles most of its nutrients and much of its moisture. Wisps of steam float from the top of endless palette of green as water evaporates off the upper leaves, cooling the trees as they collect the intense sunlight. Air currents over the forest gather this evaporation into clouds, which return the moisture to the system in torrential rains. Dead animals and vegetation decompose quickly, and the resulting nutrients move rapidly from the soil back to the growing plants. The forest is such an efficient recycler that virtually no decaying matter seeps into neighboring rivers.

Left to its own devices, the rain forest or mangrove forest is an almost self-sustaining system that thrives indefinitely. But when stripped of its trees, the land becomes inhospitable. Most of the forest soil becomes nutrient-poor and ill-suited for agriculture. The rain forest or the mangrove forest has an uncanny capacity to flourish in soils that elsewhere would not even support weeds. It is worth noting that Henry Ford tried twice to carve rubber empires out of the rain forest in the 1920 and 30s. But when the protective canopy was cut down, the rubber trees withered under the assault of sun, rain and pests. The story is the same here in our country. To encourage settlement in the Chittagong hill tracts, the government offered many



A Sunderbans water area

incentives in the coastal region of the Sunderbans, allowing settlers to claim arable land by clearing off its trees. Unfortunately, for the settler's, their dreams of agriculture-based prosperity turned into bitter disappointment.

### How do forests affect climate change?

Because of the huge volume of clouds it generates, the forest system plays a major role in the way the sun's heat is distributed around the globe. Any disturbance of this process could produce far-reaching, unpredictable effects. The Amazon alone stores about 75 billion tons of carbon in its trees, which when burned, spew carbon dioxide into the atmosphere. Since the air is already dangerously overburdened by carbon dioxide

from the cars and factories of industrial nations, the torching of either the Amazon or the destruction of the Sunderbans could magnify the greenhouse effect, the trapping of heat by atmospheric carbon dioxide. Scientists fear that the globe will begin to warm up, catapulting dramatic climatic changes. This summer, most European countries and the US have recorded extreme temperatures (40 degrees centigrade) of which were previously unheard. This, in turn, has taken a heavy toll on human lives.

### The culprits

Shrimp cultivation, logging, agriculture in forested areas, and insecticide-use are some of the major causes of forest destruction in bio-rich areas. In Bangladesh about 12,000 acres of the Chittagong

coastal region that include Parabon, a man-made forest in offshore Sonadia and Ghalibhanga, have been encroached upon by ruling party men to create enclosures for shrimp cultivation. Shrimp cultivation has been known to increase water salinity, inhibiting growth of trees that depend on fresh water, such as mangroves. In the coastal waters surrounding the Sunderbans, a section of greedy fishermen use insecticides in the water area to amass bigger catches, which indirectly and adversely affects the growth of forest resources, including plants and animals. Forest areas that include innumerable channels are twice daily submerged by the polluted sea during high tide. In Peru, forests are being cleared to grow coca for cocaine production.

In Brazil, farmers and cattle ranchers engage in an annual rite of destruction: clearing land for crops and livestock by burning the rain forests of the Amazon. An estimated 12,350 square miles of Brazilian rain forest -- an area larger than Belgium -- has been reduced to ashes as a result. Similarly, in Bangladesh, the direct assault by humans on forest resources goes unabated. Landless farmers in Shyamnagar, Kaliganj and Assasuni Upazilla of Sathkira district encroach forest lands and its resources to earn their living. Hill forests in the Chittagong region and other forest areas in different parts of Bangladesh are logged to build housing for the country's exploding population.

The vast region of unbroken green that surrounds the Amazon river and its tributaries in the other part of the world or the coastal land surrounding the Sunderbans and the Rangamati forest areas of have been under assault by settlers and developers. True, time and again forests have defied the prediction that they were doomed. But the dangers are now real and imminent as loggers level trees, dams flood vast areas and shrimp cultivation in coastal lands claims land under forest cover.

The Bangladesh part of the Sunderbans spans about 6000 square kilometers, including a water area of about 1700 square kilometers. There is hardly a doubt in the researcher's claim that here might be hidden a variety of life forms that are yet to be catalogued. Researchers rarely brave trips to the densely-packed forest areas, teeming with wildlife, in absence of a suitable and safe river transport system in the interior forest lands. Yet loggers are reaching these parts, cutting down trees, destroying the very resources that support human life. Consequently, the forest area and the life forms that depend on them are disappearing at a faster rate than ever before. Most settlers find that the lush promise of the Amazon or the Sunderbans or the forest lands of Chittagong is fast becoming an illusion.

### Too little too late

After years of inattention, the whole world has awakened at last to the magnitude of what is at stake in the regions like Amazon in Brazil,

Indonesia, India or the Sunderbans and hill forests in Bangladesh.

Happily, scientists, environmentalists, print and electronic media persons have journeyed to the endangered areas to marvel and despair at the immolation of these forest resources. These committed groups have become the front lines in the battle to rescue the earth's endangered environment from humanity's destructive ways. "Save the forest" -- long a rallying cry for conservationists -- is now being heard from politicians to film stars. Sadly, the movement has sparked a confrontation between rich industrial nations, which are fresh converts to the environmental cause, and the poor nations of the Third World, which view outside interference as an assault on their sovereignty, creating a stalemate situation in biologically diverse and forest-rich regions of the world.

We can ill-afford to wait for this situation to lift. The destruction of rain forest in the Amazon or the mangrove forest in the Sunderbans portends an incalculable disaster for all of us on planet Earth. Most tropical and mangrove forests are distinguished by their canopies of interlocking leaves and branches that shelter creatures below from sun and wind and their incredible variety of animal and plant life. If the forests perish, so will more than 1 million species, a significant part of the earth's biological diversity and genetic heritage.

Researchers estimate if the current rate of habitat destruction were to continue in forests and coral reefs, half the species of plants and animals would be gone by the end of the 21st century. Our descendants would inherit a biologically impoverished and homogenized world. Not only would there be many fewer life forms, but also faunas and floras would look much the same over large parts of the world, with disaster species such as fire ants and house mice widely spreading. Humanity would then have to wait millions of years for natural evolution to replace what was lost in a single century. Then again, climate change may have already extinguished the very resources on which human life depend.

Md Asadullah Khan is a former teacher of physics and Controller of Examination, BUET.

## To save Dhaka wetlands

ENGR. M. INAMUL HAQUE

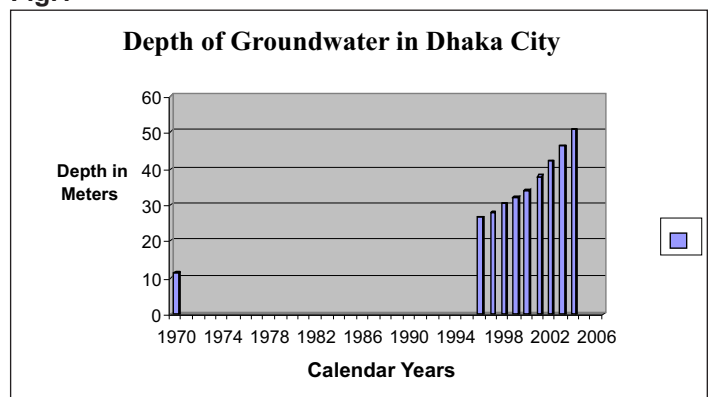
DHAKA City is located between latitudes 23040¢ and 23054¢ and longitudes 90020¢ and 90031¢ having total area of about 304.38 sq km. The city is bounded by the Balu and Sitalakhya rivers on the east, Tongi Khal on the north, Turag and Buriganga rivers on the west and Narayanganj district on the south. It lies at the southernmost tip of the Madhupur Tract, the central highlands of Bangladesh. Dhanmondi, Mirpur, Cantonment, Gulshan and Badda areas lie in this tract where many salban forests existed in the near past. In old days the Ganga and the Brahmaputra rivers met south of this city to form a combined flow towards the Bay of Bengal. Later the Brahmaputra shifted towards east and the Ganga changed its main course to other distributaries. Thus they left vast floodplains and lowlands to the east, west and south of the city.

The floodplains to the west and east of the city have ground elevations 2 to 3 meters above mean sea level. Numerous beels, khals and creeks criss-crossed this land serving drainage and providing home for fishes and other aquatic animals. But in recent times, these lowlands are increasingly being filled up for housings, industries and commercial districts. The Dhaka industries are major polluters of the rivers and wetlands in and around the city, both by emissions and effluents. The industries at Tezgaon, Hazaribag, Tongi and Shyampur being located adjacent to the city centre are causing major harm to its environment. Information received from the Department of Environment reveal, tannery, cement, pulp, paper, sugar, textiles, food processing, engineering and chemical industries as well as fertilizer and pesticide factories are mostly responsible for this pollution. Presently the Dhaka WASA treats only 10 percent of the waste, the rest spills into the rivers through different channels.

At the Consultancy Workshop on 'Dhaka City State of Environment' organised jointly by Dept. of Environment and Centre for Advanced Studies on 23 December 2004, it was revealed that, the Dhaka City groundwater level in 1970s was 11.3m, in 1996 26.6m, in 1997 28.15m, in 1998 30.45m, in 1999 31.85m, in 2000 34.18m, in 2001 37.78m, in 2002 42m, in 2003 46.24m and in 2004 50.60m average below the surface. (see Fig 1)

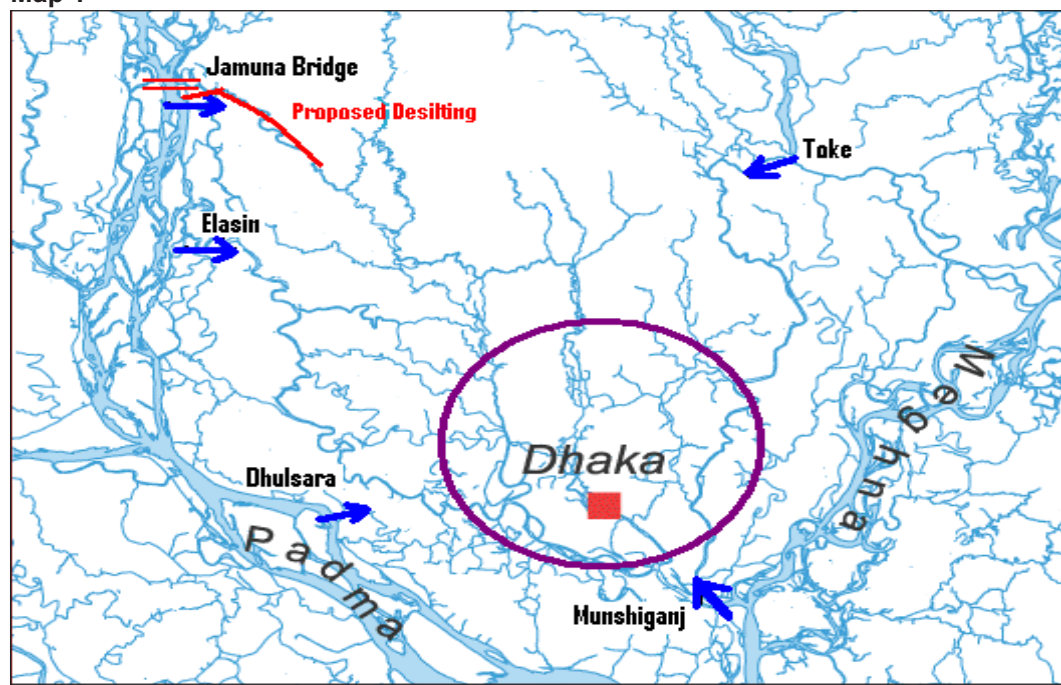
Against this backdrop, I shall discuss a project taken up by the Bangladesh Water Development Board titled 'Augmentation of Buriganga Flow by Restoring Silted Up Links with Jamuna'. This project if implemented can bring additional flow in Buriganga during dry season. This shall reduce water quality deterioration in and around Dhaka, improve navigation and recreation, help groundwater recharge and check the wetlands from being dried up. But how much feasible is this project? Can this project be implemented? If implemented, can this project bring benefit for a single year?

Fig.1



The dynamics of river morphology is such that if a silt carrying river does not get sufficient flow round the year, the silt deposited in the bed during falling floods cannot be removed totally by the monsoon flow in the following year. The flows of Old Brahmaputra, Dhaleswari and Gorai rivers are getting reduced every year leading to net deposit of silt at their off takes, and remain cut off from their feeders during low flows. Removal of silt from the off take of Gorai was thought to be the right step but there was no space for disposal of the silt.

Map 1



then flows south, southwest to become the Kaliganga river near Manikganj and then again the Dhaleswari near Munshiganj. The feasibility of this project is primarily based on the fact that the Pungli has the only surface water flow that comes down over to Dhaka City through the Turag river. If augmented, the water can be distributed to the Buriganga river and Tongi Khal by gravitation flow. There are other four locations around Dhaka City where from augmentation to the rivers of Dhaka City can be contemplated. These are the Dhaleswari from Elashin, the Padma from Dhulsara, the Dhaleswari from Munshiganj and the Sitalakhya from Toke. But all these flows either bypasses the Dhaka City or need to be back lifted to reach this City (see Map1).

But my question is, can this BWDB project be implemented? We had a similar project a few years back for augmentation of the Gorai river flow by clearing up silt from its off take, upto a considerable length. This project at the cost of around 350 crore taka was implemented in two consecutive years by dredgers, but resulted in total failure. Not only that, this project had a far reaching negative effect. If one travels over the Gorai Bridge 7 km east of

Magura, he can observe that the river has shrunk, no erosion on either side, but encroachment of green fields towards the midline of the river. Why it happened?

The dynamics of river morphology is such that if a silt carrying river does not get sufficient flow round the year, the silt deposited in the bed during falling floods cannot be removed totally by the monsoon flow in the following year. The flows of Old Brahmaputra, Dhaleswari and Gorai rivers are getting reduced every year leading to net deposit of silt at their off takes, and remain cut off from their feeders during low flows.

Removal of silt from the off take of Gorai was thought to be the right step in the project but there was no space for disposal of the silt. People along the banks of Gorai were not ready to accept sand filling over their croplands to the loss of fertile topsoil. So, the dredged soil was deposited along the slopes of the river. This reduced the top width of the river immediately from its off take and changed the river morphology. This step could bring early inflow through this river in next monsoon, but silting did occur again in the next falling flood. It was suggested that the same amount of dredging be done every year to get

the benefit. The project lasted for two years with similar dredging in the following year, but stopped in the third year for want of fund.

The result of Gorai dredging was disastrous. I can anticipate similar disaster in case of Pungli river dredging if done at its off take. I see no scope of the excavated sand to be deposited on the adjacent croplands. So, they have to be laid on the river slopes (Fig. 2 & 3). The Pungli is a narrow river compared to the Gorai river. One can imagine what it shall look like when 15 feet soil shall be excavated from the centre of the river and deposited on the slopes. This excavation shall not bring benefit immediately as it happened for Gorai river, where the Ganga river thalweg was very nearby. For Pungli river, further excavation of 1 km of Dhaleswari off take and not less than 5 km of Jamuna river shall be needed to link the perennial flow. And again this same quantity of excavation shall have to be repeated every year. If not, the river shall be filled up with silt in the falling flood resulting in a disaster (see Fig 4).

Augmentation in silt carrying rivers without putting a diversion structure over the mother river is a hopeless concept. The Canal Digging Programme started in the late seventies to link dead khals with perennial source was successful only where the rivers were not carrying silt. The silt carrying rivers filled up the excavated canals very soon and there the attempts failed eventually. In those cases barrage could divert the water flow to the desired direction even in low flows. So, diversion of water through Pungli river can only be possible if a barrage is put on the Jamuna river just downstream of the Dhaleswari off take.

It is contemplated that some sort of structural measures shall be taken at the Dhaleswari river off take to attract the flow towards the Pungli river round the year. One must keep in mind that the Jamuna river has average 6 km bed width at this point and its thalweg does not lie adjacent to the Dhaleswari off take. Any structural measure either in the form of establishing hard points or putting bottom vanes can have very much local effects only. It shall have no effect on the total behaviour of the river. The effect of such structures can be visualised in physical mod-

els. A mathematical model to understand this effect shall be misleading. But a physical model in this case cannot also give a sustainable solution unless the structural measure is supported by a diversion structure over the Jamuna river.

With the above discussion we may arrive at a hopeless position to save our wetlands in and around Dhaka City. I understand closing our eyes on the perpetrators who defy laws by discharging untreated waste from their factories, encroach and grab public lands cannot lead us anywhere. It will be foolish to wait for a heavenly solution. But we must take some stringent measures to stop those perpetrators.

1. Clear up all encroachments from the public khals and canals in and around Dhaka City. Stop all sorts of leasing process of public lands including the wetlands. Ban filling fertile top soils by carried sand. Direct the housing companies to excavate a pond in their project and fill the project area by its spoil. This shall create space for recreation and improve the environment.

Fig.2

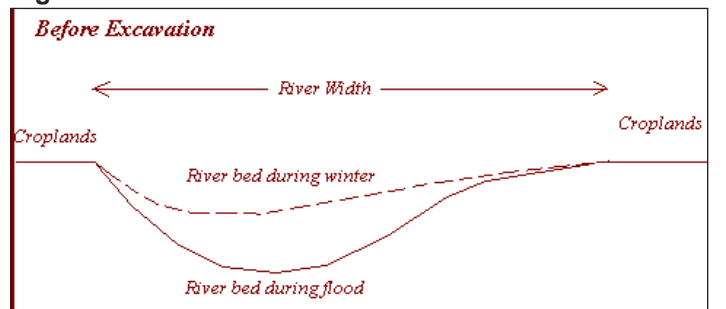


Fig.3

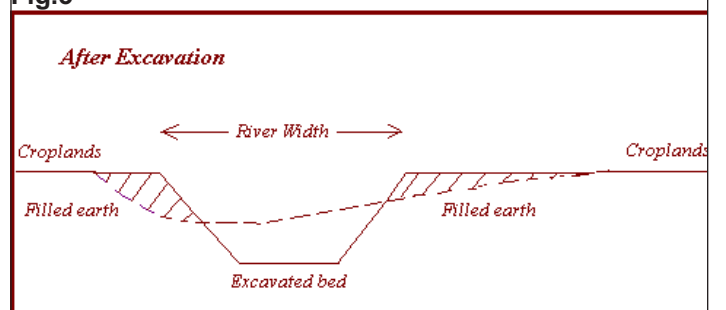
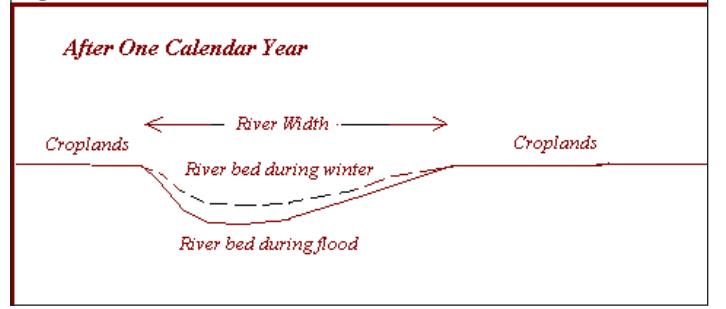


Fig.4



Dhaka City. The source should be the Turag and Sitalakhya rivers. Build 4 more water treatment plants at Narayanganj, Badda, Uttara and Mirpur.

3. Punish the perpetrators who discharge untreated waste from their industries in public khals. Recover the public khals from unauthorised encroachments. Build 6 more sewage treatment plants at Narayanganj, Demra, Badda, Uttara, Mirpur and Mohammadpur.

4. Demarcate the wetlands needed to maintain a healthy environment for the public in and around Dhaka City. Maintain these wetlands as done for the Dhanmondi Lake. Plant babla, neem, shal, shishu and other trees along edges of embankments and roads. Plant jam, tal, kadel, kul, kanthal, chaika, gabi, jalpai, dewa, khejur, narail, supari and other trees along the slopes of embankments and roads.

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