

## Dhanmondi Lake: Environmental restoration is imperative

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CONSTRUCTED in the sixties, Dhanmondi Lake became part of Dhaka's history. Lakes and open spaces are a vital part of a modern healthy city. Over the past few decades, as Dhaka started to grow into a megacity, we began to realize how important it is to have parks, natural wetland, lakes, and open spaces.

However, our lack of knowledge about environmental management and indifferent attitude towards protection of the environment have turned this once beautiful water body into a sink of pollution, receiving numerous unauthorized sewage outlets, surface run-off, urban drainage discharges and even solid waste from various sources. These practices have caused enormous harm to the lake's environment and its subsequent degradation in many ways.

It is however an encouraging development that the government now realizes that restoration and preservation of the Dhanmondi Lake and other natural water body are an important task in achieving environmentally sustainable development for greater Dhaka as well as for the whole country.

The general objective for all water management is to make sure

that all waters are free from contaminating levels of substances and materials mainly as a result of direct or indirect human activities of various types. These activities by themselves or in combination with other factors form objectionable deposits, colour, odour, taste or turbidity. This may cause toxic effects to humans, animals, or plants, or can produce or enhance undesirable aquatic life, thereby hampering/degrading intended function of the water body.

### Lake -- a living body (lake ecosystem)

Lakes are either natural or artificial wetland of usually standing or slow-moving water body. For shallow water bodies rooted plants can grow over most of the bottoms. Energy source of a lake ecosystem is sun light. Within the lake, ecosystem different community of biological species are distributed throughout the depth. Relatively small portion of water is in contact with the air and decomposition takes place on the bottom. Variation of oxygen level with depth, light, temperature, water quality such as turbidity, hardness, mineral content, acidity etc., profoundly influence life in the lake, its distribution, and adaptation.

The lake's open water is dominated by minute suspended organisms called phytoplankton. These

**Important tasks ahead are the protection, preservation, and sustainability of our limited resources in all sectors to ensure a viable future for the generations to come. It is important that guiding principles have to be developed which will control and implement these principles with regard to ecosystem watershed management and pollution control to create and achieve a balance between use and regeneration, or in other words, long term sustainability.**



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### Part of Dhanmondi Lake

tiny plants absorb sunlight and carry out photosynthesis to produce food. They are the producers and base upon which other life forms depend. From the phytoplankton (such as algae) energy moves to other life forms the consumers. Balance between the producers and consumers --indicating how freely this energy moves between different levels in turn determines the lake's ecosystem.

Environmental deterioration of the lake can be caused by many different reasons. For example, when sewage is discharged into a lake or other water body, it changes biological activities in the lake water by changing turbidity, temperature, soluble dissolved oxygen content, nutrient like nitrogen, phosphorus, and other minerals. Lack of dissolved oxygen causes anaerobic decomposition especially at the bottom layer accompanied by the production of gases like ammonia and hydrogen sulfide. De-oxygenation kills fish. In addition to sewage discharges, urban surface run-off and storm water discharges carry toxic materials, suspended particles which ultimately settle at the bottom of the lake.

Over the years, as the concentration of these chemicals start to build up and exceed certain limits, the water quality of the lake begins to deteriorate -- so is the intended use of the lake or the water body. One such phenomenon is known as eutrophication or offensive bloom of plants in the lake water which is associated with enrichment of lake water by phosphate. Unlike other two nutrients, nitrate and potassium (essential for the growth of plants), which leave lake water in various ways, phosphate which comes in on soil particle and dead leaves, etc., remains in the lake. It is readily taken up by bacteria and plants and become bound to mud in presence of oxygen. When the oxygen content of mud-water interface reaches to a critical point, large amount of locked-in phosphate releases into the water and give rise to sudden bloom of aquatic plants. The plants ultimately cover the lake surface blocking penetration of sunlight to the layer below and thereby hamper photosynthesis. The algae die and settle at the bottom. Accumulation of the organic materials creates depletion of oxygen at the lake bottom

and the cycle goes on and on.

### Remedial actions

There are various remedial actions that can be undertaken for restoration of the lake. However, magnitude of the problem will determine scale of the remedial actions. Some of these can be done locally and some will probably need international expertise. In general, remedial actions will involve identifying causes, and setting short and long-term tasks for restoration and preservation of the lake's ecosystem. The short term tasks will possibly be:

Prevent or reduce processes which degrade or pollute lake water quality (storm water flow, sanitary water flow, stock piling of construction debris and solid wastes, unauthorized construction works in the vicinity of lake area, etc.);

Protect regeneration capacity of the lake ecosystem; and

Prevent developments that are directly or indirectly detrimental to lake ecosystem.

The long term tasks will address a broad range of issues by preparing a vision for environmentally sustainable development of all natural or created systems as a whole. Within the context of the Dhanmondi Lake that will

include the following tasks:

- 1) Prepare biological mapping of the lake ecosystem along with all physical characteristics of the lake, like shape, depth of water and water samples, dissolved oxygen distribution, temperature profile, fish life, major zones of vegetation, depth of light penetration, etc;
- 2) Periodic chemical analysis of water and sediment;
- 3) Fish tissue residue criteria for human consumption;
- 4) Defining lake's hydraulic regime;
- 5) Create and maintain existing buffer zones between the lake and other public amenities;
- 6) Creating monitoring and maintenance cell; and
- 7) Creating public awareness.

### Economic sustainability

Resource constraint remains a major obstacle in materializing a comprehensive and planned restoration work of Dhanmondi lake especially at a moment when the government is in severe shortage of funds. It should be understood that in a country like Bangladesh, government by itself does not have the ability to bear

expenses of a project of purely environmental nature. Therefore, creation of fund for the projects will be a priority from sources beyond what is available currently.

In many instances, ensuring stakeholder participation resolves such problems. However, this will probably require political as well as policy decisions. The political issue will involve opinion building by arranging public forums with participation of stakeholders while policy decision will create a vision for self-supporting/self-reliant project proposal. For example, imposing development surcharges on residences and business establishments in Dhanmondi- Lalmatia area, surcharges on recreational activities such as boating, fishing etc., can be possible means to create a development fund which can ensure:

- 1) Sustainable development of the lake;
- 2) Create employment with regard to monitoring and maintenance;
- 3) Periodic water quality testing and biological inventory;
- 4) Future correctional activities; and
- 5) Support educational and research programs in collaboration with educational institutions (creating future generation of experts).

### Conclusion: ecosystem management

In conclusion, a few words can be spoken on ecosystem management.

The ecosystem management is the basis for environmental management. It views the surroundings around us (the land, water, and air) as a chain of interactions between different producers and users, and their interdependence. The cumulative effects of all these interactions will ultimately define the environment, the economy, and the society. Within the context of water resources management, the ecosystem management includes the physical, chemical, and biological compounds, and their inter-relationships.

For any resource, balance between use and regeneration defines its long-term sustainability. Important tasks ahead are the protection, preservation, and sustainability of our limited resources in all sectors to ensure a viable future for the generations to come. It is important that guiding principles have to be developed which will control and implement these principles with regard to ecosystem watershed management and pollution control to create and achieve a balance between use and regeneration, or in other words, long term sustainability.

The author is a freelance contributor to The Daily Star.

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