

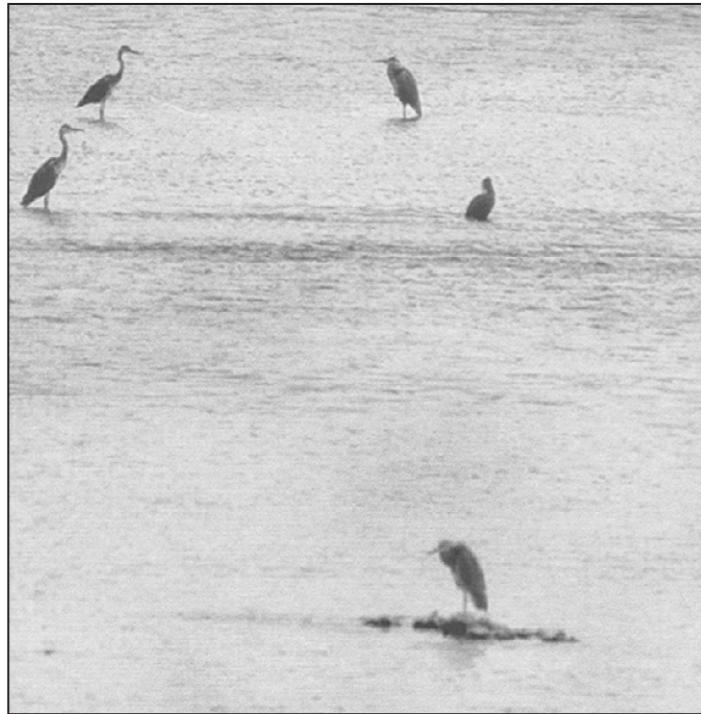
## Value of wetlands Bangladesh perspective

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ALL over the world, the wetland ecosystems carrying out a great role in the conservation of biodiversity and sustenance of ecological balance in the concerned regions of our biosphere. Specially in the tropics, the wetlands are eco-environmentally very important for this maintenance of floral and faunal equilibrium in the aquatic-terrestrial habitats. Before going to discuss about the 'values of wetlands', I like to say a little about what is meant by wetland & where from in definition of wetlands appeared to us. The term 'wetlands' groups together a wide range of inland, coastal and marine habitats which share a number of common features. The RAMSAR Convention defines wetlands as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or

salt, including areas of marine water the depth of which at low tide does not exceed six metres". According to Jordan (1995) 'wetlands are coastal and inland ecosystems characterized by daily, seasonal and long-term fluctuations in water levels'. United States Fish and Wildlife Services has defined wetlands as: *lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have one or more of the following attributes: 1. at least periodically, the land supports predominantly hydrophytes (aquatic vegetation), 2. the substrate is predominantly undrained hydric soil, and 3. the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of the year.* The United States Army Corps of Engineers and the U.S. Environmental

Bangladesh is delta of the Himalayas, and there the entire country is like a natural laboratory. Most of the rivers originated from the Himalayas have passed through the land of Bangladesh and reached to the Bay of Bengal. More or less, almost 75% land area of the country remain under water for three months after monsoon. And because of the reason, the land fertility (in natural way) is so high in this area of the sub continent. In the same way, the underground water level remain high and in such a situation that easy availability of the under ground water could be made for various purpose.



Herons (*Ardea cinerica*) are seen in the wetlands of the river Loire in France near the city of Orleans

Protection Agency use a more restricted legal definition of wetlands in their regulations covering degree and fill permits under Section 404 of the Clean Water Act. The term *wetlands* means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and that do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. Wetlands are ecosystems that constantly contain surface water and are regularly flooded. They cover about 6 percent of the Earth's land surface, which is just a little less than the tropical rainforests, and contribute about 24 percent of the world's primary biological productivity. Wetlands are located at every major climatic zone and include mangrove swamps, peat bogs, marshes and fens.

There might be some other definition of wetlands at the individual level of the various authors and nature lovers. But the definition given by the RAMSAR Convention is the most accepted one. So, I shall say few words here on the RAMSAR Convention. RAMSAR convention (Ramsar sites) is concerned with *Wetlands of International Importance*. The RAMSAR convention was signed in Ramsar (Iran) in 1971, and came into force in December 1975. This convention provides a frame work for international cooperation for conservation of wetland habitats. The RAMSAR convention was established to halt the continued destruction of wetlands. Particularly those which support migratory waterfowl and to recognize the ecological, scientific, economic cultivation and recreational values of wetlands (Kusler and Kentula, 1990; Halls, 1996). The convention places general obligations on contracting party states relating to the conservation of wetlands throughout their territories with special obligations pertaining to those *Wetlands of International Importance*. The Ramsar convention covers fresh water, estuarine, and coastal marine habitats and includes more than 844 sites with a total area of more than 54 million ha. Up to 1998, the 94 countries that have signed the RAMSAR convention agree to conserve and protect their wetland resources and designate for conservation purposes at least one wetland site of international significance. Each state party is obliged to list at least one site. A widely cited definition of wetlands is found in RAMSAR convention. Wetlands are defined by the convention as: areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine waters, the depth of which at low tide does not exceed six metres.

The values of wetlands in ecology and wetland as an ecosystem are of manifolds, very few of these are presented here on the special emphasis of Bangladesh wetlands biodiversity. Wetlands serve a wide variety of functions, including flood control, water purification, shoreline stabilisation and the control of erosion. They also support vast numbers of fish and other wildlife and numerous people depend on them for their livelihood. Wetlands support comparatively larger segments of human population than any other ecosystem. Agriculture started in the floodplains where rivers sustained some of the earliest settlements. The extensive rice fields have for centuries supported the world's most densely populated communities in the coastal plains,

estuaries and riparian lands. As most of the wetlands are flood prone, the agricultural calendar in these areas is adjusted to minimize damage. The rapid growth of population has accelerated the process of settlement in previously unproductive lands. At the early stages of settlement, fishing and cultivation of deepwater broadcast *aman* were the main activities of the wetland people. Along with the beginning of domestication of cattle, the floodplains provided the grazing ground for the livestock. Aquatic plants have been harvested for consumption as food for man and cattle. Fishing activities started to sustain communities from time immemorial.

Settlements along the rivers follow the natural levees normally above the flood level. Rivers, on account of their importance as a source of livelihood, irrigation and means of communication, act as a force influencing a linear form of settlement. Other wetland areas like *haors*, *baors* and *beels*, where water remains almost all the year round, have confinement effect on the rural settlements resulting in densely populated clusters. The wetland environment has united the inhabitants into a coherent society, culture and life pattern and made them self-reliant with subsistence-oriented economy. There, common properly system prevails so that harvesting the common resources round the year is the major source of income, nutrition and livelihood. In the deeply flooded areas like the *haor* basin, the human settlements are built on *kanda*, a high terrace land which remains above water during the monsoon when the homesteads are overcrowded as all activities are concentrated within this limited space. There are no fences between homes and the community feeling among individuals is, therefore, relatively strong. When the community home areas are threatened with erosion due to strong summer winds, powerful wave action and shifting rivers, their protection is a united responsibility of all the inhabitants who react by placing structures made of bamboo, soil, reeds and water hyacinth. In Bangladesh, inhabitants are naturally habituated and adapted to live with water and in water retaining ecosystems. They are well known about the style of daily life and social activities on the basis of utilization of natural bioresources grown in or near the wetlands and wetland ecosystems.

There is a continued strong local demand for wetland resources and their market values remain relatively high. The increasing harvesting pressure on fisheries has already pushed the systems beyond sustainable levels resulting in the decline of overall production. Increasing international demand has resulted in bringing many species to the brink of extinction and some have been decimated. Examples are turtles and frogs which are used as food, and snakes and lizards which are killed for their skins. Optimization of the wetland benefits and improvement of their management is possible only if the resource use and management control rest with the local communities so that the benefits go mostly to poor rural residents. To overall stewardship should be developed to local community groups. The continued loss of wetland areas is leading to depletion of biodiversity and is displacing the wetland-based socio-economic activities. In Bangladesh, six wetlands are seriously threatened. They are within the 93 wetlands of the most seriously threatened wetlands in Asian. These wetlands are: (1) Chalan Beel; (2) Haor Basin of Sylhet and Eastern



Pneumatophors of the characteristic mangrove plants are the natural protective barriers in the forest of Sunderban wetland

Mymensingh; (3) Dubriar Haor; (4) The Sundarbans; (5) Wetlands in Pabla Khali Wildlife Sanctuary; and (6) Chokoria Sundarbans. How these six and other non-declared wetlands are seriously affected, we are not talking this in to the consideration of today's discussion. This will be briefed next week under the heading of 'wetland conservation'.

All wetlands are subject to sedimentation composed of clay soils rich in organic matter, and the vast flooded areas of wetland are covered by crops which can tolerate waterlogging and inundation. Before the introduction of mechanized dry-season irrigation in the sixties, deepwater rice or broadcast *aman* rice (floating rice) used to be the major crop in the wetlands during the rains. This crop was sometimes mixed with short duration *aus* rice to be harvested in June allowing broadcast *aman* and *aus*. At one time, undivided Bengal had about 15,000 varieties of cultivated rice but the germplasm of most of them is lost leaving only about 6,000. Another major crop of wetlands is jute, the fibre of which is in considerable national and international demand. Wheat, rape seed, potato, tobacco, water melon, cucumber and pumpkins are also grown. However, early heavy rains may cause considerable damage to these crops due to waterlogging. Homesteads are the major areas where fruits like papaya, banana, pineapple, guava and various vegetables like sweet potato, yams and taro are cultivated. Crop diversification has, however, been limited due to absence of quick communication and consequently these crops have remained limited to local consumption. During winter, the *haor* basin is planted with *boro* paddy. As the rich and influential persons are bringing more and more land under cultivation, the community lands (*kandas*) are diminishing alarmingly resulting in extensive deforestation and impoverishment of the vegetation in this region. Many top carnivores are seriously affected in our country to maintain their population even at the level of their survivals. They are seriously threatened because their previous trophic levels are significantly broken down due to the diminishing high rate of wetlands in the country. The vultures could be taken as an example for the situation appeared in the country. These animals feed on the other animals available in an ecosystem as primary and secondary consumers. These primary and secondary consumers are the previous trophic levels and most of them are aquatic and semi aquatic in nature, means that they are the inhabitants in wetlands. In this consideration, wetlands do not maintain only aquatic ecosystem in balance but also the aquatic - terrestrial ecosystem in situ and sound condition.

Among the prime uses of wetlands, fisheries are the most significant providing nutrition, income and employment to millions. Inland fisheries alone cover an area of 4.3 million ha of which 94% comprise openwater capture fisheries, and only 6% closed water systems. The *haors*, *beels* and *baors* offer tremendous scope and potential for augmenting fish production by adoption of culture based fishery enhancement techniques. About 260 species of freshwater fish water fish exist in the wetlands of Bangladesh. But largescale water abstraction for irrigation, embankments, siltation, soil erosion, pollution and overexploitation have left a trail of devastating effects on fish stocks. Displacement by introduced species and disease have further contributed to the losses. Regulators built across the canals are a

major impediment to fish migration during the early monsoon breeding season resulting in the reduction in spawn and consequent fish decrease. Apart from a steady decline in total catch, there is an alarming downward swing in the catches of Gangetic carps. Existing records reveal a similar situation in marine which reached a level of stagnation.

In Bangladesh, the monsoon months are suitable for openwater fishing, but income from fishing generally increases during September to November when calm and clear water renders fish less mobile and thus an easy catch. The environmental study of the Flood Action Plan conducted in the Surma-Kushiyara area of the greater Sylhet district in 1992 revealed that in recent years there has been a consistent decline in inland capture fisheries. This was due to emergence of agriculture as a dominant sector of the economy due to preponderance of landless rural households with little access to other productive employments in the area. The *haors* are considered as the prime source of freshwater fish in Bangladesh. *Beels*, which retain water throughout the year, are the most resourceful as they form an ideal habitat for a wide variety of fish. As *beels* are *khas* (government-owned property) they are leased out to the highest bidders on

a term basis. These leased waterbodies representing a single beel or a group of *beels* are known as *jalmahals* which are a constant source of conflict pitting the lease holders against the residents who feel they should have an equal access to the natural open resources. The *jalmahal* fishing is traditionally done in winter months, usually in every third year; the rest of the time these are protected by employed guards against fishing by other *Beels* which were harvested in the past only once in every three years are now being harvested every year. Most of the lease holders have influential and administrative linkage and political patronage to appropriate fish resources and to become powerful in the areas by preventing subsistence fishermen from catching fish even during monsoon when the *haor* is flooded. Cases of harassment and intimidation are usually resolved by force, not by law.

The vast majority of the poor in the wetlands are dependent on water resources for their sustenance. The rootstocks of *ghechu* (*Aponogeton* spp.), *taro* or *kachu*, Indian lotus and waterlilies are rich in starch. The last two plants also provide leaf and flower stalks and seeds, especially during stress conditions of inland flooding. The seeds of *makhna* (*Euryale feros*) are also relished. Two wild species

of rice, *dhane* (*Oryza coarctata*) of brackish water and *jhora dhan* (*Oryza rufipogon*) of fresh waterbodies, are used as substitute for cultivated rice. *Paniphal* (*Trapa bispinosa* and *T. maximowiczii*) are plentifully available in larger waterbodies and provide nutritious starchy kernels. A number of other aquatic herbs are consumed as leafy greens. *Ghechu* is cultivated after the harvest of *boro* in low-lying areas of Kishoreganj and Itna where the tubers reach is size of about 1.5 cm in diameter and are harvested in October and November as the floods recede. The *ghechu* tubers yield milky white flour having nutritive value like potatoes. As the tubers are not damaged in flood waters, *ghechu* forms one of the most important famine foods. Wetlands provide a wide variety of medicinal resources. a number of species of *Polygonum* locally known as *bishkatali* or *kukra* are effective antibacterial agents. The flowers and seeds of *paddo* (Indian lotus) are prescribed for piles, as a cardiac tonic and for elimination of ringworm. The flowers of waterlilies are reputed as a remedy for heart ailments. Bangladesh is delta of the Himalayas, and there the entire country is like a natural laboratory. Most of the rivers originated from the Himalayas have passed through the land of Bangladesh and reached to the Bay of Bengal. More or less, almost 75% land area of the country remain under water for three months after monsoon. And because of the reason, the land fertility (in natural way) is so high in this area of the sub continent. In the same way, the underground water level remain high and in such a situation that easy availability of the under ground water could be made for various purpose. In the present days, the 'Arsenic Problem' has appeared to the nation as a great menace. This problem is not underground problem in the eye of ecologists. It is the surface water problem. If the water reservoirs and sufficient wetlands are maintained all over the land area of Bangladesh, the underground water level will remain high and then arsenic problem definitely will be under human control. Importance of wetlands and maintenance of wetlands in Bangladesh are essential not only for human inhabitants but also for sustaining natural balance in the country.

Note: The popular article is written on the basis of derivatives of the research works carried out by a team of researchers working in the "Environmental Biology and Biodiversity Lab" of Zoology Department, University of Dhaka. The researchers have been working in this line since 1998.

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