

Vol 2 / Issue 2 / April-June 2011

Chronicles of Young Scientists



Strategy and scenario for wetland conservation in India

Abstract

Wetlands are the most important ecosystems for the organisms in Animal Kingdom (including human beings) and Plant Kingdom. There are about hundred species of flora in and around Indian Wetlands. They include *Sagittaria montivindensis*, *Cryptocoryne ciliata*, *Cyperus* spp., *Acrostichum aureum*, *Ipomoea aquatica*, etc. They are also the habitats of several mammals like the marsh mongoose, small Indian mongoose, palm civet and the small Indian civet. Endangered species like the Indian mud turtle have also been found in the wetlands. Certain species of birds also visit the wetlands. Prominent ones are grebe, coot, darter, shag, cormorant, teals, egrets, jacanas, snipes, tern, eagle, sand piper, gulls, rails and kingfishers. The wetlands are important for production of foods and human safety. The East Kolkata wetlands with their garbage farms and fishponds have provided the city with three facilities, i.e., food, sanitation and livelihood. They also provide ecological security to the city of Kolkata. Over the past few years, wetlands have come under severe threat. With the population explosion, some of the largest fish farms have been converted from pisciculture to paddy cultivation. Industries also empty their wastewater effluent without treatment to the channels flowing eastward and these ultimately land up in the wetlands. This has caused substantial amount of deposits of metal in the canal sludge and made the wastewater incapable for the consumption by the fishes and the plants grown in the wetland. Nevertheless, due to urbanization or human interference, the wetland and its unique ecosystem biodiversity are in danger. After Ramsar Convention, 1971, different acts have been passed in India for conservation of wetlands, along with conducting general awareness program for the local people by the government, conducting different programs, management of wetlands, and research by the government, NGOs and other institutions.

Key words:

Biodiversity hotspots, East Kolkata wetlands, management of wetlands, problems of wetlands, wetlands in India, wetland conservation

Introduction

Wetlands, often known as biodiversity “hotspots”^[1] as well as pollution filters from both point and non-point sources, are being important for carbon sequestration and emissions.^[2] The value of the world’s wetlands is increasingly receiving due attention as they contribute to a healthy environment in many ways. Wetlands are also important storehouses of plant genetic material. Rice, for example, which is a common wetland plant, is the staple diet of more than half of humanity. The government identifies 648,507 hectares as wetland in India and it is estimated that freshwater wetlands alone support 20% of the known range of biodiversity in India.^[3]

The multiple roles of wetland ecosystems and their value to humanity have been increasingly understood and documented in recent years. This has led to larger expenditures to restore lost or degraded hydro-biological and biological functions of wetlands. But it is not enough – the race is on to improve practices on a significant global scale as the world leaders try to cope with the accelerating water crisis and the effects of climate change and this at a time when the world’s population is likely to increase by a million every year for the next 20 years.

Wetlands are among the world’s most productive environments. They are cradles of biological diversity,

Access this article online	
Website: http://www.cysonline.org	Quick Response Code 
DOI: 10.4103/2229-5186.82976	

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providing water and primary productivity upon which countless species of plants and animals depend for survival. They support large numbers of birds, mammals, reptiles, amphibian, fish, and invertebrate and microorganism species. The ability of wetlands to adapt to changing conditions, and to accelerating rates of change, is crucial to human communities and wildlife everywhere as the full impact of climate change on our ecosystem lifelines is felt and there is a worldwide focus on wetlands and their services to us.

In addition, wetlands are important, and sometimes essential, for the health, welfare and safety of people who live in or around. They are amongst the world's most productive environments and provide a wide array of benefits.^[4]

2nd February of every year is observed as World Wetlands Day. It marks the date of the signing of the Convention on Wetland in 1971 in the Iranian city of Ramsar on the shores of the Caspian Sea. Therefore, this convention came to be known as the Ramsar Convention, 1971. Ramsar Convention on Wetlands, an intergovernmental treaty, deals with conservation aspects of inland waters and the near shore coastal areas.

Co-existence of variety of micro- and macro-habitats of the food chain, including phytoplankton, zooplankton, aquatic plants, insects, fish, birds, mammals and others, in a particular ecosystem combines to create biodiversity. The North-East region of India is one of the richest spots of ichthyodiversity in the world.^[5]

Problems of Wetlands

The wetlands are environmentally sensitive areas^[6] and the most important for fishery sectors as they provide a major part of the fish production in our country. They also provide the homeland to various organisms including fishes, non-fish aquatic organisms like frogs and other amphibians, snakes and birds. The area of wetlands in our country is reducing day by day with increased population and urbanization. They are reduced and degraded through infilling and inflow of polluted urban, agricultural and industrial wastewaters. Overfishing and overhunting deprives wetlands of many of their functions, such as wildlife habitat, food-chain support, and human recreation.

Destruction of wetland habitat reduces the abundance and biodiversity of wetland-dependent flora and fauna, including exploitable fish and shellfish stocks. The wetland habitats are not only destroyed by the above means, but also destroyed by culturing the wetlands for fish and agro production. Generally, high economical valued fishes are reared and cultivated in wetlands and, due to this, various natives of wetland species of aquatic organisms are destroying. Even in the case of more poorly known wetland fauna, such as

invertebrates, existing assessments show that species in these groups are significantly threatened with extinction. For example, IUCN Red List reports that some 275 species of freshwater crustaceans and 420 freshwater mollusks are globally threatened, although no comprehensive global assessment has been made of all the species in these groups.

Karnataka state has 4.75 lakh hectares of inland waters and about 200 freshwater species recorded from inland water, of which nearly 40 species are considered "threatened" or "extinct", such as *Puntius parrah*, *Puntius pinnauratus*, *Puntius narayani*, *Puntius melanostigma*, *Puntius puckelli* and *Puntius sophore*. Exotic species introduced in these water bodies, either with a purpose or accidentally, can decimate the native species and significantly alter the aquatic food webs. *Oreochromis mossambica* (Tilapia), which has inadvertently entered and dominated most of these lakes like Yennehole Lake and Kuduregundihalla Lake, are prolific breeders and have multiplied fast to the extent of declining the population of indigenous fish species comprising *Puntius*, *Labeo*, *Cirrhinus*, Murrels and Catfishes. Other exotic fish species significantly found in all these wetlands include *Hypophthalmichthys molitrix*, *Cyprinus carpio*, *Oreochromis mossambicus* and *Ctenopharyngodon idella*.^[7]

Wetlands in India support around 2400 species and subspecies of birds. Nevertheless, losses in habitat have threatened the diversity of this ecosystem. Introduction of exotic species like water hyacinth (*Eichornia crassipes*) and salvinia (*Salvinia molesta*) have threatened the wetlands and clogged the waterways, competing with the native vegetation.^[8]

The current loss rate in India can lead to serious consequences, where 74% of the human population is rural^[7] and many of these people are resources dependent. Healthy wetlands are essential in India for sustainable food production and potable water availability for humans and livestock. They are also necessary for the continued existence of India's diverse populations of wildlife and plant species; a large number of endemic species are wetland dependent. Most problems pertaining to India's wetlands are related to human population. India contains 16% of the world's population, and yet constitutes only 2.42% of the Earth's surface. Indian landscape contains fewer natural wetlands. Over time, restoration of these converted wetlands is quite difficult once these sites are occupied for no wetland uses. Hence, the demand for wetland products (e.g. water, fish, wood, fiber, medicinal plants, etc.) increases with increase in population. Wetland loss refers to physical loss in the spatial extent or loss in the wetland function. Loss of 1 km² of wetlands in India will have much greater impact than loss of 1 km² of wetlands in low population areas of abundant wetlands.^[9] The wetland loss in India can be divided into two broad groups, namely, acute and chronic losses. The filling up of wetland areas with soil constitutes acute loss, whereas

the gradual elimination of forest cover with subsequent erosion and sedimentation of the wetlands over many decades is termed as chronic loss.^[10]

Other notable points of wetland destruction are the following.^[11]

- Deforestation and cutting of trees, soil erosion: About 35% of mangroves have been lost over the last two decades, driven primarily by aquaculture development, deforestation, and freshwater diversion
- Habitat destruction leading to loss of fish and decrease in number of migratory birds
- Encroachment resulting in shrinkage of area
- Anthropogenic pressures resulting in habitat destruction and loss of biodiversity
- Uncontrolled dredging resulting in successional changes
- Hydrological intervention resulting in loss of aquifer
- Rapid depletion of ground water
- Use of water in large quantity for agriculture, industrial and domestic purposes
- Cultural siltation and other problems

Conservation and Management of Wetlands

Wetlands are not delineated under any specific administrative jurisdiction. The primary responsibility for the management of these ecosystems is in the hands of the Ministry of Environment and Forests. Although some wetlands have been protected after the formulation of the Wildlife Protection Act, the others are in grave danger of extinction. Effective coordination between the different ministries, energy, fisheries revenue, agriculture, transport and water resources is essential for the protection of these ecosystems.

Protection Laws and Government Initiatives

Wetland conservation in India is indirectly influenced by an array of policy and legislative measures. Some of the key legislations are as follows:

- The Indian Fisheries Act, 1857
- The Indian Forest Act, 1927
- Wildlife Protection Act, 1972
- Water (Prevention and Control of Pollution) Act, 1974
- Territorial Water, Continental Shelf, Exclusive Economic zone and other Marine Zones Act, 1976
- Water (Prevention and Control of Pollution) Act, 1980
- Maritime Zone of India (regulation and fishing by foreign vessels) Act, 1980
- Forest (Conservation) Act, 1980
- Environmental (Protection) Act, 1986
- Coastal Zone Regulation Notification Act, 1991
- Wildlife (protection) Amendment Act, 1991
- National Conservation Strategy and Policy Statement on Environment and Development Act, 1992
- National Policy and Macro level Action Strategy on

Biodiversity Act, 1999

- East Kolkata Wetlands (Conservation and Management) Act, 2006

National wetlands strategy should encompass

- conservation and collaborative management,
- prevention and loss and restoration and
- sustainable management.

These include:

- Protection
- Planning, managing and monitoring
- Legislation
- Comprehensive inventory of all the Indian wetlands
- Coordinated approach
- Research
- Building awareness among the general public, educational and corporate institutions
- Use of remote sensing and Geographic Information System (GIS) in wetland management
- Flood zonation mapping
- Inventory and monitoring of irrigation and cropping pattern
- Water quality analysis and modeling
- Mapping changes in the river course
- Delineation of extinct river course
- Water resource management
- Habitat mapping using remote sensing

Measures must be taken for the following:

- Regeneration of economically less important aquatic organisms (both fish and non-fish organisms)
- Reduction of culture of exotic fish species
- Operation of hatchery for reproduction of less economic fish or other non-fish organisms
- Regular maintenance of the water bodies

East Kolkata Wetland Management Status

After the Ramsar declaration of East Kolkata wetlands as a site, the State Government of West Bengal formed a management Committee under the chairmanship of the Chief Secretary. The objective of the committee is to look after the conservation and management of the wetland. Under the management of the committee, the whole area has been delineated plot wise and the area wise, using high-resolution satellite data. The management committee has formed a sub-committee for formulation of outline management plan for the conservation. The outline of the management plan is as follows:^[12]

- In no case and no circumstances, any water area will be allowed to be converted
- In each case relating to development proposal, prior permission of the Environment Department or its designated/delegated authority will be required (EKWM authority)

- The waste recycling practice may be allowed in areas other than substantially water body oriented area, on case-to-case basis, to be examined by the Department of Environment or its designated/delegated authority
- Excavation of new channels or desiltation of the silted channels for the purpose of sewage flow may be allowed for promoting sewage fed fish culture. The proposal should, however, be examined beforehand by the Environment Department or its designated/delegated authority
- To raise the awareness about the utility of wetlands, in general, and EKW, in particular
- To promote basic conservation principles like sewage fed fish culture and eco-tourisms
- To enforce the land use control in substantially water body oriented areas and other areas
- To detect the change of ecological character and in land use in EKW

The East Kolkata Wetlands (Conservation and management) Ordinance, 2005, came into force on 16 November 2005. On 31 March 2006, the West Bengal Legislature passed this ordinance into an act, namely, East Kolkata Wetlands (Conservation and Management) Act, 2006, which allowed the State Government to form an authority called East Kolkata Wetland Management Authority (EKWMA), under the Chairmanship of Chief Secretary to the Government of West Bengal.

Some important functions of the authority are the following.

- To take measures or make an order to stop, undo and prevent any unauthorized project in, unauthorized use of, or unauthorized act on the EKW
- To make an order directing demolition or alteration of any hoarding, frame, post, kiosk, structure, erected or exhibited illegally for the purpose of advertisement on any land within EKW
- To make an order to prevent, prohibit or restrict any mining, quarrying, blasting or other operations for the purpose of protecting or conserving the EKW
- To take measures to abate pollution in the EKW and conserve the flora and fauna and biodiversity, in general
- To prepare action plans conforming to the resolutions taken and recommendations made from time to time under the Ramsar convention and update the land use maps of EKW
- To implement and monitor the activities specified in the action plans
- To promote research and disseminate findings of such research among the stakeholders

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How to cite this article: Paul M, Chanda M, Gupta SS. Strategy and scenario for wetland conservation in India. Chron Young Sci 2011;2:79-82.

Source of Support: Nil, **Conflict of Interest:** None declared

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