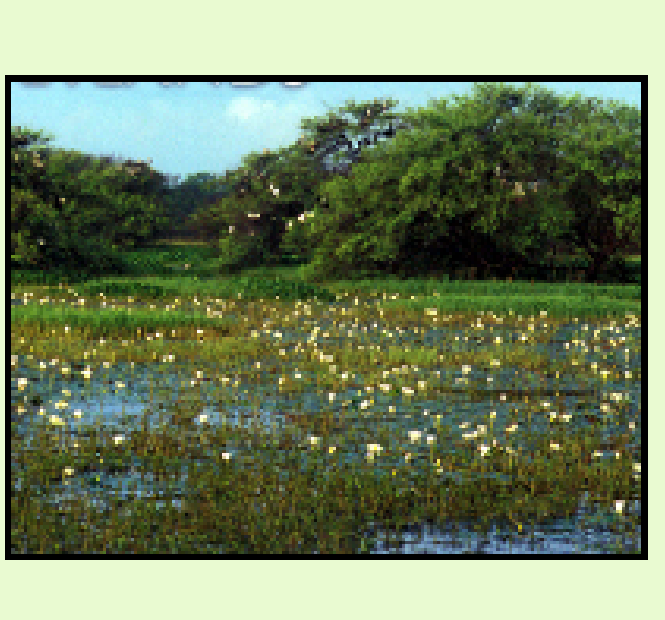
CONSERVATION OF WETLANDS

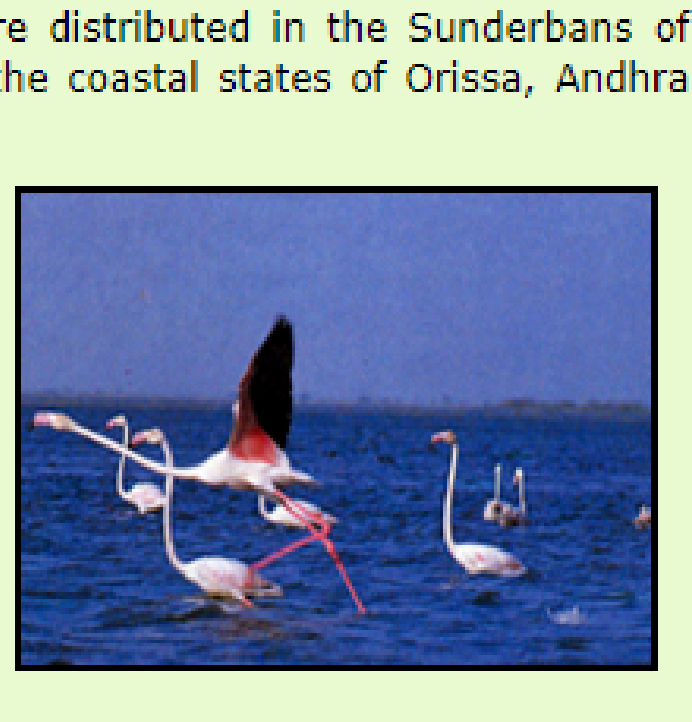
Save our wetlands



Wetlands are areas of land where the water level remains near or above the surface of the ground for most of the year. The association of man and wetlands is ancient, with the first signs of civilization originating in wetland habitats such as the flood plains of the Indus, the Nile Delta and the Fertile Crescent of the Tigris and Euphrates rivers. Wetlands cover about 6% of the earth's land surface. There are several kinds of wetlands such as marshes, swamps, lagoons, bogs, fens and mangroves. They are home to some of the richest, most diverse and fragile of natural resources. As they support a variety of plant and animal life, biologically they are one of the most productive ecosystems.

Wetlands of India

India has a wealth of wetland ecosystems distributed in different geographical regions. Most of the wetlands in India are directly or indirectly linked with major river systems such as the Ganges, Cauvery, Krishna, Godavari and Tapti. India has totally 27, 403 wetlands, of which 23,444 are inland wetlands and 3,959 are coastal wetlands. According to the Directory of Asian Wetlands (1989), wetlands occupy 18.4% of the country's area (excluding rivers), of which 70 % are under paddy cultivation. In India, out of an estimated 4.1 mha (excluding irrigated agricultural lands, rivers, and streams) of wetlands, 1.5 mha are natural, while 2.6 mha are manmade. The coastal wetlands occupy an estimated 6,750 sq km, and are largely dominated by mangrove vegetation. About 80% of the mangroves are distributed in the Sunderbans of West Bengal and the Andaman and Nicobar Islands, with the rest in the coastal states of Orissa, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala, Goa, Maharashtra and Gujarat.



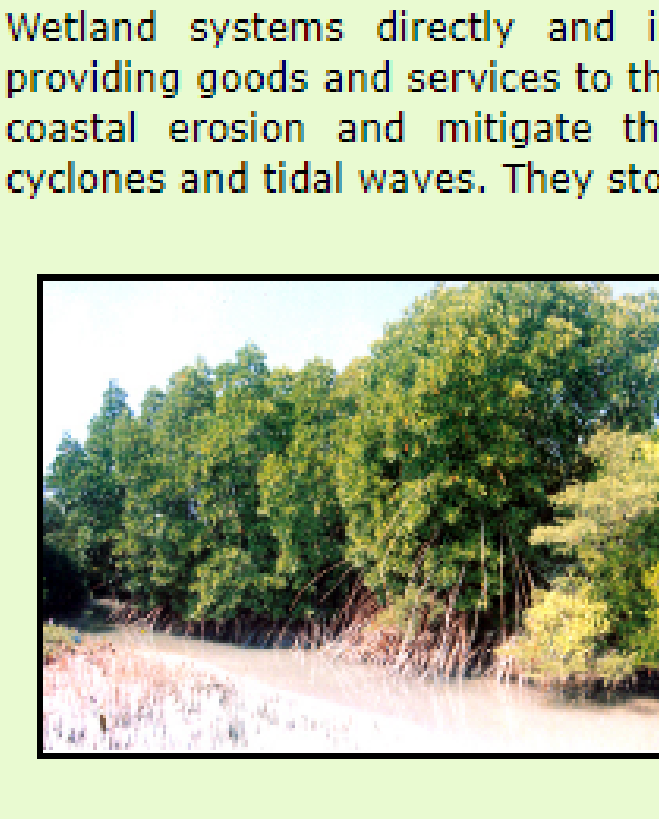
Wetlands in southern peninsular India are mostly manmade and are known as yeris (tanks). They are constructed in every village and provide water for various human needs, besides serving as nesting, feeding, and breeding sites for a large variety of bird species. Point Calimere in Tamilnadu; Ashtamudi, Sasthamkotta and Vembanad Kol lakes in Kerala; and Kolleru lake in Andhra Pradesh are some of the natural wetland sites in South India.

India's wetlands are generally differentiated into 8 categories depending on their regional presence (Scott, 1989):

- The reservoirs of the Deccan Plateau in the south, together with the lagoons and other wetlands of the southwest coast
- The vast saline expanses of Rajasthan, Gujarat and the Gulf of Kutch
- The freshwater lakes and reservoirs from Gujarat eastwards through Rajasthan (Keoladeo Ghana National Park) and Madhya Pradesh
- The delta wetlands and lagoons of India's east coast (Chilka Lake)
- The freshwater marshes of the Gangetic Plains and the floodplains of the Brahmaputra
- The marshes and swamps in the hills of northeast India and the Himalayan foothills
- The lakes and rivers of the mountain region of Kashmir and Ladakh
- The mangroves and other wetlands of the Andaman and Nicobar Islands.

Importance of wetlands

Wetland systems directly and indirectly support lakhs of people, providing goods and services to them. They help check floods, prevent coastal erosion and mitigate the effects of natural disasters like cyclones and tidal waves. They store water for long periods.



Their capacity during heavy rainfall to retain excess floodwater that would otherwise cause flooding results in maintaining a constant flow regime downstream, preserving water quality and increasing biological productivity for both aquatic life as well as human communities of the region. Inundated wetlands are very effective in storing rainwater and are the primary source for recharging ground water aquifers.

Many wading birds and waterfowl like egrets, herons and cranes nest in wetlands. Wetlands also provide food and shelter for mammals. They act as natural filters and help remove a wide range of pollutants from water, including harmful viruses from sewage and heavy metals from industries.

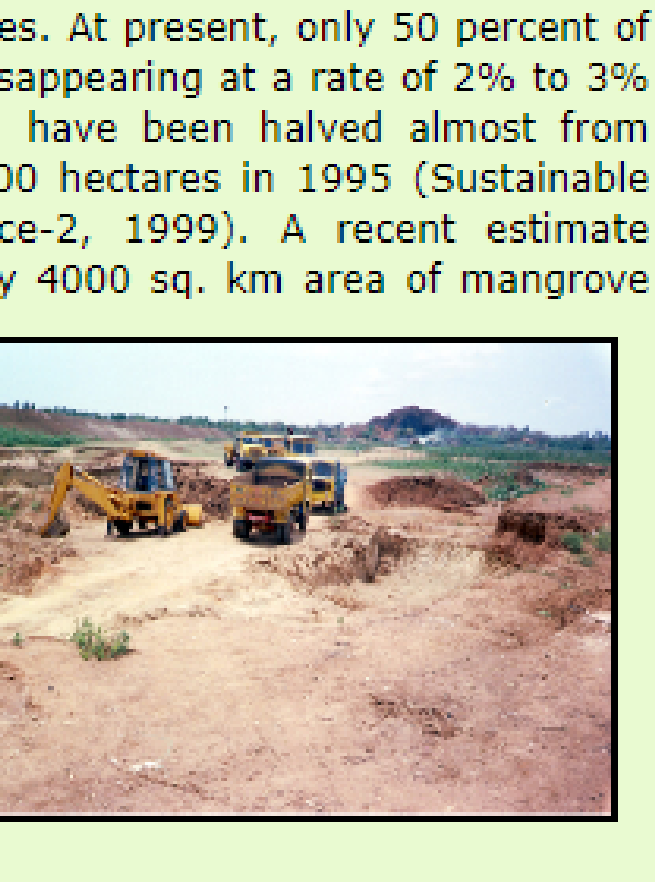
Wetlands retain nutrients by storing eutrophic parameters like nitrogen and phosphorus and accumulating them in the sub-soil, thereby decreasing the potential for eutrophication.

Mangrove forests are valued for production of fish and shell-fish, live-stock fodder, fuel and building materials, local medicine, honey and bees-wax and for extracting chemicals used in tanning leather, farming and fisheries production have replaced many mangrove areas.

Moreover, significant socio-economic values like constant water supply, fisheries, fuelwood, medicinal plants, livestock grazing, agriculture, energy resource, wildlife resource, transport, recreation and tourism are noteworthy.

Threats to wetlands

The Wildlife Institute of India's survey reveals that 70-80% of individual freshwater marshes and lakes in the Gangetic flood plains have been lost in the last five decades. At present, only 50 percent of India's wetlands remain. They are disappearing at a rate of 2% to 3% every year. Indian mangrove areas have been halved almost from 700,000 hectares in 1987 to 453,000 hectares in 1995 (Sustainable Wetlands, Environmental Governance-2, 1999). A recent estimate based on remote sensing shows only 4000 sq. km area of mangrove resource in India.



The loss of wetlands leads to environmental and ecological problems, which have a direct impact on the socio-economic benefits of the associated populace. Serious consequences, including increased flooding, species decline, deformity, or extinction and decline in water quality could result. Wetlands are also important as a genetic reservoir for various species of plants including rice, which is a staple food for 3/4th of the world's population.

Urbanization	Wetlands near urban centres are under increasing developmental pressure for residential, industrial and commercial facilities. Urban wetlands are essential for preserving public water supplies.
Anthropogenic activities	Due to unplanned urban and agricultural development, industries, road construction, impoundment, resource extraction and dredge disposal, wetlands have been drained and transformed, causing substantial economic and ecological losses in the long term.
Agricultural activities	Following the Green Revolution of the 1970s, vast stretches of wetlands have been converted to paddy fields. Construction of a large number of reservoirs, canals and dams to provide for irrigation significantly altered the hydrology of the associated wetlands.
Hydrologic activities	Construction of canals and diversion of streams and rivers to transport water to lower arid regions for irrigation has altered the drainage pattern and significantly degraded the wetlands of the region.
Deforestation	Removal of vegetation in the catchment leads to soil erosion and siltation
Pollution	Unrestricted dumping of sewage and toxic chemicals from industries has polluted many freshwater wetlands
Salinization	Over withdrawal of groundwater has led to salinization
Aquaculture	Demand for shrimps and fishes has provided economic incentives to convert wetlands and mangrove forests to develop pisciculture and aquaculture ponds.
Introduced species	Indian wetlands are threatened by exotic introduced plant species such as water hyacinth and salvinia. They clog waterways and compete with native vegetation.
Climate change	Increased air temperature; shifts in precipitation; increased frequency of storms, droughts, and floods; increased atmospheric carbon dioxide concentration; and sea level rise could also affect wetlands.

All of the above have contributed to the decline in the diversity of flora and fauna, migratory birds and productivity of wetland systems. Simultaneously, several thousand species have become extinct.

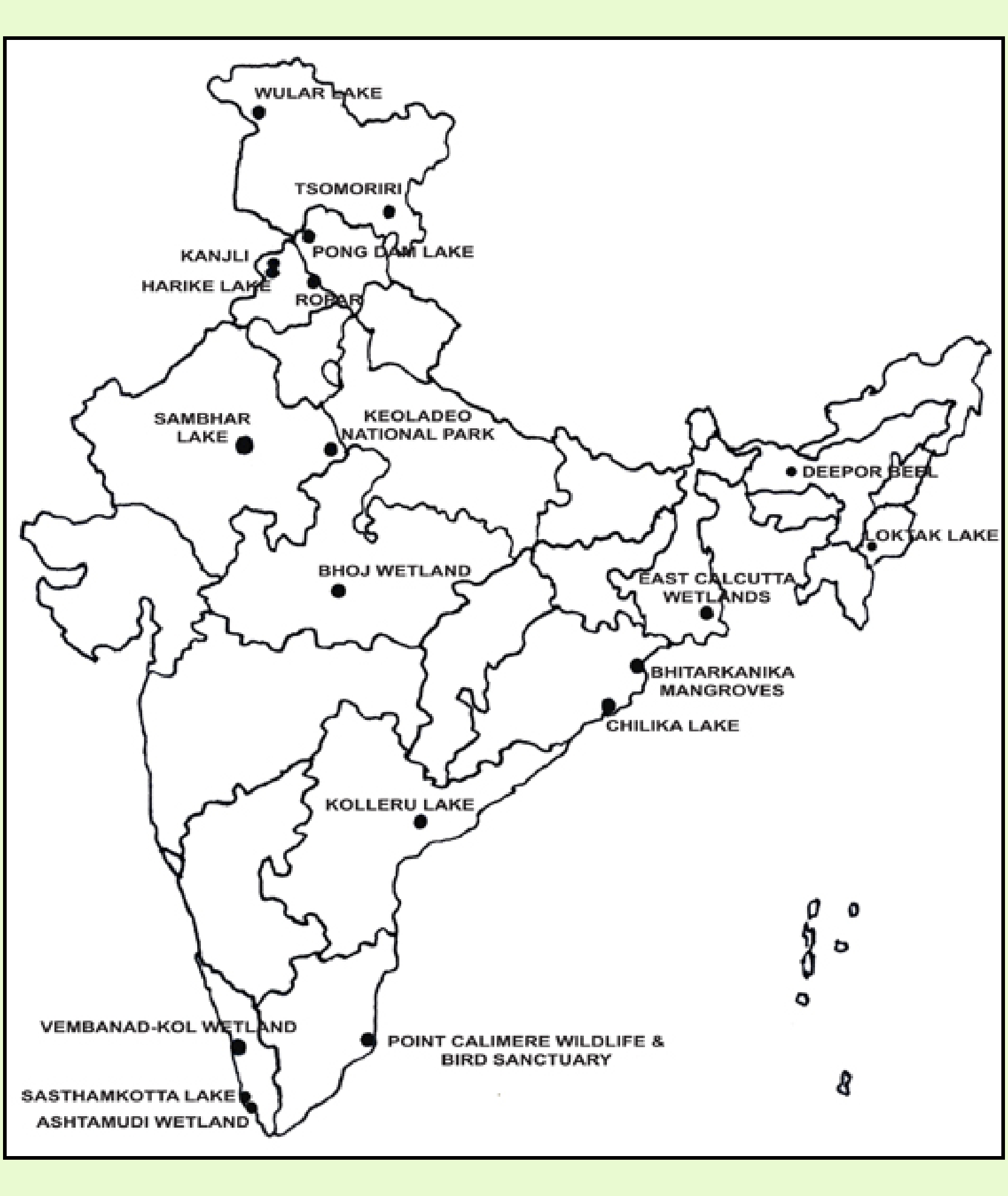
The Ramsar Convention

Many people consider wetlands as unproductive areas and hence destroy or drain them for developmental activities. However, the importance and usefulness of wetlands was first brought to the notice of the world through a Convention on Wetlands held at the Iranian city Ramsar, in the year 1971.

The Ramsar Convention on Wetlands is an inter-governmental treaty with 135 contracting parties. "The convention's mission is the conservation and wise use of all wetlands through local, regional, and national actions and international cooperation as a contribution towards achieving sustainable development throughout the world". There are 1235 wetland sites totaling 106.6 mha., designated for inclusion in the Ramsar List of Wetlands of International Importance. India is also a signatory to the Ramsar Convention, especially on the Waterfowl Habitat.

To commemorate the date of signing of the convention on wetlands, 2nd February of every year is observed as World Wetlands Day. It was celebrated for the first time in 1997 and the beginning was quite encouraging. Chilka Lake (Orissa) and Keoladeo National Park (Bharatpur, Rajasthan) have been designated under the Convention of Wetlands of International Importance (Ramsar Convention) as being especially significant waterfowl habitats.

As a part of the conservation strategy a data book called Montreaux Record is kept of all those wetlands that require international help for conservation. The inclusion of a site in this list makes it eligible for a global package for conservation related activities. An annual 'International Ramsar Convention Award' carrying a cash prize of $ 10,000 and commendation is given to the best conservation efforts.



Conservation of wetlands

Efforts to conserve wetlands in India began in 1987 and the main focus of Governmental efforts was on biological methods of conservation rather than adopting engineering options. A national wetland-mapping project has also been initiated for an integrated approach on conservation. In certain wetland sites it is heartening to see the Government, NGOs and local community coming together to save our wetlands and thus realize the objectives of Ramsar Convention.

The National Committee on Wetlands, Mangroves and Coral Reefs, constituted for advising the Government on appropriate policies and measures to be taken for conservation and management of the wetlands, has identified 93 wetlands for conservation and management on priority basis.

19 wetlands in India have been categorized for seeking international assistance to save them from destruction.

Sr.No.	Name of Wetland	State	Area (ha)
1	Ashtamudi Wetland	Kerala	61,400
2	Bhitarkanika Mangroves	Orissa	65,000
3	Bhoj Wetland	Madhya Pradesh	3,201
4	Chilika Lake	Orissa	1,16,500
5	Deepor Beel	Assam	4,000
6	East Calcutta Wetlands	West Bengal	12,500
7	Harike Lake	Punjab	4,100
8	Kanjli	Punjab	183
9	Keoladeo National Park	Rajasthan	2,873
10	Kolleru Lake	Andhra Pradesh	90,100
11	Loktak Lake	Manipur	26,600
12	Point Calimere Wildlife and Bird Sanctuary	Tamil Nadu	38,500
13	Pong Dam Lake	Himachal Pradesh	15,662
14	Ropar	Punjab	1,365
15	Sambhar Lake	Rajasthan	24,000
16	Sasthamkotta Lake	Kerala	373
17	Tsomoriri	Jammu & Kashmir	12,000
18	Vembanad-Kol Lake	Kerala	1,51,250
19	Wular Lake	Jammu & Kashmir	18,900

The concerned State Governments have set up Steering Committees constituting representatives from government departments, universities and research institutions for effective implementation of these policies. Nodal research / academic institutions have been drawn up for most of the identified wetlands.

Wetlands of Tamilnadu

In Tamilnadu, we have utilized more than 90% of the available surface water and more than 60% of the available ground water. Since Independence, many dams have been constructed to utilize the surface water and further development is almost nil. The recent studies indicate that irrigation through tanks is decreasing and irrigation through wells increasing. Drinking water source for most of the cities in Tamilnadu is from rivers, lakes and tanks. In olden days, the local people maintained these water bodies, which has diminished over the past few decades resulting in their dismal conditions. Presently people have started looking to the government for assistance.

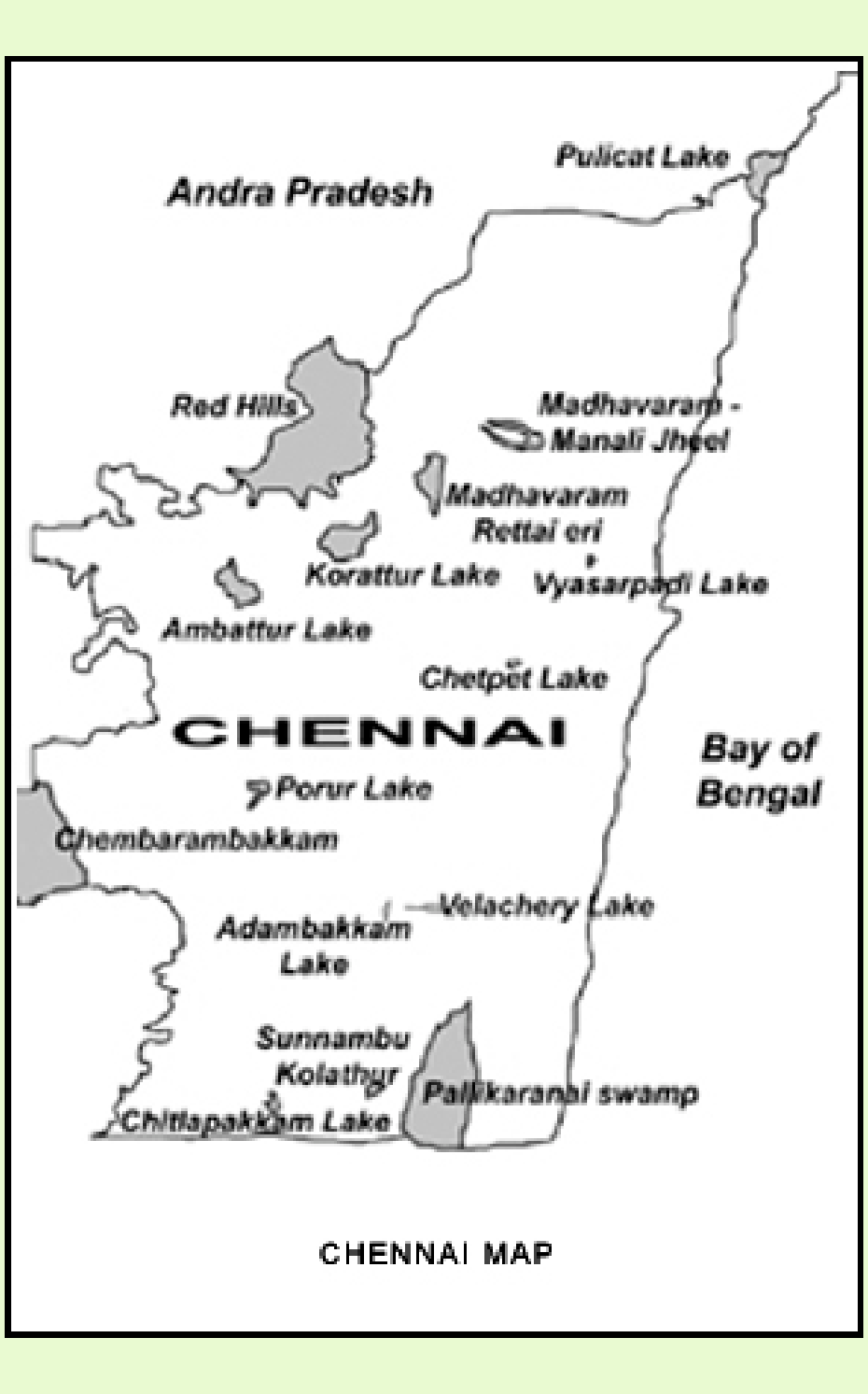
Total number of water bodies	39,202
Panchayat Union tanks	20,413
Public Works Department tanks	8,903
Ex-Zamin tanks	9,886
Length of rivers and canals	7,420 kms
Area of reservoirs	52,000 ha
Area of tanks and ponds	6,92,000 ha.
Area comprising brackish water (5,600 places)	400 ha.
Area under mangroves	21 sq. km.
Coastal length	1,076 kms.

Important wetlands

Name of the wetland	District
Point Calimere Wildlife and Bird Sanctuary	Nagappattinam
Vedanthangal Bird Sanctuary	Kanchipuram
Karikili Bird Sanctuary	Kanchipuram
Gulf of Mannar Biosphere Reserve	Ramanathapuram
Kanjirankulam Bird Sanctuary	Ramanathapuram
Chithrangudi Bird Sanctuary	Ramanathapuram
Pichavaram Mangrove Forest	Cuddalore
Pulicat Lake	Thiruvallur
Vettangudi Bird Sanctuary	Sivagangai
Udhaya Marthandapuram Bird Sanctuary	Thiruvarur
Vaduvoor Bird Sanctuary	Thiruvarur
Melselvanur Bird Sanctuary	Ramanathapuram
Vellode Bird Sanctuary	Erode
Karaivetti Bird Sanctuary	Perambalur

Wetlands of Chennai

Chennai used to have about 150 small and big water bodies in and around it, but today, the number has been reduced to 27. According to Dr. Sanjeeva Raj (2002), Adambakkam Lake, Mugappair Lake, Red Hills, Manali jheel, Madhavaram jheel, Korattur Lake, Ambattur Lake, Pulicat Lake, Pallikaranai, Velachery and Chembarambakkam Lake are a few of them. Rettai eri, Porur Lake, Sunnampu Kolathur Lake, Chetpet Lake, Vyasarpadi Lake and Chitlapakkam Lake are some of the other water bodies that still exist today. They serve as recharge systems for the city's underground aquifers.



Pallikaranai swamp

Pallikaranai wetland is a fresh water swamp adjacent to the Bay of Bengal situated about 20 km. south of Chennai city with a geographical area of 80 sq. km. The swamp is helpful in charging the aquifers of the region. It is one of the last few remaining natural ecosystems in the city of Chennai.

The topography of the swamp is such that it always retains some storage, thus forming an aquatic ecosystem. It has been a home for naturally occurring plants (61 species), fish (46 species), birds (106 species), butterflies (7 species), reptiles (21 species) and some exotic floating vegetation such as water hyacinth and water lettuce, which are less extensive now and highly localized.

Recent reports of the appearance of the white-spotted garden skink, for the first time in Tamilnadu, and Russell's viper, the largest and the most widespread among Asian vipers, confirm its invaluable ecological status. Fish such as dwarf gourami and chromides that are widely bred and traded worldwide for aquaria, occur naturally in Pallikaranai. Besides, the windowpane oyster, mud crab, mullet, half beak and green chromide are some of the estuarine fauna present in the marsh.

Dumping of solid waste, discharge of sewage, construction of buildings, construction of a railway station and a new road to connect old Mahabhalipuram road and Pallavaram are causing the Pallikaranai marsh to shrink.

Madhavaram and Manali jheels

The Manali jheel is 16 km. north of Chennai and covers an area of about 40 acres. The Manali-Madhavaram jheel ecosystem is listed in the Directory of Wetlands published by World Wildlife Fund (WWF). The Madhavaram jheel is situated near the Manali jheel covering an area of 30 acres. It has patches of floating vegetation: lily, wetland rushes and islands of grasses.

During the Northeast Monsoon (October to December), the jheel gets filled up to 7 or 8 feet. Embankments on the west and north hold back the water. To prevent flooding on the eastern side, the northern embankment has been breached thus reducing the water in it.

The jheels harbour native fish such as tilapia, freshwater gastropod, applesnail, insects such as dragonfly, damselfly, pond skater, diving beetle and keelback water snakes. Birds like pheasant-tailed jacanas, sandpipers, snipes, stints, stilts, lapwings, plovers, terns, gulls, moorhen, dabchick, snake bird or darter, winter-visiting waders and wagtails, ducks like the whistling teal, cotton teal and the migratory garganey teal, three different species of bittern, egret and raptors like osprey and the marsh harrier are found in the Madhavaram jheel.

Effluents flowing into the jheel from the Madhavaram Dairy cause oxygen depletion in the water leading to fish mortality. Till the mid-1990s, the Madhavaram jheel was leased out each year to the local residents for harvesting fish. Canals were dug to divert the already depleting water storage and catch the fish that were caught in the slush. The vegetation was uprooted, resulting in total desertion of the jheels by the jacanas. The most common problem to both the jheels during the monsoon months is snail gathering and invasion by livestock. Due to silting, the storage capacity of both the jheels has reduced.

Pulicat Lagoon

The Pulicat lagoon is situated about 60 km north of Chennai with an area of 18,440 ha. The International Union for the Conservation of Nature and Natural Resources (IUCN) recently declared the Pulicat Lake system as a Ramsar Site of international importance and World Wide Fund for Nature declared it a protected area. It is the second largest brackish water lake in the country, which runs parallel to the Bay of Bengal across the Tamilnadu and Andhra Pradesh border. The Buckhingham Canal running parallel to the Coromandel Coast, passes through the southern end, where the Pulicat lagoon opens into the Bay of Bengal.

Since, the lagoon receives fresh water from the Swarnamukhi, the Kalangi, the Araniar and the Royyala Kalava rivers, Pulicat is endowed with diverse natural resources, which include both aquatic and terrestrial flora and fauna. Its aquatic resources include white and tiger prawns, mud and lagoon crabs, mullets and catfish, edible oyster and clam varieties such as Meretrix casta. Its rich fauna comprises rare and endangered reptiles, insects, amphibians, snakes, sea turtles, birds and mammals. It is home to 50 species of water birds. Many mangrove species, herbs and cultivated crops such as paddy and cashew are found here.

Thousands of acres of land have been cleared for the North Chennai Thermal Power Station (NCTPS). The Ennore Satellite Port and a petrochemical complex are progressively damaging the Pulicat ecosystem. The NCTPS lets out hot water into the Buckingham Canal and discharges toxic fly ash, in the form of slurry, which causes siltation in the lagoon system. Tiger prawn, mud crabs, threadfin fish and bhetki have become rare now.

Adyar Estuary

Chennai is one of the few cities having an estuarine ecosystem. The Adyar creek is of a tidal type and a part of the natural estuarine ecosystem located right in the heart of the city. At its mouth (the estuary), the river takes a bend forming the creek. The estuary extends from the sandbar at the edge of the sea to the Adyar Bridge, with small islands in between. The creek begins near the Chettinad Palace.

The Adyar creek, in spite of the disappearance of mangroves, which are an essential part of an estuarine ecosystem and were found in plenty till the 1970s, still exhibits a wide range of biodiversity. The flora found in the Adyar creek are Prosopis juliflora (Velikathan) along with Crotons sparciflorous and Ipomea biloba, Thespesia populnea, Cassia occidentalis, Cephalandra coccinia and Pongamia glabra, Abrus precatorius, Lantana camera, Zizyphus jujuba, Azadirachta indica, Morinda species, Antigonon species, Hyptis species and Acacia species. The fauna found here are gastropods and springtails, polychaetes, crabs, hermit crabs and oligochaetes. Many species of fish earlier found in abundance are no longer seen. Originally there were about 170 species of birds at the estuary now dominated only by crows.

The Adyar Creek has several threats such as heavy accumulation of silt over a period of time. The cattle sheds, that have been set up along the creek, not only reduce the width of the creek but also pollute it. The other sources of pollution are the raw sewage let in at various points. Both the banks of the creek are devoid of any native vegetation. The creek, once a paradise, has now been practically ruined.

Cooum Estuary

The name Cooum appears to be derived from Tamil Literature, where the word coovalan denotes a person who is well versed in the science of hydrology. The River Cooum, once a freshwater source is today a drainage course collecting surpluses of 75 small tanks of a minor basin.

The River Cooum is a typical example for biodegradation of a natural watercourse. Along its twisting course through the heart of the city it carries large quantities of sewage and cattle wash. The river is stagnant and contains a lot of silt As a result, the oxygen content is reduced to a level below which fish cannot live.

Reduction of fish species (Azariah, J. and Azariah, H. 1987a)

Year	No. of fish species
1949	49
1957-59	30
1975-79	21
2000	No fish

Far from being an asset to the city, the river is an eyesore to residents and visitors alike, and is not fit for any use.

Conclusion

Wetlands jurisdiction is diffused and falls under various departments like agriculture, fisheries, irrigation, revenue, tourism, water resources and local bodies. For instance, all mangroves in the country fall under the direct control of forest department. The lack of a comprehensive wetland policy, with each department having its own developmental priorities, works against the interests of conservation of wetlands resulting in intended or unintended spill-over that further aggravates the problem.

Wetland ecosystems are interconnected and interactive within a watershed. In India, unplanned urbanization and a growing population have taken their toll on wetlands. To counter these, management of wetlands has to be an integrated approach in terms of planning, execution and monitoring. Effective tie-ups of trained academicians and professionals, including ecologists, hydrologists, economists, watershed management specialists, planners and decision makers must be linked with local expertise for overall management of wetlands. All these would increase knowledge and understanding of wetlands and evolve more comprehensive and long-term conservation and management strategies. Spreading awareness by initiating educational programs about the importance of wetlands in local schools, colleges and among the general public in the vicinity of the water bodies, besides constant monitoring of wetlands for their water quality, would provide vital inputs to safeguard the wetlands from further deterioration.

The materials and illustrations used in this publication have been taken from the following:

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