Research Paper E-ISSN No : 2455-295X | Volume : 2 | Issue : 9 | Sep 2016

ECOLOGICAL HERITAGE SITES OF CHENNAI

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ABSTRACT

There are hundreds of Ecological Heritage Sites (EHS) in India. For example the Sundarbans, Chilka and Pulicat Lake, Guindy National Park, IIT Campus, Theosophical Society Campus, Madras Christian College Campus and Kattupalli Island in Chennai are a few to worth mention.. Over 28 species of shrubs and herbs and 10 species of climbers are found here. The vegetation type of the campus is similar to that of the IIT campus. According to 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. 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. Therefore, far from being an asset to the city, the river has turned into a black spot mainly due to human activities. The river is an "eye sore" to permanent residents and visitors alike and is not fit for any use.
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KEY WORDS: Ecological Heritage Sites, flora, fauna, lakes, threats.

Introduction

Ecological Heritage Sites (EHS) are areas of remnant indigenous vegetation representing different range of landform, soil, plant associations, habitat or ecosystem that occur in a particular region. They are the remnants of unique vegetation types that exist in such regions and have high ecological value (Sanjeeva Raj, 2002). There are hundreds of EHS in India: Sundarbans, Chilka Lake and Pulicat Lake are but a few worth mention. In Chennai alone over 20 sites are identified as EHS and have been assessed and evaluated on various criteria such as the number of native species, degree of disturbance and the area covered by the site.

Classification of EHS in Chennai

According to their vegetation and natural resources, the EHS in Chennai are classified into five broad categories. They are: Estuaries such as Adyar, Cooum; Scrub-jungle such as IIT campus, MCC campus, Guindy Park, Theosophical Society campus and Kattupalli Island and Wetlands: Madhavaram Lake, Korattur Lake, Ambattur Lake and Pulicat Lake, Pallikaranai, Velachery and Chembarambakkam. The EHS are noted for their richness of biological diversity but sadly a number of threats are associated with them.

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. The original creek area is about 100 acres. Of this, roughly about half the extent remains as a creek, where tidal effect is felt twice a day.

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The Adyar River originates at Chembarambakkam tank in Tiruvallur district. It flows a distance of about 40 kms. to join the Bay of Bengal in the southern part of Chennai. At its mouth (the estuary), it 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 picture of an ecosystem would be incomplete without a description of its flora and fauna. The Adyar creek, inspite of the absence of mangroves, which is an essential part of an estuarine ecosystem, 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 by the omnipresent crows (Exnora Naturalists' Club, 1997). The Adyar estuary is a textbook case of a fragile natural heritage losing out to frantic urbanization (Theodore Baskaran, 2003).

Threats

The Adyar Creek has several threats such as heavy accumulation of silt over a period of time. Slums have encroached upon more than half the footbridge. The remaining portion and its debris impede the flow of water. It is used as a garbage dump now. A number of cattle sheds, which are 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 from the encroachments, storm water drains and other upstream sources such as industries, hospitals and sewage pumping stations. Heavy encroachment along the creek has also resulted in gross pollution of the wetland, turning it into a health hazard (Exnora Naturalists' Club, 1997).

The creek bed is heavily silted and the water is forced to take a meandering course. 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 of Cooum appears to be derived from Tamil Literature. The word "coovalan" denotes a person who is well versed in the science of hydrology. It is likely, that the River Cooum might have derived its name from such a usage (Rajamanickam, 1970; Mudaliar, 1981). The River Cooum, once a fresh water source is today a drainage course collecting surpluses of 75 small tanks of a minor basin. The length of the river is about 65 km, of which 18 km, fall within the Chennai city limits (Sundaresan, 1986).

The River Cooum is a typical example for biodegradation of a natural watercourse. It enters Madras city limits near Arumbakkam and winds its way through the city for about 18 km flowing through Choolaimedu, Chetpet, Egmore and Chindadripet. Because of its twisting course through the heart of the city, the river carries the major portion of the storm water drainage from Madras city during the rainy season.

The Kesavaram dam diverts the river into the Chembarambakkam Lake from which water is utilized for the supply of drinking water to the city of Madras. Thereafter, the flow of water in the river is totally reduced (Kothandaraman, et.al., 1986).

Threats

The River Cooum carries large quantities of sullage, sewage and cattle wash. The river is stagnant and contains a lot of silt. The silt is supposed to be two to three feet deep at certain places. It is reported that the net amount of silt deposited in the river is 3200 tonnes/year. As a result, the oxygen content is reduced to a level below which fish cannot live (Azariah, and Azariah, 1987). Sand mining, increasing hutments, dumping of wastes and encroachments are the causes significantly damage to plants, animals and birds. Developmental activities also cause irreversible changes because they badly displace the native vegetation.

The water body has been subjected to heavy stress due to organic pollution, thus preventing it from regenerating itself. Several places along the banks are used to rear and perpetuate buffaloes. There are unauthorised hutments situated on the banks and these directly dump garbage, excreta and sullage into the Cooum. Several hotels in the city are discharging sewage into the river at various points.

Effluents from a variety of industries heavily pollute it (Rao, 1987). Therefore, far from being an asset to the city, the river has turned into a black spot mainly due to the human activities. The river is an "eye sore" to permanent residents and visitors alike and is not fit for any use.

Beside of the above, another heritage sites the natural resources - scrub jungles being one of them. Scrub jungles are home to diverse and fragile biological organisms. There are five sites that come under this category and these include the Guindy National Park, IIT Campus, Theosophical Society Campus, Madras Christian College Campus and Kattupalli Island in Chennai.

Guindy National Park

It is situated in the southwestern corner of Chennai and has an area of 270 hectares. It is the last surviving habitat of the Tropical Dry Evergreen Forest type of the Coromandel Coast. According to Banerjee (1999), it is a representative of the natural thorny scrub jungle of the southern dry zone, comprising 350 species of plants including trees, shrubs, herbs, climbers and grasses. Trees such as Annona squamosa, Feronia limon, Azadirachta indica, Cassia fistula, Santalum album, Mangifera indica, Tamarindus indica, Tectona grandis, Ficus benghalensis, Cassia siamea, Cassia marginata, Borassus flabellifer, Anacardium occidentale, Swietinea mahagoni; shrubs such as Atlantia monophylla, Clausena dentate, Glycosmis cochinsinensis, Randia dumetorum, Randia malabarica, Cassia auriculata and Carissa spinarum; climbers such as Tinospora cordifolia, Cissus quadrangularis and Abrus precatorius and Drosera burmanii (the insect eating plant) are worth mentioning. There is a great diversity of flora and fauna within the Guindy National Park. The main attraction of the park is the presence of the Indian Antelope, commonly called "Blackbuck". Other mammals such as the elephant, antelope, spotted deer, jungle cat, toddy cat and Indian civet are also found here. 37 varieties of birds including the kingfisher, blue jay, golden backed woodpecker, crow pheasant, yellow wattled lapwing, red wattled lapwing, blue faced malkoha, shrikes, koels, doves, minivets, munias, barkets, parakeets, grey partridge, tailor birds, robins, drongos, quails, paradise flycatcher, stone curlew, etc., are found here. Reptiles such as cobra, krait, russell's viper, tortoises and turtles, lizards, geckos, chameleons and the common Indian monitor can be commonly seen. Invertebrates such as worms, spiders, centipedes, millipedes, butterflies, bugs, grasshoppers, scorpions and crabs are also found.

Indian Institute of Technology (IIT) campus

According to an earlier survey on "Biodiversity study - An Environmental approach at IIT campus, Chennai", by C.P.R. Environmental Education Centre, the vegetation type of the campus comes under Tropical Dry Evergreen Forest type. It is an ideal example for the coexistence of various types of mini ecosystems and these include open grasslands, wetlands, thick forest patches and patches of scrub jungles. There are about 80 different species of trees, of which 35 of them are native. Over 28 species of shrubs and herbs and 10 species of climbers are found here. These thickets are home to the blackbuck, spotted deer, jackals, mongooses, monkeys, squirrels, toddy cats, wild cats, various types of reptiles, 20 different species of insects, 40 different species of butterflies and about 100 species of birds. The campus attracts large groups of migratory birds and butterflies every year. There are about 100 species of birds seen at different times of the year. While quite a number of species are residents, few migrants like forest wagtail, pied crested cuckoo, golden oriole, etc., which are migratory are a treat to watch.

Theosophical Society campus

It was shifted from Bombay to Madras in 1882 within an area of 28 acres of wooded land, on the southern bank of the River Adyar. The campus is a natural scientist's delight with its various gardens and wooded areas which are a haven for a number of migratory birds, including the pink flamingo and other forms of wild life such as lizards, snakes, jackals, wild cats, mongooses and hares. Apart from various woods there is an avenue of mahogany trees (Swietinea mahagoni). The campus has the most impressive botanical wonder - "Aala Maram" or the "Great Banyan Tree" - a 450 year old tree with a circumference of 251.65 metres, roots at a height of 12.2 metres and a huge canopy of leafy branches that throw down hundreds of aerial roots with an area of 4,670 sq.m.

Madras Christian College campus

At the 363 acre MCC campus adjacent to the Vandalur Reserve Forest, the habitat diversity includes wildlife such as antelope, blacknaped hare, common mongoose, jackal, jungle cat, monitor lizard and a variety of snakes besides 140 species of birds. Porcupines, striped hyena, small Indian civet, toddy cat, binturong, leopard cats and pangolins are found occasionally. The vegetation type of the campus is similar to that of the IIT campus.

Kattupalli Island

It is situated on the Coromandel Coast, bordered by the Ennore creek in the south, the Pulicat Lake and the Buckingham canal on the west and the Bay of Bengal on the east. It is about 14 km long from south to north and about 1.25 km to 2.25 km wide from east to west and the area of this island is about 18 sq.km. The vegetation type consists of a rare combination of mangroves, halophytic salt marsh, psammophytic beach, tropical dry evergreen and aquatic habitat. There are 290 flowering plant species belonging to 210 genera and 82 families, 1 pteridophyte and 9 aquatic algae. The most striking feature in this island is the presence of 4 individuals of Diospyros malabarica that are 600 years old. This species of mangrove is not found anywhere else along the east coast. The faunal wealth of this island includes mammals like jackals, wild boar, rabbits, jungle cats, reptiles such as scorpions, lizards, snakes and the endangered Olive Ridley Sea turtles, besides an abundance of water birds and butterflies (Sanjeeva Raj, 2002). The island is unique for its multi-ecosystems, such as the in-shore, beach, sand dunes, scrub jungles, brackish water, mangrove and agricultural ecosystem.

Wetlands are areas inundated or saturated by groundwater at a frequency and duration sufficient to support the prevalence of vegetation typically adapted to the saturated soil condition. It includes marshes, swamps (jheels), lakeshores, peat lands, wet meadows and estuaries (World Wide Fund-India, 1987). Around the world, there are about 1235 wetland sites, totaling 106.6 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance. In India, a total area of 40,494 sq. km. is classified as wetlands. This constitutes only 1.21 per cent of the total land area (Anonymous, 1988).

Wetlands are home to diverse and fragile living organisms. They help to check floods, prevent coastal erosion and mitigate the effect of cyclones and tidal waves. They store water for long periods and are the home and breeding place for myriads of birds and animals. Recently, eleven wetlands in India have been categorized for seeking international assistance to save them from destruction. These include Point Calimere in Tamil Nadu, Astamudi, Sasthamkolta Lake and Vembanad wetlands in Kerala, Kolleru Lake in Andhra Pradesh, Bhitarkanika mangroves in Orissa, Pong Dam Lake in Himachal Pradesh, East Calcutta wetlands in West Bengal, Bhoj wetlands in Madhya Pradesh, Tsomoriri in Jammu and Kashmir and Deepor Beel freshwater lake in Assam (The Hindu, 2002). At the national level, 22 wetlands and 11 lakes have been identified for intensive conservation and management purposes.

Water bodies in 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 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. An attempt has been made in this paper to discuss the geographical area, location, principal features and conservation issues of Pallikaranai swamp, Manali and Madhavaram jheels and Pulicat Lagoon.

Pallikaranai swamp

This swamp is located about 20 km south of the city of Chennai, in the state of Tamilnadu, South India and spread around 80 sq. km. with a width of 3 kilometres and length of 15 km. On February 20, 2003, the Kancheepuram district collector issued a gazette notification announcing that 548.14 hectares of the marsh area is classified as Protected Land.

Pallikaranai wetland is a fresh water swamp adjacent to the Bay of Bengal situated about 20 km. south of Chennai city. 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.

Conservation issues

Due to encroachments and other developmental activities, the Pallikaranai marsh is on the verge of extinction. It is shrinking day by day due to developmental activities such as dumping of solid waste, discharge of sewage, construction of buildings, establishment of a railway station and a new road to connect old Mahabhalipuram road and Pallavaram. 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.

Madhavaram and Manali jheels

This jheels is located about 16 km south of the city of Chennai, in the state of Tamilnadu, South India. The Manali-Madhavaram jheel ecosystem is listed in the Directory of Wetlands published by World Wildlife Fund (WWF).

Principal features

The Manali jheel covers an area of about 40 acres. According to Prince Frederick (2003), it is small and interesting to find a straggling representation of bird life such as purple moorhen, bitterns and cattle egrets.

During the North East Monsoon (October to December), the jheel gets filled up to 7 or 8 feet. The stone embankment along the western flank helps to hold the water. This storage causes flooding of the low-lying eastern flank, where people

displaced by the Manali Refinery have built settlements. To avoid flooding, they breach the embankment in the north. If the northern embankment had not been breached, there would be water spread to some extent during summer. 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.
The jheels harbour native fish such as tilapia, freshwater gastropod, applesnail, insects such as dragonfly, damselfly, waterskater, diving beetle and keelback water snakes. Birds like pheasant-tailed jacanas in breeding plumage, sandpipers, snipes, stints, stilts, lapwings, plovers, terns, gulls, moorhen, dabchick, snake bird or darter, 5 coots, 2 cormorants, 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.

Conservation issue
Effluents flowing into the jheel from the Madhavaram Dairy cause oxygen depletion in the water. During this period, fish mortality is high due to asphyxiation. Before deepening, the sloping topography of the jheel served as an ideal habitat for wetland birds. Till the mid-1990s, the Madhavaram jheel was leased out each year to the local residents for harvesting fish. The harvesting of fish synchronized with the breeding cycle of the jacana (June to September). The lessee dug up canals to divert the already depleting water storage and just scooped up 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. This results in the lack of nesting sites for the jacanas to lay eggs or shelter their nestlings. Poaching has only been curbed. Due to silting, the storage capacity of both the jheels has reduced. People have started making the jheel the abode of the dead. Three graves came up last year. This in a way symbolically represents the death of the jheel ecosystem.

Pulicat Lagoon
This lagoon is located about 60 km south of the city of Chennai, in the state of Tamilnadu, South India and spread around 18,440 hectares. 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.

Principal features
According to Asha Krishna Kumar (2000), 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 runs parallel to the Coromandel Coast, passess 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.

Conservation issues
There are about 52 villages around the biodiversity rich Pulicat lagoon, the livelihood of whose people is in danger. 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. However, the lagoon still supports a major commercial fishery and carries about 10,000 tonnes of seafood. As a result of ecological changes within the lagoon, the production of fish has drastically decreased.

Conclusion
The major threats to these EHS are the increasing pressure of human activities such as sand mining, increasing hutments, dumping of wastes and encroachments. They cause significant damage to plants, animals and birds. Developmental activities also cause irreversible changes because they badly displace the native vegetation. The North Chennai Thermal Power Station (NCTP) lets out hot water into the Buckingham canal and discharges toxic fly ash in the form of slurry, resulting in siltation in the lagoon ecosystem. Scrub jungles are a habitat for several flora and fauna. They are home to diverse and fragile living organisms. They help birds and animals to breed and also help in propagating plants and increasing the green cover. The Guindy National Park, IIT campus, Theosophical Society campus, Madras Christian College campus and Kattupalli Island in Chennai have been identified as Ecologically Sensitive Sites. The Government should take necessary action against any anti-developmental activities in these ecologically sensitive areas and protect such valuable ecosystems in the city. Pallikaranai swamp, Manali and Madhavaram jheels and Pulicat lagoon have also been identified as Ecological Heritage Sites. The major threats to these wetlands comes from increasing pressure of human activities, urbanization, industrialization, developmental activities such as dumping of solid waste, discharging sewage and encroachments. The Government, NGOs, people and naturalists should join hands to protect the valuable wetland ecosystems in the city.

Acknowledgement

I wish to express my gratitude to Dr. Nanditha Krishna, Honorary Director of C.P.R. Environmental Education Centre for her constant encouragement and valuable guidance.

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