ENVIS NEWSLETTER

CENTRE FOR ENVIRONMENTAL STUDIES
N-3/56, IRC VILLAGE, BHUBANESWAR-751015
(Forest & Environment Department, Government of Orissa)

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Envis Team

Contents

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From the Director's Desk...

The Environmental Information System has been providing a base for information dissemination in issues related to State of Environment of Orissa. Publication of Newsletter is one of the component of the ENVIS Programme; other being information dissemination through web-enabled system and query services. The Centre has been responding to various queries on environmental issues.

This newsletter depicts the importance of wetlands with special reference to Chilika lagoon, one of the largest brackish water lagoons of Orissa. The management practices commonly adopted by the State Government has been brought into picture. I sincerely hope that the information content of the newsletter would enlighten environmentalist over the country on importance of wetlands and how better management can improve the ecology and economy of the area. I would like to thank to the ENVIS team and the Chilika Development Authority for their support towards preparation of this newsletter.

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State of Environment: Wetland - Chilika

Wetlands are the lands transitional between terrestrial and aquatic eco-systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands have important role in recycling nutrients, purifying water, attenuating floods, recharging ground water and maintaining stream flow. Wetlands provide many services and commodities to humanity. Orissa has 16277.5 ha of Inland wetland and 185431.75 ha of coastal wetland. Chilika is one of the largest brackish water lagoons in Orissa and one of the hotspots of biodiversity in India as well. It shelters a number of endangered species listed in the IUCN red list of threatened species and wintering ground for more than one million migratory birds. During the past years the lagoon has faced considerably ecological and anthropogenic pressure leading to decline in biodiversity and productivity. Chilika Lake is also a Ramsar Site designated in 1981. Due to proper management practices adopted by the State Government along with active cooperation from various institutions and local community Chilika Lake has been removed from the Montreux Record.

Keywords: Biodiversity, Ramsar site, eco-tourism, Montreux record.

Wetlands are the lands transitional between terrestrial and aquatic eco-systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands retain water during dry periods, thus keeping the water table high and relatively stable. During the periods of flooding, they mitigate flood and trap suspended solids and attach nutrients. Wetlands are important feeding and breeding areas for wildlife. Wetlands are also important in supporting species diversity.

With respect to the altitude, natural wetlands found in India are high-altitude Himalayan lakes, wetlands situated in the flood plains of the major river systems, saline wetlands, coastal wetlands (lagoons, backwaters and estuaries), mangrove swamps, coral reefs, marine wetlands and so on. Besides the natural habitats, a large number of man-made wetlands also found in India which have been developed for different purposes such as irrigation, water supply, fisheries, electricity, flood control etc. It is estimated that 20% of the known range of biodiversity in India are supported by fresh water wetlands alone. 58.2 million hectares of area is occupied by wetlands in India.

Indian wetlands are grouped as Himalayan wetlands, Indo-Gangetic wetlands, coastal wetlands and Deccan. Coastal wetlands are situated along the 7500 Km long coastline in West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa, Maharastra and Gujrat. This also includes mangrove forests and offshore coral reefs.

Value of Wetlands:

Wetlands provide many services and commodities to humanity. Wetlands have important role in recycling of nutrients, purifying water, attenuating floods, recharging ground water and maintaining stream flow. It also serves in providing drinking water, fish, fodder, fuel, wildlife habitat and control shoreline areas against erosion. Wetlands are also important as nesting sites for migratory birds. Aquatic vegetation is a valuable source of food, especially for water fowl. In winter, migratory water fowl search the sediment for nutrious seeds, roots and tubers besides the resident water fowl who may feed different aquatic vegetation species round the year.

Orissa has 16277.5 hectares of Inland wetland and 185431.75 hectares of coastal wetland. Out of this 204 numbers are natural wetlands while man-made wetlands are 141 in numbers.

Inland and Coastal Wetlands in Orissa				
Category	Inland Wetland		Coastal Wetland	
	Nos.	Area in Ha.	Nos.	Area in Ha.
Natural	100	14001.75	104	183144.75
Man-made	134	148771.75	7	2287.00
Total	234	162773.50	111	185431.75

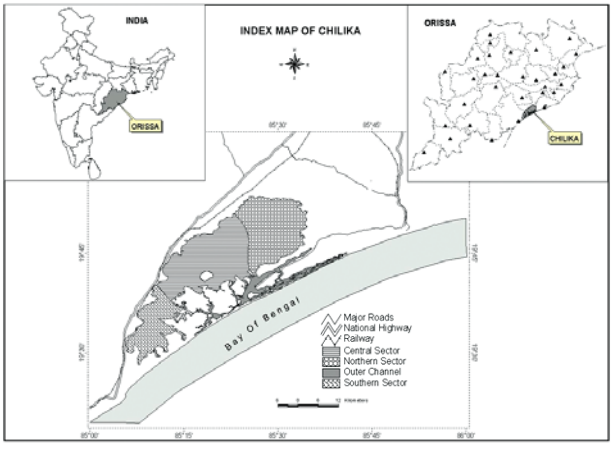
Source- SoER, OSPCB, Orissa

District wise breakup of wetlands in Orissa	
District	Area in Hect.
Angul	25175.50
Balasore	16809.75
Bargarh	8629.75
Bhadrak	794.00
Bolangir	826.00
Boudh	63.00
Cuttack	2889.25
Deogarh	1062.00
Dhenkanal	506.25
Gajapati	694.25
Ganjam	12779.75
Jagatsinghpur	10440.00
Jajpur	1407.50
Kalahandi	194.00
Kendrapra	30748.25
Keonjhar	3777.00
Khurda	3872.25
Koraput	17400.00
Malkangiri	16869.00
Mayurbhanj	2671.25
Nabarangpur	744.00
Nayagarh	594.25
Nuapda	1626.00
Puri	117523.75
Rayagada	294.00
Sambalpur	62794.00
Sundargarh	6265.00

Source- SoER, OSPCB, Orissa

Chilika:

Chilika is one of the hotspots of biodiversity in India. It is mostly brackish water lake with partly freshwater and partly saline water at places. There is a unique assemblage of freshwater, brackish and marine eco-system in the lagoon. It has very high productivity along with the presence of a variety of habitats allowing amazing number of species. Chilika is the largest lagoon along the coast of India situated between latitude of 19°28′ and 19°54′ N and longitude of 85°05′ and 85°38′ E. The water spread area of the lagoon varies between 1165 to 906 Sq.Km during the monsoon and summer respectively. The lagoon is surrounded by Bay of Bengal in East, Rocky hills of Eastern Ghats in West, Alluvial plain of Mahanadi Delta at North and rocky hills of Eastern Ghats in South.



Source- CDA

Chilika lagoon lies adjoining the districts of Puri, Khurda and Ganjam of Orissa state along the eastern coast of India. The lagoon is divided into four ecological sectors such as the Northern, Central, Southern and outer channel. The lagoon is pear shaped having depth varying from 0.38 to 6.2 m. A 32 Km long narrow, outer channel connects the main lagoon to the Bay of Bengal. High tides near the inlet mouth drive in salt water through channel during dry months. During rainy season, 52 river and rivulets fall into the Chilika causing fresh water currents which gradually push the sea water out.

The catchment of the lagoon enjoys a typically tropical climate with an average maximum temperature of 39.9ºC and minimum temperature of 14ºC. The average rainfall in the catchment is 1238.8 mm. The wind speed mostly from North and north-east direction and during monsoon month it is mostly southerly and south-westerly direction due to the influence of South-West monsoon and the wind speed varies from 5.3 to 16 Km/hour. Hydrology is the single most dominant factor governing the ecological processes and functions of the lagoon. It has a large catchment area constituted by two river systems. The first in the deltaic drainage of the Mahanadi river system into the lake formed by rivers Bhargavi, Daya, Nuna, Makra etc. which contributes the major part of the freshwater and silt input to the lagoon. The Second drainage system is that of the older rivers which drains the Eastern Ghats which account for 39% of the total fresh water inflow into the lagoon. River Kansari, Kusumi, Janjira and Tarini are the parts of this drainage system.

Biodiversity in Chilika:

The Chilika lagoon shelters a number of endangered species listed in the IUCN red list of threatened species and wintering ground for more than one million migratory birds. The highly productive lagoon ecosystem with its rich fishery resources sustains the livelihood of more than 0.2 million fisher folk and 0.8 million people who live in the catchment of the lagoon.

Chilika lagoon is the largest wintering ground for migratory water-fowl found anywhere on the Indian sub-continent. It is one of the hot spot of biodiversity in the country, and some rare, vulnerable and endangered species listed in the IUCN Red List of threatened Animals inhabit the lake area for at least part of their life cycle. This list includes a number of rare, threatened ad endangered species such as Irrawaddy dolphins and the Barakudia limbless skink.

Source- CDA

The lagoon hosts over 225 species of birds in peak migratory season and at least 97 of these are intercontinental migrants. Birds from as far as the Caspian Sea, Lake Baikal, Aral Sea and other remote parts of Russia, Kirghiz steppes of Mongolia, Central and South-east Asia, Ladakh and Himalayas come here. Huge flocks of birds scattered throughout the lake of major concentration in terms of species abundance is on Nalabana Island. Nalabana Island has been declared as bird sanctuary since 1987. The island gets completely submerged during the monsoons and almost no birds are seen during that time. The island emerges when the monsoon goes away. Nalaban covers an area of 15.53 sq. Km, which is also one of the protected areas of Orissa. Long-legged waders and dabbling species are predominant during migratory season. The island also attracts a large number of ducks, fish eating birds and small waders. The bird census carried out in the lagoon area every year claimed huge numbers of Shovellers, Pintails, Coots, Gadwalls and Great Grebes in Chilika. Large number of flamingos in flocks comes to Chilika from Iran and Rann of Kutch of Gujarat. A few birds such as the short-legged shorebirds, Pond Herons and Night heron are seen along the shifting shores of the lake and islands. These also include several Plovers, the Collard Pratincole, Ruff, Dunlins, Snipes and Sand pipers. Some Larks, Wagtails and Lapwings are found in the mudflats. Deep water area of the lagoon attracts some Longer-legged Avocets, Stilts and Godwits. The vegetated area of the lake also supports moorhens, coots and Jacanas. Though River Tern breeds sporadically throughout India, the 540 nests (record of Nalabana) is the largest nesting in the South-east Asia.

By a recent phytodiversity survey by Chilika Development Authority during 2002, 720 numbers of plants identified from Chilika.

Problems & Mitigation:

The Chilika lagoon had been facing considerably ecological and anthropogenic pressure leading to decline in biodiversity and productivity and thus adversely affecting the livelihood of the local community. Factors responsible for the degradation of the lagoon ecology were identified as siltation, fall in salinity level, proliferation of fresh water weed and other invasive species, poor discharge of flood water leading to water logging in the peripheral cropland, unauthorized shrimp culture etc.

Wetlands conservation in India is indirectly influenced by an array of policy and legislative measures. Some of the key legislations can be outlined here.

- 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, 1977
- Maritime Zone of India (Regulation and fishing by foreign vessels) Acts, 1980
- Forest (Conservation) Act, 1980
- Environmental (Protection) Act, 1986
- Coastal Zone Regulation Notification, 1991
- Wildlife (Protection) Amendment Act, 1991
- National Conservation Strategy and Policy Statement on Environment and Development, 1992
- National Policy and Macro level Action Strategy on Biodiversity, 1999
- Biological Diversity Act, 2003

Chilika - A Ramsar site

Chilika lake was designated as a Ramsar site in 1981 by Ramsar Bureau for its biodiversity and economic importance to the local people. About one million migratory water-fowl and shorebirds winter here. It shelters over 400 vertebrate species. As an estuarine lagoon it supports a unique assemblage of marine brackish water and fresh water species as well as several rare, endangered and threatened species. The lagoon supports fisheries that are a lifeline to a community of over 2,00,000 fisher folk and contribute significantly to India's international trade. In 1993, the Ministry of Environment and Forests requested that the lake be placed on the Montreux Record.

The Government of Orissa launched Chilika Development Authority (CDA) in 1991 for the restoration and management of the lagoon. The aim and objectives of the Authority is to –

- Protect the lake ecosystem with all its genetic diversity.
- Survey, plan and prepare the project proposal for interacted Resource Management for all-round development in and around the Lake.
- Execute various multidimensional and multi disciplinary developmental activities
- Cooperate and collaborate with other institutions of the States, National or International institutions for all-round development of the Lake.

The Chilika Development Authority has coordinated monitoring and assessment at Chilika lake. They addressed the major pressures causing adverse change in the ecological character of the lake. The primary drivers for these changes are population growth and catchment degradation along with widespread poor awareness of the ecological processes that maintain the ecosystem and among the local people.

Ameliorating measures by CDA

To overcome the problem faced, CDA has initiated different ameliorating measures for integral management of the lagoon.

◆ **Catchment treatment**

For an integrated management of the catchment of the lagoon, treatment plan has been prepared using various satellite data. Catchment management has been carried out through management of the micro watersheds with active cooperation of the local communities, block plantations and rehabilitation of degraded forests with the help of forest department and soil conservation departments.

◆ **Opening of New Mouth**

A 32 Km long narrow, outer channel was connecting the main lagoon to the Bay of Bengal, near the village Arakhruda. The mouth connecting the channel to the sea was close to the north eastern end. High tides near this inlet mouth used to drive in salt water through the channel during the dry months (December to June). With the onset of the rains, the rivers falling into the northern zone are in spate, causing fresh water currents, which gradually push the sea water out. As result of this dynamics, the inlet mouth constantly changes position. Due to shifting of the mouth proper exchange of water was

Source- CDA

not taking place and due to choking of outer channel and its mouth opening into the Sea, the exchange of water between the sea and the Lake as decreasing. As a result the salinity level of the lake was gradually decreasing affecting the biodiversity of the lake. To over come the problem, an artificial mouth was opened in September 2000. After the opening of the new mouth there has been a marked improvement in the water quality of the lagoon. There has been improvement of salinity flux by 40% and the tidal flux by 45%. There has been a substantial increase in the fish, prawn and crab production as well as the species diversity including the reappearance of the threatened species, increase in the avian diversity, expansion flushing out of sediment to the sea and decrease of fresh water invasive species and water logging.

◆ **Desilation of lead channels**

About one million ton of silt is added to the lake every year, which makes the lake gradually more shallow. To reduce the silt load, for maintenance of a salinity gradient in the lagoon as well as to maintain the lead channels and to facilitate movement of boats massive de-siltation has been done through dredging by the crawl cat dredgers. The dredged channels serve as the express waterways for migration of dolphins, fishes, prawn and crabs.

◆ **Improvement of Nalabana Eco-system**

Nalabana island is an abode of the avifauna and becomes a paradise for the migratory birds in winter. Restoration and improvement of Nalabana eco-system is being carried out through plantation of Nalagrass; formation of bunds and mounds; perching facilities for birds; demarcation and maintenance of boundaries of Nalabana sanctuary; renovation of creeks; protection of migratory birds; and formation of rescue centers for ailing birds etc.

◆ **Weed Management**

Spread of Nalagrass not only poses threat for the movement of boats but also facilitates fast siltation of the area. Mechanical removal of weeds, which is in practice at present, has not yielded considerable result in controlling its growth in the lagoon. However experimental plots have been taken up to arrive at a suitable strategy to control the weed species in the worst affected areas.

◆ **Fishery resource development**

After opening of the new mouth, the fish landing attained over 10,000 metric tones in a year. To regulate the fishing activities and to remove the unauthorized encroachments and enclosure for prawn culture, a Task Force has been created under the administrative jurisdiction of district collectors.

◆ **Socio-economic activities**

CDA is implementing infrastructure development programmes like renovation of village ponds, construction of fish landing jetties, construction of village community centers, provision of solar street light system etc in the villages in and around the lagoon. Besides, various income

Source- CDA

generation programmes through value addition for the poor fishermen are being promoted in the villages.

◆ **Environmental Awareness Programmes**

With an objective to educate people and protect Chilika lagoon, different methods are being implemented such as provision of visitor center; eco park; massive education programme in collaboration with the local CBOs and NGOs; and educational programme for the school children.

◆ **Wetland Research Centre**

For scientific monitoring of biological and physical parameters of the lagoon, a Wetland Research Centre, first of its kind in India has been established at Chandraput.

A request to remove Chilika Lake from the Montreux Record was submitted to the Ramsar Bureau by the Ministry of Environment and Forests on 30th April 2001. Based on information supplied by relevant authorities, the management actions at Chilika Lake were sufficient to recommend removal of the site from the Montreux Record with effect from

Source- CDA

November 2003. The removal of the site from the Montreux Record was accompanied by a commitment from the Government of India and the CDA to continue the management practices to avoid further degradation of the site in future. It is the first Ramsar site from Asia to be removed from the Montreux Record. This has happened due to the community participation, linkage with the various national and international institutions, intensive monitoring and assessment system for management adopted by the CDA.

ECO-TOURISM IN CHILIKA

Chilika lagoon offers scope for eco-tourism in various ways. Vast bio-diversity in the lagoon, Nalaban island inviting million of migratory birds during winter and the dancing Irrawaddy Dolphins are some of the features. Besides, there are some other important places, which attracts tourists round the year.

Rambha

It is a popular tourist's site with a number of inviting islands and vast stretch of blue water.

Beacon Island

It is an architectural marvel with a conical pillar constructed on a submerged mass of rock in the Rambha Bay near Ghantasila hill. It was built by the then Collector of Ganjam under the East India Company.

Breakfast Island

It is also known as Sanakuda Island. It is a pear shaped island located in the Rambha Bay. Once upon a time the island was full of greenery with the Casupurea ceylanica a mangrove associates. The vegetation at present in degraded condition.

Honeymoon Island

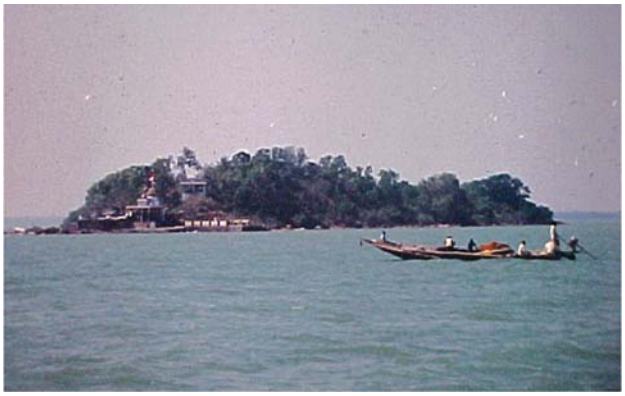
It is also situated in the Rambha Bay near Sanakuda Island. The limbless lizard was recorded from this island, which is endemic to this island.

Bird's Island

It is situated in the southern sector of Chilika. The island has luxuriant growth of herbs, shrubs, trees and creepers. During winter season, the migratory birds are sighted here. It is known for its rich algal communities.

Kalijai Temple

It is situated on an island. It is an excellent destination.



Source- CDA

Satapada

It is located on the eastern shore of the lake. It is bounded by the lagoon on three sides. One main attraction of Satapada is Irrawaddy Dolphins, once abundant but now an endangered species. As per 2007 census, the population of dolphins in Chilika lagoon is 135.

Sand-bar and mouth of Chilika lagoon

A beautifully stretch of endless unexplored stretch of empty beach exists across the sand bar, which separates the lagoon from the sea.

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