

# CHILIKA

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**Chilika**  
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The Chilika Development Authority is the nodal agency of State Government of Odisha entrusted with conservation and sustainable management of Chilika Lake. It was created by the Forest and Environment Department, Government of Odisha vide Resolution No. 20389/F&E dated 20.11.1991. The Authority is registered under the Orissa Societies Registration Act. Its Governing Body consists of the Chief Minister of Orissa as the Chairman and the Minister of Environment, Science and Technology as the working Chairman. The members are drawn from various state government departments, NGOs and technical experts besides elected representatives.



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## Editorial Panel

Wetlands International - South Asia : Ritesh Kumar  
Chilika Development Authority : Dr. Ajit Kumar Pattnaik

## Design and Layout

Kamal Dalakoti & Meena Kumari, Wetlands International - South Asia

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# Strengthening Community Institutions for Sustainable Chilika Fisheries



**T**he diverse and dynamic assemblage of fish, invertebrate and crustacean species found in Chilika Lake provide the basis of a rich fishery which supports over 200,000 local fishers and currently generates over 9% of the Orissa State's foreign revenue from marine products. Conservation and wise use of Chilika is linked to sustainable management of fisheries resource base and well-being of wetland dependent fisher communities. While the hydrological intervention of 2000 was able to restore the necessary ecological conditions for rejuvenation of fisheries, the key to its sustenance lies in the design of institutional arrangements and mechanisms through which various stakeholders gain access to and manage the resource base.

In this article **Ajit K. Pattnaik, S.K. Mohanty and Ritesh Kumar** outline the measures being undertaken by Chilika Development Authority and the state government for strengthening community fishery institutions for promoting responsible fishery.



*Fishers prepare for the day at Kalupadaghat*

### How were the Chilika fisheries managed historically?

Chilika fisheries were under the control of Zamindars (land revenue administrators) till the abolition of the estates and princely rules in 1953. The fishery sources within the lake (called Sairats) were leased out to traditional fishers against payment of royalty. Since 1953, when the government of Orissa took control of the Chilika Lake, the fishery sources were leased out through open auction by erstwhile Anchala Adhikaries.

For generations, Chilika fishers evolved a complex system of resource partitioning, wherein access to each fisher group was determined on the basis on species they specialized in catching. The norms include setting spatial limits (what places to fish), temporal limits (seasonality), gear restrictions (what harvesting gear may be used), and physical limits (what sizes may be fished). These were traditionally set and were even exchanged during the periods of scarcity and calamities. Each fisher village had an organization called 'desh' responsible for settling disputes, administering common property resources and organizing collective fishing for communal purposes.

Late Dr. Gajendranath Mitra, the first fishery officer of Orissa State and the founder Director of the Orissa Fisheries Department is credited with establishment of the first fishery cooperative society in 1942 as a part of the rehabilitation measures for a cyclone devastated village in southern shores of Chilika. Its objective was to empower the fisher communities and to enhance their livelihoods by preventing exploitation in the hands of middlemen. By

1959, twenty five Primary Fishers Cooperative Societies (PFCS) emerged around Chilika as the grass root level fishery institutions.

Dr. Mitra also played an instrumental role in drafting the Chilika Development Plan (subsequently included in the First Five Year Plan of Orissa) which focused on strengthening the cooperatives for sustainable management of wild fisheries under a lease system. Similar recommendations were given by Mr. A.F. Leide-Law, a Canadian expert commissioned by the state to suggest measures for managing diverse fishery sources and the age old traditional fishing systems. This led to the implementation of the Chilika Reorganization Scheme of 1959 which gave priority and precedence to the PFCS by recognizing the traditional right of the local fishers. A Central Fishers Cooperative Marketing Society (CFCMS) Limited was constituted in 1959 at Balugaon as an apex body for ensuring smooth management of fishery leases, marketing of fish catch, providing necessary infrastructure, and most importantly working capital to the affiliated fishers for purchase of fishing nets and boats. The existing 25 PFCS were affiliated to the CFCMS.

The CFCMS took the lease of various fishery sources from the State Revenue Department and subsequently sub-leased them to the member PFCS on annual basis with provision of 10% increase in lease value every year. One tenth of the lease value was retained to cover the administrative costs. The government revised the lease principles in 1988 enhancing the lease period to three years. By 1988, the CFCMS managed 203 fishery sources within the lake and had 49 PFCS as registered members.



The 1991 lease policy led to classification of Chilika fisheries into “capture and culture” sources as well as provided scope for sub-leasing the fishery sources to non-fishers and fish merchants. The traditional fishers resisted this move and filed a civil suit in 1992 at the High Court of Orissa to withdraw the policy. In accordance with the High Court decision of November 1993, the State Government earmarked 6,000 acres (2,429 ha) as culture fishery sources for PFCSs and 14,000 acres (5,668 ha) as culture fishery sources for non-fishers villages. Government decided to implement the Court order with a lease term of 3 years and lease value of Rs.800 for each 0.4 ha for culture fishery sources with 10% annual increase. Government also decided to constitute a Task Force to monitor the encroachments and to demarcate the fishery sources in the lake. However, leasing of fishery sources remained suspended for seven year period of 1992-98 due to promulgation of Coastal Regulation Zone Notification by Central Government in 1991 and specific ban order on aquaculture in Chilika imposed by the Hon'ble Supreme Court of India in their 1996 judgment.

In 2001, the lease policy was again drastically revised. The diverse fisheries were broadly classified into prawn and non-prawn sources. *Bahani, Jano, Dian* and *Uthapani* were merged into the non-prawn category. The lease term was reduced to one year, and a single value fixed irrespective of the productivity and area (Rs.9,300 for non prawn sources, and Rs.27,900 for prawn sources). The District Collectors leased the fishery sources to the FISHFED (which replaced CFCMS as the apex agency in 1992, holding a similar mandate and objective) every year and in



*Fish haul at landing center*

turn, FISHFED sub-leased to PFCSs with 10% increase in the annual lease value. During 2001-2004, although 127 fishery sources were leased out by FISHFED, 15 were surrendered since many PFCS were not interested due to inordinate delay in handing over the rights and disputes on the source. Again, from the remaining 112 sources, nearly 30% were forcibly encroached by non-fishers and outsiders for illegal ghery operation.

By 2009-2010, of the 104 PFCS registered under the FISHFED, 11 became moribund and defunct. The performance of FISHFED itself took a severe beating with decline in marketing activities and financial support to the member PFCS.

### Why did the Fisher Cooperatives fail?

The ultimate collapse of PFCSs and the apex body (first CFCMS and subsequently FISHFED) indicate the vulnerability of institutional design. This is attributed to several factors.

Firstly, despite the fact that CFCMS was given the mandate to manage marketing and supporting capital requirements of fishers, it was not equipped with any authority to regulate the lease agreement or monitor its implementation. These remained vested with the revenue department. This prompted PFCS, particularly since the 70s, to bypass the CFCMS and market their catch directly through the local commission agents at Howrah. Even the presently existing FISHFED does not have the powers to enforce the lease terms, prevent illegal and unauthorized intrusions into the lease areas (fishery sources) or even resolve the disputes over Chilika fisheries.

Rapid increase in illegal prawn enclosures (gheries) played a huge role in changing the power relationships within fishing operations. The gheries were mainly operated by the non-fishers having ability to invest higher capital and power and influence to oversee the operations. These in turn also became sources of capital for the traditional fishers, gradually replacing the role of PFCS as capital providers. While the apex institutions were unable to provide any financial assistance to the PFCS for procurement of fisheries equipment or for working capital requirements, the non-fishers used this as an opportunity to create a credit trap for the fishers. While providing the loans, they entered into informal agreements with the fishers to procure the catch at preferential prices (nearly 15-20% less than the prevailing market prices) using biased weights and measurement systems (under-recording of the catch weight). The fishers gradually fell into the vicious debt trap, defeating one of the key purposes of setting up cooperative fishing in Chilika.

The various lease policies failed to protect the fishing grounds and rights of the traditional fishers. The erstwhile CFCMS and the present FISHFED in many cases made erratic distribution of fishery sources, which caused dissatisfaction among some of the societies as well as fishers communities. Lack of proper demarcation, rational lease valuation systems and clear rights over the leased area prevented many PFCS to take lease of fishery



Tourist boats in the outer channel area

sources. On the other hand, unauthorized occupation of the fishing grounds for ghery operation continued unabated.

### What are the current regulatory regimes for managing Chilika fisheries ?

The state government, concerned with the rapid increase in destructive fishing practices in Chilika introduced regulations in fisheries management based on the powers conferred under the Orissa Marine Fishing Regulation Act (OMFRA), 1982. The act requires registration of all fishing boats in Chilika. Additionally, it declared illegal:

1. Fishing in any form and method in the Palur canal
2. Capture of the following in Chilika: Khainga (*Mugil cephalus* larger size), Kabala (*Mugil cephalus* medium and smaller size), Bhekti (*Lates calcarifer*) below 150 (one hundred fifty) mm size and prawns like Bagada (*Penaeus monodon*) and Chapra/Kantala (*Penaeus*

*indicus*) varieties below 100 (one hundred) mm size by any means throughout the year; juvenile fish by use of small mesh nets with mesh size between 8 mm–10 mm (stretched mesh) locally called as “Zero net” throughout the year.

3. Within Chilika lake outer channel: All forms of fishing during July till January; all forms of nets, except Khanda, in the outer channel throughout the year; capture of three prawns species (*Metapenaeus monoceros* – locally called Morada; *Metapenaeus dobsonii*- Panu; *Metapenaeus affinis*- locally called Ghausu) which do not grow above 2 inches during the month of February and March.

The length of the enclosure leader line was also been restricted to 800 feet and the distance between two enclosures to a minimum of 500 m.

Though these regulations have been in force in Chilika since 1988, their impact on the destructive fishing practices has been very limited. This is attributed to several reasons. Firstly, the act does not provide for any penal provisions for violators. It also leaves regulation of Khanda (net trap) fishing, the most rampant fishing technique within the main Chilika Lake, beyond its regulation ambit. It also leaves out of its purview several other economic species as Sahala (*Eleutheronema tetradactylum*), Ilishi (*Tenualosa ilisha*) and Boroga (*Daysciaena albida*), which require conservation regulation. The mudcrab fisheries, which has gained economic importance in the recent years is also not subject to any regulation. It also does not provide for any conservation measures as protection of spawning grounds of target species or regulation of the unrestricted plying of tourist boats in the outer channel which affect free breeding migration of catadromous and anadromous fishes, seed incursion and dolphin population.





## Fisheries Resource Management Plan for Chilika

In 2010, CDA through technical collaboration with Japan International Cooperation Agency (JICA) formulated a Fisheries Resource Management plan (FRMP) based on over 3 years of resource survey, assessment of biology and ecology of eight commercially important high value fish, prawn and mud crab species; modeling for various conservation and management options; wide- range stakeholder consultations and ratification by an expert committee. The plan entails convergence in fisheries governance to ensure sustainable fish production through wise use of fisheries resources as well secure livelihoods of fishers. The plan recommends a co-management strategy with active participation of fishers. The following are the key recommendations of the FRMP:

- Empowerment of CDA to enforce fishery regulation act, management of leasing system of fishery sources and fishery cooperatives and coordination with concerned state government departments.
- Restricting the number of fishing boats in Chilika (to 7,000 based on the research undertaken by Central Inland Fisheries Research Institute). This is important in view of reducing fishing mortality of target species to avoid over fishing. Presently, three target species (*Lates calcarifer*, *Daysciaena albida* and *Etroplus suratensis*) are already under the impact of over fishing.
- Regulation of plying of motorized tourist boats in the outer channel to prevent impacts on migration of catadromous and anadromous spawners and seed ingress.
- Continued fishery resources survey and assessment including scientific monitoring of fish stocks by a regular collection of fish landing statistics, length frequency data, catch and effort data and collection of, information on fishing gears, spawning season and grounds of target species etc. This includes infrequent data

collections on fisher demography, income, marketing system and fish quality management.

- Re-organizing and strengthening the PFCSS and the Apex societies as a basis of co-management of Chilika fisheries
- Continued effort to educate the fishers through planned training programmes aimed at enhancing their understandings of fishery resource management measures. CDA with the help of Chilika Fishermen Central Cooperative Societies Ltd. to organize workshops, seminars and meetings, awareness raising events on specific topics as current stock status of target species, importance of spawning stock biomass and sustainable economic harvest/catch, protection of spawning and nursery grounds and fishery regulations in regard to closed seasons, fishing gear restrictions, harvestable size limit of target species and reduction in the number of fishing boats.
- Promoting alternative livelihood programmes through well planned fishery and non-fishery activities based on acceptable techno-feasibilities in Chilika.

Building on past experiences and recommendations of the FRMP, the state government has outlined a detailed blue print for re-activation of the fisheries cooperatives with an aim to promote sustainable fisheries in Chilika and improve the well-being of fishers. The plan, formulated in 2009-10, forms a part of the long term 10 years perspective plan for fisheries sector of Orissa.

Under the aegis of the CDA, the plan envisages judicious revision of leasing policy for fishery sources after stakeholders consultations and commensurate with the principles of sustainable fisheries.

The plan also envisages establishing an apex central society for Chilika fishery to rejuvenate sick and dormant PFCSS by providing financial, infrastructural and



## Revitalizing PFCS through access to credit and cold chain facilities

Availability of credit at equitable terms plays an important role in economic viability of the PFCS. Under a pilot initiative, CDA through the Fisheries and Animal Resources Development Department is providing Rs. 7 lakh as revolving fund to PFCSs to revive the institutions and ensure fair access to credit to the member fishers. The results have so far been encouraging. Jayantipur PFCS is one of the early cooperative societies to stop depending on middlemen for credit. It currently receives around Rs. 20,000 monthly though loan repayment from fishers, which is being used to build back the seed capital for second cycle of loans.

Lack of appropriate storage facilities force the fisher to sell their catch to the middlemen who exploit their vulnerability by paying low prices and manipulating weights. CDA through support of Marine Products Export Development Authority (MPEDA) has launched an initiative to provide ice boxes to the fishers so that the catch could be maintained for a longer time and fishers could choose their preferred point of sale. A 70 litre box costs Rs. 2,200, of which 50 % is subsidized by MPEDA, 30 % by CDA and the rest is borne by the fisher. This scheme has been very warmly received and thus far 1,000 boxes have already been distributed with fishers reporting at least 30% increase in sale proceeds. The scheme is financed through Rs. 16.40 lakh funding support provided by MPEDA along with Rs. 10 lakhs from CDA's special problem grant under the 12<sup>th</sup> finance commission.

institutional support management of their catches to enhance financial stability and working efficiency. The Central Society will play the pivotal role in strengthening the member PFCSs, promoting responsible fisheries and implementing fisheries resources management plan (FRMP) in Chilika with the active involvement of PFCSs. The society shall be funded with adequate seed money by the state government for providing working capital loan to the PFCSs using a revolving fund mechanism. This is aimed to release the fishers from the credit trap and support development of fish marketing channels with the help of Central Society. The Assistant Registrar, Fishery Cooperatives, Chilika Circle of the Department of Fisheries and the Central Society will function to effectively coordinate the function of the PFCSs (election, audit, book keeping, etc.) with the marketing management and proper operation of lease sources.

With a view to making a beginning in this direction, State Government has established a new Central Fishermen Cooperative Society called Chilika Fishermen Central Cooperative Society (CFCCS) Ltd. with its head quarter at Balugaon on Chilika during July 2010. Its core objectives are:

- To provide working capital loan as revolving fund to the member PFCSs to improve their financial situation through fish marketing business and gradually become debt-free.
- Smooth management of leasing of fishery sources in accordance with the proposed revised lease policy with effective monitoring of lease operation.
- To introduce effective marketing system for the catches of member PFCSs to fetch higher return that can help improve the financial condition of the PFCSs.
- Supply of fishing requisites to the member PFCSs at fair prices.
- To set up support service units under PPP mode to introduce cold chain systems for fish quality management and improving marketing system.
- To promote production and marketing of value added fish products through women Self Help Group (SHG) of PFCSs.

- To promote fresh fish retailing business in modern sales outlets for the consumers in the nearby cities and towns.
- To organize capacity building training programmes at the community / PFCSs level to educate the fishers to follow "Do's or Don'ts" in regulated fishing operation to achieve the goal of sustainable fisheries and fish quality management.

Further, CDA, in collaboration with the Department of Fisheries and Animal Resource Development, has taken initiatives aimed at providing ice boxes and credit at equitable terms to the societies. These have led to some very positive outcomes (refer box for details).

## Conclusion

Wise use of Chilika Lake is hinged on conserving ecosystem component and processes and sustaining its ecosystem services, fisheries being the most important in the context of livelihoods. Managing Chilika needs to be based on a socio-ecological system perspective wherein the wetland system is seen as a setting determining well-being of its dependent communities, and ecological character of the wetland system as a foundational construct. Livelihood systems of fishers interact with Chilika at multiple spatial and temporal scales, mutually shaping and reinforcing ecosystem services embedded within ecological character, as well as livelihood capitals which form the basis of livelihood strategies.

Community fishery institutions hold the future to sustainable fisheries management in Chilika. The success of all management efforts in this direction lie in creating positive incentives and community stewardship for conserving fisheries while sustaining harvest in an equitable manner. This expands the domain of current wetland management from merely ensuring conservation of wetland ecological character, to also addressing market chains and power structures which influence Chilika fisheries. Finally, they provide the much needed polycentricity to the state and market led institutional solutions, ultimately bringing fishers in an active role in management of Chilika ecosystem.



# Management of *Phragmites Karka* Invasion in Chilika

The rapid spread of *Phragmites karka* in the northern and north-western parts of Chilika is being observed in the recent years. There are several hydrological, ecological and social implications of this invasion. The northern sector, being a part of the delta fraction of Chilika Lake basin, receives the maximum inflow of freshwater and silt. The presence of *Phragmites* in this zone impedes flushing of sediments, and thereby impacts water holding capacity of the system in the long run. The northern sector also serves as breeding ground for several economically important fish species. Spread of *Phragmites* creates ecologically stressed environments for juveniles as well as blocks their migratory pathways. *Phragmites* has also tended to colonize areas previously under submerged vegetation (primarily *Hydrilla*, *Vallisneria*, and *Potamogeton*). Several species of ducks have been observed to avoid their dense stands. The delta communities identify *Phragmites* as a causative factor for extended periods of waterlogging in agricultural fields. This is also impacting movement within the lake.

An experimental attempt to control *Phragmites* spread by using chemical methods was undertaken in 2007-08 in partnership with Orissa University of Agriculture and Technology. Herbicide Glyphosate at a dose of 15ml per litre of water was applied to foliage over 13.5 acres. This however was of limited success, and raised several questions related to the short and long term implications of the chemicals on the ecology of the wetland as well as the biota living therein.

*Phragmites* invasion is not unique to Chilika, but is shared by several tropical and temperate wetlands. World over, *Phragmites* invasion has been observed to alter the structure and function of shallow wetland ecosystems by changing species composition, nutrient cycles and hydrological regimes. Dense *Phragmites* stands are known to decrease native biodiversity and quality of wetland habitat, particularly for migrating waterbirds. Experiences from management of invasive species in Loktak Lake (Manipur), Harike Lake (Punjab) and elsewhere indicate that a holistic management strategy considering the ecosystem complexities and societal interdependence is required. High economic costs are entailed if management interventions are not designed appropriately and are not able to act at multiple scales.

Considering the above, CDA and WISA convened a consultation workshop during 17-18 January 2011 with an objective of developing a strategy for management of *Phragmites* invasion in Chilika. Overall, 43 international and national experts drawn from various disciplines of wetland management attended the workshop.



The inaugural session of the workshop was chaired by Mr. Bhagirathi Behera (Director, Environment cum Special Secretary, Government of Odisha). Dr. Sidharth Kaul (Advisor, Ministry of Environment and Forests) delivered a special address on the significance of *Phragmites* invasion for management of Chilika Lake.

The technical sessions held on the first day focused on identification of invasion impacts and risks, in-situ and ex-situ measures. Prof. Max Finlayson (Institute of Land, Water and Society, Charles Sturt University, Australia) presented a framework for an integrated response strategy for managing Chilika invasion, building on similar experiences from Australia and other parts of the world. This was followed by a presentation of the current knowledge base on *Phragmites* invasion in Chilika by Ritesh Kumar (WISA). Discussions focused on identification of gaps in current management responses, impacts that needed to be taken into account and risks required to be considered. The second technical session on in-situ measures was chaired by Dr. Ajit Pattnaik (CDA) with a presentation by Dr. S.S. Mishra (Orissa University of Agriculture Technology) on the outcomes of chemical control of *Phragmites* project. The session also included discussion on mechanical removal of the biomass using specialized machinery. The third session focused on ex-situ measures was chaired by Prof. E.J. James (Karunya University) and included discussions on the ex-situ interventions required for managing *Phragmites* invasion.

The second day of the workshop focused on development of a risk management framework for Chilika Lake. Prof. P. Hejmadi chaired the session which included discussions on the risk indicators, need for additional research, review and adaptation and linkages of assessment with management planning.

The following recommendations emerged from the presentations and discussions:

1. The response strategy for managing *Phragmites* invasion in Chilika needs to be integrated building broadly on two sets of actions:
  - controlling the current invasion through appropriate in-situ and ex-situ measures
  - enhancing preparedness to manage risks of future invasions within the wetland ecosystem by developing appropriate assessment and monitoring systems. The strategy should be nested with the management planning processes and include preparedness as part of solutions
2. Interventions for controlling invasion should be undertaken considering the following:
  - ecological implications - for example impact on species replacement, and overall habitat. This includes considering the positive role played by *Phragmites* in Chilika ecosystem.
  - cost effectiveness, preferably achieving higher degree of control for every unit of resources spent. The technology used should be economically viable.
  - social implications of control technologies used
  - institutional priorities including ability to sustain interventions over long term if required.
3. Current knowledgebase on *Phragmites* invasion is limited to pin-point a solution for its control and management. Further assessments are required in the following areas to support management :
  - History of species in Chilka
  - Extent of removal required and feasible, also considering the role of *Phragmites* in nutrient dynamics and contribution to ecosystem services



Prof. Max Finlayson with Ritesh Kumar and Dr. A.K. Pattnaik at the workshop.

- Expected pattern of species habitat replacement
  - Impact of *Phragmites* removal on wetland processes, eg., hydrological (impacts on water circulation and mixing patterns, sediment exchange), ecological processes (nutrient cycles, impacts on other species, phyto-sociology)
  - Life cycle assessments focused on identification of factors creating conducive environments for invasion, impacts of various stressors (eg. Glyphosate in repeat applications and differing concentrations), growth and propagation patterns, associated biodiversity, extent and condition of degradability
- Alternate (economic) uses of harvested biomass
4. The feasibility of following mechanical options needs to be assessed by undertaking pilot experimentation :
    - Mechanical removal – cutting and completely uprooting stands with specialized equipment
    - Chemical control - use of improvised products as imazapyr in varied concentrations and application patterns





*Workshop in progress*



*Prof. P. Hejmadi and Dr. D.P. Bankhwal chairing session on risk management*

- Habitat management - cutting and submerging below water for 4 -6 months to promote biological degradation; breaking mono-specific stands to control spread; managing salinity in the northern sector to impede growth
- 5. Economic uses of *Phragmites* may be explored in view of its high fiber content. Pilot projects could be undertaken with paper industry as well as those dealing in handicrafts to assess viability of developing a community led enterprise based on the harvested biomass.
- 6. The in-situ management options needs to be nested with long term sediment and nutrient management interventions in the Northern Sector

CDA is undertaking necessary measures for implementing the recommendations of the workshops. A detailed mapping of the northern sector using advance remote

sensing techniques is under progress. Studies have also been commissioned to identify suitable biological conditions for control of invasion as well as use for economical use. Monitoring systems are also being reviewed under the ambit of integrated management planning process.





# Irrawaddy Dolphin Census 2012

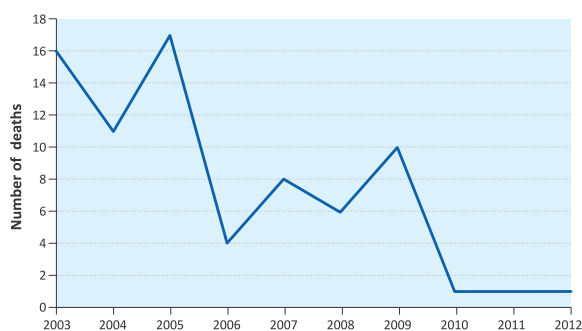
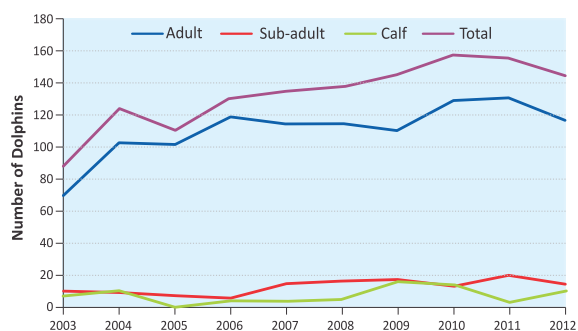
Irrawaddy dolphin (*Orcaella brevirostris*) is the flagship cetacean inhabiting Chilika. In fact, Chilika is one of only two lagoons in the world that support Irrawaddy Dolphin populations, the other being Lake Songkhla in Cambodia. The species is found confined within Asia, between Chilika and Indonesia. Irrawaddy dolphins are globally threatened, but have a healthy population in this wetland.

Annual population census for assessing health of dolphin population was conducted on 17 January 2012 involving 90 participants from government and non-government organizations including wildlife wing of Forest Department; WWF- India, New Delhi and BNHS, Mumbai; Odisha Watershed Development Mission;

Regional Museum of Natural History, Bhubaneswar; Centre for Environment Education, Bhubaneswar; researchers and academicians from the University and colleges; Wildlife Society of Orissa; Chilika Wildlife Division; Senior Research Officers from the Office of Chief Wildlife Warden, Odisha; officials from Chilika Development Authority; Animal Resource Development Department; local NGOs; and members of local Motor Boat Associations. In addition, 40 local volunteers were deployed in 18 boats. The survey was conducted using line transect method. Eighteen transects covering the dolphin habitat were identified, with three surveyors equipped with binoculars, GPS sets, rangefinders and data recording sheets.

Overall 145 dolphins were counted during the survey which included 118 adult, 16 sub-adult and 11 calves. While the total number recorded was lower than that of 2011 (156), the number of calves observed were 11 as compared to 4 recorded during the last year. Maximum sighting of 75 was recorded in the outer channel, followed by 41 in the southern sector and 29 in the central sector of the lake. On an overall, there has been a significant decline in the number of deaths due to accidents, only 1 reported during the last year.

Conservation of Irrawaddy Dolphins is accorded high priority within wetland management. CDA, in collaboration with the Wildlife Wing of the State Forest Department has initiated several measures in this direction, which include: (1) survey and assessment of dolphin habitat; (2) development of dolphin watching protocols for tourists; (3) sensitization and training of tourist boat operators; (4) deployment of dolphin protection squad in the outer channel area through the DFO, Chilika Wildlife Division; (5) widening and deepening of Magarmukh channel for free movement of dolphins from Outer channel to the main lagoon; and (6) acoustic survey of underwater behavior of dolphins through deployment of hydrophones in collaboration with Tokyo University.



# Chilika Waterbird Census 2012

The 2012 mid-winter waterbird census for Chilika was carried out on January 8, 2012 jointly by Odisha State Wildlife Organization, Chilika Development Authority and the Bombay Natural History Society.

The count of waterbirds this year stood at 868,512 of 106 species. Of this, 318,108 were observed in Nalabana alone. Additionally, 14,548 terrestrial birds from 61 species were also sighted. Among the ducks, population of Gadwall, Northern Pintail and Eurasian Wigeon exceeded over one lakh. The population count of Black-tailed Godwit (*Limosa limosa*) exceeded 80,000. Eight near threatened species namely Pallas's Fish Eagle (*Haliaeetus leucoryphus*), Asian Dowitcher (*Limnodromus semipalmatus*), Spotbilled Pelican (*Pelecanus philippensis*), Oriental Darter (*Anhinga melanogaster*), Eurasian Curlew (*Numenius arquata*), Eurasian Spoonbill (*Platalea leucorodia*), Painted Stork (*Mycteria leucocephala*) and Black-tailed Godwit (*Limosa limosa*) were sighted. Glossy Ibis (*Plegadis falcinellus*) in several hundreds was observed at Mangalajodi for the first time.

The overall diving duck and wader population were observed to be on a general decline. The population of Northern Shoveller (*Anas clypeata*) has declined to less than 50,000. Common Pochard (*Aythya ferina*), a regular visitor, seemed to have given the wetland a miss this year as not a single individual was recorded. Large declines have also been observed in the population of Greater Flamingo (*Phoenicopterus roseus*). The number of Tufted Duck (*Aythya fuligula*) has shown a healthy increase as has the population of Greylag Goose (*Anser anser*). The waterbird population at Nalabana this year was marginally lesser than the previous (382,290)

The census involved over 80 experts and enthusiasts from Bombay Natural History Society, Project Bihang, R.M.N.H, Wild Odisha, Wildlife Society of Odisha, World Wide Fund for Nature - India and teachers and students of universities and local colleges. The lake was divided into 18 segments which included four segments for Nalabana. Each segment was led by a bird expert, two to three participants and a local guide. Total bird count was done for all the species of water birds by performing actual number counts for larger and conspicuous birds and smaller flocks and estimates for species found in larger flocks.

## Waterbird Count at Chilika

Group	Number
Geese & Ducks	584,385
Waders/Shorebirds	136,199
Rails, Gallinules & Coots	58,742
Gulls, Terns & Skimmers	27,923
Hérons & Egrets	23,517
Storks	13,333
Cormorants/Darters	11,177
Grebes	6,075
Finfoot & Jacanas	5,138
Ibises & Spoonbills	1,967
Pelicans	30
Flamingos	26
Total	868,512



# Celebrating World Wetlands Day 2012

**W**orld Wetlands Day (WWD) marks the adoption of the Convention on Wetlands in the Iranian city of Ramsar on the 2 February 1971. Each year since 1997, government agencies, non-governmental organizations, and groups of citizens at all levels of the community have taken advantage of the opportunity to undertake actions aimed at raising public awareness of wetland values and benefits in general and the Ramsar Convention in particular. Chilika Development Authority has also been observing World Wetlands Day since 1997 with active participation of the government and non-government organizations, local communities, experts, political and religious leaders, citizens and wetland enthusiasts.

The WWD theme for 2012 is Wetlands and Tourism and is linked to the theme for the next meeting of the Conference of the Parties, COP11: Wetlands, Tourism and Recreation, which will take place in July 2012, in Bucharest, Romania.

CDA celebrated WWD 2012 at Wetland Research and Training Centre (WRTC) of Chilika and Sarandha hills of Ansupa Lake. The celebration at WRTC was inaugurated by Chief Executive, CDA as Chief Guest and Additional Project Director, Integrated Coastal Zone Management Project (ICZMP), Odisha and DFO, Chilika Wildlife as Guest of Honour. At Sarandha hill, Division and Divisional Forest Officer, Athagrah Forest Division, attended the



celebration as the Chief Guest and Sri P.K. Sahu, Retd. Joint Director, Soil Conservation Department Odisha was the Chief Speaker during the celebration.

Essay and drawing competitions on the theme of WWD-2012 were conducted so as to create awareness on wetland conservation among school children. The winners of the competitions were awarded with cash prize and certificate by the chief guest and drawings of the winners were displayed during the celebration. The thematic WWD-2012 poster developed by the Ramsar secretariat, translated in local (Oriya) language was released and distributed in a number of schools and used in the WWD celebration sites.





# Chilika and Climate Change

A three year research initiative on strengthening livelihood security and managing climate uncertainty was launched at Wetland Research and Training Centre, Chandraput on 1-3 December 2011.

The research is supported under the Climate Change and Water Programme of International Development and Research Centre (IDRC) and implemented by Wetlands International – South Asia (WISA) in collaboration with Chilika Development Authority with expert support from the Institute of Land, Water and Society, Charles Sturt University, Australia. Implementation will build on climate scenarios modelling, participatory risk assessments with Chilika communities, stakeholder consultations, capacity building and communication and outreach. This initiative is first of its kind to be implemented for a wetland system and would be of immense use to wetland managers in the country.

The three year research would focus on the following elements:

- Developing scenarios of change in ecosystem components, processes and services of Chilika Lagoon due to climate change
- Assessing current coping and adaptation mechanisms within wetland communities in the context of climate change.
- Demonstrating options for enhancing livelihood resilience in changing climate through pilot interventions.
- Formulating a “climate smart” plan for wetland management identifying adaptation options, intervention strategies, priority actions and investment required

- Building capacity of wetland managers to develop response strategy to climate change, particularly addressing livelihood resilience.

The outcomes of the research would be used to guide investment planning for climate change mitigation and adaptation for the Odisha State in general and Chilika in particular. The project would provide a platform for knowledge sharing amongst wetland managers placed in similar development and ecological contexts, as well as advancing research on building livelihood resilience in socio-environmental systems within the context of changing climate. Research outcomes would be available as technical reports, peer reviewed publications, datasets as well as policy briefs.

The launching event was attended by over 40 participants representing National Wetlands Regulatory Authority, experts, media, NGOs and local community people. Dr. Stephen McGurk (Regional Director, IDRC), the chief guest of the occasion highlighted the challenges faced on implementing climate and resilience research due to lack of communicability and common languages between climate scientists and local communities; limitations of downscaling regional climate models in local situations; limited comprehension of probabilistic climate scenario outcomes amongst stakeholders; and wetlands being common with multiple resource users. The launch event was followed by a workshop on various modalities for delivering the project. Key expert attending the workshop included Prof. M.N. Murty, a noted environmental economist, and Prof. E.J. James, a wetland hydrologist of national repute and member of Central Wetland Regulatory Authority.



Dr. A.K. Kundra, President, WISA, addressing the inaugural session  
From L to R on the dais - Ritesh Kumar, Dr. A.K. Pattnaik, Dr. Stephen Mc Gurk (IDRC), Prof. E.J. James (Karunys Univ.) and Prof M.N. Murty

# Integrated Coastal Zone Management Project, Odisha

Historically, the coastal zone has been a major focus for the development of human society. The coastal and marine ecosystems being highly productive attract human settlement and economic activities. Coastal zone ecosystem is important for biological and economic productivity, storm protection, erosion control and most importantly provides a range of ecosystem services crucial for human wellbeing. Despite their ecological richness and the contribution to national economy, the coastal and marine areas have not received adequate protection, and are under stress. Rapid urban-industrialization, maritime transport, marine fishing, tourism, coastal and sea bed mining, offshore oil and natural gas production and aquaculture have led to a significant increase in demand for infrastructure, resulting in the over-exploitation of natural resources. Such rapid depletion and degradation, unless arrested, will impact the livelihood, health and wellbeing of the coastal population; affecting in turn prospects for India's sustained economic growth.

Odisha coast is subject to severe weather events, such as cyclones and super-cyclones inflicting great loss of lives and property, especially among the rural coastal communities that always had low resilience to extreme weather variability. In recent years, accelerated erosion of coastal land has affected coastal agriculture and built habitats. The returns from traditional fishing are also diminishing due to degradation habitat, depletion of stock and over-exploitation. Climate change is likely to further exacerbate the risks to coastal communities and infrastructure. Studies reveal a significant potential risk from rise in sea level, increase in the frequency and intensity of extreme weather events, and changes in mean climate variables.

The six coastal districts of Odisha account for 36% of its population. Economic development, rapid population growth, urbanisation and migration from inland to coastal areas are exerting increasing pressure on coastal zones. Odisha's coastal zone is endowed with a wide range of mangroves, sea grasses, salt marshes, sand dunes, estuaries, lagoons, and a unique marine and coastal flora and fauna. The abundant coastal and offshore marine ecosystems include some 1435 sq. km. of mangroves forest in Bhitarkanika. There are major stocks of fish, marine mammals, reptiles and Olive Ridley turtles, sea grass meadows, and abundant sea weeds.

In this context Ministry of Forest & Environment, Government of India, The World Bank and Government of Orissa have lent support to implementation of Integrated Coastal Zone Management Project (ICZMP), an initiative aimed at supporting an integrated approach to coordinate



*Chief Minister at Culture Workshop of ICZMP on 16 June 2011*

activities of various government agencies & departments for the sustainable management and usages of coastal resources and maintaining the natural environment. The Project, on a pilot basis would be implemented in three States i.e. Gujarat, West Bengal and Odisha. The pilot project is being funded by the World Bank through Ministry of Forest & Environment, Government of India. The allocation would be received as grant from the Ministry of Forest & Environment; Government of India. For Odisha state, the financial outlay is 227.64 crores, including 10% contribution (of the total financial outlay) by the State Government.

Two coastal stretches, namely Paradeep to Dhamra and Gopalpur to Chilika have been identified as project sites. Specific components of the project include:

1. Formulation of an Integrated Coastal Zone Management Plan for the State
2. Study of coastal erosion and associated oceanographic processes
3. Vulnerability to Disaster
4. Biodiversity Conservation
5. Livelihood Security
6. Pollution / Environmental Quality Management
7. Improvement and Conservation of Cultural / Archaeological Assets
8. Promotion of community based ecotourism.

The project Executing Agencies / Departments in Odisha include the following:

1. The State Pollution Control Board
2. Department of Water Resources
3. Department of Environment and Forest (Wildlife Wing)
4. Department of Fisheries
5. Department of Culture
6. Department of Tourism
7. Orissa State Disaster Mitigation Authority

8. Department of Industries
9. Department of H & U D (Paradeep Municipality)
10. Chilika Development Authority

The Department of Forest and Environment, Government of Odisha is the nodal Department to coordinate with all the 10 implementing agencies / departments for preparation of the Detailed Project Reports and implementation and monitoring of proposed activities under the ICZM Project. Further, expert consultancy has been hired from Integrated Coastal & Marine Area Management (ICMAM, Chennai), Department of Marine Sciences, Berhampur University, IIT Madras and Xavier Institute of Management Bhubaneswar for guiding in techno-environment aspects and socio-economic and cultural aspects.

For effective management and implementation of the Integrated Coastal Zone Management Project in Odisha a separate 'State Project Management Unit' (SPMU) has been registered in the name of '**Integrated Coastal Zone Management Society, Odisha**' under Societies Registration Act of 1860.

The project would benefit approximately 25 lakh coastal population of our state. In addition to the direct benefit in form of infrastructure created under the aegis of the project capacity building and sensitization of the coastal communities to adopt and cope up to the extreme climatic events like cyclone, tsunami, flood, would be achieved. The coastal communities would also be sensitized on conservation of natural resources (flora & fauna). Nearly 4 lakh population of 235 coastal villages of Kendrapara, Jagatsinghpur, Puri, Khurda and Ganjam would be directly benefitted from the project activities.

For Chilika, the significant contributions would be through:

1. Strengthening of the Wetland Research and Training Center through enhanced capability and infrastructure for ecological monitoring
2. Improved protocols for monitoring of water quality, dolphins and waterbirds
3. Support to alternate livelihood initiatives for fisher communities
4. Development of community led ecotourism infrastructure

Apart from the above, the project would also support regional coastal processes studies which will support integrated management of the wetland systems. ICMAM Chennai, Berhampur University and Chilika Development Authority would do a comprehensive research on Coastal Processes Studies to identify / delineate the natural resource as well as threat / vulnerability zones (hazard line) due to natural hazards such as cyclones, tsunami, flood, etc. Through the study extensive data on waves, tides, currents, bathymetry, beach profiles etc would be collected and models such as hydrodynamics, wave and sediment transport would be developed for Shoreline Management Plans to ensure sustained long-term maintenance of coastal morphology (beach profiles), preserve productivity regimes by prevention of siltation, prevention of salt water intrusion in the agricultural fields, form a baseline data for planning future developments along Odisha coast especially to locate ports, marine zones for waste disposal etc. and preserve beach ecosystem for tourism development.

### World Bank President Robert B. Zoellick's Visit to Gupti

Mr. Robert Zoellick, the World Bank President, along with Roberto Jhagga, Country Director, World Bank, India visited Bhitarkanika National Park on 28<sup>th</sup> March 2011. During the course of his visit, he reviewed the progress of implementation of the ICZM Project in Odisha. He was briefed on about the alternate livelihood activities for the affected fisher folks, mangrove plantation through community contract, biodiversity conservation, community based ecotourism, conservation of maritime built heritage structures, multipurpose cyclone shelters under the project in the District of Kendrapada. He was also briefed how proposed activities were planned through a consultative process and innovation. He was explained about the Regional Coastal Process study and the frame work being developed for ICZM Planning for the state of Odisha.



*Dr. Ajit Pattnaik presents a community made souvenir to Mr. Robert Zoellick*

Mr. Zoellick traveled by boat to have a look at the mangrove forest of Bhitarkanika National Park. He interacted with the Self Help Groups, EDC members, NGOs at length at Gupti. While briefing the media he mentioned the need to replicate innovative approaches of ICZM Odisha Project in other coastal areas of the world.



# Workshops and Seminars (2010-2012)

## Training Workshop on Ecosystem and Community based climate change adaptation

Training of Trainers on 'Ecosystem and Community Based Climate Change Adaptation' was held at the Wetlands Research and Training Centre, Chandraput on 16-20 August 2010. The course aimed to provide basic knowledge related to wetlands and ecosystem services and hands-on skills on how to deal with ecosystem and community based approaches to climate change adaptation. The training was delivered by Wetlands International in collaboration with WWF-US and Conservation International. A total of 24 participants with expertise in different ecological systems and community institutions and actively working towards climate change adaptation participated in the training. Wetland authorities - Chilika Development Authority, Loktak Development



*Participants at Ecosystem & community based Climate Change Adaptation Workshop*

Authority, CWRDM and East Kolkata Wetland Management Authority; lead officials from Ministry of Environment and Forest and State Government Authorities; scientists from premier research institutes; leading NGOs like WWF-India, Caritas India, BNHS, AIDMI and Nallamalai Foundation; international trainees from ICIMOD Nepal, BCAS Bangladesh, CIFOR Indonesia, WI- China, WI- Indonesia and WI- Panama participated in the programme.

## Seminar on Heritage of Chilika

Wetland Research and Training Centre (WRTC), Chandraput and Indian National Trust for Art and Culture Heritage (INTACH), Bhubaneswar jointly organized a seminar on the "Heritage of Chilika" on 4th December



*Dr Aji Pattnaik releasing a brochure during seminar on Chilika heritage*

2010, attended by 30 members of INTACH and officials from CDA. Dr. A.K. Pattnaik, Chief Executive, CDA elaborated the history, culture and traditions of Chilika and the socio-economic importance of the lagoon in the State. The members appreciated the restoration activities undertaken by CDA. INTACH and CDA look forward to work in close collaboration for conservation of the cultural heritage of Chilika in future.

## Workshop on Sustainable Management of Chilika

A two-day workshop on "Sustainable Management of Chilika Lagoon" was held on 10-11 November 2010 at WRTC, Chandraput, to assess and identify the management needs and research gaps that need to be addressed to provide a long term management support system for sustainable management of Chilika. Scientists



*Experts at workshop on Sustainable Management of Chilika*

and experts from National University -Singapore, NIO-Goa, ICMAM-Chennai, School of Bio-technology, KIIT University- Bhubaneswar and CDA actively participated in the workshop.

The workshop focused on eco-restoration of Chilika and prospects for modelling its components, identifying indicators of hydro-biological monitoring, assessing trends in biological and ecological characteristics of Chilika post-hydrological interventions. Key research gaps in the areas of catchment management, hydrological regimes, lagoon ecology, fisheries and socio-economic were identified for future action.

### Indo-Swiss workshop on research at Chilika, Odisha

The Swiss Embassy, in collaboration with KIIT University and Chilika Development Authority organized a two-day workshop on November 25-26, 2011 at Wetland Research and Training Centre (WRTC) of CDA. The objective of the workshop was to promote Indo-Swiss Scientific collaboration and to find out research opportunities for Master and PhD students. The Swiss embassy identified Chilika for this initiative considering its potential for original research in different disciplines within the natural sciences and the social sciences.

His Excellency Mr. Philippe Welte, Swiss Ambassador to India, New Delhi inaugurated the workshop on 25th November 2011 at WRTC, Badkul in the presence of

Dr. Mattia Celio, Science & Technology counsellor from Swiss Embassy, New Delhi, Dr. Ajit Kumar Pattnaik, Chief Executive of Chilika Development Authority, Government of Odisha and Dr. Mrutunjaya Suar, Chief of KIIT School of Bio-technology. During the two days of intense deliberation involving 19 overseas and 30 Indian scientists & experts, several opportunities for scientific collaboration in the fields of limnology, hydrology and catchment dynamics and management of ecosystem services were identified. It is expected that the research would be pursued through specific projects to be sponsored by Swiss Embassy.



*His Excellency Mr. Phillippe Welte, (centre) Swiss ambassador to India addressing Chilika Science Workshop*





Conserve and restore Chilika Lagoon ecosystem with its rich biodiversity and aquatic resources for the benefit of stakeholders, particularly local communities through participatory processes, research and ecologically sound management techniques for the present and future generations.



To sustain and restore wetlands, their resources and biodiversity.



**Dr. Ajit Kumar Pattnaik**  
Chief Executive  
**Chilika Development Authority**

Plot No. C/11, B.J.B. Nagar  
Bhubaneswar - 751 014, Odisha, India  
Tel: +91-674 - 2434044  
URL: <http://www.chilika.com>

**Ritesh Kumar**  
Conservation Programme Manager  
**Wetlands International - South Asia**

A-25, (2<sup>nd</sup> Floor), Defence Colony  
New Delhi - 110 024, India  
Telefax: 011 - 24338906  
URL: <http://south-asia.wetlands.org>