MESSAGE

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I am pleased to know that Chilika Development Authority is going to publish the Annual Report highlighting the activities undertaken by the Authority during the year 2010-11.

Chilika a wetland of international importance with its rich biodiversity, supports the livelihood of more than 0.2 million fishermen.

Chilika Development Authority, since its creation in 1992, has been constantly engaged in restoration and sustainable management of the lake. It is noteworthy that successful restoration of the lake with ecosystem approach by the CDA has been recognised as a global model. Two important landmarks during the year have been the initiation of formulation of a long term management plan based on the Ramsar guidelines and the reactivation of the Primary Fishermen Co-operative Societies for promotion of responsible fishery in Chilika Lake.

I am sure this publication shall be of use to everyone having interest in sustainable management of Chilika and other wetlands.

I wish the publication all success.

(R.K. Sharma)

PREFACE

2010-11 have been an outstanding year of accomplishment for Chilika Development Authority. The year began with a two-day long science workshop on management of *Phragmites karka* jointly organized by Chilika Development Authority and the Wetlands International South Asia on 17th – 18th January 2011 at Bhubaneswar. Eminent naturalist and Chief Guest Prof. Priyambada Mohanty-Hejmadi and Dr. Colin Maxwell Finlayson, Professor for Ecology & Biodiversity, Director of Institute for Land, Water & Society, Charles Sturt University, Albury, NSW, Australia inaugurated the Workshop. The objective of the workshop was to deliberate on the management issues of invasive macrophytes particularly *Phragmites karka* in the northern sector of the Lake. More than 50 experts from India and abroad having experience in the field of Management of Phragmites karka participated in the workshop. Dr. Colin Maxwell Finlayson an eminent Wetlands Ecologist, Chair, Technical and Scientific Advisory Panel, Ramsar Convention, Switzerland and an expert on the Phragmites gave a detail presentation on the Management of *Phragmites karka.*

Chilika Lake is a highly productive eco-system. It is one of the main sources of capture fisheries of the state and provides food and livelihood security to more than 0.2 million fisher folk. To promote sustainable fishery in the Lake the capacity building & empowerment of fishers is given priority. CDA in collaboration with NETFISH (MPEDA)- initiated the capacity building training for the local fishers with effect from January 2010 with a target to cover all PFCS. The programme is facilitated by a NGO partners. During the financial year 92 training camps in 86 fishing villages covering 31 PFCSs was completed. As a step towards maintaining cold-chain, 1511 Insulated Fish Boxes were supplied to 1511 active fishers from 31 Primary Fishermen Cooperative Societies (PFCSs). The performance evaluation of supply of IFBs was accessed and it was observed that the fishermen are getting on an average, 32-35% better price after use of Insulated Fish Boxes.

A workshop on "Sustainable Management of Chilika Lake" was organized on 10th & 11th November 2010 at Wetland Research & Training Center (WRTC), Chandraput and was participated by the scientists and experts from NUS-Singapore, NIO-Goa, ICMAM- Chennai, School of Bio- technology, KIIT University- Bhubaneswar and CDA. The two days workshop was held with the objective 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.

A seminar on the Heritage of Chilika was organized at WRTC ,Chandraput on 4th December 2010 in collaboration with Indian National Trust for Art and Cultural Heritage (INTACH), Bhubaneswar, Chapter. The seminar was attended by 30 members of INTACH and officials from CDA.

The last financial year has been a fabulous year so far as wetland education is concerned. In collaboration with the local stakeholders a Workshop-cum- training on "Sustainable Ecotourism in Chilika" was organized at Sipakuda, Mirzapur, Gabakunda and Gangadharapur for the boat operators who conduct the tourist in Chilika Lake. The objective of the training programme was to sensitize the boat operators on sustainable eco-tourism, dolphin conservation as well as promoting nature-based tourism as an alternate source of livelihood for the local fishermen. Experts from CDA, the Divisional Forest Officer of Chilika Wildlife Division , Tourism Department, local NGOs, Dolphin researchers were the resource persons.

While these pages contain only a part of our achievements and aspirations, we hope you would appreciate the sincerity of our endeavour.

Dr. A. K. Pattnaik, IFS
Chief Executive
Chilika Development Authority

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1. Introduction

1.1. Chilika Development Authority

Chilika Development Authority (a Government of Orissa Agency) was created in the year 1991 under, Forest & Environment Department of Government of Odisha with an objective of restoration and sustainable management of Chilika Lake with all its genetic diversity. The broad objectives of Chilika Development Authority are;

- To protect the Lake eco-system with all its genetic diversity.
- To execute various multidimensional developmental activities either itself or through some other agency to enhance the economic condition of the community.
- To survey, plan and prepare the project proposal for integrated resource management for all-round development in and around the Lake.
- To co-operate and collaborate with other institutions of the States, National and International institutions for all-round development of the Lake.
- To establish management information system for the Lake.
- To promote long term multidisciplinary research, prepare environment status report and establish education centre for the Lake.

2. The Chilika Lake

Chilika Lake is situated on the east coast of India and is situated between 19° 28' and 19° 54' North latitude and 85° 05' and 85° 38' East longitudes. It extends from Southwest corner of Puri and Khurda districts to the adjoining Ganjam District of Odisha State. It is one of the largest brackish water Lake in Asia with estuarine character. The water spread area of the Lake varies between 1165 and 906 sq.km during the monsoon and summer respectively. The Lake can be broadly divided into four ecological sectors based on salinity and depth: the southern sectors, central sectors, northern sectors and the outer channel. It is the largest wintering ground for migratory water-fowl on the Indian sub-continent. It is one of the hot spot of biodiversity, and habitats for 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 and endangered species such as Irrawaddy dolphin and the Barakudia limbless skink. The Nalabana wildlife sanctuary is located within the Lake. The Lake is a highly productive ecosystem and the rich fishery resources support the livelihood of more than 2,00,000 fisher folk who live in and around the Lake.

The Nalabana island inside the Lake, spreads over an area of 15.53 sq.km., is notified as a Wildlife Sanctuary. This island is an abode of the avifauna and is an important wintering ground for host of migratory bird. The avifauna of Chilika is diverse and includes 225 species of birds belonging to 26 families. The migratory species are predominated by 22 species of Ducks and Geese, 52 species of Plovers and Sandpipers, 14 species of Gulls and Terns.

Based on its rich biodiversity and socio-economic importance, Chilika Lake was designated as a Ramsar Site since from 1981. It is also included in the list of Wetlands selected for intensive conservation and management by the Ministry of Environment and Forests, Government of India.

Chilika has been subjected to constant pressures from both natural and anthropogenic factors. The management problems have been siltation, changes in salinity gradient, increase in invasive species, and aquaculture activities, resulting in loss of productivity and biodiversity. The degradation of the Lake's ecosystem resulted in change of its ecological characters. Chilika was included in the ***Montreux Record*** (threatened list of Ramsar site) in 1993 by Ramsar secretariat due to change of its ecological characters. Chilika Development Authority (CDA) was created by the Govt. of Odisha with an objective to address the above management issues.

3. Establishment

SI. No.	Post	Sanctioned strength	Men in Position	Vacancy	Remarks
1	Chief Executive	1	1		
2	Additional Chief Executive	1	1		
3	Asst. Conservator of Forests*	1	1		
4	Senior Scientist	1		1	
5	Asst. Engineer	1		1	
6	Scientific Officer	2	1	1	
7	Accounts Officer	1		1	
8	Range Officer	1	1		
9	Data Entry Operator	1		1	
10	Junior Engineer	4	2	2	
11	Technical Assistant	3		3	
12	Computer Assistant	1		1	
13	Draft man	1		1	
14	Sr. stenographer	1		1	
15	Senior Clerk	1		1	
16	Laboratory Assistant	1		1	
17	Junior Clerk	1	1		
18	Typist	1		1	
19	Driver	3	3		
20	Dredger operator	2		2	
21	Sample collector	2		2	
22	Peon	4	4		
23	Khalasi	2	2		
24	Helper	2		2	
25	Accountant	1	1		
	Total	**40**	**18**	**22**	

*Asst. Conservator of Forests (In place of DFO)

4. Restoration of the Lake

Chilika Development Authority has been adopting ecosystem approach for management and restoration of Chilika Lake. Some of the activities carried out by CDA for restoration and sustainable management of Chilika Lake, are, i) treatment of the Lake basin, ii) Opening of a new mouth, iii) De-siltation of Lead Channels, iv) Improvement of Nalabana Eco-system, v) Fishery resource management vi) Socio - economic development of fishers vii) development of communication network including ferry services linking the island villages, viii) CEPA activities.

A state of the art Visitor Center is developed at Satapada, in collaboration with CEE, Ahmadabad. The visitor center show case the complete Chilika ecosystem. The center is equipped with facilities like multimedia presentation; touch screen, exhibits, diorama, aquarium, observatory and a discovery room for the children. This centre is open to the tourist round the year. Chilika is an unique ecosystem and is a hotspot of biodiversity; it provides ample scope for scientific study of its eco-system. For scientific research and monitoring of the Lake ecosystem a Wetland Research & Training Centre is established at Barkul near Balugaon. The WR&TC at Barkul is also well equipped for conducting the training programme.

The opening of an artificial mouth along the sands spit at a distance of 11 kms from the Lake proper has been considered as the most successful hydrological intervention to save the eco-system of the Lake. The other major hydrological interventions were, the desiltation of portion outer channel from Magarmukh to new sea inlet through dredging, desiltation of lead channel over a length of 22.6 kms from Muggermukh to river confluence point of Daya & Bhargavi, desiltation of Palur Canal over a length of 14.5 kms. on southern sector. Due to desiltation measures carried out at outer channel, lead channel & Palur Canal and opening of the new mouth the following positive impacts are observed.

(a) Improvement in salinity flux resulting in the restoration of the salinity gradient of the Lake , (b) Better exchange of the water between the Lake and the sea, (c) Improved flushing-out of sediments from the Lake , (d) Reduction of water-logging in the paddy field of northern sector during monsoon, (e) Substantial improvement of the fishery resources due to auto-recruitment of the juvenile from the sea and free migration of fish and other economic species from Lake to sea and vice versa, (f) Due to increase in the salinity regime there has been reduction of fresh water weed spread area in northern sector. (g) The dredge spoil is deposited on an existing island and planted with suitable species to provide perching facility to migratory birds, this will further add to the species diversity.

The Ramsar Advisory Mission made an assessment of the restoration measures taken by Chilika Development Authority from the funds received as per the recommendation of Tenth and Eleventh Finance Commission. Based on their recommendation, the Ramsar Bureau removed the Chilika from Montreux Record (threatened list of Ramsar site) due to marked improvement in its ecosystem after hydrological intervention by CDA. Chilika is the first site from Asia removed from Montreux Record. Only 20 sites are so far removed from Montreux Record all over the world. CDA is conferred with prestigious Ramsar Wetland Award 2002 for the outstanding achievements in restoring the Chilika Lake. CDA is the first recipient of this prestigious award from Asia.

5. Activities undertaken during 2010-11

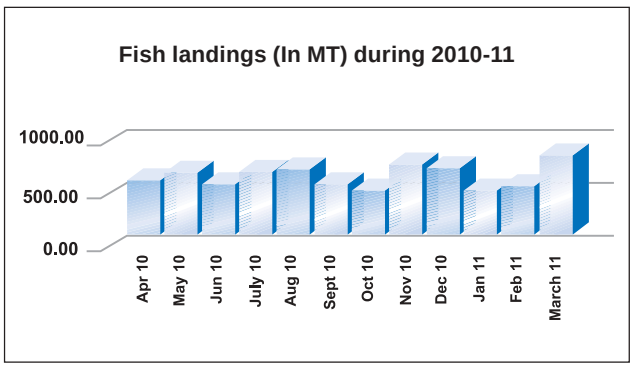
CDA received a grant of Rs.200.00 lakhs from Govt. of Odisha to continue the restoration and scientific monitoring activities in the Lake. The list of activities undertaken during the year is listed below:

5.1. Fishery Resource Development

Chilika Lake is one of the highly productive eco-system. It is one of the main sources of capture fisheries of Odisha and provides food and livelihood security to more than 0.2 million fisher folk. After the hydrological intervention by CDA there have been significant improvements of the Lake fishery. To monitor the lake fishery, fish landing data is being collected from 24 fish landing centers, 2 island markets and one cluster of fish godowns from the eastern side of the Lake (Dahikhia to Brahmagiri) and compiled every month.

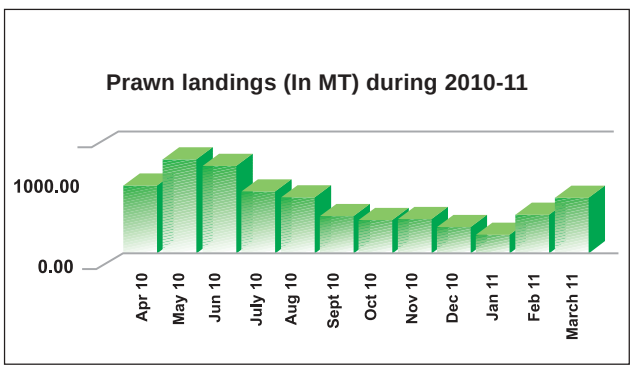
5.1.1. Fish

During 2010-2011 the total fish landing of the Lake was recorded to be 7736.54 MT as against 7892.97 MT during 2009-2010 *i.e 1.98* % decrease. The monthly fish landings ranged between 485.54 MT to 807.45 MT. and the highest fish landing was recorded in the month of March, 2011 and the lowest in January, 2011. *Thryssa sp & Stolephorus sp.* contributed maximum (998.09 MT.) during the year followed by *Nematalosa nasus* with 959.16 MT. and *Mystus gulio* with 573.65 MT. The important species like *Tenualosa ilisha* contributed only 68.68 MT. during the year.



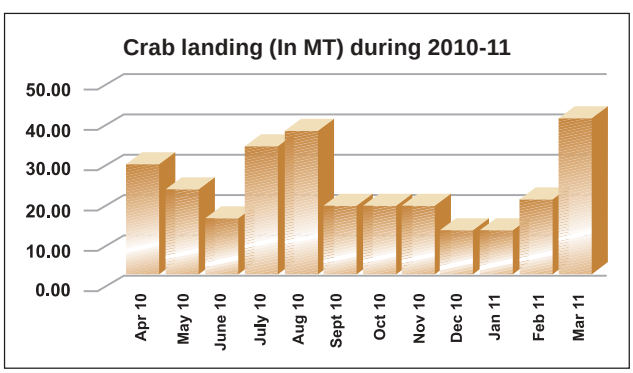
5.1.2 Prawn

During the year 2010-2011, the total prawn landing was 5043.18 MT as against 3851.51 MT during 2009-2010 *i.e 31.20* % increase. The monthly landing ranged between 106.08 MT to 865.53 MT. The lowest landing was noticed during January, 2011 and highest during May, 2010. The average landing per month during the year was 420.26 MT. The maximum landing was contributed by *P.indicus* (*Kantala*) i.e. 1708.19 MT. followed by *M.dobsoni* (Panu) i.e. 1249.29 MT. The total freshwater prawn landing during the year was 201.33.



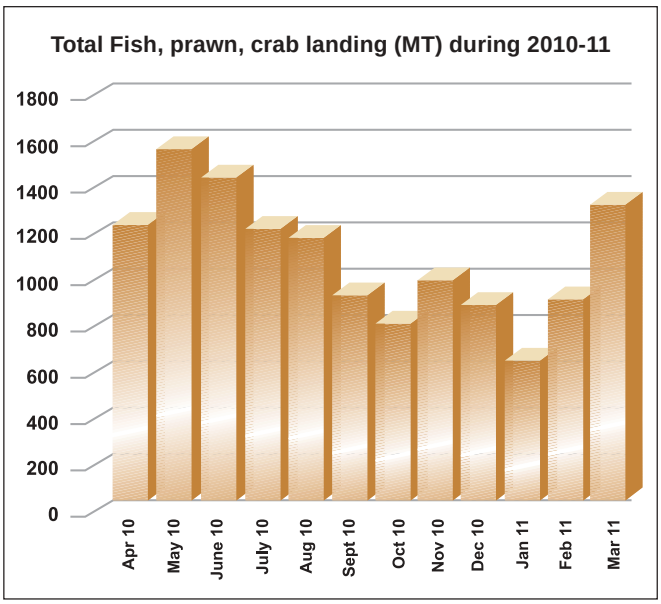
5.1.3 Mud Crab

During the year 2010-2011, the total landing of mud crab was recorded to be 285.90 MT as against 210.89 MT during 2009-2010 *i.e 35.57* % increase. The lowest landing i.e. 11.75 MT was encountered during December, 2010 and highest i.e. 40.47 MT during March, 2011. During the year average crab landing per month was 23.83 MT. The highest crab landing of 174.03 MT was recorded at Balugaon centre while the lowest (0.26 MT) was recorded at Keshpur centre.



5.1.4 Total Landing

The total landing of fish, prawn and crab during the year 2010.-2011 was 13065.62 MT as against of 11955.37 MT recorded during the year 2009-2010, showing an increase of 9.29 %. Despite the various destructive fishing practices and large scale encroachment of productive fishery areas for prawn ghery operation in the lake, the overall average annual landing of the Lake maintained a stable trend. The average annual landings during 2001-2002 to 2010-2011 after opening of the New mouth fluctuated between 9955.83 MT (2006-2007) to 14053.22 MT (2003-2004), averaging at 11815.14 MT which follows the estimated Maximum Sustainable Yield (MSY) level projected by CIFRI.



5.1.5 Eviction of encroachment

CDA provided the barge mounted excavators & boats and financial assistance to the district administration of Puri, Khurda and Ganjam for operation of task force to curb the destructive fishery practices and prawn gherries in Chilika Lake. During 2010-11 an amount of Rs.5.00 lakhs was released to the District Collector of Puri for eviction of illegal encroachments in Chilika.

5.1.6 Capacity development training on sustainable fisheries and post-harvest management

To promote sustainable fishery in the Lake the capacity building of fishers is given priority. CDA in collaboration with NETFISH (MPEDA)- initiated the capacity building training for the local fishers with effect from 25th January 2010 and is in progress. Nine number of NGO partners facilitated programme. During the financial year 92 training camps in 86 fishing villages covering 31 PFCSs covering 2760 participants have been completed (T-1).

Table - 1

Month	No. of training camps	Name the PFCSs	Name of trainer NGOs	Name of villages	Total no. of participants
January, 2010	04	Maa Mangala	RPRDS	Borokudi, Karimpur, Mudiratha & Baghalangi	120
February, 2010	05	Jayantipur, Uttar Chilika, Jadupur, Keshpur & Rambha	Pallishree, The People, National Club, NJNS & PAR	Jayantipur, Jaguleipadar,Jadupur, Keshpur & Rambha	150
March, 2010	22	Maa Palankeswari, Budhimaa, Motto, Pathara, Jadupur, Maa Mangala, Mahamaya, Uttar Chilika, Satapada, Kalapata, Gajapatinagar, Rambha, Bhusandpur, Chandidevi, Bhagabati & Chamunda	Researcher, RPRDS, NJNS, National Club, PAR, The People & Pallishree	Gorapur, Raypur, Gangadharpur, Motto, Pathara, Jadupur, Karimpur, Langaleswar, Gadakokala, Balabhadrapur, Patanasi, Gajapatinagar, Baghalangi, Gourangapatna, Bhusandpur, Kumundalapatna, Sorana, Kumarpur & Borokudi	660
April, 2010	05	Maa Mangala	RPRDS	Motto, Borokudi, Baghalangi, Karimpur & Mudiratha	150
May, 2010	06	Motto & Maa Mangala	RPRDS	Motto, Baghalangi, Karimpur, Borokudi, Mudiratha & Keutakudi	180
June, 2010	11 (Including one onboard training)	Maa Mangala, Motto, Bhusandpur, Basudev, Padma devi, Jayantipur	RPRDS & Pallishree	Keutakudi, Motto, Baghalangi, Karimpur, Borokudi, Mudiratha, Bhusandpur & Jayantipur	330
July, 2010	06	Maa Mangala	RPRDS	Motto, Karimpur, Baghalangi, Borokudi, Mudiratha & Keutakudi	180
Augus, 2010	08 (Including one onboard training)	Maa Mangala, Motto, Arakhakuda, Maa Gangadevi, Jadupur & Uttar Chilika	RPRDS, PRIDA, National Club & The People	Karimpur, Motto, Arakhakuda, Sanapatna, Baghalangi, Jadupur, Gadakokala	240
September, 2010	07 (Including one onboard training)	Jayantipur, Maa Mangala, Laxminarayan, Bhusandpur & Kholamunha	Pallishree, RPRDS, NJNS & DI	Jayantipur, Karimpur, Baghalangi, Samantrapur, Bhusandpur & Kholamunha	210
October, 2010	09	Uttar Chilika, Laxmi, Hataboradi, Trinathdev, Refujee & Rasakudi	RPRDS, Pallishree, The People, NJNS & DI	Dayabihar, Makara, Dokanda, Nairi, Hatabaradi, Khajuria, Balinasi, Balugaon & Rasakudi	270
November, 2010	04	Uttar Chilika & Satapada	RPRDS, The People & DI	Charabatia, Jankia, Naikulapatna & Satapada	120
December, 2010	05 (Including one onboard training)	Banamalipur, Mainsa, Maa Domani & Maa Mangala	DI, NJNS & RPRDS	Banamalipur, Mainsa, Chhedapadar, Borokudi & Mudiratha	150
TOTAL	**92**	**31 PFCS**	**9 NGOs**	**86 villages**	**2760**

5.1.5 Introduction of highly efficient Insulated Fish Boxes (IFB)

As a part of the endeavor to promote the sustainable fisheries in Chilika, the post-harvest fish quality management and maintenance of cold chain system was considered imperative and a priority. This is essential to prevent loss, maintain high quality and realization of better price. Chilika Development Authority (CDA) initiated an ambitious programme to supply highly efficient Insulated Fish Boxes (IFBs) in collaboration with the Marine Products Export Development Authority (MPEDA), Govt. of India to Chilika fishers having their own fishing boats with valid registration licenses. The facility is extended to the Primary Fishermen Co-operative Society (PFCS) members. Subsidy assistance to the extent of MPEDA provided 50% and CDA provided 30% cost of the insulated box as subsidy to procure and supply the boxes to the Chilika fishers. The boxes were procured from the manufacturing companies namely, M / s-Nil Kamal Pvt. Ltd, Mumbai, M / s-Promens Pvt. Ltd., Ahmadabad and M / s-Sintex Pvt. Ltd, Ahmadabad approved by MPEDA.

During the financial year 2010-2011, in total, 1511 Insulated Fish Boxes were supplied to 1511 active fishers from 31 Primary Fishermen Cooperative Societies (PFCSs) under the CFCCS Ltd., Balugaon. The use of the Insulated Fish Boxes by the fishers in their fishing boats were monitored by the field staff of CDA and the staff of CFCCS Ltd. The performance evaluation of supply of IFBs was accessed and it was noticed that the fishermen are getting on an average, 32-35% better price after use of Insulated Fish Boxes.

5.2. Biodiversity Conservation

5.2.1. Annual Population Estimation of Irrawaddy of dolphins in Chilika Lake - 2011

The Chilika Lake is home of the Irrawaddy dolphin *(Orcaella brevirostris)*. The present distribution range of this species is only in Asia i.e. from Chilika to Indonesia within south east Asia and South Asia. The total population of these animals in the world is estimated to be less than 7500 (highest 6400 reported from Bangladesh) and the population in Chilika is considered to be the highest single Lake population.

Chilika Development Authority has been carrying out a number of conservation measures for the protection and conservation of Irrawaddy dolphins in Chilika in close coordination with Wildlife wing of State Forest Department for (1) Survey and identification of dolphin habitat in the Lake for proper management, (2) Development of dolphin watching protocol for safe watching of dolphins, (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 Lake , (7) Acoustic survey of underwater behavior of dolphins through deployment of hydro phones in collaboration with Tokyo University. The increasing trend in the population of Irrawaddy dolphins in Chilika is the outcome of effective implementation of conservation initiatives as detailed above.

The annual population estimation survey of Irrawaddy dolphins in Chilika Lake was conducted on 10th & 11th February 2011 but due to higher Beaufort(due to high velocity of wind) the survey was suspended till 15th and 16th February, 2011. Generally the animals are distributed in some random pattern thus the survey transects were laid in a random manner with a spacing of 2 km in the main Lake and along the deeper channels of the outer channel. The total number of survey transect were 18 numbers. This is in

consensus with widely used methodology, i.e., Line Transect Method. The sampling of dolphin / group of dolphin in each transact was carried out by a team of three experienced surveyers. Each team was equipped with a binoculars, GPS set, VHF sets, rangefinder and data recording sheets etc. In total, 66 participants from different organizations such as the Director Environment, Orissa, Officials from State Watershed Mission, OSDMA, BNHS Mumbai, Regional Museum of Natural History, Bhubaneswar, Centre for Environment Education Bhubaneswar, Researchers & academicians from the University and colleges, Wildlife Society of Orissa, Chilika Wildlife Division, Senior Research Officers from the Office of Chief Wildlife Warden, Orissa, Chilika Development Authority, Officials from Animal Resource

Development Department, Local NGOs, Members of the dolphin Motor Boat Association participated in the census operation. In addition, 40 local volunteers were deployed in 18 boats.

Out of the 18 teams, 10 were deployed in the main Lake and 8 nos. of team were deployed along the Outer channel area for the survey. Based on the population estimation this year 156 Irrawaddy dolphins were recoded out of which 131 were adult, 21 sub- adult and 4-calves. There has been marginal decrease in the total number of dolphins as compared to the census figures of past years 158 in 2010.

Population estimation of Irrawaddy dolphin- 2011

Sector	Adults	Sub-adults	Calves/Neonate	Total
Main Lake	73	14	0	87
Outer channel	58	7	4	69
Total	**131**	**21**	4	**156**

5.2.2. Annual survey of water birds

Mid-winter water bird status survey, 2011 was conducted in Chilika Lake jointly by the Orissa State Wildlife Organization, Chilika Development Authority and the Bombay Natural History Society on 19th January 2011. Training on status survey methodology was imparted to the participants at the Wetland Research & Training Centre, Chandraput on 18th January 2011. A total of 90 experts, volunteers, from Government and Non-Government Organizations like Bombay Natural History Society, Project Bihang, R.M.N.H, Wild Orissa, Wildlife Society of Orissa, W.W.F – India, Indian Institute of Science and students from universities and local colleges participated in the survey.

The Chilika Lake was divided strategically into 18 segments(units) which include four units of the Nalabana Island. Each unit was lead by a bird expert supported by two to three co-experts and crew members of the mechanized boat. Each unit was provided with a status survey kit (map showing the area of the unit and route to follow, binocular / telescope, notebook with multicolor pictures of 48 commonly occurring birds of Chilika, Kit bag & paper weight with logo, bird reference book, waterfowl status survey form, one GPS set and V.H.F. etc.). The total bird count was carried out for all water bird species and wetland dependent birds which include resident birds as well. Actual number counts were made for smaller flocks and larger / conspicuous birds and estimates were done for the denser / larger flocks. Time chosen for bird count was 06.00 to 11.00 hours in the Forenoon.

A total of 7,91,738 wetland birds of 103 species of water birds were counted from the entire Lake. Among the ducks, in case of three species i.e. Gadwall, Northern Pintail and Eurasian Wigeon, the population exceeded over one lakh. A decline of over 50,000 has been noticed in the Northern Shoveller *Anas clypeata* population this year bringing its number to over 50,000. The Common Pochard *Aythya ferina* numbers have decreased from 35905 last year to 7109 showing an 80% decline and the Tufted Duck *Aythya fuligula* numbers have declined from 39709 last year to 14337 this year resulting in a decline 64%. This shows a heavy decline noticed in diving ducks. In the past decade, for the first time among waders, the Black-tailed Godwit *Limosa limosa* numbers have crossed one lakh. Also, among other waders three species (Little stint, Lesser Sand Plover and Black-winged Stilt) crossed 10,000 in numbers. There were no duck congregations sighted between Chandraput to Nalabana and Barkul to Balugaon. The Greylag Goose *Anser anser* has gone down to 161 as compared to last year's 422. The Bar-headed Goose numbers have shown a rise of approximately 20%.

5.3. Socio-economic activities

The thickly populated (about 2 lakhs) peripheral villages of the Lake are plagued with perennial problem of shortage of drinking water, lack of communication facilities, lack of electricity in island villages etc. CDA have been carrying out infrastructure development programmes like construction of protection wall to prevent saline inundation, construction of fish landing Jetties, construction of village community centers, toilet facilities at the landing centre, excavation of creeks and channels to facilitate navigation, providing solar street lighting systems etc. in the villages in and around Chilika Lake.

5.4. Wetland research

5.4.1. Wetland Research & Training Centre, Balugaon

The Wetland Research & Training Centre, an institute first of its kind in India, was established near Balugaon with the financial assistance from 10th Finance Commission in 2002. The Centre provides an excellent in-situ advanced research facility and also have facility for socio-economic and anthropogenic studies of the peripheral stake-holder villages. The centre has a well stocked library facility for the Scientists and Researchers. Regular Scientific Monitoring of Lake water quality as well as biological parameter is carried out ever month through collection of sample from 30 GPs set points spread all over the Lake. Analysis of the samples is carried out at the WRTC and the data base is created for sustainable management of the Lake. The research works / activities undertaken and the abstract of monitoring activities is indicated below.

5.4.1.1 Research activities

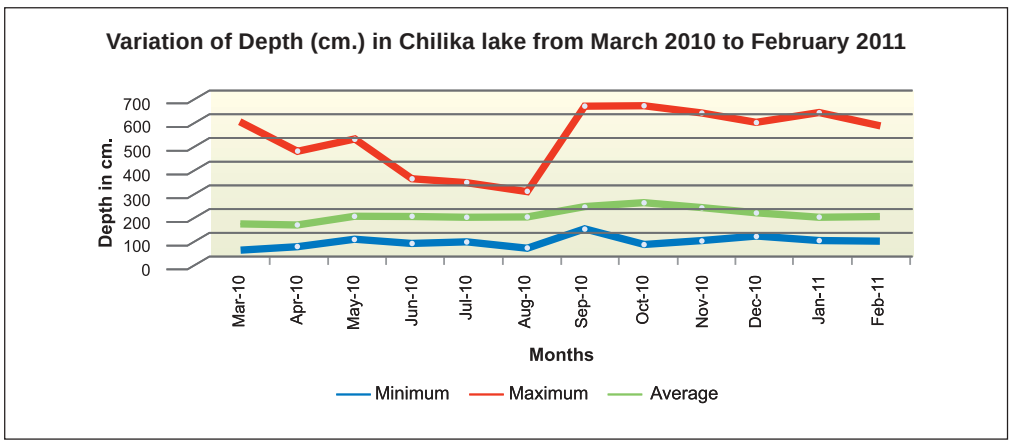
- Close monitoring of Chilika Lake,
- Sediment analysis, monitoring of river water quality,
- Biological parameters,
- Collection and estimation of fish landing statistics in Chilika Lake,
- Shooting net operations,
- Distribution and growth pattern of Chilika crabs,
- Studies on benthos and research on Irrawaddy dolphins.

5.4.2. Water quality monitoring

The monitoring of water quality of Chilika Lake is being carried out through collection of water samples from 30 different fixed stations (GPS set points) distributed over four ecological sectors of the Lake at an interval of 30 days. The water samples are analyzed in the laboratory and physico-chemical parameters like *Air and Water temperature, Depth, Transparency, pH, Total alkalinity, Conductivity, Salinity, Dissolved oxygen, BOD, Ammonia, Nitrite, Nitrate and Phosphate* etc. are recorded for future management. The biological parameters like *benthos, primary production of phytoplankton* also carried out. Water samples are also collected from 12 rivers and rivulets drained to the Lake regularly for fresh water and sediment flow analysis. Chemical analysis of the water samples are conducted to know the nutrient flow to the Lake through different point and nonpoint sources.

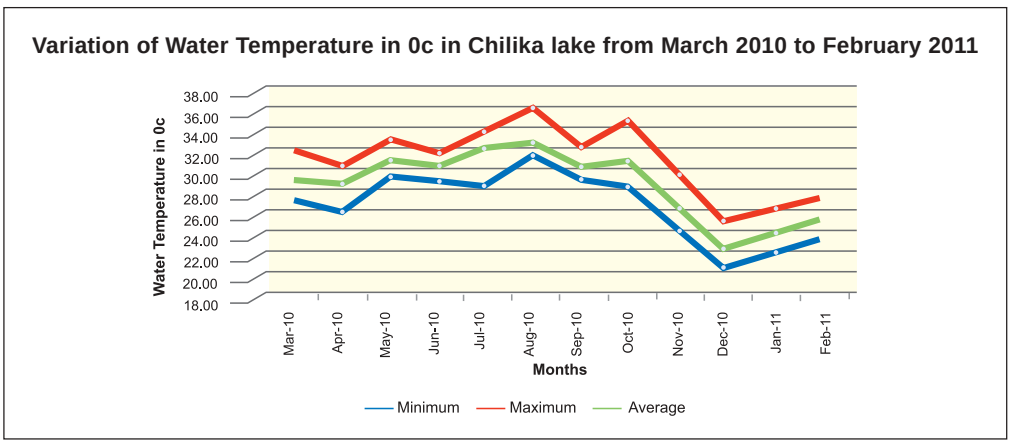
5.4.2.1 Depth

The water depth of Chilika Lake is greatly influenced by the fresh water inflows and tidal intrusion through the Lake mouth. The depth of the Lake has potential impact on the ecology of aquatic organisms including fish and shellfish.The Minimum Depth of the lake during the period observed during the period March 2010 to February 2011 was observed to be 39cm at station no 17 during the month of March-2010 and maximu of 650cm at station no28 during the month of September-2010 with an average value of 142cm- 238cm.



5.4.2.2 Water Temperature

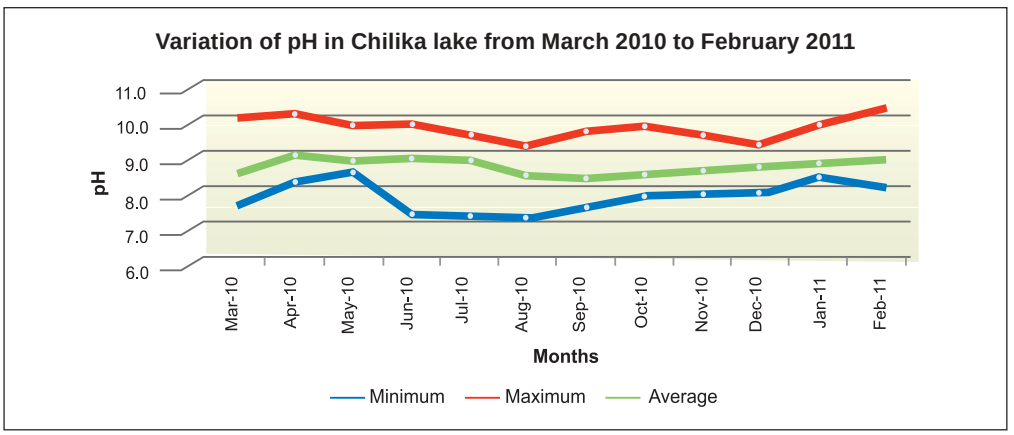
The water temperature is considered as an important environmental variable which influences the growth, feeding intensity, maturation, sexual maturity and spawning of fish and shellfish including other aquatic organism. The water temperature of Chilika lake during the year 2010-2011 varied between 20.5 (St.No 20; central Sector; in December-2010) and 35.9°C (St.No 18 ; Northern sector; in August-2010). The overall annual average water temperature for the Lake during the above period was 28.7°C.





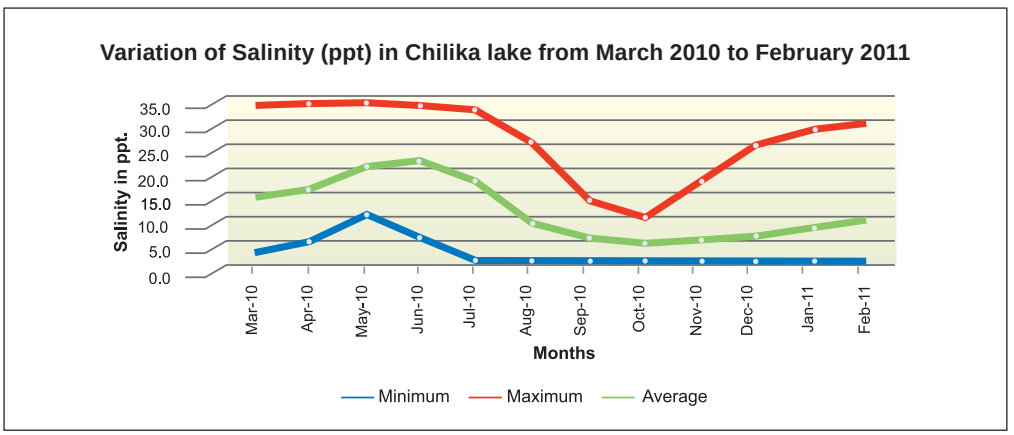

5.4.2.3 Water pH

Water pH in coastal estuaries and Lakes plays important role in structuring and sustenance of biodiversity and indicates the status of the Lake ecology. The Chilika Lake, in general, is alkaline in nature. The pH value recorded were between 7.2 (St.No.17; Northern sector; June-2010) and maximum of 10.1 (St.No.21; Northern sector; Februry-2010) during 2010-2011. The annual average pH value for the Lake as a whole was recorded to be 8.5 during above period.



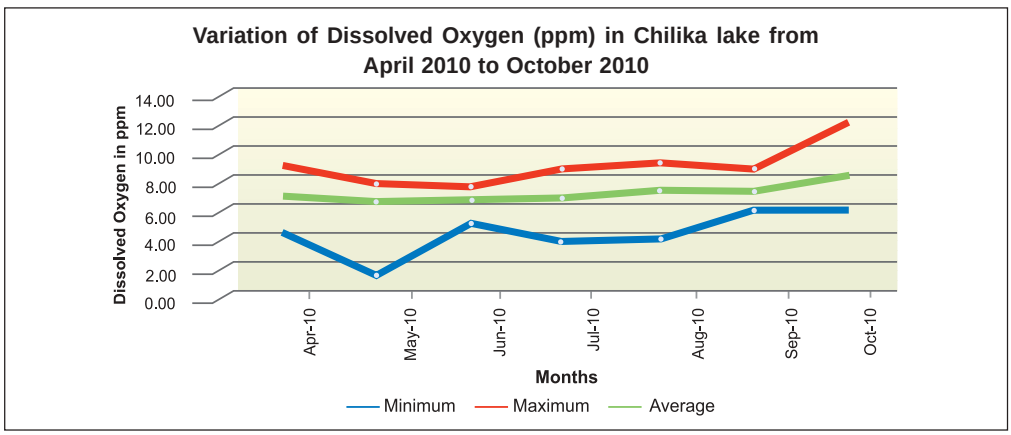
5.4.2.4 Salinity

The Salinity dynamics, among all environmental variables, plays a profound role in Lake ecology. It significantlyinfluences the fishery performance, biotic diversity with its succession and species richness pattern. The salinity value of Lake Water varied between0 ppt (St.No.18 Northern sector; October- 2010) and 33.2 ppt (St.No26; Outer channel,) during the year 2010-2011. The maximum salinity value was recorded at Outer channel and the minimum at Kalupadaghat. The overall average salinity for the whole of the Lake was 11.7 ppt during the year 2010-2011.



5.4.2.5 Disolved Oxygen

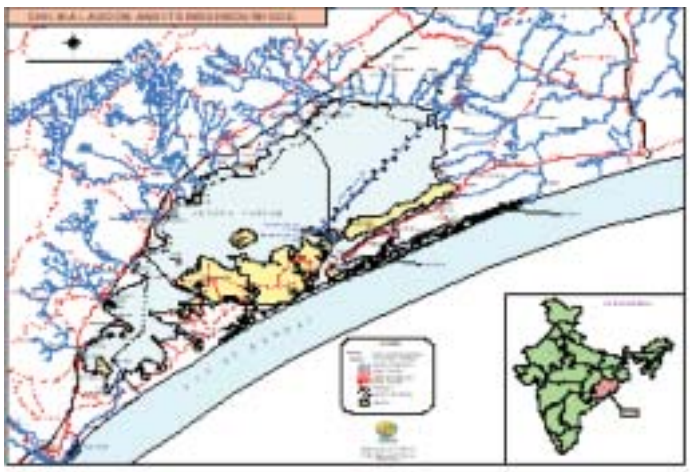
Dissolved Oxygen (DO) is considered as critical environmental factor in aquatic eco-system for survival, feeding activity and growth of fish and shellfish and other aquatic organisms. It is an indicator of the health of the lake ecosystem. The Dissolved Oxygen during 2010-11 varied between 1.10 ppm (St.No 17; Northern sector; May-2010) and 11.71 ppm (St.No.15; Northern sector; October-2010). The annual average value of DO for the whole Lake during the year was 6.86 ppm.



5.4.2.6 Turbidity

The minimum turbidity recorded during 2010-11 was 1N.T.U. and maximum of 552N.T.U. recorded during march 2010 at station no 26 with an average of 55 NTU.

5.4.3 Hydrological Monitoring



Hydro-logically, Chilika is influenced by three sub-systems viz. Mahanadi Delta, Western Catchment and Bay of Bengal. The fresh water input into the Lake is from fifty two rivers / rivulets, out of which 5 rivers are from the Mahanadi system and 47 river and rivulets are from the Western Catchment. The saline water influx into the Lake comes from the Bay of Bengal through the mouths in the Outer Channel and through the Palur Canal in southern sector.

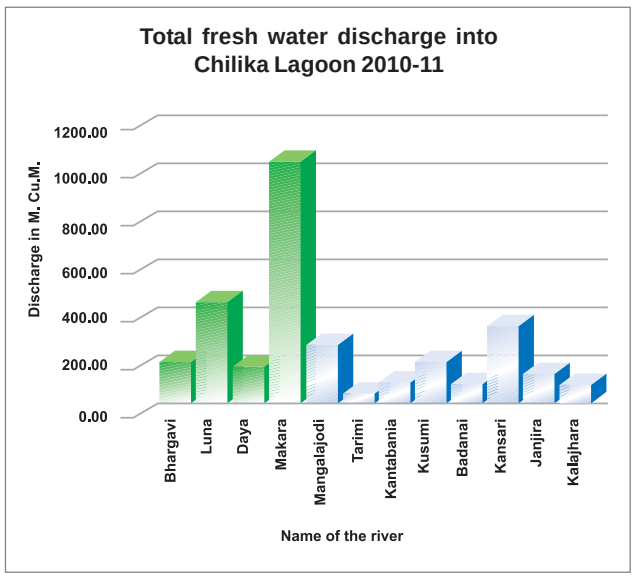
12 stream gauging stations have been established to monitor the discharge from the rivers viz. Bhargavi, Luna, Makara, Daya all from Mahandi System and Mangalajodi, Tarimi, Kantabania, Kansari, Kusumi, Badanai, Janjira, Kalajhara from Western catchment discharging freshwater into the Lake. Data on the discharge in the various stream gauging stations are collected thrice daily at 0800 hrs, 1300 hrs and 1800 hrs.

5.4.3.1 Estimation of fresh water inflow

The total inflow of freshwater into the Lake can be predominantly divided into two parts viz. inflow from the Western Catchment & inflow from the Mahanadi system.

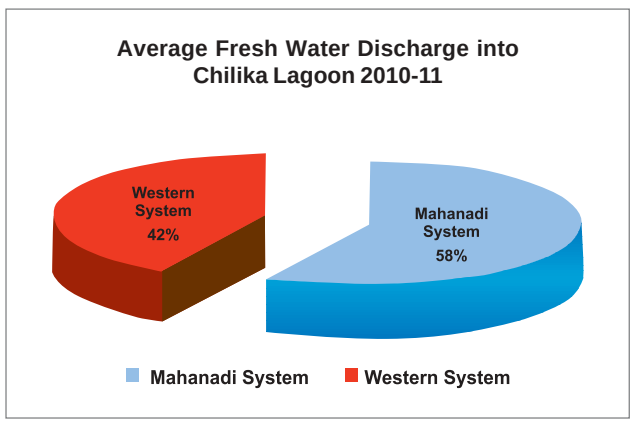
5.4.3.1.1 Inflow from the Western Catchment

47 River and rivulets drain into the Lake from the western catchment. All these streams are non-perennial and flow only during the monsoon months only. Out of these streams, only 8 namely Mangalajodi, Tarimi, Kantabania, Kusumi, Badanai, Kansari, Janjira and Kalajhara are gauged. It was estimated that 1362 Million Cu.M. of water is discharged into the Lake from these streams / rivulets of the Western Catchment during 2010-11 which accounts for 42% of the fresh water inflow in to the Lake. It was further observed that Kansari contributed maximum of 349 Million Cu.M followed by Mangalajodi 286 Million Cu.M.



5.4.3.1.2 Inflow from the Mahanadi System

The total inflow of freshwater from the Mahanadi delta has been estimated to be 1888 Million Cu.M. Out of the rivers flowing in the region, Makara carries the maximum discharge of 1037 Million Cu.M., followed by Luna (464 Million Cu.M.). From the analysis of the data collected so far, it has been estimated that during 2010-11. The fresh water flow from Mahanadi system accounts for 58% of total freshwater inflow in to the Lake.

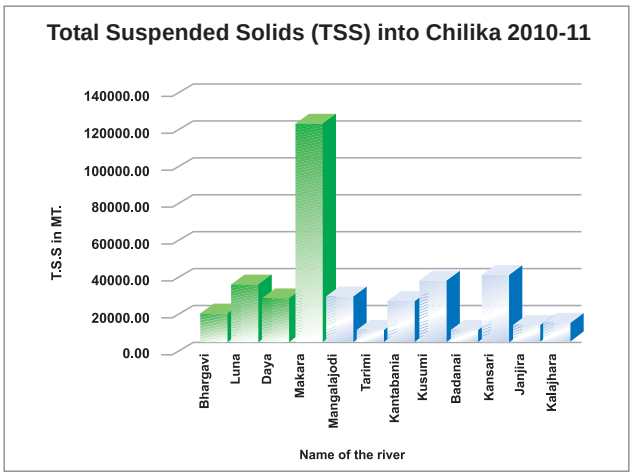


5.4.3.2 Sediment Monitoring

The monitoring of the sediment flow in to the lake basin is vital for management of the Lake. 12 streams gauging stations have been established along the major River system of the lake to monitor the sediment flow in to the Lake. The sediment loads from both Mahanadi system and the Western catchment; was assessed during the period 2010-11. The samples from the sampling stations were collected thrice daily at 0800hrs, 1300 hrs and 1800 hrs and analysis was carried out at CDA lab.

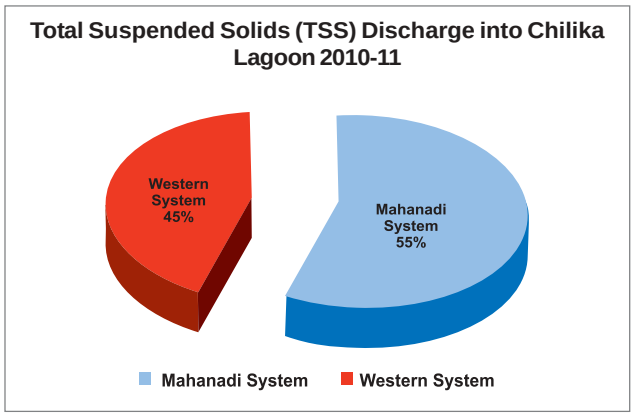
5.4.3.2.1 Inflow of sediment from Western catchments

The River and rivulets from the Western Catchment flowing into the Lake carry good amount of sediment. It was estimated that a total of 157022 Metric Ton of sediment inflow into the Lake was from the gauged streams of the Western Catchment during 2010-11. Out of which Kansari contributed the maximum of 39595 Metric Ton followed by, Kusumi 36656 Metric Ton. The Western system accounts for 45% of the total sediment load in to the Lake.



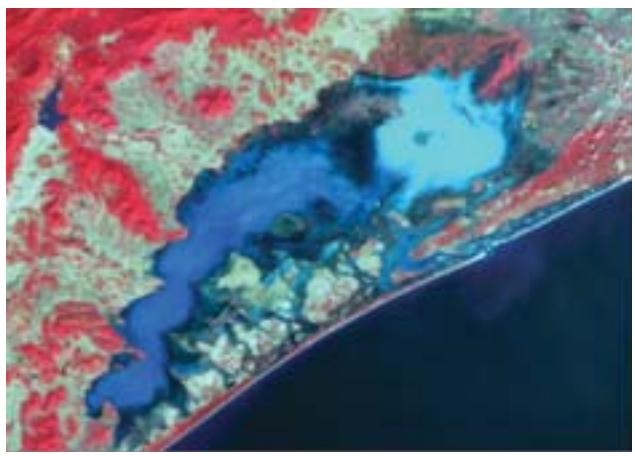
5.4.3.2.2 Inflow of sediment from Mahanadi system

The Rivers of Mahanadi system i.e. Bhargavi, Luna, Daya and Makara contribute largest quantum of sediment into the Lake. The total sediment load into the Lake from the Mahanadi system during 2010-11 was estimated to be 191686 MT. Out of which River Makara contributed maximum 121203 metric ton sediment followed by Luna 31152 metric ton. The Mahanadi system accounts for 55% of the total sediment load in to the Lake.



5.4.4 GIS and remote sensing

A GIS and image processing lab is established at CDA with all requisite hardware and software. The monitoring of the catchment and the aquatic vegetation is being carried out through the image-processing unit. A series of vegetation map is generated for further comparison. The distribution of the aquatic vegetation is monitored by use of GIS and remote sensing technique.



Satellite imageries are procured at regular intervals from NRSA. Chilika Development Authority in collaboration with Space Application Centre (SAC) Ahmadabad, has been undertaking the evaluation wetland eco-system of Chilika Lake by use of Hyper spectral data. Space Applications Centre, Ahmadabad sponsored a project to study the Coastal Processes and Coastal Dynamics in and around Chilika Lake for a period of five years.

5.4.5 Inlet Monitoring of Chilika Lake

The inlets of the lakes are very dynamic. The cross sections of the inlets determine the salinity gradients of the Lake. The shifting of the dredged mouth (Sipakuda) and the natural mouth (Gobakunda) are monitored at regular interval. The mouths are shifting in the north eastern direction due to the littoral drift. From the observation it was observed that both the mouth are shifting and their cross section is changing.

Shifting of Chilika Inlet during the period April 2010 to March 2011

Sl. No.	Name of the Inlet	Width in meters
1.	Sipakuda Mouth	222 (April 2010)
2.	Sipakuda Mouth	231 (March 2011)
3.	Gabakunda Mouth	137 (April 2010)
4.	Gabakunda Mouth	270 (March 2011)

5.5 Weed management

The macrophytes of Chilika Lake are of emergent, floating and submerged types. As assessed through satellite imagery, the macrophyte covered area of Lake was about 285.96 square kilometers during the 2009-10. The spread of emergent reed Phragmites is adversely affecting navigation and restricting the fishing grounds.

Map showing weed coverage in Chilika

5.6. Outreach Programme

5.6.1. The Eco- park

An Eco-park has been developed at Satapada over an area of 1.72 acres by Chilika Development Authority in consultation with Centre for Environment Education (CEE), Ahmadabad. The objective for establishment of such park at Satapada is to disseminate the information on Chilika Ecosystem to the visitors / students and local communities. There are facilities like display of live and educative models on Chilika eco-system, play station for children, sit outs etc.. The eco-park is unique and first of its kind in Odisha.

5.6.2. The Visitor Center

The Visitor Centre at Satapada, dedicated to the public on 29th September, 2002, has been serving as a gateway to Chilika for tourists. The Visitor Centre is equipped with signage's, backlit panels, working models, life size models, interactive touch screens , paintings, aquariums, diorama, children's corner and an auditorium with audio visual facilities. The skeletons of Irrawaddy dolphins, stripped dolphin and finless porpoise have been displayed in the Visitor Centre for education and also for creating awareness.

5.6.3. Environmental Education programme

The Communication, Education, Participation and Awareness (CEPA) activity was given major emphasis to promote the awareness about the values and functions of the wetlands. The focus of the programme during the year 2010-11 was issue based area specific CEPA programmes in and around Chilika Lake.

The activities in different areas were undertaken with active participation of local stake holders facilitated by the local NGOs. 12 local NGOs actively participated in the programme. Activities were carried by different NGO partners in different localities are given below:

Sl.No.	NGO Partner	Activities undertaken	Funds provided
1	ISERD, Pandapokhari, Panaspada, Puri	**Conflict resolution in Arakhakuda village** 1. Wall Painting 2. Street play on conflict resolution 3. Orientation meeting of core teams, opinion leaders 4. Orientation camp of village youth 2nos. & Village SHGs 2 nos. 5. Exposure visit of core team to Aryapalli	60000/-
2	THE PEOPLE At/Po. Palli Brahmagiri, Dist. Puri, Orissa -752011	Drive to make Sipakuda tourist centre polythene free. Promotion of eco-friendly cotton bags.	60000/-
3	RESEARCHERS At. Mirjapur Po. Bhagabanpur Dist. Puri	Drive to make Sipakuda tourist centre polythene free at Mirzapur tourist centre. Promotion of eco-friendly cotton bags.	60000/-
4	GRAMYA PRAVA At. Begunia, Po. Bhairipur Via. Gop, Dist. Puri	Best utilization of organic waste (Water hyacinths) by converting it to Vermin compost (1 Unit) 1. Community mobilization and sensitization meeting. 2. Training of Trainer for vermi composting	60000/-
5	National Club At. Sunamuhin, Po. Bhubanapur Via Brahmagiri, Dist. Puri, Pin 7520011	Best utilization of organic waste (Water hyacinths) by converting it to Vermin compost (1 Unit) 1. Community mobilization, meeting & sensitization 2. Training of Trainer for vermi composting	60000/-
6	LSS Vill. Nikhira Gobindapur Po. Kandagoda, Via Brahmagiri Dist. Puri, Pin 752011	Best utilization of organic waste (Water hyacinths) by converting it to Vermin compost (1 Unit) 1. Community mobilization, meeting & sensitization 2. Training of Trainer for vermi composting	60000/-
7	Nabajagaran Nari Sanghathan Balugaon, Khurda Pin 752030, Orissa	Environment Education Programme for controlling of fishing gear in Palur Canal to avoid destructive fishing practices: 1. Orientation workshop for fishermen in 10 villages 2. Awareness campaign for local school children on Sundays and holidays without affecting the study periods.	70000/-
8	Netra Pitula Sishu Sanghathana At. Khatiakudi	No plastic campaign for kalijai 1. Street play 2. Awareness Campaign	70000/
9	PALLISHREE 502/2, Mallick Complex Lane 9, Jagamara, Khandagiri, Bhubaneswar-30	Strengthening the CEPA programme through Teacher workshop: 2 nos. of Workshop (one at Chandraput & one at Satapada)	45200/-
10	Jiban Bikash At/Po. Nirakarpur Dist. Khurda	Changes in standard of living of refugees through promotion of sustainable income generation in village Sundarpur	40000/-
11	RCRD	An holistic approach to bring village Barakudi to the main stream of life and take lead role in conserving the Chilika lake	25000/-
12	Development initiative	Rain water harvesting & recharge in Gangadharpur village UGME School	49582/-

5.7 Communication Network Development

A number of thickly populated fisherman villages around Chilika do not have proper road network. The villagers find it difficult to market the fish and fish products and sometimes resort to distress sale due to the above bottleneck. To mitigate this problem priority is given for development of communication network. A bridge over Palur canal and another bridge over a channel of Chilika Lake in village Poisana have been constructed by CDA facilitating road communication to the villages of Krushnaprasad block upto Jahnikuda. Approach road to the fish landing centres and improvement of village roads specially for the fishermen villages located in inaccessible areas are undertaken by CDA.

Ferry services carrying vehicles and people are in operation between Satapada and Jahnikuda, benefiting more than 70,000 people living in Krushnaprasad block of Puri district in particular and drastically reducing the road length between Berhampur and Puri.

6. Integrated Sustainable Management of Chilika Lake with financial assistance from Ministry of Environment & Forest, Govt. of India.

The drainage basin plays a vital role in the management of Lake eco-system. The proper treatment of the drainage basin is one of the most important components of the Lake management as siltation is identified as one of the major threat to the Lake eco-system. The catchment area of Chilika is spread over 4085 square kilometers, out of which 57,072.5 ha has been identified to be most erosion prone. Catchment treatment through block plantation with community participation was undertaken through the approved scheme and financial support from Ministry of Environment & Forest, Govt. of India.

Block Plantation: Block plantations over 111.00 ha in the western catchment area of the Lake have been raised in 5 different sites during 2010-11 with the participation of local communities. These plantations are raised with active participation of the respective villagers.

Sl. No.	Name of the sites	Area in ha	Nos. of seedlings planted	Status of land
1	Mardarajpur	30 ha	48000 nos.	Sanaghati DPF
2	Salapadi	35 ha	56000 nos.	Kandaambajhara DPF
3	Magarmukh	15 ha	24000 nos.	Island area, Revenue land
4	Badasereipur	20 ha	32000 nos.	Urdhapawan pahadRevenue land
5	Gadahuma	11 ha	17600 nos.	Ranibar 'A' DPF
	Total	**111 ha**	**177600 nos.**	

6.1 Community Development

6.1.2 Drinking water facilities

The ground water available in the shore area of the Chilika Lake generally brackish in nature and not suitable for drinking. So drinking water through sinking of tube wells was provided in three locations under Baulabandha GP of Chilika CD Block in Khurda district i.e. at school sahi, Belapatna sahi and Ichhapur.

6.1.3 Solar Street Lighting

In the remote areas of Chilika catchment and in the island villages peoples are deprived of electricity. To bring them in to main stream of development 18 nos. solar street light sets have been installed in the remote and inaccessible localities. The list of sites where solar street light have installed is as follows:

Sl.No.	Name of the locality	Qty. (Nos.)
1.	Tala Chhkasingh	1
2.	Jani Chhakasingh	1
3.	Khajurisahi (Nuasahi)	1
4.	Bhaliapadara	1
5.	Gundipadar	1
6.	Phasikhola	1
7.	Badabola (tala sahi)	1
8.	Punjiama (at Mahadev temple)	1
9.	Katuala (at Birajai temple campus)	1
10.	Mardarajpur	1
11.	Sabulia	1
12.	Nuagaon	1
13.	Satapada, visitor centre campus	4
14.	Muggarmukh island	2
	Total	**18**

7. Micro Watershed Projects under IWDP -II

Under Integrated Wasteland Development Programmes (IWDP- II) 10 micro watershed in Banpur Block of Khurda District has been sanctioned by Government of India in Ministry of Rural Development in Letter No K-11011-51-2004-IWDP (DI) dated 20.10.2004 with an approved outlay of Rs.300.00 lakhs The project envisages treatment of 5000.00 ha of wasteland in 10 nos. of micro watersheds covering 38 villages over a period of 5 years. The list of watershed projects with project profile, physical and financial achievements during 2010-11 are as follows:

7.1 Project profile

Sl. No	Name & code no. of micro watershed	Name of the G.P.	Name of the village	Total Geographical area (In Ha.)	Total treatable area(In Ha.)	Population SC (In Nos.)	Population ST (In Nos.)	Population Others (In Nos.)	Total (In Nos.)	Total project outlay (In Rs. lakhs)
1	Beruanbari Nala 0407010801080202	Narendrapur Niladriprasad Veteswar	1.Beruanbari 2. Badasereipur 3. Juliamba 4. Trilochanpur	1579.49	697.00	132	119	2730	2981	41.82
2	Raipada Nala 0407010801060103	Niladriprasad	1. Raipada 2. Bhaliapada 3. Bankadagada	996.00	720.00	4	194	42	240	43.20
3	Rigidisima Nala 0407010801060102	Niladriprasad	1. Rigidisima 2. Kasipada 3. Tabhadihi 4. Nilapalli	745.00	588.00	-	506	-	506	35.28
4	Karanjapalli Nala 0407010801080101	Niladriprasad	1. Karanjapalli 2. Bamadeipur 3. Nakulapalli	668.00	364.00	-	63	-	63	21.84
5	Kusarada Nala 0407010801070101	Damiabarabara	1. Kusarada 2. Podakoi	809.00	400.00	-	490	-	490	24.00
6	Barakoli Nala 0407010801060101	Niladriprasad	1. Barakoli 2. Chandrama 3. Kalapata 4. Nakitatha 5. Haradama 6. Sunduria 7. Jateswar	1000.00	696.00	-	367	-	367	41.76
7	Punjiama Nala 0407010801040203	Niladriprasad	1. Punjiama 2. Barahampada 3. Khariapalli 4. Nuagaon	407.00	343.00	14	935	12	961	20.58
8	Mandara Nala 0407010801050202	Damiabarabara	1. Mandara 2. Bhunjabarbara 3. Katualpat 4. Damiabarbara	1071.00	400.00	-	695	5	700	24.00
9	Bighnaput Nala 0407010801040202	Niladriprasad Damiabarabara	1. Bighnaput 2. Katualpat (P) 3. Bankiapalli 4. Bodhakapalli	756.00	400.00	-	784	7	791	24.00
10	Sana Nuagaon Nala 0407010801050203	Damiabarabara	1. Sananuagaon 2. Talabarei 3. Buradabadi	403.00	392.00	-	660	-	660	23.52
	TOTAL			**8434.49**	**5000**	**150**	**4813**	**2796**	**7759**	**300.00**

7.2 Financial achievements

Sl. No.	Name & code no. of micro watershed	Opening balance on 01.04.2010	Funds received during the year	Funds utilized during 2010-2011	Balance funds
1	Beruanbari Nala	11.21	Nil	10.74	0.47
2	Raipada Nala	16.81		7.23	9.58
3	Rigidisima Nala	10.27		8.69	1.58
4	Karanjapalli Nala	7.92		5.31	2.61
5	Kusarada Nala	8.75		5.29	3.46
6	Barakoli Nala	8.55		8.26	0.29
7	Punjiama Nala	6.69		3.46	3.23
8	Mandara Nala	6.42		5.61	0.81
9	Bighnaput Nala	8.68		4.88	3.8
10	Sana nuagaon Nala	9.83		5.16	4.67
	10 micro watersheds	**95.13**		**64.61**	**30.52**

7.3 Physical achievement during 2010-11

i) Loose boulder check dams

Sl. No.	Name of the watershed	Name of the village	Name of the nallas	Nos. of LBC D constructed
1	Benruabari Nala	Badasereipur Gagadia nala Badasereipur	Bhoi Mundia, Sanaseripur Urdhapaban Pahada	8 7 5
2	Raipadanala	Raipada	Kalunijhara Nala	6
3	Rigidisimanala	Nilapalli	Nilapali jhola nala	10
4	Karanjapalli nala	Karanjapalli	Chamajhara nala	22
5	Kusaradanala	Kosarada Podakhai	Kosarada nala Jangua Nala	10 16
6	Barakoli Nala	Chandrama	Patakhala Nala	10
7	Punjiama nala	Malua jhola	Maloa jhola nala	7
9	Bighnaputnala	Bankiapalli	Khajurinala	10
10	Sana Nua-gaon nala	Tabadihi	Mugger nala	14
		Total	**140 nos.**	

7.4 Development of water resources

Sl. No.	Name of the watershed.	Name of the village	No. of WHS / Farm ponds/ Canal & pond renovation/diversion weir constructed	Remarks
1	Benruabari Nala	Beruabari Badasereipur	3	Renovation and repair of Mahulasahi WHS Renovation of village pond at Badasereipur Village drain (diversion channel)
2	Raipadanala	Bhalipada Raipada	2	Construction of WHS at Bhalipada Construction of WHS at Singhalakhola
3	Rigidisimanala	NilapalliKasipada	2	Construction of Farm pond
5	Kusaradanala	Kosarada	1	Construction Farm pond
6	Barakoli Nala	Kalapata	1	Construction of WHS
7	Mandaranala	Bhujia barabara Mahulasahi	2	Construction of Ketaki jhara WHS Construction of Madiaganda WHS
8	Bighnaputnala	Bignaput	1	Renovation of existing WHS
9	Sana Nua-gaon nala	Kandulsahi	1	Construction of Farm pond
	Total		**13**	

7.5 Horticulture Plantation

Horticultural plantations (Cashew) have been raised over 20 acre in the micro watershed areas of Karanjapalli Nala and Barakoli Nala watersheds during the year 2010. Besides 3864 nos. grafted cashew seedlings procured from Cashew Development Corporation were distributed among the beneficiaries of 5 micro watersheds for planting on their land as follows:

Name of the Watershed	Name of the village	Extended area	Seedlings planted
Karanjapalli nala	Karanjapalli	10 ac	820 nos.
Barakoli nala	Tuburi Munidia	10 ac	820 nos.

Name of the Watershed	Name of the village	No. of Seedlings distributed	No. of beneficiaries
Karanjapalli Nala Watershed	Karanjapalli	160	1
Rigisima Nala Watershed	Rigidisima	984	8
Kosarada Nala Watershed	Podakhai	500	9
Barakoli Nala Watershed	Barakoli	220	1
	Kalapat	60	1
	Masanisahi	440	7
Sananugaon nala Watershed	Talborei	1500	34
	Total	**3864**	**61**

7.6 Installation of solar streetlight systems

Most of the villages in the micro watersheds area are in accessible and without electricity. Solar Street light systems in the micro-watershed villages;

Sl. No.	Name micro watershed	Location of installation	No. of Solar street light system provided
1	Beruanbari Nala	1. Jualiamaba 2. –do-	2
2	Raipada Nala	3. Raipada 4. Raipada Tile sahi 5. Bhalipada	3
3	Rigidisima Nala	6. Rigidisima 7. Raijhola 8. Kasipada 9. Hatibari	4
4	Karanjapalli Nala	10. Karanjapalli 11. Nakulapalli	2
5	Kusarada Nala	12. Kosarada 13. Podakhai	2
6	Barakoli Nala	14. Barakoli Talasahi 15. Barakoli upparsahi 16. Mashanisahi 17. Mashanisahi 18. Chandrama	5
7	Punjiama Nala	19. Khariapalli 20. Punjiama 21. Maluajhola	3
8	Mandara Nala	22. Mandar 23. Damia Barabara 24. Bhujia barabara 25. Katuala	4
9	Bighnaput Nala	26. Bankiapalli 27. Bignaput Janisahi 28. Burusahi	3
10	Sana Nuagaon Nala	29. Kandulasahi 30. Talaborei 31. Bhubaneswar Sahi	3
Total 10 watersheds			**31**

7.7 Installation of Smokeless Chullahs

The villages in the micro watershed are very remote and close to the forest areas. The villagers use fuel wood for cooking. To reduce the firewood requirement , highly efficient smokeless challah was introduced in the project villages. This improved challah not only reduce the firewood requirement but it also take care of the health of the women who cook the food by addressing the smoke problem. 410 improved chullahs developed by OREDA were distributed among 410 families belonging to 7 nos. of micro watersheds as detailed below. Necessary technical training was provided to the village women regarding use of the smokeless chullahs and wall paintings were done at different strategic locations depicting benefits of the chullahs.

Name of the watershed	Name of the village	No. of Smokeless chullas provided
Beruanbari Nala Watershed	Jualiamba	25
	Harijana sahi	75
Raipada Nala Watershed	Raipada	60
Kosarada Nala Watershed	Kosarada	50
Punjiama Nala Watershed	Khariapalli	30
Mandar Nala Watershed	Mandar	70
Bignaput Nala Watershed	Bignaput	50
Sananuagaon Nala Watershed	Talaborei	50
Total		**410**

7.8 Promotion of Krushak Bandhu pump for irrigation

The villagers of the micro-watershed use their farm ponds and open wells for irrigation. A simple and customized leg operated pump for small scale irrigation is developed and promoted by the Agriculture Department, GOO is found suitable for small scale irrigation by the farmers of the micro-watershed. 47, KB pumps were adopted by 47 farmers in 9 micro watersheds during 2010-11

Name of the Watershed	Name of the village	No. of KB pump provided	No. of beneficiaries
Beruanbari Nala Watershed	Sanasereipur	4	4
	Beruabari	2	2
	Badasereipur	3	3
Raipada Nala Watershed	Raipada	6	6
Karanjapalli Nala Watershed	Karanjapalli	1	1
Rigidisima Nala Watershed	Kasipada	1	1
	Rigidisima	1	1
	Raijhola	1	1

	Hatibari	1	1
	Nilaplli	2	2
Kosarada Nala Watershed	Kosarada	3	3
	Podakhai	2	2
Barakoli Nala Watershed	Barakoli	1	1
	Chandrama	1	1
	Masanisahi	3	3
Punjiama Nala Watershed	Punjiama	3	3
	Khariapalli	1	1
	Nuasahi	1	1
Mandar nala Watershed	Mandar	5	5
Bignaput Nala Watershed	Bignaput	5	5
	Total	**47**	**47**

7.9 Improved Agricultural practices

Farmers from the micro watershed area were encouraged to adopt improved agricultural practice through crop diversification to maximize their income from agriculture. High yielding and improved verities of cowpea, cauliflower, Chilli, cabbage, radish, brinjal etc were introduced through demonstration.

Name of the Watershed	Name of the village	No. of beneficiaries	Remarks
Beruanbari Nala Watershed	Badasereipur Sanasereipur Beruanbari	6 5 4	Onion, cowpea, maize, radish, koshila, Palanga, lady's figure, Coriander, cucumber, janhi, water melon, cauliflower, Chilli, cabbage, brinjal
Raipada Nala Watershed	Raipada	8	
Karanjapalli Nala Watershed	Karanjapalli	7	
Rigidisima Nala Watershed	Nilapalli	3	
	Hatibari	14	
Kosarada Nala Watershed	Kosarada	5	
	Podakhai	2	
Barakoli Nala Watershed	Barakoli	2	
	Masanisahi	30	
Punjiama Nala Watershed	Maluajhola	4	
	Punjiama	3	
Mandar Nala Watershed	Mandar	8	
	Mahulasahi	5	
Bignaput Nala Watershed	Bignaput	3	
	Kadamjhola	1	
	Bankiapalli	2	
Sananugaon Nala Watershed	Talaborei	8	

7.10 Livelihood support programme (Strengthening of SHGs)

For providing alternate livelihood and empowerment of the women in the micro-watershed villages four types of activities were introduced with adequate capacity building.

Name of Watershed	Name of Activity	Name of Self Help Group	Member involved (nos.)	Input provided
Berunbari Nala Watershed	Tailoring Training	Bande Purashattam SHG	7	• Tailoring
		Unemployed young girls	13	
Raipada Nala Watershed	Leaf plate Stitching	Maa Kaluni Debi SHG Maa Tarini SHG	24	• Leaf plate stitching
Punjiama Nala Watershed		Raimali SHG Nilakantheswar SHG Bedhakali SHG	15	• Leaf plate stitching
Rigidisima Nala rearing Watershed	Honey Bee	Maa Domani SHG	10	• Honey bee rearing
Barakoli Nala Watershed	Honey Bee rearing	Jyotrimayee SHG Maa Durgadevi SHG Maa Suliadevi SHG	10	• Honey bee rearing
Kosarada Nala Watershed	Honey Bee rearing	Nari Jagarana SHG Santoshi SHG Brahamani Devi SHG	10	• Honey bee rearing
	Honey Bee rearing	Maa Birajai SHG	10	• Honey bee rearing
Mandar Nala Watershed	Cashew nut marketing	Jishu Khrista SHG	10	Revolving fund Rs.10000/-

8. Workshops, Seminars, Training & celebration of important days

A number of important events took place during the financial year 2010-11 which includes the scientific workshop, capacity building training, workshops and seminars and observation of World Wetlands Day.

8.1. Training for the boat operators in Chilika

Workshop-cum- training on “Sustainable Ecotourism in Chilika” was organized at Sipakuda, Mirzapur, Gabakunda and Gangadharapur for the boat operators who conduct the tourist in Chilika Lake. The objective of the training programme was to sensitize the boat operators on sustainable eco-tourism, dolphin conservation as well as promoting nature-based tourism as an alternate source of livelihood for the local fishermen. Officials from CDA, the DFO of Chilika Wildlife Division, Tourism Department,

local NGOs, Dolphin researchers were the resource persons. The participants were provided with the resource material in local language, the Dolphin watching protocols.

Sl. No.	Motorboat Association participated	Date of training	Nos. of participants
1	Chaubar Dev Motorboat Association, Sipakuda	29.09.2010	58
2	Bhabakundaleswar Naubihar Eco-tourism Centre, Mirzapur	24.09.2010	55
3	Bhabakundaleswar Motorboat Association , Gabakunda	06.10.2010	54
4	Gadiswardeva Motorboat Association, Gangadharapur	05.03.2011	56

8.2. Workshop on Sustainable Management of Chilika Lake

A workshop on "Sustainable Management of Chilika Lake" was organized on 10th & 11th November 2010 at WRTC, Chandraput and was participated by the scientists and experts from NUS-Singapore, NIO-Goa, ICMAM- Chennai, School of Bio-technology, KIIT University- Bhubaneswar and CDA. The two days workshop was held with the objective 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.

Deliberations and thread bare discussion was held on the subject like eco-restoration of Chilika and prospects for modeling of its eco-systems, hydro-biological monitoring, changes in biology and ecology of Chilika Lake after the hydrological interventions, sustainable management of fishery resources, Integrated approaches / technologies for sustainable inclusive growth of Chilika Lake and integrated approaches towards sustainable ecological functioning of open water systems.

Key research gaps in the areas of catchment management, hydrological regimes, Lake ecology, fisheries and socio-economic were identified during the work shop for necessary future action.

8.3. Seminar on Heritage of Chilika Lake on 4th December 2010

A seminar on the Heritage of Chilika was organized at WRTC, Chandraput on 4th December 2010 in collaboration with Indian National Trust for Art and Cultural Heritage (INTACH), Bhubaneswar, Chapter. The seminar was attended by 30 members of INTACH and officials from CDA. A power point presentation on hydrological interventions and restoration activities initiated by Chilika Development Authority was presented by Sri Chittaranjan Mishra, Addl. Chief Executive, CDA. Dr. A.K. Pattnaik, Chief Executive, CDA gave a detailed presentation on the history, culture and traditions of Chilika and the socio-economic importance of the Lake in the State. Taking part in the discussions the members expressed the cultural and traditional importance of Chilika and appreciated the restoration activities undertaken by CDA. INTACH and CDA looked forward to work in close collaboration for conservation of the cultural heritage of Chilika in future.

8.4. International workshop on Management of *Phragmites karka* invasion in Chilika, Lake

A two-day long science workshop on management of *Phragmites karka* jointly organized by Chilka Development Authority and the Wetlands International South Asia on 17th–18th January 2011 at Hotel Mayfair Lagoon, Bhubaneswar, Orissa. Eminent naturalist and Chief Guest Prof. Priyambada Mohanty_Hejmadi inaugurated the workshop. Sri Bhagirathi Behera, IFS, Director, Environment & Special Secretary, Forest Environment Department, Government of Orissa, Dr.S.Kaul, Advisor, Ministry of Environment & Forest, Government of India, Dr. Colin Maxwell Finlayson, Professor for Ecology & Biodiversity, Director of Institute for Land, Water & Society, Charles Sturt University, Albury, NSW, Australia and Dr.A.K.Pattnaik, IFS, Chief Executive, Chilika Development Authority-cum- Project Director, ICZM Project, Orissa were among the dignitaries. The objective of the workshop was to deliberate on the management issues of invasive macrophytes particularly *Phragmites karka* in the northern sector of the Lake. More than 50 experts from India and abroad having experience in the field of Management of Phragmites karka participated in the workshop.

Dr. Colin Maxwell Finlayson an eminent wetlands ecologist, Chair, Technical and Scientific Advisory Panel, Ramsar Convention, Switzerland and an expert on the Phragmites(Nala) gave a detail presentation on the Management of *Phragmites karka.*

8.5 Celebration of World Wetlands Day 2011

To commemorate the 1st meeting of the convention on wetlands on 2nd February 1971 in the Iranian city of Ramsar, World Wetlands Day was celebrated on 2nd February at Chilika Lake. This day presents us with a welcome opportunity to join together in acknowledging the benefits that we all receive from the wetlands, as well as to raise the awareness of the local communities who derive their livelihood about the importance of these vital ecosystems for our common future. The Ramsar Bureau (Secretariat) took a decision to observe the World wetland day on 2nd February from 1997. Chilika Development Authority have been observing WWD in and around Chilika Lake with the active participation of local communities, NGOs, CBOs, school children, local intellectual, eminent dignitaries, religious leaders, political leaders, foreign delegates etc. since from 1997.

This year being the Ramsar Convention's 40th anniversary it was observed in a befitting manner at Chilika Lake. The theme of this year was "Forests for water and Wetlands", considering 2011 is the UN International Year of Forests. 2011 being the 40th year of Ramsar Convention, WWD is celebrated all over the world with the theme "Forests for water and Wetlands" captured the sense of urgency about the need to address the potentially of forests followed by wetlands to emphasizes the belief that the role of wetlands and forest played for the lifeline of the local stakeholders. Considering the importance of the theme of the WWD 2011 major thrust was given to associate the school children in and around Chilika in a big way. To create awareness among them essay and drawing competitions on the theme of WWD-2011 i.e. "Forest for wetland and water" was conducted in all the sectors of Chilika Lake.

The WWD-2011 was observed at Satapada one of the gateway to Chilika. More than 0.4 million tourists come to Chilika annually for dolphin watching. Ecologically this is the most sensitive area as the inlet of the Lake is located in this zone. The rich fishery resource also supports the livelihood of fishers from more than 30 villages located in and around Satapada. Sj.Sanjay Dasburma, Hon'ble Member of Legislative Assembly of Orissa of Brahmagiri constituency was the Chief Guest of the function and Chairman of the Krushna Prasad Block was the guest of honour. Hundreds of local communities, women SHG members and school children, teachers, boat men, local leaders and Nominees, NGO personnel, Release of '*Chilika Darpan*' newsletter by the Chief Guest Government Officials, Scientists and experts participated. On this occasion a quarterly news letter in Oriya(local) language "*CHILIKA DARPAN*' was released. The thematic WWO-2011 poster developed by the Ramsar secretariat was dubbed in local language and was printed in bulk and distributed. Flyers with the theme "*Forests for water and Wetlands*" in local language was developed and distributed among the participants to sensitize the local communities.

An exhibition was set up near the venue exhibiting the Chilika ecosystem, biodiversity, Ramsar principles of management was opened for the local community to sensitize them about the wise-use and sustainable management of the Lake.

WWD – 2011 at Ansupa Lake

Ansupa Lake is one of the largest natural fresh water Lake of the state (Cuttack district), covers an area of 170 ha. It is an important site for birds, indigenous riverine fishes and supports the livelihood of local communities. Like Chilika Lake to sensitize the school children essay and drawing competitions was organized around the high schools of the Ansupa Lake on the theme "*Forests for water and Wetlands*" of the WWD 2011. The WWD was celebrated at the foot hill of historical Sarandha hill. The Divisional Forest Officer, Athagrah Forest Division was the Chief Guest. He gave away the prizes to the winners of the essay and drawing competition.

9. Distinguished Visitors

The inviting islands inside Chilika Lake, the mouth connecting the Lake with Bay of Bengal, vast stretches of blue water, endless sand bars separating the Lake from sea, congregation of migratory birds, and sighting of endangered Irrawaddy dolphins and rich bio-diversity of Chilika have always fascinated the

national and international visitors and dignitaries to visit Chilika. The list of some of the distinguished visitors to Chilika during the year is as follows:

Sl. No.	Name of Visitor	Date / Period of visit
1	Reiko Nakamura, Secretary General, RCJ, Tokyo, Japan	05.09.2010
2	R.L. Jamuda, IAS, Principal Secretary, Rural Development Department, Govt. of Odisha	25.12.2010
3	Dave Bomero, 4478, S Rimview Way, Boise, USA	30.01.2011
4	Maj. Gen.P.K.Goswami, National Defence Academy, New Delhi	16.03.2011
5	Doris Kohler Staub, Switzerland	03.02.2011
6	Marie Vexrest, Wetlands International headquarters, Netherlands	02.03.2011
7	Prof. Rittu, Lausanne, Switzerland	13.02.2011
8	Frederik Noack and Marie-Catherine Riekhof, Kiel University, Germany - (Intern from Kiel University)	17.04.2010
9	Eliot Levine, WWT, CCA, USA	15.08.2010 to 21.08.2010
10	Jonathan Randall, WWF, USA	15.08.2010 to 21.08.2010
11	Emilia Pramova, CIFOR Research Associate, Bulgaria	15.08.2010 to 21.08.2010
12	Munish Kanthey, Country Advisor, Netherlands	do
13	Bishnu Bhandari, ICIMOD, Kathmandu, Nepal	do
15	Terry Hills, Australia	do

10. Overseas Training and Workshop attended by CDA personnel

I. Dr.A.K.Pattnaik, Chief Executive attended Mid Career Training programme for Indian Forest Service Officers of 1982 batch at University of British Columbia, Vancouver , Canada and IIM, Bangalore held from 7th June to 3rd July 2010 organised by IGNFA, Dehra Dun sponsored by Ministry of Environment & Forest, Government of India.

II. Dr.A.K.Pattnaik, Chief Executive attended the International Steering Committee on Asian Wetland Symposium (AWS) and the International Workshop on Rice Paddy and Wetland Conservation on 7th August 2010 at Takashima, Shiga, Prefecture, Japan. He presented a paper on “SRI method of paddy Cultivation and the aquatic biodiversity of rice field”.

III. Dr.A.K.Pattnaik, Chief Executive attended the international symposium on “Wetlands Matter: valuing wetland ecosystems in a changing climate” on 24th February 2011 organised by Wetland International and Scottish Government and presented a paper on ‘Governance mechanism for wetland management and enhanced community participation-experience of Chilika lake, India’ at Edinburgh, Scotland.

MARP ASSOCIATES
BHUBANESWAR

CHILIKA DEVELOPMENT AUTHORITY
Plot No-C11, B.J.B Nagar,
Bhubaneswar-14

BALANCE SHEET AS ON 31ST MARCH 2010

Prev Year (Amount Rs)	Liabilities	Current Year (Amount Rs)	Prev Year (Amount Rs)	Assets	Current Year (Amount Rs)
	Capital Fund			**Fixed Assets**	
40,796,163.00	Opening Balance	39,080,754.00	579,718.00	As Per Sch-1	7,635,952.60
-	Less Fund Transferred to ICZM	690.732.00			
	Add/Less: Excess of income Over				
(1,715,409.00)	Expenditure	16,530,858.60			
39,080,754.00	**Closing Balance**	**54,920,880.60**		**Loans & Advances**	
			225,000.00	TFC - schedule	225,000.00
				Current Assets	
	Current Liabilities & Provisions		74,902,00	Deposit TFC - Sch 2	74,902.00
813,432.00	Liabilities for Exp (Sch-4)	1,231,490.00	46,250.00	Deposit Others - Sch 3	46,250.00
457.655.00	Liabilities of Other grant (Sch-5)	424,227.00	-	Advances to staffs & Others	88,414.00
242,894.00	Sundry Creditor	242,894.00	-	Cash in Hand	-
			34,445,789.00	Cash At Bank	34,611,379.00
			5,133,485.00	Fixed Deposit With Bank	14,048,003.00
			1,244.00	Cash Suspense	1,244.00
			45,848.00	Dolphin FD	45,848.00
			42,499.00	Hydro FD	42,499.00
40,594,735.00	**Total**	**56,819,491.60**	**40,594,735.00**	**Total**	**56,819,491.60**

For MARP Associates
Chartered Accountants

C.A.A.N. Swain, FCA, DISA (ICA)
Partner
Date: 19.04.2011
Place: Bhubaneswar