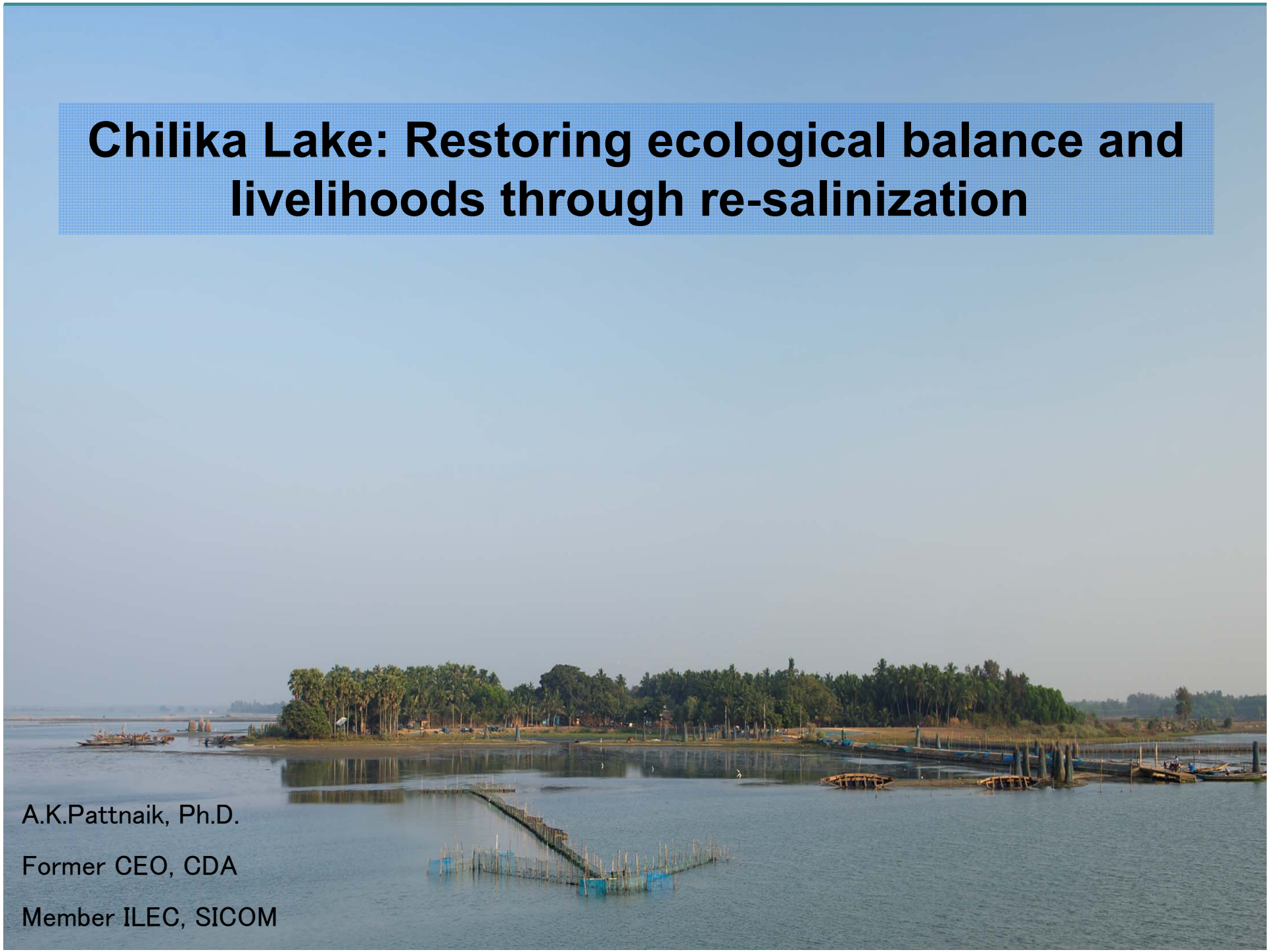
Chilika Lake: Restoring ecological balance and livelihoods through re-salinization



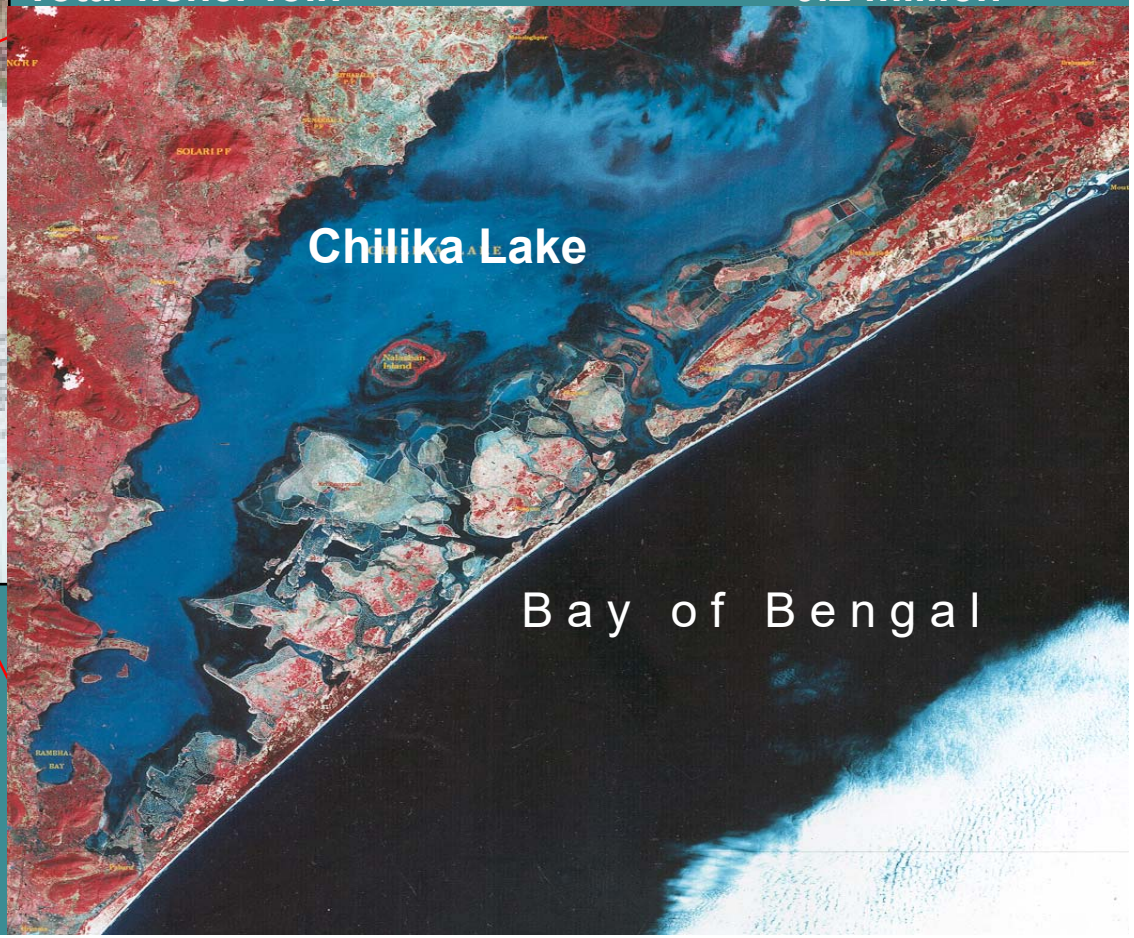
A.K.Pattnaik, Ph.D.

Former CEO, CDA

Member ILEC, SICOM

Location & Salient features of Chilika Lake

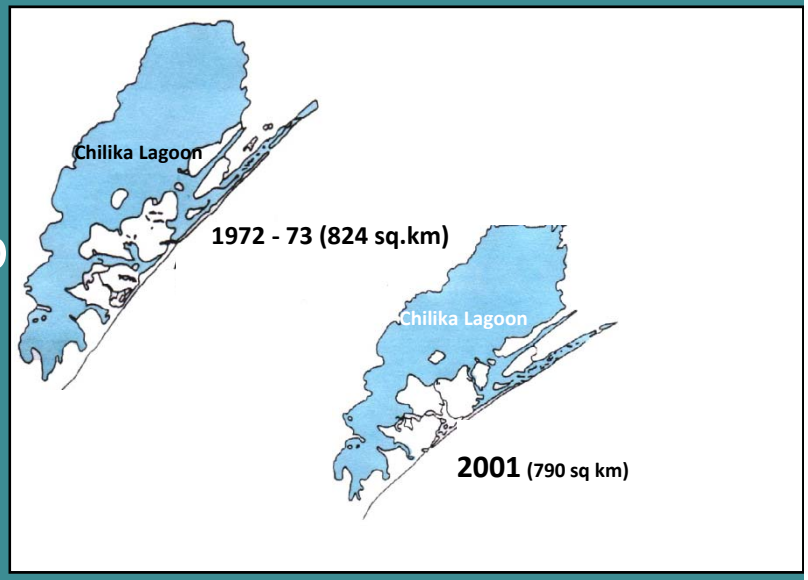
Length	-	64 kms (max)
Breadth	-	20 kms (max)
Avg. water spread area	-	1065 sq. km
Depth	-	0.38 to 4.2 m
Catchment area	-	4406 sq kms
No. of fishermen villages	-	192
Total fisher folk	-	0.2 million

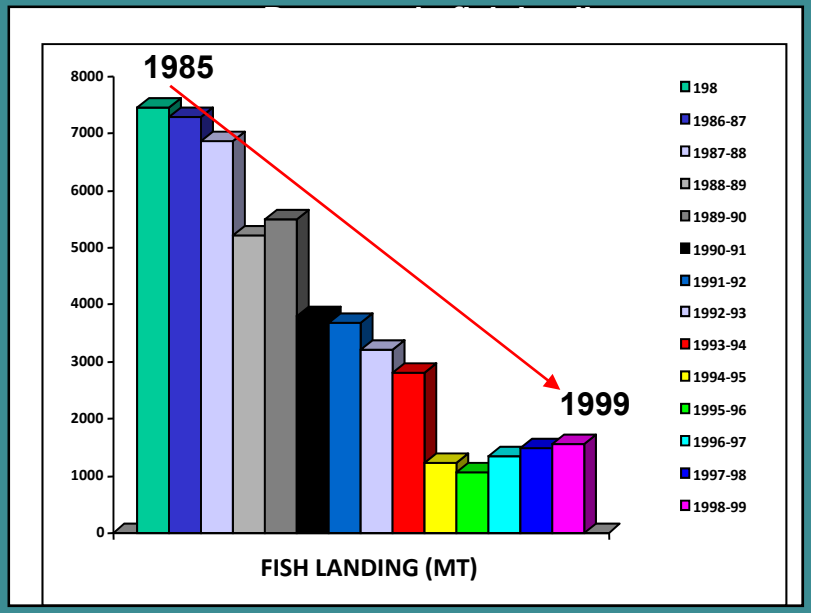


Management Issues

- Complex ecosystem, multitude stake holders
- Shrinkage of water spread area due to siltation (degradation of lake basin)
- Fall in salinity level of lake water , resulting change in ecological character.
- loss of biodiversity & productivity & decrease in the fish yield/ diversity adversely affecting the livelihood of local communities.
- *Included in Montreux Record in 1993 due to change in the ecological characters by Ramsar convention.*

Shrinkage of waterspread Area (1972 –2001)

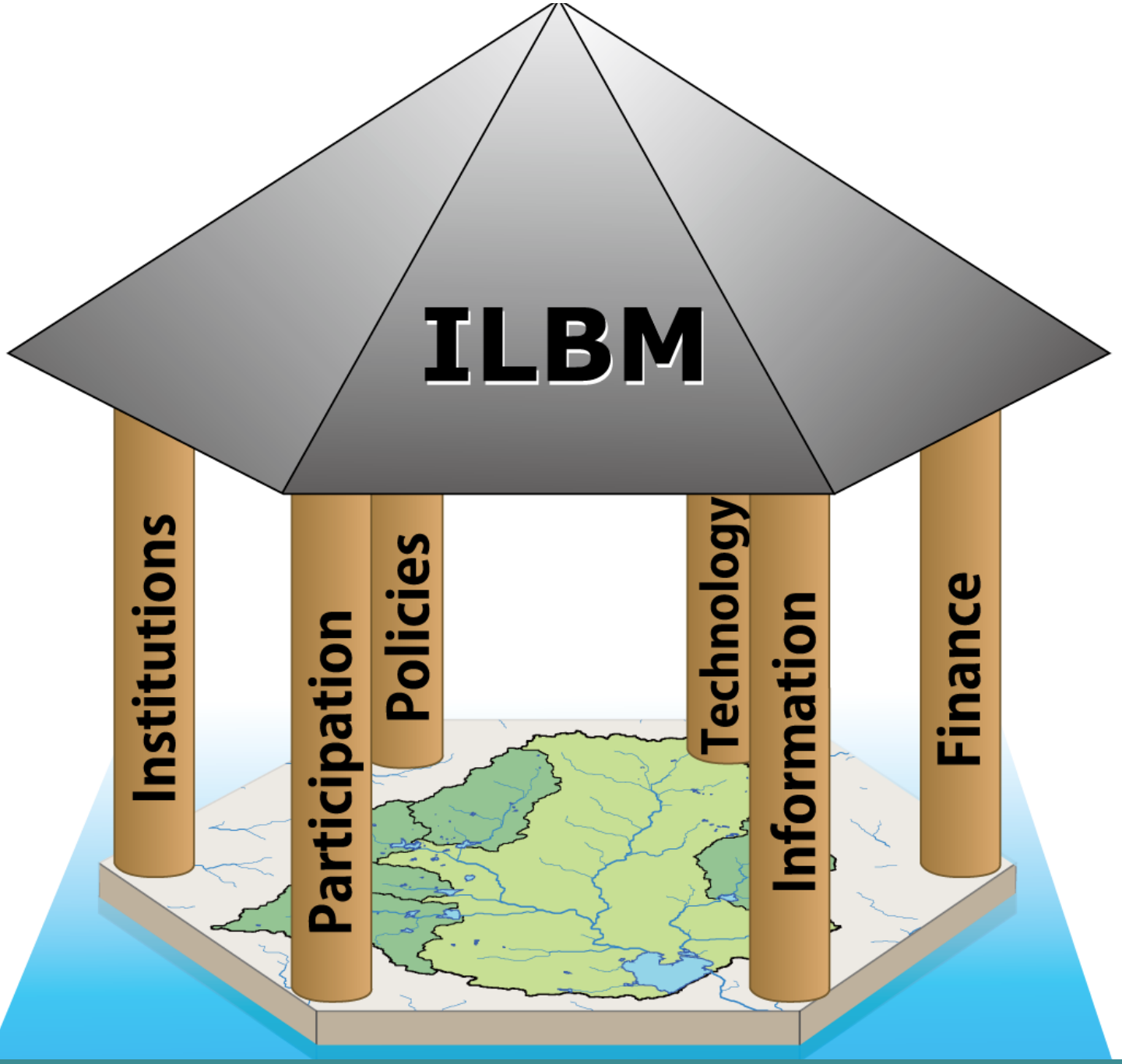




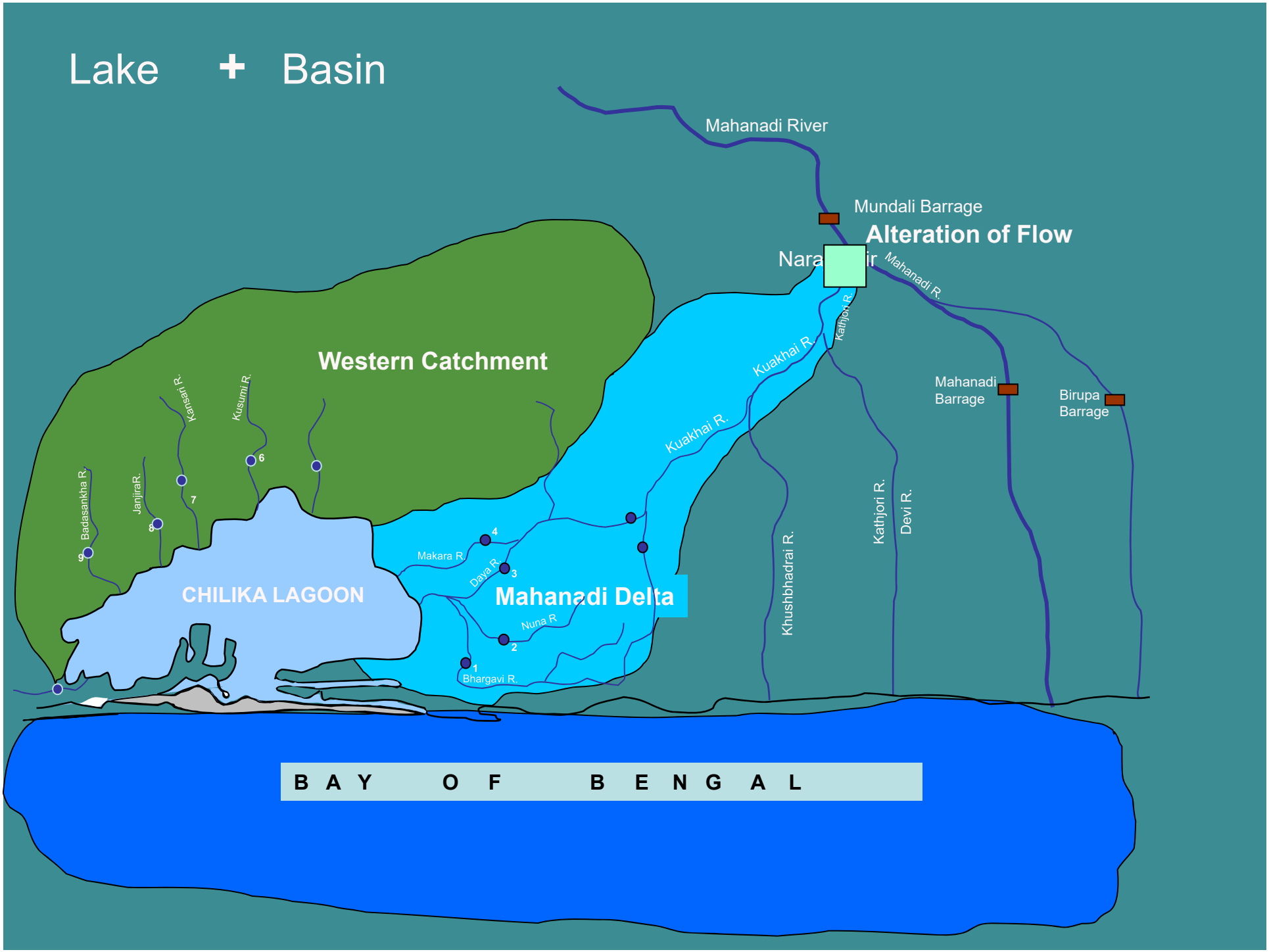
Restoration strategy

(Ecosystem approach)

- Key targeted studies to understand the complex ecosystem and to trace the root cause of degradation
- Adaptive restoration planning through wide consultative process.
- Integration of the lake basin in the management .
- Wide scale consultation & strategic partnership with a wide array of organization within & outside the country .
- Science based management & a strong institutional mechanism and adoption of a robust monitoring protocol.

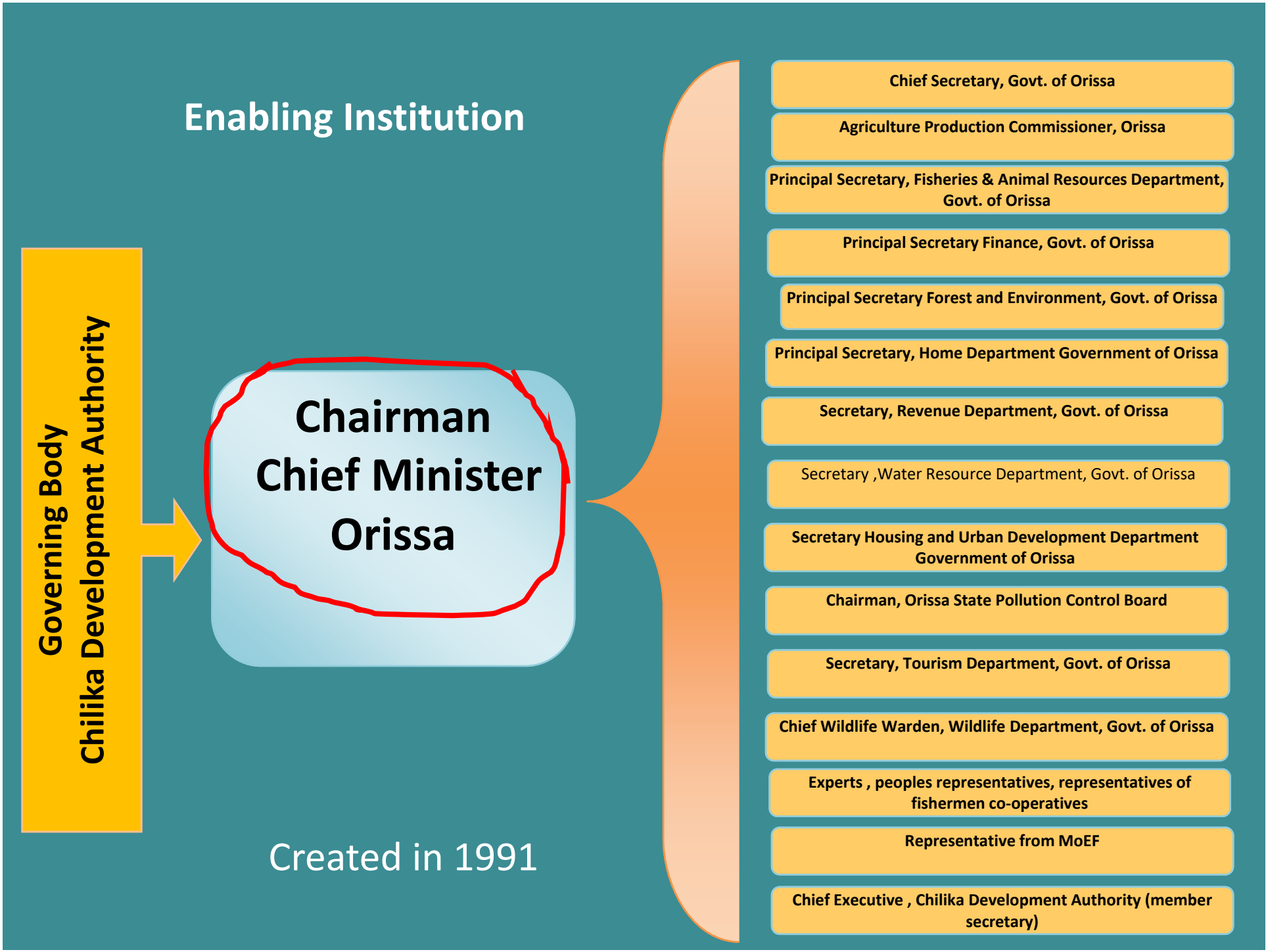


Restoration strategy adopted by CDA mimics ILBM Framework closely


Lake + Basin
Mahanadi River
Mundali Barrage
Alteration of Flow
Mahanadi R.
Kathjori R.
Kuakhai R.
Western Catchment
Kansari R.
Kusumi R.
Badasankha R.
JanjiraR.
6
7
8
9
Mahanadi Barrage
Birupa Barrage
Kuakhai R.
Khushbhadrai R.
Kathjori R.
Devi R.
4
Makara R.
Daya R.
3
CHILIKA LAGOON
Mahanadi Delta
Nuna R
2
1
Bhargavi R.
B A Y O F B E N G A L

Institution & Policy

A strong attribute of the restoration initiative by CDA is the enabling institution, policy support and “good governance” that encompasses ideal procedural aspects of planning and management as well as concepts of legitimacy, fairness, wisdom, acceptability, transparency and accountability.


Enabling Institution
Governing Body
Chilika Development Authority
Chairman
Chief Minister
Orissa
Created in 1991
Chief Secretary, Govt. of Orissa
Agriculture Production Commissioner, Orissa
Principal Secretary, Fisheries & Animal Resources Department, Govt. of Orissa
Principal Secretary Finance, Govt. of Orissa
Principal Secretary Forest and Environment, Govt. of Orissa
Principal Secretary, Home Department Government of Orissa
Secretary, Revenue Department, Govt. of Orissa
Secretary ,Water Resource Department, Govt. of Orissa
Secretary Housing and Urban Development Department Government of Orissa
Chairman, Orissa State Pollution Control Board
Secretary, Tourism Department, Govt. of Orissa
Chief Wildlife Warden, Wildlife Department, Govt. of Orissa
Experts , peoples representatives, representatives of fishermen co-operatives
Representative from MoEF
Chief Executive , Chilika Development Authority (member secretary)

Lake & Lake-basin institutions

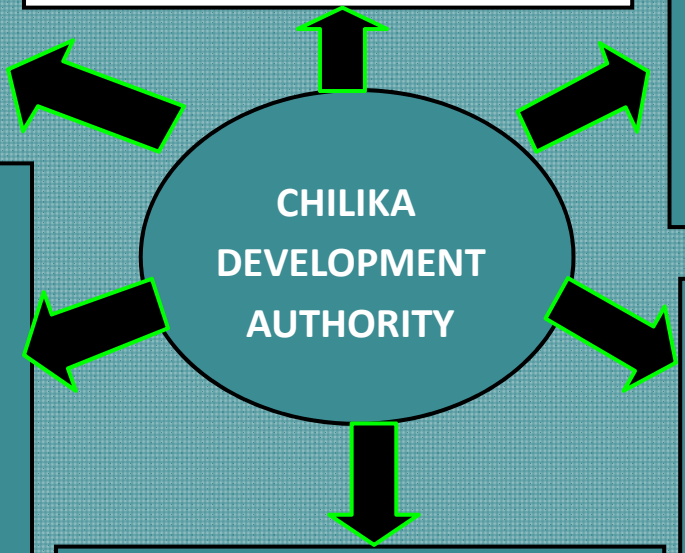
- Watershed Association are registered institutions at each micro watershed are the key institutions to mange the natural resources and ensure equitable distribution of the benefits.
- Primary Fishermen Cooperative Society (PFCS) are the institutions at the grass root level and accountable for responsible fishery in the lake.

Strategic Partnership

INTERNATIONAL ORGANISATIONS
- Ramsar Secretariat
- Wetlands international
- Ramsar Center Japan
- World bank
- JICA
- ILEC
- Danish Embassy
- Swiss Embassy
- DHI
- Tokyo University
- Kiel University
- Maryland University
- UNEP
- UNDP

COMMUNITY LEVEL INSTITUTIONS
- Fishermen Cooperative Societies
- Central Fishermen co-op Society
- Watershed Associations
- Self Help Groups
- Community based organization

NATIONAL ORGANISATIONS
- Ministry of Environment ,Agriculture,
- Science and technology, Water Resources
- National Bank for Agriculture Devt.
- Water Technology Development for Eastern region
- Central Inland Fishery development Center
- IITTM
- NCSCM



RESEARCH INSTITUTIONS
- Central Water & Power Research Station
- National Institute of Oceanography
- IIT Chennai
- Zoological Survey of india
- Botanical survey of India
- Wildlife Institute of India
- Space Applications Center
- National Remote Sensing Agency
- Bombay natural history Society
- Central Inland Fishery Research Institute
- Central Institute for Brackish Water Fishery
- KIIT School of Biotechnology
- Anamalai University
- CIFA
- IISER Kolkatta
- NISER
- RPRC

NONGOVERNMENTAL ORGANISATIONS
- Campaign for Conservation of Chilika Lagoon (CCCL)
- 20 local NGOs and CBOs
- Barefoot
- Wild Orissa
- WWF

LOCAL ORGANISATIONS
- Fishery and ARD Department
- Water Resources Department
- Forest & Env. Department
- Revenue Department
- Science and Technology Department
- Agriculture Department
- Remote Sensing Application Center
- Watershed Mission
- Tourism Department
- Revenue & Disaster Management Dept.
- Renewable Energy Development Center

Technology & Information

- One of the most significant strategy adopted by CDA has been acknowledging the vital role of the scientific information in achieving management goals. The basic programme of opening a new lake mouth, a major recommendation from numerical modelling carried out by the Central Water and Power Research Station (CWPRS), can be considered a first step in improving the lake environment.
- *Interestingly, this was also a long-standing demand of the local communities, reflecting the value of local knowledge.*
- The most vital restoration intervention by CDA have been the new mouth, which transformed the lake ecosystem positively is based on the science.
- To track the changes, close monitoring of the lake and its basin is being carried out by CDA.
- The data generated on the freshwater flows, silt loads, coastal process, the nature and characteristics of weed infestation, salinity and nutrients, biogeochemical cycles, the role of microbes and other biotas in the lake ecosystem, depth and possible impacts of dredging, constitute vital management inputs .

IRS 1D LISS III IMAGE OF CHILIKA LAGOON

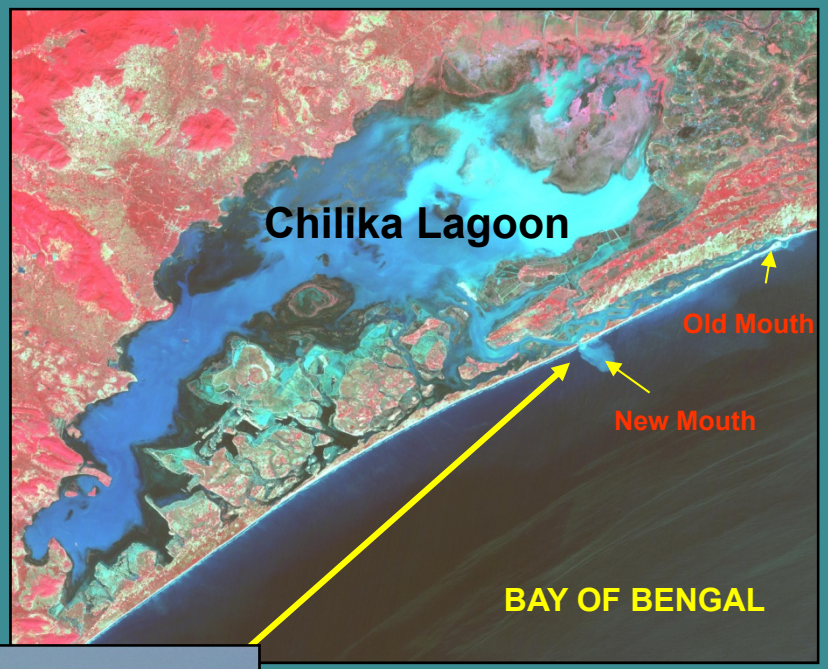
DATE : 23rd OCTOBER 2000

Technical intervention can
have
Hydrological intervention- Opening of the new mouth

Impacts

Improvement after hydrological intervention

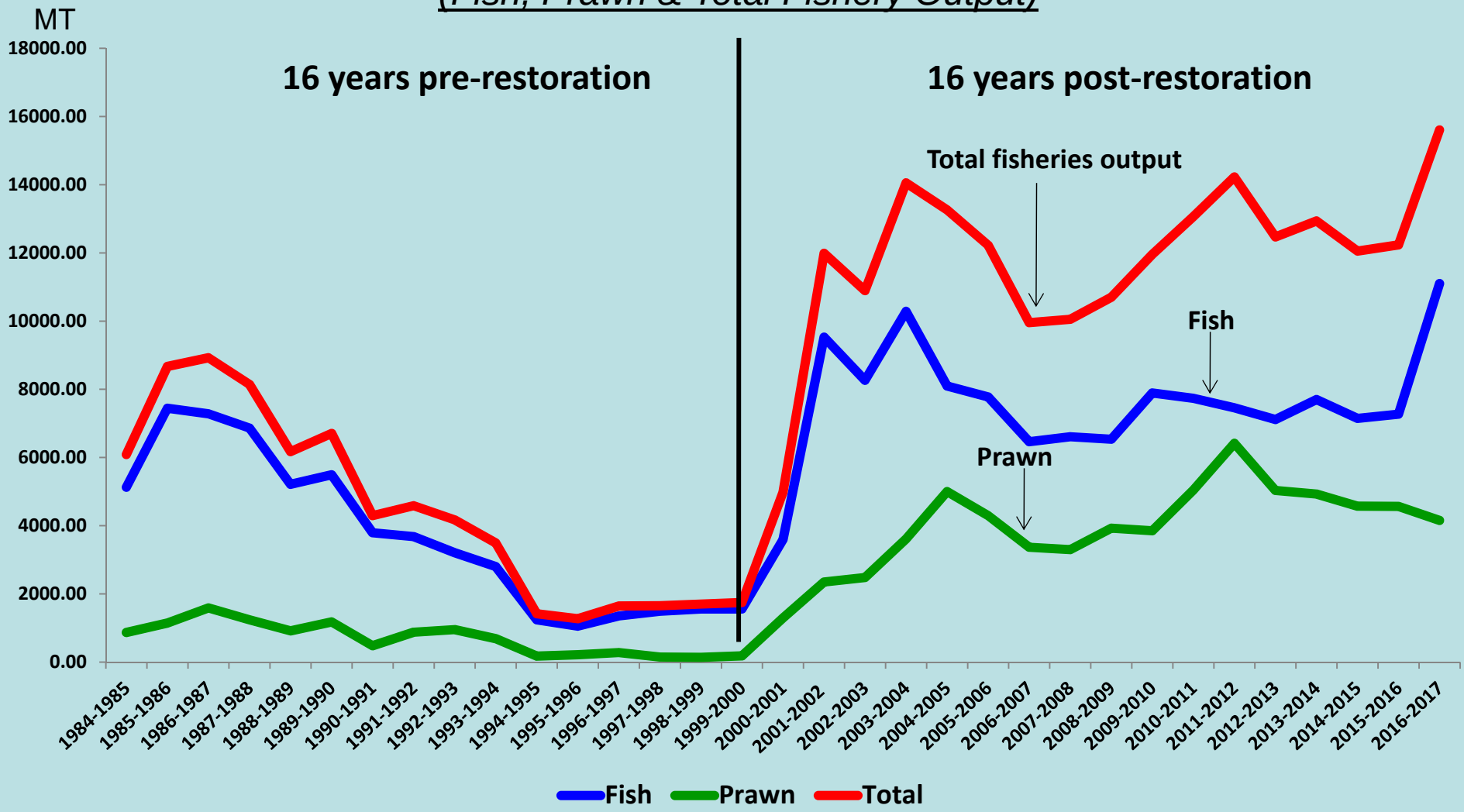
- Seven fold increase in annual fish & prawn landing 140 Crores only from enhancement of fishery resources per annum).
- Improvement of salinity flux & tidal flux.
- Expansion of sea grass meadows , increase of dolphin population and habitat of avian fauna
- Reappearance of native fish Sps.
- Improvement of sediment flushing and water transparency
- Decrease of invasive species .
- *Removed from Montreux Record due to improvement of the lake ecosystem in 2002(1st from Asia). Ramsar wetland conservation Award*



Opening of the New Mouth

Pre & Post-restoration Fishery Yield

(Fish, Prawn & Total Fishery Output)



% of average yield increase during post-restoration phase

Fish	**= 114.66% increase**
Prawn	**= 504.32% increase**
Total fisheries output	**= 179.72 increase**

Biodiversity and sustainable livelihood

- With the amelioration of biodiversity (post restoration), new vistas opened i.e. community based ecotourism. An amount of INR 400 million ($US 2.78 million) per annum is generated from this activity.
- As an alternative source of livelihood more than 850 boats are being used for dolphin watching and 400 boats to conduct the tourists for bird watching by the local fishermen. (reducing pressure on fishery).
- To facilitate this ; capacity building of the local communities and infrastructure development is being done by CDA
- The dolphin and the migratory birds are protected by local communities.

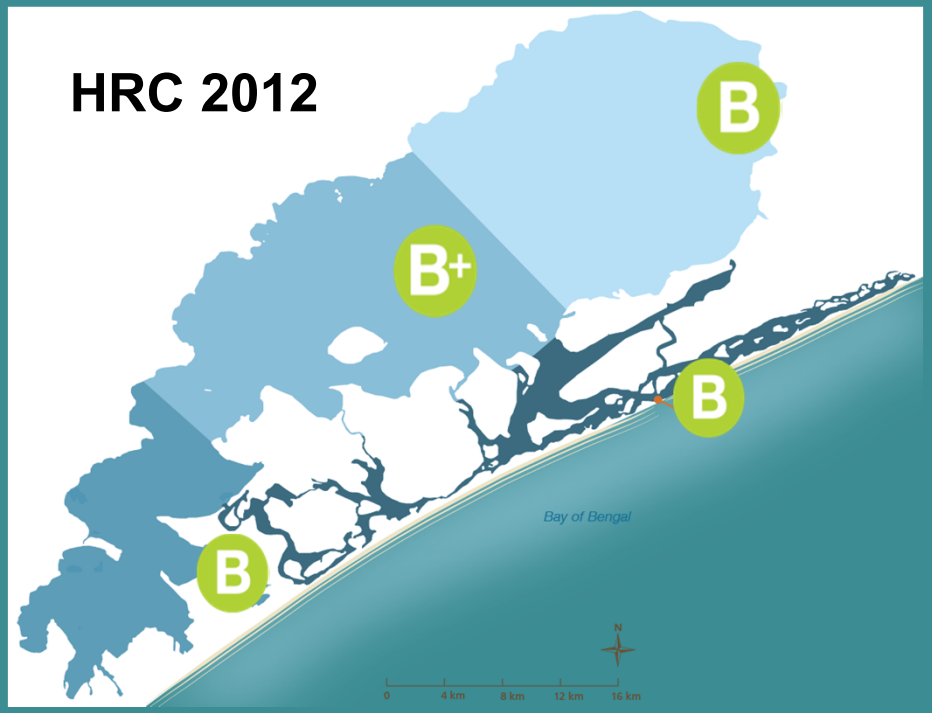
- For generating credible scientific information, “Wetland Research and Training Center” (WRTC) is established by CDA. The state of the art laboratory has multidisciplinary research facilities and more than 30 scientists and researchers are researching the lake ecosystem from this centre.
- Close monitoring of the lake including the real-time monitoring of water quality is carried out from WRTC.

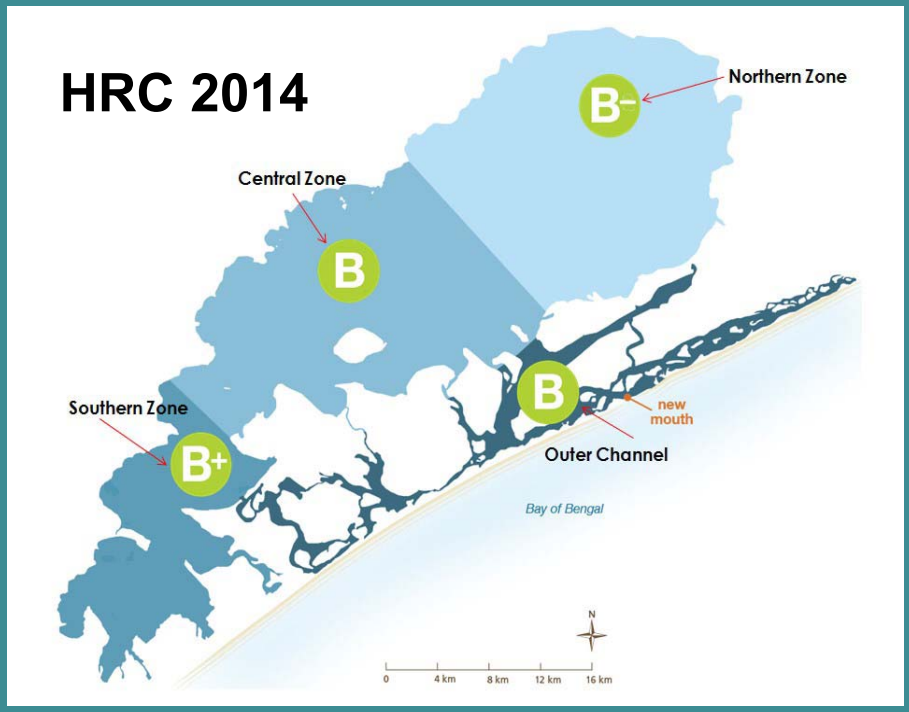
Ecosystem Health Report Card

- Environmental report cards are transformative assessment and communication products that compare environmental data to scientific or management thresholds and are delivered to a wide audience on a regular basis. To facilitate science to become policy relevant .
- *Chilika Health Report Card (HRC) is used as a management tool for sustained monitoring of the lake ecosystem and as a communication tool.*

Grades

A	100-80%
B	80-60%
C	60-40%
D	40-20%
F	20-0%





Expansion of sea grass meadows

Seagrass are indicator of a healthy coastal ecosystem

April	1999	24.8
May	2000	22.32
June	2004	86.84
Jan	2012	102.00
Jan	2014	55.00
Feb	2015	100.00

Participation

- The restoration strategy adopted by CDA, derives its strength from the strong participation by local communities, grassroots-level non-government organizations (NGOs), community-based organizations (CBOs), and strategic partnerships with various national and international organizations and experts, government agencies and stakeholder government institutions.
- The key to success has been a strategic partnership built up through networking, consultation and coordination with the stakeholders.
- The strong network of the NGOs and CBOs, widespread stakeholder consultation, and watershed associations are some of the positive elements in the participatory management approach adopted by the CDA.
- A visitors' centre is established at Satapada, a major entry point to the lake by CDA. The entire Chilika ecosystem is showcased at the centre, via interactive exhibits.

Finance

- A major key to achieving complete success of the planned activities is the timely flow of funds and availability of resources.
- The major investment for restoration of the lake has been from the National Government i.e. from the Special Problem Grants(SPG), as per the recommendations of the Finance Commissions which is approximately INR 1250 million (or $US17.2 million).
- However, since from 2014 the special problem grant was dispensed.
- To ensure the steady flow of funds to CDA, the State Government is providing a yearly grant of INR 60 million ($US 0.834 million) to carry out the activities and INR 20 million ($US 0.278 million) to meet the establishment cost of CDA.
- With strategic planning and sound financial management, and the limited resources available in the form of grants from the government of India, the entire restoration task could be accomplished.
- To this end, it would be worthwhile to determine the feasibility of sustainable financing for carrying out core activities, generating resources from the lake fisheries and ecotourism.

Importance of the case study

- This case study demonstrates how Integrated Lake Basin Management is essential for successful restoration of a Lake and its basin. The primary feature of the restoration model adopted by CDA is the integration of the basin and the coastal process with active participation of the local communities with a shared decision-making process.
- Another strong attribute of the restoration initiative is the enabling institution, policy support and "good governance" that encompasses ideal procedural aspects of planning and management as well as concepts of legitimacy, fairness, wisdom, acceptability, transparency and accountability.
- The intensive monitoring and assessment system, linkages between the targeted scientific studies and the management interventions reflect the distinctiveness of the management practices adopted by (CDA) for restoration of this unique wetland with an ecosystem approach. The innovative communication of science i.e. Ecosystem Health Report Card to reach wider audience and transparency in management outcomes.
- To ensure the stakeholders participation an extensive outreach programme was carried out with the help of local NGOs to make the community aware about the ecological goods and services provided by the lake eco-systems, which contribute significantly to their livelihood

Contd..

- The intervention for improvement of the hydrological regime and the participatory management of the watershed resulted in the functional integrity of the ecosystem and enhancement of the productivity thereby increasing the per capita income of the local community. This has also facilitated the self-initiated good practices by the community because they are the immediate beneficiaries of successful ecosystem management.
- Supported by a high-level Governing Body and with access to government funding, CDA combines the stability of a government authority with implementation flexibility, avoiding the constraints of the normal bureaucratic system.
- The management philosophy of CDA is pragmatic and outcome-focused, implemented by innovative leadership and a strong and committed core team.
- **The case study illustrates the strategy adopted by CDA is in conformity with the six pillar ILBM principles.**