IWRM Action Hub

CASE STUDY

India: Integrated management of Chilika Lagoon

Summary

The Chilika Lagoon was subjected to environmental degradation. Action was taken by the Chilika Development Authority through the application of GIS and remote sensing tools for monitoring and assessment of the lagoon, resulting in significant improvement of the ecological health of the lagoon. The key lesson learnt is how a clear understanding of the coastal process and the river basin is essential for restoration of a coastal wetland.

Background

Chilika is the largest lagoon along the east coast of India. The lagoon is a unique assemblage of marine, brackish, and fresh water eco-systems with estuarine characters. It is one of the hotspots of biodiversity and shelters a number of endangered species listed in the IUCN red list of threatened species, and also is a designated Ramsar site. Chilika is influenced by three subsystems:

- the Mahanadi River delta,
- minor rivers flowing in the lagoon from the Western catchment and
- the tidal outlet to the Bay of Bengal.

Construction of major hydraulic structures upstream in the Mahanadi has altered the flow pattern into Chilika. The hydrological alterations leading to the transformation of the lagoon towards a freshwater ecosystem was considered as a potential threat to the biota of this unique ecosystem. This could be broadly attributed to the change in the flow pattern from the lagoon basin and the changes in the coastal processes. The lagoon encountered a combination of increased siltation, as well as partial closure the outlet channel connecting the sea. The consequent decrease in salinity caused proliferation of invasive species, increased turbidity, shrinkage of area, loss of biodiversity, depletion of the fishery resources. The overall decline in the productivity adversely affected the livelihood of the local community.

Actions taken

Being concerned with this the Orissa State Government created Chilika Development Authority (CDA) in the year 1992, for the integrated management of the lagoon. CDA adopted a holistic approach of integration of coastal processes and lagoon basin in the management planning. Hydro-biological monitoring of the lagoon in collaboration with the Wetlands International South Asia (WISA) is being carried out to understand the changes in the hydrological regimes, water quality and biota in reference to the changes in the flow

pattern into the lagoon from the catchments. Based on the output of these studies, the Central Water and Power Research Station (CWPRS), Pune, carried out a two-dimensional numerical model studies. The studies concluded that the tidal influx into the lagoon was considerably reduced because of the shoal formation along the lead channel and continuous shifting of the mouth that resulted in significant hydraulic head loss.
Based on the findings of the numerical model studies, CWPRS inferred that the salinity flux and tidal flux into the lagoon would not improve unless the location of the opening of the inlet was moved closer to the central parts of the lagoon. Following the recommendations of the CWPRS, an artificial mouth was opened on 23rd September 2000 which reduced length of the outflow channel by 18 km. Dredging of the lead channel was also completed before opening the new mouth. The environment impact assessment was carried out by National Institute of Oceanography, Goa, before and after the opening of the mouth.

Outcomes

The opening of the artificial mouth and the desiltation of the lead channel not only rejuvenated the ecosystem of the lagoon but also immensely benefited the community depending on the lagoon whose average annual income increased by more than 1040 USD approx. per family. Application of GIS and remote sensing tools have been useful tools for monitoring and assessment of the lagoon.

The outcome has been a significant improvement of the ecological health of the lagoon, including a substantial per capita income of the fishing community due to the restoration of the lagoon.

After the reception of the Ramsar Wetland Conservation Award in 2002, the case has received international recognition, and the experiences demonstrate the promising potentials in reforming the management frameworks of the numerous important coastal wetlands in the Asian region.

Lessons Learned

The extraordinary implementation success of Chilika Development Authority (CDA) can be related to the non-bureaucratic organizational setup, which actually has no formal legal mandate.

Supported by a high-level Governing Body with strong political backing and with full access to government funding, the CDA combines the stability of a government authority with the implementation flexibility of private sector, avoiding constraints of the normal bureaucracy.

Management steps by the CDA are widely debated, researched and implemented, and this extensive consultative approach has contributed significantly to the success of the management actions undertaken.

The hydrological interventions for the restoration of the lagoon have resulted in considerable improvement of its fishery resources, water quality and a positive impact on the biodiversity of the lagoon.

The community participation and stewardship, linkage with the various national and international professional institutions, intensive monitoring and assessment system are some of the uniqueness of the management practices adopted by CDA for restoration of this wetland.

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Related IWRM Tools
Basin Management Plans, Coastal Zone Management Plans, Geographic Information System

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