Born to fish, forced to shift: Vulnerabilities of small-scale fisheries in Chilika Lagoon, India

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Chilika is Asia's biggest brackish lagoon. Because of its rich biodiversity and nature of the water composition, Chilika Lagoon is considered a Ramsar site. The lagoon is one of Odisha's key sources of fishing, supporting nutritional and livelihood protection for more than 0.2 million fishers living in and around the lagoon. A total of 454 motorized and nearly 5,000 traditional boats operate in the lagoon. A substantial part of this lagoon remains underwater during winter and functions as a wetland that also serves as a breeding and nesting ground for millions of species of migratory birds. One of the most important economic activities in Chilika is fishing. Several drivers contributed to the Chilika's social-ecological changes and affected the shaping of the history of the lagoon. The two key factors are: the growth of shrimp aquaculture in the 1980s and the opening of a new sea mouth in the Bay of Bengal in 2001, which led to changes in access, rights of use, and laws of the lagoon fish economy affecting biophysical processes and associated livelihood systems. After the opening of the new sea mouth on the east coast of the lagoon in September 2000, fish production in the lagoon increased dramatically. However, the lagoon's fisheries and biodiversity have suffered the most in the recent years, both due to the rise in natural and man-made disturbances.

Photo: *Small-scale fishing boats in Satapada, popular tourist spot, especially for Irrawady Dolphins.Chilika Lagoon, India. 2018. ©Navya V. Nair*

Location:
Chilika Lagoon, India

Ecosystem type:
Brackish

Main gear:
Casnet, gillnet, gleaning, hook & line, traps, trammel nets, drag net, barrier net, box gears, *Jano* fishery (enclosure fishery)

Target species:
Wallago attu, Clupeidae, Engraulidae, *Orcaella brevirostris* (Irrawaddy dolphin), *Felis viverrine* (fishing cat)

Vessel type:
Danga or Naha: Wooden plank-built canoes

No. of small-scale fishers:
400,000

> *... To put it simply, in Chilika, the key environmental changes encompass biodiversity loss and introduction of novel multi-species along with changes in the water system, including salinity variations. Cultural and caste elements such as exploitation of caste norms and related deprivation, loss of access and jobs led to increase in out-migration, as well as a breakdown of fishery cooperatives and dynamic structures, accompanied by rising conflicts of poverty and economic loss leading to marginalization of small-scale fishing communities...*

Justice in context

Types of justice:

- **Distributive**
- **Social**
- **Economic**
- **Market**
- **Infrastructure/wellbeing**
- **Regulatory**
- **Procedural**
- **Environmental**
- **COVID-19 related**

Several hydrological effects in the lagoon, such as runoff from the unregulated depleted catchment, silt-borne freshwater discharges, and lagoon-water exchange, have had dramatic and unpredictable consequences. These changes in the lagoon ecosystem have turned out to be a cause of concern for local and national governments resulting in the dredging of a new sea mouth in 1980. Along with this, the rising market for shrimp aquaculture has served as a driver of rapid social-ecological change. This resulted in the differences in water inflow-outflow rates, pollution, salinity variation, and has disrupted saltwater-freshwater balance.

Past researches in Chilika highlight the adverse impacts of these changes contributing to a reduction in fish production and fishers' incomes. The changes affected fishers' livelihoods, led to restrictions of fishing rights and access to customary fishing grounds, caused reduction in water distribution and decreased depth due to siltation. The effects also include salinity decline, infestation of macrophytes, eutrophication, loss of biodiversity, as well as an increase in employment displacement and migration to cities in search for better job opportunities.

Industrial developments, agricultural drainage, river runoff containing urban waste, and drainage from agro-based factories are all anthropogenic practices related to the processes which affect the water quality of the Chilika Lagoon. These types of inputs severely altered the ecology of the lagoon and impacted the ecosystem's overall biotic population. This ultimately results in fish decline leading to a reduction in the economy of small-scale fisheries causing vulnerabilities and marginalization. Rules and policies should be formulated to manage the water resources and the SSF Guidelines should be implemented for managing and securing the lives of small-scale fishers in Chilika Lagoon.

Definition of small-scale fisheries

SSF are not explicitly defined in India's legislation. According to FAO, SSF are defined as a dynamic and evolving sub-sector of fisheries employing labour-intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources. They are often defined by their association with poverty, marginalization, vulnerability, exclusion, exploitation, discrimination, and impoverishment processes that play out in different forms and combinations in this specific fishery context (Nayak et. al 2014).

> *... Despite the CDA efforts, there are still a number of small-scale fisheries issues that need to be resolved, such as water quality degradation, destruction of mangroves, uncontrolled industrialization, exploitation through tourism and destructive fishing practices.....*

Dealing with justice

The National Wetlands, Mangroves and Coral Reefs Committee of the Ministry of Environment and Forests, the Government of India, and the State Government have listed the lagoon as a priority site for conservation and management in view of the threats faced by the lagoon. The concern about the deterioration of the lagoon ecology and the significant number of people dependent on the lagoon resources led to a foundation of the Chilika Development Authority (CDA) in 1992. CDA was formed for the conservation of lagoon's social-ecological system, such as protection of genetic diversity and threatened species, integrated resource management strategies, execution of multidimensional and multidisciplinary sustainable activities and improved national, as well as international collaborations.

The hydrological intervention of opening the new sea mouth and channel to the sea was the most successful remedial action. It helped in retaining specific characteristics of an estuarine ecosystem by raising spatial and temporal salinity gradients of the lagoon waters. Other CDA restoration activities included preservation of bird habitat and aquatic species, strengthened socio-economic conditions, such as eco-tourism and catchment management in a participatory ecosystem approach to micro-watershed management. Activities also included the establishment of a ferry service for remote communities, provision of solar streetlights to island villages, construction of fish landing facilities for fishers, training and environmental awareness activities and economic incentives for the local population to avoid bird poaching. Despite the CDA efforts, there are still a number of small-scale fisheries issues that need to be resolved, such as water quality degradation, destruction of mangroves, uncontrolled industrialization, exploitation through tourism and destructive fishing practices.

Sources:

- Nayak, P. K., & Berkes, F. (2010). Whose marginalisation? Politics around environmental injustices in India's Chilika lagoon. Local environment, 15(6), 553-567.
- Nayak, P. K. (2014). The Chilika Lagoon social-ecological system: an historical analysis. Ecology and Society, 19(1).
- Nayak, P. K., Oliveira, L. E., & Berkes, F. (2014). Resource degradation, marginalization, and poverty in small-scale fisheries: threats to social-ecological resilience in India and Brazil. Ecology and Society, 19(2).
- Nayak, P. K. (2017). Fisher communities in transition: understanding change from a livelihood perspective in Chilika Lagoon, India. Maritime studies, 16(1), 13.
- Nayak, P. K., Armitage, D., & Andrachuk, M. (2016). Power and politics of social–ecological regime shifts in the Chilika lagoon, India and Tam Giang lagoon, Vietnam. Regional Environmental Change, 16(2), 325–339. https://doi.org/10.1007/s10113-015-0775-4.
- Nayak, P., Oliveira, L., & Berkes, F. (2014). Resource degradation, marginalization, and poverty in small-scale fisheries: threats to social-ecological resilience in India and Brazil. Ecology and Society, 19(2).
- Panigrahi, S., Acharya, B. C., Panigrahy, R. C., Nayak, B. K., Banarjee, K., & Sarkar, S. K. (2007). Anthropogenic impact on water quality of Chilika lagoon RAMSAR site: a statistical approach. Wetlands Ecology and Management, 15(2), 113-126.
- Parida, S., Parida, P. K., Bhatta, K., & Karna, S. K. (2019, September). Paradigm Shift in Fishing Technology of Chilika: The Largest Brackish Water Wetland of Asia. In Proceedings of the Zoological Society (Vol. 72, No. 3, pp. 263-272). Springer India.
- Salagrama, V. (2015). Implementing the voluntary guidelines for securing sustainable small-scale fisheries in the context of food security and poverty eradication (SSF Guidelines): perspectives of the fishers and fishworkers on the east coast of India.
- Samal, K. C., & Meher, S. (2003). Fishing communities on Chilika Lake: comparative socio-economic study. Economic and political weekly, 3319-3325.
- Sarkar, S. K., Bhattacharya, A., Bhattacharya, A. K., Satpathy, K. K., Mohanty, A. K., Panigrahi, S., & Forskningscentrum, U. M. (2012). Chilika lake. Monographiae Biologicae, 53, 10-26.

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