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# Towards an ecosystem approach to fisheries management in India - case study of the Ashtamudi Lake yellow-foot clam fishery

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Conserving marine resources and managing fisheries have been put in an ecosystem perspective in many parts of the world for some time now. The Ecosystem Approach to Fisheries (EAF) and its many variants as enunciated by the FAO differs from most fisheries or environmental policies, which tend to focus on single species or habitats, in that the interconnectedness of ecological, social, and economic parameters for developing local and regional management of an ecosystem is explicitly recognized. Despite the soundness of the concept of EAF, there are only a few successful examples of well managed fisheries using the approach. Even when EAF is ecologically and institutionally attainable, multiple problems can arise from competing interests among stakeholders, undeveloped or inappropriate governance structures, poor science, or lack of political will. The situation is perhaps more complex in the tropics due to the large number of co-occurring species, gears and fishers. In the developing world, this is compounded by the lack of a governance structure, and in places where they do exist, the lack of its implementation.

The guiding principles for EAF as given by FAO include the following six points and these have been adapted by many countries.

1. Application of the **precautionary approach**, implying that where there are threats of serious irreversible damage, the lack of full scientific knowledge shall not be used as a reason for postponing or failing to take measures to prevent environmental degradation.
2. The need of moving towards **adaptive management systems**, given the complexity and dynamics of ecosystems and society and the difficulty in predicting outcomes of different management measures.

3. The **principle of compatibility** stresses the importance of coherence of management measures across the resource/ecosystem range. Related to this is the need to collaborate at the regional level, when resources and ecosystems are transboundary (CCRF, Article 6.12).
4. The **principle of participation** is reflected in most recent international instruments, requiring that stakeholders be more closely associated with the management process, data collection, knowledge building, option analysis, decision making and implementation.
5. Using **incentives**, as compared to being prescriptive, is another guiding principle in the application of EAF. Conventional fisheries management is largely built on developing norms and punishing those who do not comply (negative incentives).
6. Coordination and **harmonization across sectors** (sectoral integration) are needed for a successful application of EAF.

In India, there are several legislations which directly impinge and/or touch upon marine fisheries management both at the level of the central and state governments. However, a clear governance structure has not been articulated. In 2004, India brought forth a comprehensive marine fisheries policy in which the concept of ecosystem based fisheries management was mooted. Eight years later, the guidance and framework of this approach has not been developed. Recently, the Central Marine Fisheries Research Institute (CMFRI) is considering the development of a National Marine Fisheries Management Code which would address EAF. Currently, India partly addresses point number one of the EAF guiding principles. Recent recommendations of an expert committee appointed by the Government of Kerala (southwestern part of India) gives guidance on fulfilling point 4 and 5 of the FAO EAF principles. The newly developed Ashtamudi Lake Clam Fisheries Management Plan (CFMP) does take in hand some of the EAF principles and is presented here as a case study.

Ashtamudi Lake is the second largest lake- estuary of Kerala. Small-scale clam fishery forms the livelihood of more than 500 families in and around the estuary. Clams are fished throughout the year except during unfavourable environmental conditions or during fishing ban periods. Initiation of frozen clam meat export, particularly short-neck clam, *Paphia malabarica* in 1981 led to increased fishing effort for clam exploitation, leading to catch declines. The alarming increase in the exploitation of clams in the following years forced the local administration to impose a ban on the fishing activities during the clam breeding season and also place restriction on the mesh size of clam dredges based on the recommendations of CMFRI in 1993. Although, they do not form a high unit value resource, short-neck clams are exported to niche markets such as Japan fetching high value. Almost 90% of this export is sourced from the Ashtamudi Lake, and in 2009, India exported 542 tonnes of clam meat in various forms valued at US\$ 0.99 million.

Let us examine how the yellow-foot clam fishery in the Ashtamudi Lake in Kerala (southwest coast of India) complies with the EAF principles and operational framework (Table 1).

Table 1. Status of EAF operationalization for Ashtamudi Lake yellow-foot clam fisheries

EAF principle	Operational Framework	Implementation Status
Precautionary approach	Fishery management plan in place	Recommended
	Target and limit reference points (TRP & LRP)	Recommended
	Mesh size limits	Practiced
	Effort control – closed season	Practiced
	Size restriction - Minimum Legal Size	Recommended
	Closed area – clam sanctuary	Recommended
Adaptive management system	Annual biomass surveys leading to recommendations to the governance council	System in place
Principle of compatibility	Linkages to other resources	To be developed
Principle of participation	Twenty member Ashtamudi Clam Fisheries Governance Council (ACFGC) with multiple stakeholder representation	Practiced
Using incentives	Negative incentives exist, positives not developed	To be developed
Sectoral integration	ACFGC provides scope for representation from multiple stakeholders apart from core sector, for example, tourism, exporters etc	Practiced

The above table indicates that many of the EAF principles are applied in the Ashtamudi Lake yellow-foot clam fisheries, but much more needs to be done. The compliance to some of the precautionary principles has ensured that the fishery is carried out in a sustainable manner for the past several years (Fig. 1).

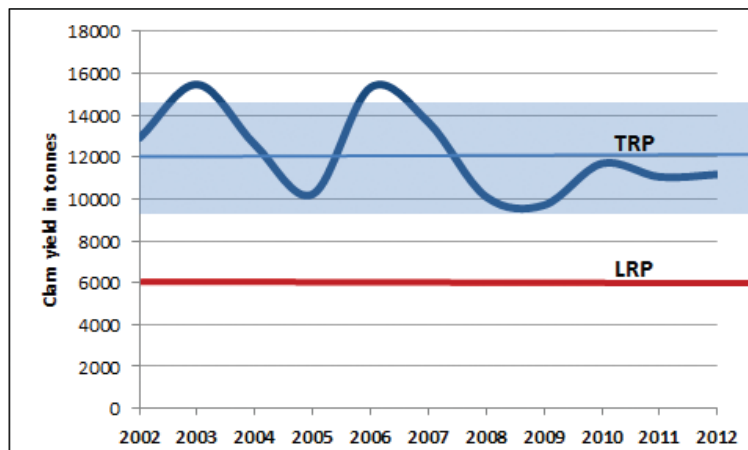


Fig.1. Catch trend of clams in Ashtamudi Lake with respect to Target Reference Point (TRP) ( $BMSY \pm 20\%$ ) and Limit Reference Point LRP ( $0.5_{BMSY}$ ). If the stock biomass falls below LRP, then target fishing must cease for a period sufficient to rebuild the stock as per the recommendations.

The formation of the governance councils proved to be tough, as the local self-governments could not comprehend the concept and its eventual benefits and also were not willing to take up the responsibility of governing the resource. Finally administrative support from the top-most district authority was necessary to form the ACFGC. A 3-tier council based on consultative participatory management system (Fig. 2) has been recommended to the state government.

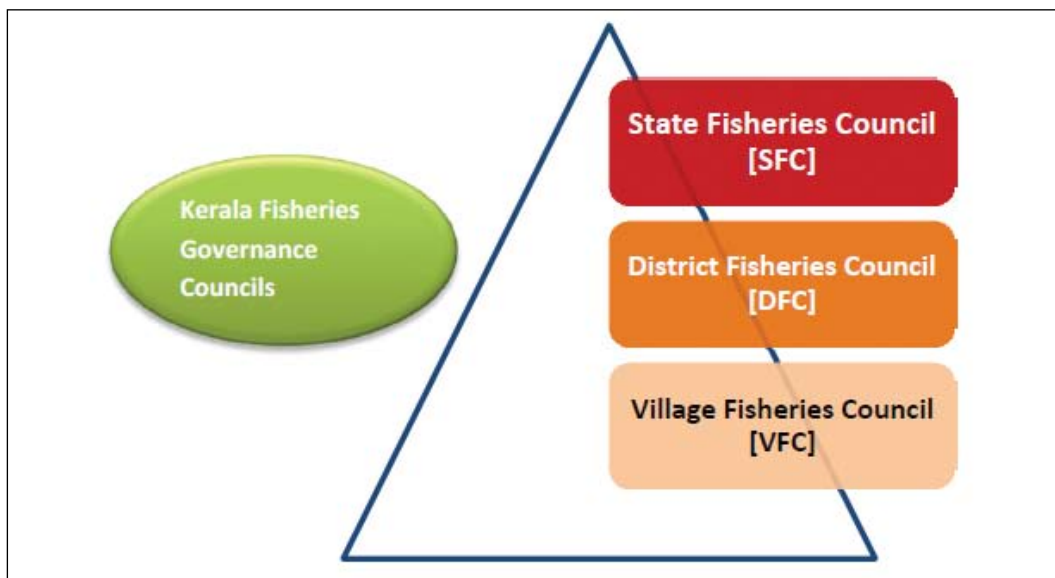


Fig. 2. Three-tier Fisheries Council proposed to be established for participatory management of clam fishery of Ashtamudi Lake