FAD assisted fishing practice of Kerala: A review

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Abstract
Padal fishing in backwaters of Kerala and Kolachel Fishery operating particularly for squids in marine waters are the known FAD assisted fishing practice of Kerala. It creates an artificial habitat for the feeding and breeding of fishes. The adult fishes aggregating around the FADs lay eggs underneath the FAD and thus the fishery mainly comprising the juveniles. It reduces the fish population drastically. And hence the non selective Kolachel fishing practice is now banned in Karnataka and a modified form of Padal fishing is practiced as a fish sanctuary, which can replenish the lost fish stock.

Keywords: Indigenous fishing methods, FAD assisted Fishery, Conservation

1. Introduction
The fish capture from the wild mainly depends on the understanding of the behavioral pattern of fish and ecological conditions of living habitat and topography. Using the knowledge acquired from the nature, traditional fisherman have developed many indigenous fishing gears (Plamoottil and Win, 2017) [14]. These indigenous fishing practices are characterized by the conventional wisdom of traditional fishermen and long term practice of fishing (Sahadevan, 2016) [8]. Use of Fish Aggregating Devices (FADs) to attract fishes are increasingly common through out the world (Guillotreau et al., 2011) [9]. The thigmotropism in fish are being used in these type of fishing activities (Uddin et al., 2015) [27].

The aggregating behaviour of fish species around the floating object have been used by the fishermen globally. Fish Aggregating Devices are the tool to improve the fish production in marine and inshore waters by attracting fishes. Under the high fishing pressure in marine waters, FAD offers an alternative fishing opportunity to the fisherman. The behaviour of aggregation around the floating structure was reported for the first time in 200 AD in Mediterranean (Dagorn et al., 2013) [3]. The information on aggregated biomass can get from the buoy equipped with echo-sounder (Moreno et al, 2016) [12]. The major hypotheses used to define the aggregating nature of fish around FAD are sheltering, meeting point. Feeding, resting, and treating it as indication of area of high production li. FAD Assisted Fishing Practices of Kerala.

1.1 Padal Fishing of Ashtamudi Lake
Ashtamudi lake is second largest estuary in the south west coast of India shaped palm with set of eight lakes is known for the fishing in Padals (Raghunathan, et al, 2007) [15]. Padal fishing of Kerala is a type of FAD assisted fishing practice where the padals acts as a Fish Aggregating Device (FAD) that provides shelter and food to the fish which stimulate aggregating behaviour of fish (van Dam et al., 2002) [28]. Around 400 padals were operating in Ashtamudi lake even after it is banned by the State Department (Thomas and Kurup, 2004) [29]. The padals are deployed in water for almost an year and are harvested once a month.

2. Kolachel Fishery
A similar fishing method operated by the migrant fishermen from Tamil Nadu can be seen in Malabar area of the state is locally known as Kolachel. The fishermen migrates from Colachel and Kanyakumari to Blangad village of Thrissur district and makes an FAD, locally called as Norumb, with Kolanj (Coconut Spadix) nylon ropes, pieces of webbing, plastic bottles and heavy sand bags. The plant material like Coconut fronds placed at 0.3m interval on long rope constitute the main body of the aggregating device (Sasikumar, et al. 2015) [20].

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Cash nut tree branches are used by the fishermen of Malabar region in Kerala as an aggregating device. The twigs of cashew trees are placed in rivers and lakes to attract the fish like pearl spot. The fishes feeding on peryphyton are being attracted to spadix. Sasikumar (2016) has reported that purse seine operation around drifting Fish Aggregating Devices pollutes the marine ecosystem and can cause entangling of aquatic organisms or ghost fishing (Sasikumar et al., 2015) [20].

2.3 Impact of Padal fishing

It is one of the most destructive fishing method due to the extent of destruction caused to juvenile populations of commercially important fish such as etopulus and mullet (Suresh, 2000; Thomas and Kurup, 2004) [20]. The catch from padal mainly comprises of broodstock and juveniles. The aggregating fishes around the FADs are vulnerable to over exploitation, increased predator pressure over lower trophic fish species and also it alters the fish migration route (Kingsford, 1999) [19]. Thus over the years, padal fishing has reduced the piscine population drastically. The structure accelerates sedimentation threatening the balance of the inland ecosystem. Completely Submerged padals also pose a threat to the navigation system. This is why this practice is banned.

It has been shown that the depleting mangrove cover has a serious impact on the fish population. Therefore a modified form of padal fishing has been introduced to rejuvenate the fragile ecosystem. This new initiation is called Matsysthavalams which means fish sanctuaries. The padals are fixed in the bed attracting and aggregating the fish, thus purse seine operation around drifting Fish Aggregating Devices is avoided.

The use of non degradation materials like HDPE cones in the construction of Fish Aggregating Devices pollutes the marine ecosystem and can cause entangling of aquatic organisms or ghost fishing (Sasikumar et al., 2015) [20]. FAD attracts the non targeted fishes during purse seining (Hunter and Mitchell 1967) and the release of FADs in large numbers changes the natural environment of tunas (Moreno et al., 2016) [12]. Thus purse seine operation around drifting Fish Aggregating Device causes deleterious impact to the ecosystem viz., reduction in yield per recruit of targeted fishery, alteration to the movement pattern of resources, increased bycatch and imbalanced ecosystem ((Fonteneau et al., 2000; Bromhead et al. 2003; Morgan 2011) [6, 1, 13].
3. Conclusion
It is clear that padal fishing is a destructive fishing practice. Excessive use of padals have decreased the fish population drastically because of the extent of destruction caused to juveniles. If the juveniles are allowed to reach marketable size with judicious exploitation by statutory gears, it would replenish the stock of the estuary (Kurup and Thomas, 2001) [11]. This is why the government decided to ban it. But even now, more than hundred of padals can be found in Ashtamudi and Vembanad lake. Kerala state fisheries department is removing these padals with the help of fisherman who are willing to follow sustainable practices.

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