

Fish Aggregating Devices - A Case Study in Andhra Pradesh Coast

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Deployment of fish aggregating devices (FAD) is one of the approaches towards enhancement and management of coastal fishery resources. Code of conduct for responsible fisheries has stressed the importance of rehabilitation of resources. This paper gives details of a case study of deployment of benthic and floating FADs off Jodugullapalem, Visakhapatnam. The paper discusses the design, construction and installation of benthic and floating FADs and the gears used for fishery exploitation. The paper also highlights the biological, economic and social significance of FADs.

Key words: *Fish aggregating device, gillnet, hook and line, Jodugullapalem*

The fish aggregating devices (FADs) are man-made structures which facilitate the attraction and aggregation of fish. FADs are deployed to enhance biological productivity in coastal waters, rehabilitate and conserve the depleting stocks, reduce the scouting time during harvesting operations and to enhance income and the standard of living of the fishermen (Aprieto, 1990; Atapattu, 1990; Fujisawa, 1990; Kurien, 1990, Wong, 1990; Caddy and Majkowski, 1996). The material used for FADs should be durable, cheap and easily available, and should not leach out any toxic chemicals when immersed in seawater.

Site selection is an important factor for FAD installation. A firm sandy seabed is preferable for installation. The area should be free from strong currents and should have adequate water clarity. The selected area should be away from navigational routes and easily accessible to fishermen.

In Andhra Pradesh, the practice of aggregating fish around floating objects, is an age-old practice mainly restricted to freshwater bodies. The experimental work on installation of FADs in marine waters off Visakhapatnam, was initiated in 1998. The main objective of the present study was to design and install fish aggregating devices at Jodugullapalem with the aim of reducing the scouting time, thereby reducing operational cost.

Construction of FADs

Two types of FADs were designed and constructed. Benthic FAD module was fabricated using scrap truck tyres tied together in a pyramidal shape, with polyethylene rope. On the bottom of each module, three concrete cylindrical rings were tied as weights to anchor the reef. Each unit consisted of 8 scrap tyres. A total of 8 modules were made. Each module has a base area of 3m² with 2 m height. The estimated cost of each module was less than Rs 500 (Table 1; Fig. 1).

Table 1. Material used and unit cost of materials in benthic FAD

Material	Quantity	Unit cost (Rs.)	Total (Rs.)
Scrap tyres	7 nos.	20	140
Cement rings	3 nos.	100	300
Ropes	250 g	50	50
Grand total (Rs.)			490

Floating FAD was constructed as a double layered bamboo raft made of 20 bamboos of 7-10 m length arranged in two layers. The bamboos were tied with coir ropes and HDPE ropes. 12 mm dia polypropylene rope and steel cables were tied below the raft. The raft was anchored with a 200 kg concrete blocks. Coconut leaves and fronds, old HDPE netting pieces and old cycle tyres, were tied under raft as attractants (Fig. 2).

Table 2. Material used and unit cost of materials in floating FAD

Material	Quantity	Unit cost (Rs.)	Total (Rs.)
Bamboo poles	40 nos.	20	800
Concrete block	1 no.	200	200
Ropes	500 g	100	100
Scrap materials (Coconut leaves, cycle tyres, old HDPE netting)	-	200	200
Grand total (Rs.)			1300

Low cost bamboo raft and tyre structures are simple in construction and can be easily deployed in the fishing ground. The FADs were deployed at a site, off Jodugullapalem fishing village in Visakhapatnam (17°44' N lat; 83°23' E long), where bottom topography and currents were favourable. The site was located at 15 m depth and occupied an area of about 25m². The floating FAD was removed after two months due to human interference.

The main activity Jodugullapalem village is fishing. The total fishermen population of the village is 2000. Among them 60% of the population are actively



Fig. 1. Benthic FAD module, being deployed off Jodugullapalem, Visakhapatnam



Fig. 2. Floating FAD, deployed off Jodugullapalem, Visakhapatnam

involved in fishing and operate gill nets and lines from stitched boats. Gill netting accounts for about 70% of the total catch from the village and rest from hook and line fishing.

Biological impact

A comparison of landings from the fishing area, before (1998) and after the installation of FADs (2001), has indicated beneficial impact on fishing. Though there was no significant variation in species diversity, noticeable increase in the total catch and CPUE was observed. An average increase in of 25% was observed in the monthly catches (Fig. 3). Similar observations were reported from Indonesia and Thailand (Fujisawa, 1990). The major species of fishes caught in the area near FAD site comprised of mackerel, seerfishes, carangids, sciaenids, *Upeneus* sp., engraulids and little tunas.

Economic impact

The daily average income of the traditional fishermen, before the deployment of FADs was on an average Rs.200-300, depending on the quantity of catch and its market value. Increase in landings per man-day enhanced the daily average income of fishermen to Rs. 400-500. Aggregation of fish around FAD also led to indirect benefits by saving scouting time and thus increasing effective fishing time.

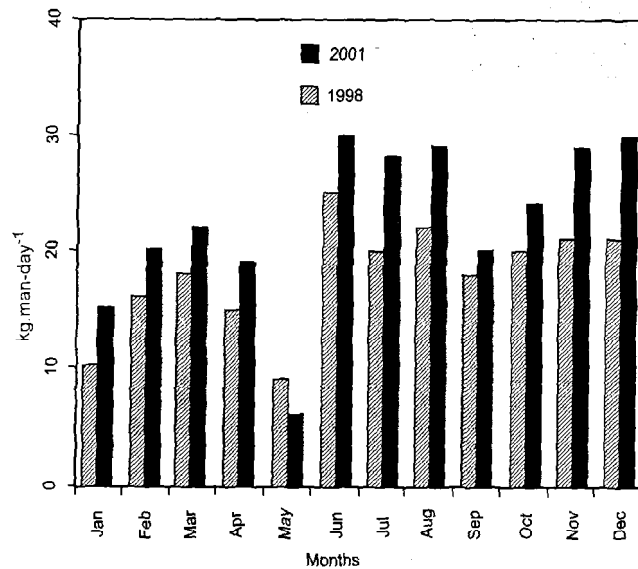


Fig. 3. Comparison of CPUE (kg.man-day⁻¹) before (1998) and after installation (2001) of FADs, off Jodugullapalem

Management aspects

The deployment of benthic FADs protects the fishing ground from mechanized bottom trawling, keeping the area accessible to artisanal fishermen for deploying gill nets and lines. Benthic FADs could, thus, be used as a management measure to control trawling in selected areas.

Legal issues

Benthic FADs should be constructed and installed in such a way as to enhance fishery resources, minimize conflicts among competing users, minimize environmental risks and without causing obstruction to navigation. A system of licensing which gives the approved location, design and specifications of the FADs, could be introduced, to manage the deployment of FADs in coastal waters.

FADs are important in the present context, where over-exploitation of resources and low income of the traditional fishermen are evident. The benefits accrued through the operation of FAD encompass, several aspects of fisheries, viz., biological, environmental, economic and social. Though economic benefits of FADs have been well recognized, the diffusion of technology to the fishermen has been inadequate. Low-cost FADs could be popularized by government agencies, NGOs and fishermen's cooperatives as an effective tool to enhance the productivity of inshore waters and, thus, increase the standard of living of the traditional fishermen.

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100 Sustainable Fisheries Development : Focus on Andhra Pradesh

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