

## Fish Aggregating Devices as a Sustainable Fishing Practice

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### SUMMARY

Fish Aggregating Devices (FADs) are drifting or anchored buoys or rafts that attract and aggregate pelagic fishes, making them easier to catch. Fishers have known that fish congregate around naturally occurring floating objects like logs and that by mimicking this effect fish aggregation could be exploited. They do not increase the abundance of fish, but only redistribute them into a smaller area. Today there are thousands of FADs in use worldwide for industrial handline, purse seine, and pole and line fisheries. This article has discussed about the fish aggregating devices and its benefits and impact to the environment and its management strategies.

### INTRODUCTION

Fish aggregating devices, more commonly called FADs, are anchored or drifting objects that are placed in the ocean to attract fish. They may be a permanent, semi-permanent\temporary structures made from any material and used to lure fish. They have been used throughout the world for thousands of years in various forms. The earliest surface/ midwater FADs were elements from nature such as driftwood and trees. Fishermen from Indonesia and Philippines are considered as expert, as they began building floating rafts of bamboo and by using other materials to attract fish as early as 1900. Now surface and midwater artificial FADs are systematically practiced in a large number of countries. Traditional FADs, based on long-term fishing experience, are made on-the-spot with local materials and used in shallow coastal waters (depth 50-200 m) by small-scale fishers to catch small pelagic fish and bait fish, e.g. payaos (Philippines), unjang (Malaysia), rumpon (Indonesia). In recent days, the modern FADs, the result of imported technology and materials the fishes are gathered over 3000 m depth.

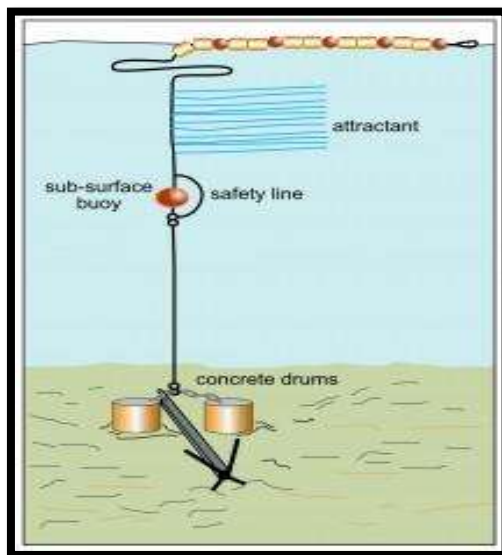


Figure 1: Anchored FAD



Figure 2: Drifting FAD

### Types of FAD's

The FAD's are classified into different types. Depending on the type of construction method, they are grouped into anchored and drifting FAD's. Depending on the scale of operation, it is further classified into artisanal and industrial FAD's. Anchored FAD's occupy a fixed location and are attached to the sea bottom using weights like concrete blocks. They are either on surface or submerged in water column. The principal components like floats, mooring line, anchor and underwater structures and attractants are commonly used. The drifting FAD's

use floating objects like trees, planks, buoys, abandoned fishing nets etc. These are not fixed and drifted along the water column. To identify the locations, colour tape, marker floats and nowadays radio buoys are used along with transmitter.

### Artisanal vs Industrial FAD's

The artisanal FAD's are all anchored structures that are set to improve food security and local tourism. The catch rate in artisanal FADs are comparatively lower than the industrial FAD's however it benefits the large group of domestic small-scale fishers. In the case industrial FAD's with drifting and anchored structures most helpful to operate commercial fishing gears like purse seine. They are done by the big fishing companies that focuses on large catch rates of tuna shoals.

### Targeted species of FADs

Artisanal fishing on anchored FADs targets tuna and other pelagic fish species including: Bigeye tuna (*Thunnus obesus*); Yellowfin tuna (*T. albacares*); Albacore tuna (*T. alalunga*); Skipjack tuna (*Katsuwonus pelamis*); Blue marlin (*Makaira mazara*); Black marlin (*M. indica*); Striped marlin (*Kajikia audax*); Sailfish (*Istiophorus platypterus*); Wahoo (*Acanthocybium solandri*); Mahi mahi (*Coryphaena hippurus*); and Rainbow runner (*Elagatis bipinnulata*).

### Common Fishing methods involving FADs

The best methods for artisanal and small-scale commercial fishing around FADs are hook and line techniques that target pelagic fish and that require minimum investment in gear and equipment.

These include:

- Trolling – dragging lures or dead or live fresh baitfish behind a boat – catch is tunas, billfish, mahi mahi, wahoo, seer fish and carangids.
- Vertical longline – a mainline with several baited branch lines is suspended from fishing buoys and allowed to drift past the FAD – catch is larger, deep dwelling tunas and billfish;
- Drop stone – uses a stone and a lead to sink one baited hook and chum to a desired depth – catch is deep dwelling tunas;
- Palu ahi – Hawaiian method similar to drop stone but uses a cloth and a lead weight. Palu is chum, ahi is tuna;
- Ika shibi – a Japanese-Hawaiian method that first catches squid (ika) on a handline and then uses the squid to catch tuna (shibi) on a handline;
- Jigging – a handline with a lure or a baited hook is bobbed up and down near the FAD at various depths– catch is wahoo and tuna; cuttle fish and octopus fishing.
- Drifting bottle – a short line with one baited hook is attached to a small buoy or plastic bottle that is then allowed to drift past the FAD – catch is mahi mahi, rainbow runner, and small tuna.

### Advantages

- Increases the catch rate with reduction in fishing costs.
- Food security
- Saves fuel
- Reducing the fish searching time
- Enhances the income and standard of living of fishermen

### Disadvantages

- Catch of under-sized fishes
- Bycatch of vulnerable non-target species
- Modification and redistribution of tuna habitat
- Over exploitation of fishes
- Potential damage to coastal habitats
- Interference with other maritime activities like barrier for ship passage.
- Recruitment overfishing
- Alterations in fish shoal movement patterns as a result, behavioural changes in tuna
- Difficulty in assessing the status of fish stock.

**Management measures**

Following are the management measure could help to reduce the negative impacts of FADs,

- Prohibiting the use of FADs in busy ship route
- Restricting the depth of setting of FADs.
- Setting bycatch limits.
- Restrictions on number of FADs used.
- Restriction on time and closures of FADs

**CONCLUSION**

Fish aggregating devices are potentially beneficial but certain requirements has to be met so that it will not affect the coastal ecosystem and fish stocks. Currently, there are minimal requirements for sharing the tracking information for FADs, which makes monitoring them extremely difficult. Hence, FADs are required to be fixed with Automatic Identification System (AIS) to track FADs continuously, further it will be easy for the owner to track their FADs whereabouts and for administrator to enforce strategies. It is also highly recommended to use biodegradable materials for making FADs to avoid consequences due to the use of old nets. Additionally, the purse seines operated near to the FADs should have larger meshes for the prevention of capture of juvenile and smaller bait fishes.

**REFERENCES**

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