

The Survey of Fish Enhancing Devices (FEDs) at the Coastal Areas of Thailand

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Introduction

Coastal waters of Southeast Asia are blessed with high productivity of fisheries resources because of rich ecosystems such as dense mangrove forests and sea grass beds, as well as extensive coral reefs with clean tropical sea environment. These areas are critical to a broad range of aquatic organisms during their life cycle from breeding, spawning, nursing and growing, hosting the feeding zones of aquatic species that are economically important, and serving as important source of recruitment of a wide diversity of fishery resources.

However, commercially important fishery resources in the region have declined due to many factors that include overfishing, illegal fishing, use of destructive fishing practices, and environmental degradation. The artificial reef has been the significant tool for fishing ground development and increasing fisheries production of the small scale fisheries. However, regarding the cost of artificial reef installation has high investment and managed by government agencies. Fishers only involve in the identification of fishing ground. The fishers' ownership on fishing ground could not be generated as well as management through community approaches has not been able to promote effectively.

One of the SEAFDEC's missions is to seek for the appropriate tools to enhance coastal fishery resources together with awareness building on the community management as well as promoting a shifting of resources user to be resource manager through the installation of Fish Aggregating Devices (FADs) that costs cheaper investment than artificial reef. SEAFDEC has promoted the new design of Fish Enhancing Device (FEDs) since year 2009 and Thailand was reported as the first to introduce the use of FEDs. Until now, the utilization of FEDs in Thailand has widely spread throughout the coastal province of Thailand and is used in various designs.

In order to update the information on the structure and design of FEDs and to seek for the significant factors of FEDs construction and design that different between local and fishing ground. Thus, SEAFDEC/TD in cooperation with Department of Fisheries, Thailand conducted survey on FEDs for small-scale fisheries covering the coastal provinces of Thailand.

Materials and Methods

SEAFDEC/TD in cooperation with Department of Fisheries, Thailand conducted the survey on FEDs for small-scale fisheries from October 2017 to January 2018. The study sites were 47 fishing communities covered of 15 provinces along the coastal of Thailand; both in the Gulf of Thailand and Andaman Sea (**Fig. 1**). This survey coordinated with the Fisheries Provincial Officer to obtain the general information on the FEDs installation in each provinces. The interview with the local fisheries officers and fishers was carried out to obtain the information. We investigated the designs, necessary materials used, construction, installation area, and utilization of FEDs. Photographs of the existing FEDs were taken and their dimensions were also measured during the survey and investigation. In this study, we consider on the materials used, construction and their designs to determine the types of FEDs.

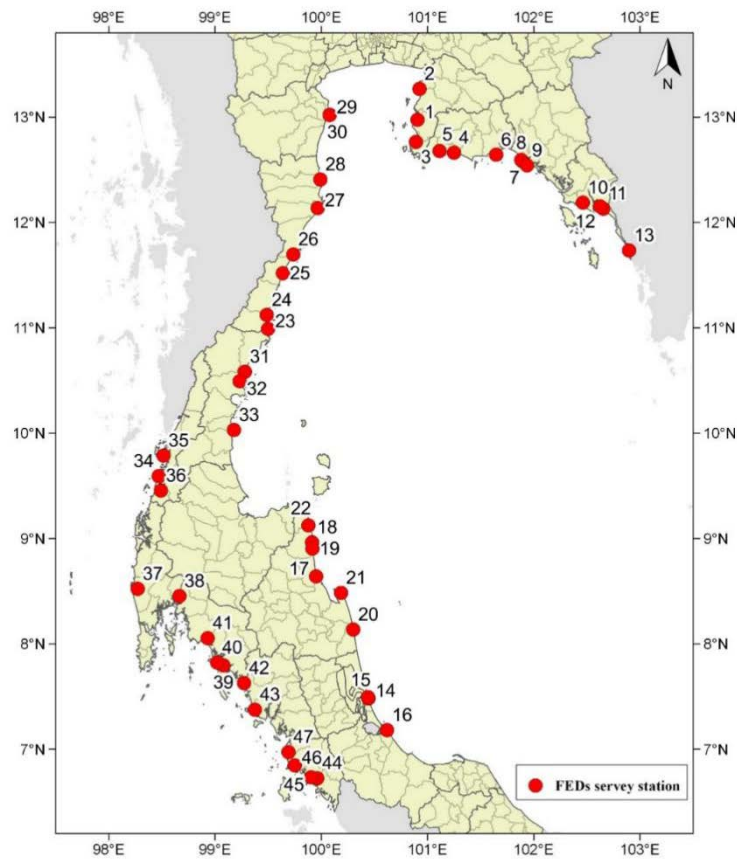


Fig. 1 The survey positions of FEDs along the coastal areas of Thailand (as indicates by red circles)

Results and Discussion

Recently, FEDs were used as an innovative fisheries management tool in the coastal communities of Thailand. In this survey, FEDs built from various materials and designs. The fisher groups choose pattern of FEDs based on their artisanal fishermen's wisdom, objective of installation, geography of the area, water depth and supporting agency. The fishing communities got their budget from supporting agencies including private company and government such as Petroleum Authority of Thailand (PTT), Erawan group, Amarin TV, Department of Fisheries (DOF), Department of Marine and Coastal Resources (DMCR), *etc.*

With reference to the survey and observation, the FEDs were mostly placed at the conservation area about 0.1 to 1.6 nm away from shoreline and the average water depth ranging from 2 to 17 m. Based on the material that the fishermen used, FEDs can be categorized into two types, as the following: traditional and modern. For traditional FEDs, the buoy and attractor sections were constructed by locally available materials such as bamboo, coconut or palm leaves were used. FEDs of this type are low cost, very effective to attract fishes and their useful life range between 3 to 6 months. However, Anna *et al.* (1999) reported that "*Palm leaf of the traditional FADs provided less effective shelter than rope.*" The result from Ali *et al.* (2004) indicated that the average lifespan of coconut leaf is 1 – 2 months; While the modern FEDs, instead of using the natural materials, polyethylene or fiberglass materials were used in their buoy sections which affects the cost but having longer useful life in comparison with traditional FEDs.

There are various characteristic of FEDs, which designs are different based on their local knowledge and supporting agencies. According to structure, design and installation inspected and found during the surveys along the coastal of Thailand, we categorized the FEDs into five (5) patterns, as following (**Fig. 2**):

1. Traditional FEDs; the attracting parts are made of natural materials such as coconut leaves, palm leaves and bamboo pole.
2. Rope FEDs; the attracting devices are synthetic rope
3. Mid-water rope FEDs; a kind of rope FEDs that is set up at mid-water layer or at a desired depth.
4. Pillar FEDs; attracting parts are made of synthetic rope tied up with a pillar and submerged when settled.
5. Concrete pipe FEDs; which can be either a single concrete pipe or multi-pipes, with or without attracting parts.

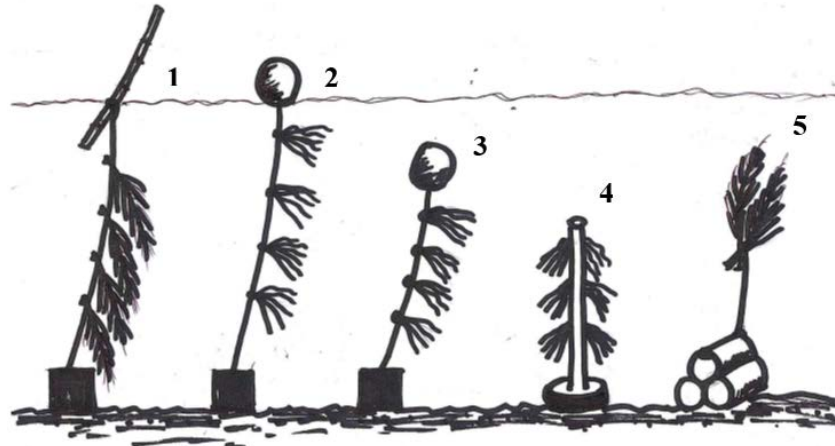


Fig.2 Types of FEDs found in Thailand

In this survey, Rope FEDs were mainly found both in the Gulf of Thailand and the Andaman Sea, covering 14 provinces (29 fisher groups). Following with the traditional FEDs spread over ten (10) provinces (19 fisher groups). The Concrete pipe FEDs was found only in 4 provinces (5 fisher groups) in the Andaman Sea. While the Mid-water FEDs was found in 3 provinces (4 fisher groups) and the Pillar FEDs which was only found in Trat province (3 fisher groups). In Trat province, fishers modified the design of FEDs for more suitable in the area. Moreover, the spirit house wrecks and used motorcycle tire were also deployed as FEDs in Chumphon and Ranong provinces, respectively.

Results from our interview found that, FEDs installation was accepted by fishermen as a tool to enhance fishery resources and to protect coastal resources from the encroachment of the destructive fishing gear into the coastal areas where the artisanal fishers exist. There are various species found after the FEDs installation; thus, the fishermen are able to catch more fish to increase their income. Similar to Ali *et al'* (2004) concluded that after a few years, deployment of new design of FADs called as "Artificial Reef Fish Aggregating Devices (ARFADs)." This FADs had turned into new habitats for many demersal fish species and sanctuaries of fish and other marine lives. Moreover, some fisher communities said that the making of FEDs could strengthen the cooperation among members of the fisher groups.

References

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