A COUNTRY REPORT FOR THE WORKSHOP ON ARTIFICIAL REEF AND STATIONARY FISHING GEAR DESIGN AND CONSTRUCTION AND MARINE ROTECTED AREA IN THAILAND

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■ INTRODUCTION

The rapid development of the commercial trawling and purse seining fleet resulted in extreme economic hardship for small-scale fishermen who could no longer compete for scarce fishing resources. A great numbers of them changed to alternative fishing practices such as near-shored push nets and fine mesh cod-end trawlers. Such gears are destructive both the resources themselves and their habitats. Since juvenile fish and shrimps were also taken by these activities even in high percentage, recruitment of high-value, market-size fish into the fisheries was unfortunately reduced. The Government has, therefore, undertaken various tasks to diminish numbers of the push-nets and trawls.

As Thailand realized its problems associated the capture fisheries occurring not only in the Gulf of Thailand but also in the Andaman Sea, many management programs and conservation measurements were implemented by the Department of Fisheries to enhance the national resources. As well as other management and conservation mechanisms, such programs as installation of artificial reefs, introduction of stationary gears and proclamation of marine Sanctuaries or protected area are highly expected as the most effective strategies of resource enhancement.

■ GEOGRAPHIC FEATURES

Thailand is situated between 5°- 21° N, 95° - 106° E in the Southeast Asian Peninsula. It covers a terrestrial area of 513, 115 km2, bordering Myanmar to the West and Northwest, Laos to o the North and Northeast, Cambodia to the East, and Malaysia to the South. The country has an extensive inland water surface area of 5,300 km^2 and a shoreline of 2,614 km, 1,874 km of which borders the northern and western reaches of the Gulf of Thailand, whereas 740 km face the Andaman Sea making 420,280 km^2 of coastal areas.

The Gulf of Thailand can be classified as a shallow semi-enclosed sea with limited, wind-driven water circulation and a low rate of exchange with the adjacent South China Sea. Its average depth is 45 m with a maximum depth of 85 m located in a central basin. The fishing area is about 252,000 km^2. The Andaman Sea is located on western coast of Southern Thailand. It is an open area adjacent to deep oceanic waters of the Indian Ocean. The Andaman Sea of Thailand provides about 126,000 km^2 fishing area for Thai fishermen.

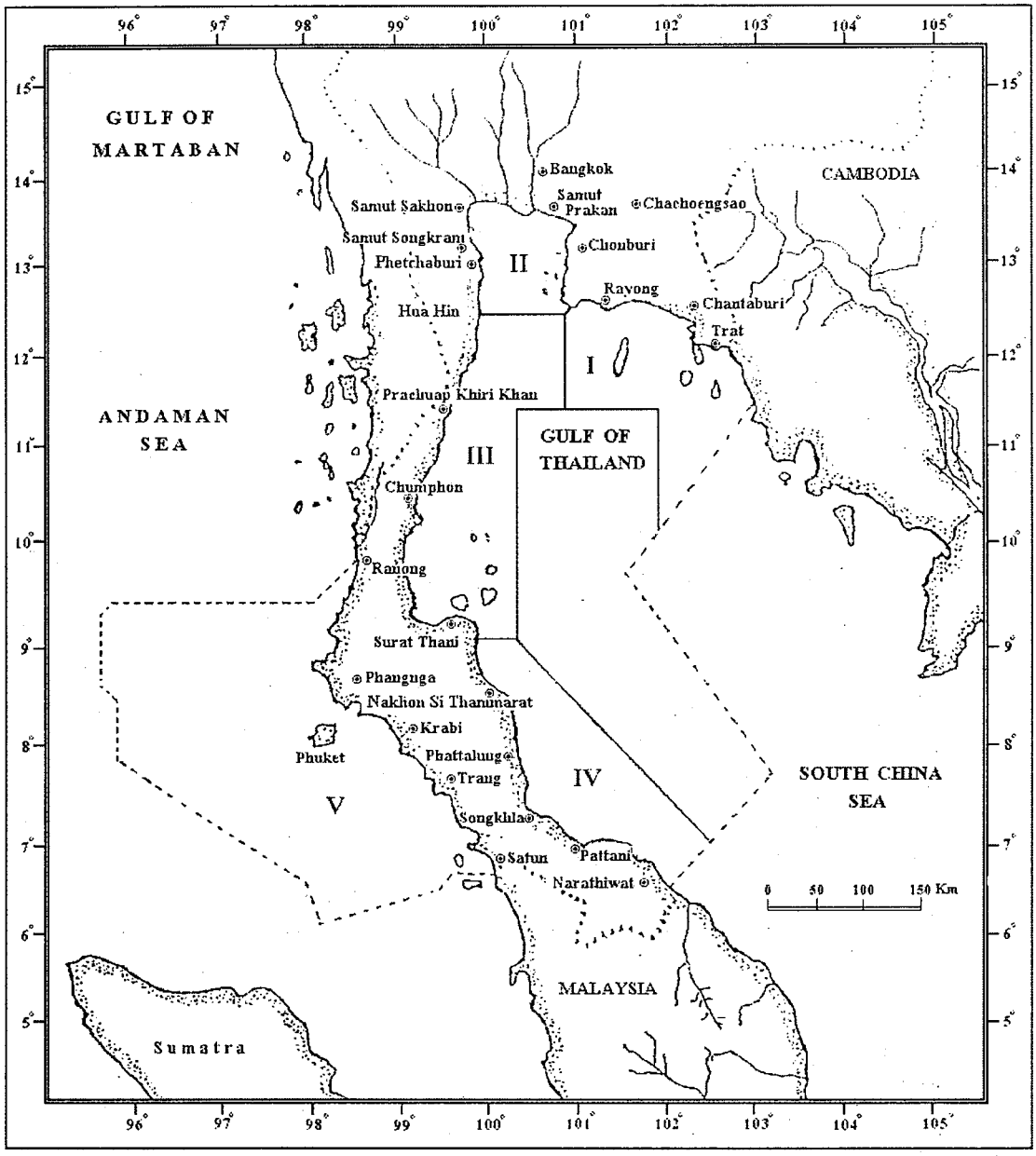

Fig. 1 Coastal areas of Thailand and limits of fishing areas (—) and the Thai EEZ (Economical Exclusive Zone) (-----)

Area I Eastern Gulf:	Trat, Chantaburi, Rayong
Area II Inner Gulf:	Chonburi, Chachoengsao, Samut Prakan, Bangkok, Samut Songkram, Samut Sakhon, Phetchaburi
Area III Central Gulf:	Prachaup Khiri Khan, Chumphon, Surat Thani
Area IV Southern Gulf:	Nakhon Si Thammarat, Phattalung, Songkhla, Phattani, Narathiwat
Area V Andaman Sea:	Ranong, Phangnga, Phuket, Krabi, Trang, Satun

Culturally and administratively, Thailand divides into 6 regions, 76 provinces and 787 districts. The total area of brackish waters in Thailand is approvimately 259 km2 of mangrove swamps, tidal land and lagoon, most of them are suitable for brackish water fish culture. There are 24 coastal provinces that can be divided into 5 fishing zones. The Eastern Gulf covers 3 provinces (Area I), the Inner Gulf covers 7 provinces located around Bangkok (Area II), the Central Gulf covers 3 provinces (Area III), the Southern Gulf covers 5 provinces (Area IV), and the 6 provinces facing the Andaman Sea Coast (Area V) (National Statistical Office, 1997).

Like other countries in the Southeast Asia, Thailand is also influenced by tropical monsoons that are clearly defined the wet and dry seasons. During May to September, the Southwest Monsoon brings heavy rainfalls to the country. Typhoons and depressions sometimes occur bringing low moisture, cooler winds over the country, featuring the cool season.

■ FISHERY RESOURCE ENHANCEMENT

Artificial reefs

The Department of Fisheries has implemented the artificial reef program as a fulfillment of the Small-Scale Fisheries Development Project. This program should serve the following objectives:

1. Providing habitats and shelters for juvenile fish, increasing in yields of food fish and reducing the juvenile fish component of trash fish landings;

2. Providing substrates for primary and secondary productions that are food sources of the higher levels of food web;

3. Providing physical obstructions against invasion of trawlers into nursery grounds, thereby potentially increasing overall production of the Gulf and provide a resolution to conflicts between the small-scale and commercial fishermen; and

4. Facilitating the small-scale fishermen to access the fishing grounds for income with little fishing effort.

Since 1978, hundreds of artificial reefs have been constructed at the depth of 4-18 m along the coast of the Gulf of Thailand and in the Andaman Sea. They are composed of used tyres, open concrete pipes, open concrete cubes and open concrete pyramids, each covering different areas between 3.0 km2 to 50.0 km2. Among the criteria of selecting a suitable site for artificial reef installation, an agreement from the Habour Department and the Royal Thai Navy is required to secure the marine transport.

The Department of Fisheries has regularly managed to evaluate the benefit of artificial reefs. So far, it was often reported that the artificial reefs became alternative grounds for small-scale fisheries. Traps and hand-lines are commonly used in the reef areas, occasionally gill nets and trammel nets are working nearby. Economically important fish as grouper *(Epinephelus spp.)*, snappers *(lutjanus spp)*, rabbit fish and parrot fish are usually caught by those gears.

Artificial reefs are considerably popular among Thai fishermen, especially the small-scale fishermen, who usually ask for extension of the projects from their own communities or associations or even from the NGOs. Besides collaborations and good management, in fact, researches on suitable materials and techniques are still needed in order to improve the durability and reduce deterioration or sinking rate of materials, for example.

The artificial reef program would be a long-term engagement, which is expected to play a key role in future fisheries development of Thailand.

Stationary gears (Set net)

Stationary fishing gears or set nets known as stake traps used to be very common in Thailand in the past. The Government did not promote these gears because they are fixed to one place for so long time and need large coastal areas for installation and operation, and that might hinder the navigation, as well. To possess or operate a net set of such gears requires special permission and seemed to be impossible. Since 1960, as the trawls were first introduced to Thailand and became very popular among Thai fishermen in only short time, numbers of stake traps were rapidly reduced.

As the fishing resources were severely exploited and their habitats were destroyed particularly by the trawls, similar to artificial

reefs, the set nets are accounted to enhance restocking of the marine resources.

The pioneer project on set-net, entitled "Introduction of Set-Net Fishing to develop Sustainable Coastal Fisheries Management", was approved in April 2003. This project is being conducted in collaboration of the SEAFDEC/TC, Department of Fisheries (by Eastern Marine Fisheries Research and Development Center 9EMDEC) and Rayong Provincial Fisheries Office) and the local fishermen in the project site of Mae Rumphung Beach, Ban Phe, Rayong Province.

The following objectives should serve this proposed project:

1. To reduce fishing pressure on coastal fishery resources through introduction of set-net as a passive fishing gear.
2. To alleviate fishing competition in the congested fishing ground by organizing collective fishing operation in set-net through the pilot project.
3. To develop common policy concept of fishery management for fishing gear occupying wide fishing ground such as set-net through the pilot project.

To accomplish the project the following activities were accounted:

1. Project site selection and grouping fishermen on the coastal of the Gulf of Thailand.
2. Fishing gear construction, installation, operation and maintenance will be conducted at the site and fishermen training on set-net fishing will also carried out at the same time.
3. Monitoring on impact of set-net installation to the coastal fishery resources and fishing ground condition will be carried out.
4. Technical seminar at national level will be held in order to evaluate the project from public idea.

Now the construction of set-net is nearly finished and installation of the gear should be completely done in October this year. Financially, the project is supported by the Trust Fund-I Program.

Marine sanctuaries or protected areas

In terms of fisheries management, in general, the near-shored areas within the 3-km boundary from shorelines are protected for spawning and nursing grounds of the juvenile fish and shellfish. This zone is, however, open for some small-scaled fisheries. Legislation under Fisheries Acts implemented in Thailand include 3 significant measures. They are: (1) limited fishing gears, (2) closed seasons, and (3) closed areas.

Limited Fishing gears: is concentrated on the control number of trawlers and push nets by 3 mechanisms of licensing issued in September 1982:

1.1 New fishing licenses for all types of trawlers and push nets are not to be issued:

1.2 Fishing licenses for other types of fisheries are not be permitted to be transferred or utilized to operate trawlers and push nets; and

1.3 Only the licenses and navigation certificates of the holders of the license/ certificate for the preceding year are to be renewed and transfer of these licenses to another person cannot be allowed or negotiated under any circumstances, except as in instance of family inheritance.

These measures are not effective since the authority to control is distributed in 2 agencies, i.e. fishing boat registration for navigation certificate is the responsibility of Harbour Department while Department of Fisheries issues fishing license. This creates the gaps because fishermen can operate with other type of gear not mentioned in the fishing license. The review of this legal practice has not been complemented until presently.

Closed seasons: which was issued in November 1984. By this regulation, a conservation area of approximately 26,400 km2 was declared in the Gulf of Thailand to protect several commercially exploited species of demersal and pelagic fish during their spawning and breeding seasons from 15 February to 15 May. This regulation prohibited fishing by all types and sizes of trawlers (with the exception of beam trawlers), all types of purse seines (except for anchovy purse seines operating in the day time during 15 February to 31 March only) and gillnets with less than 4.7 cm mesh

size, along the coastline of Prachuap Khirikhan, Chumphon and Surat Thani provinces, as well as Khanom district in Nakhon Sri Thammaratprovince, in central western Gulf of Thailand. These measures yielded quite encouraging results. The total annual catch of Rastrelliger spp., which is the target species, is reported to be gradually increased.

Closed areas: concentrates on the prohibition of using trawl and push net within 3 km from shore was issued on July 1972. This aims to conserve the juvenile fish and shrimps from being heavily exploited. Anyhow, some small-size trawllers (14 meters) always break the rule searching for valuable small shrimps.

In terms of marine parks, sanctuaries or protected areas for other purposes (non-fisheries) such as tourism and recreations, the Department of Forestry is also responsible for. The Fisheries Acts, the Forestry Acts and its supporting regulations are mainly enforced by the Provincial and District Administration, with, occasionally, assistance from the water police and the Royal Thai Navy. The enforcement faces numerous problems, particularly in the marine capture sector, due to the independent nature of most fishermen, lack of patrol craft and the small penalties usually imposed (for example, the fine for fishing with an unlicensed gear is set at three times the annual license fee). Although many fisheries officers attempt to enforce the regulations, it is considered that inability to prosecute the regulations has led to a lack of respect for the law. It is known that most fishermen profess knowledge of the regulation, but they often ignore them. These are also problems of inequality in enforcement effort between provinces and between individuals within provinces.

As the nation needs to develop its social and economic structures, a great numbers of development projects are proposed and conducted. These also include the intensive use of coastal areas that often causes not only domestic but also industrial pollution, which are eventually transferred to the marine environment. Any fisheries management and conservation program could hardly get success, so long the pollution exists.

■ INTERNATIONAL ORGANIZATIONS RELATING FISHERIES MANAGMENT OF THAILAND

Thailand is the member of the following organizations: the Southeast Asian Fisheries Development Center (SEAFDEC), Association of Southeast Asian Nations (ASEAN), Asia-Pacific Economic Cooperation (APEC), Asia-Pacific Fishery Commission (APFIC), Food and Agriculture Organization/Regional Office for Asia and Pacific (FAO/RAPA)

■ CONCLUSION

Fishery resource enhancement should be nationalized or globalized that requires a great deal of responsibility and cooperation not only from the fishermen or the authorities, but everybody must incorporate within the program. Nowadays nobody could say yet, which of the present programs and measures implemented in fishery management and conservation policy determines the best effective manipulation for resource enhancement. Further tasks must be done and we all have to work hard and sincerely to approach the expected target.