

Fishery Development and Management in Southeast Asia: Spotlight on Thailand

Thailand ranks as one of the top 10 fishing nations of the world and boasts the largest fish production of all the Southeast Asian nations. Its 2,600 km of coastline, 395,000 km² of shelf area, and 4.5 million hectares of inland waters yield nearly 2 million mt of fish and shellfish annually. Besides providing the basis for an industry contributing 3.7% to the GDP (1973), fish are a mainstay in the Thai people's diet, and present landings are sufficient to furnish an average of 25 kg per capita for direct consumption for the 43 million Thai per year.

As of 1976 there were 257,254 Thai engaged in fisheries on both a full-time and part-time basis. Their catch of marine and freshwater fish and shellfish was worth 7.5 billion baht (or US\$375 million) for an average value of \$1460 per fisherman. Although small fishermen (having less than \$5000 as capital) outnumber the commercial fishermen 7:3, the latter group's catch accounts for 70% of the country's total production. Thus, the small fisherman earns an average net income of US\$300 per year. Only 10%

of these fishermen own boats, usually rowboats or powered boats not more than 16 m long.

With the introduction of improved fishing gear and discovery of new fishing grounds in Thai waters and contiguous areas. Thailand's fish production skyrocketed from 186,500 mt in 1960 to the present figure of 1.7 million mt, a ninefold increase in 16 years. Most of the increase was derived from marine landings; freshwater fish from natural waters and pond culture contributed a much smaller amount, growing at the rate of about 10% per year.

Thailand's trawl fishery is well developed but is greatly overcapitalized. Trawlers have overfished the country's marine waters, and the Gulf of Thailand, once teeming with demersal fish, is now comparatively impoverished and has been termed an aquatic desert. Dwindling catches impelled the Thai to develop a distant water fleet which now operates on the high seas off the coasts of Malaysia, Kampuchea, South Viet Nam, Burma, Bangladesh, and India, but

possibilities of continuing distant-water fishing steadily dim as nations prepare to declare a 200-mi exclusive economic zone (EEZ). Once the EEZ's are established, Thailand's catch will be reduced by an estimated 250,000-660,000 mt (15-39%). At the same time, the population is increasing at a rate of 3.1% per year and it demands that fish production keep pace. Does Thailand have a way out of the dilemma of compensating for its impending fish losses and still providing fish for all? It does. Planners state that production could be increased by improving pelagic fisheries, arranging joint fishing ventures with other countries, utilizing underutilized species such as round scad (*Decapterus* spp.) and tuna-like species, and reducing wastage from poor handling and preservation. Increased production is also possible through intensifying inland fisheries and aquacultural development and improving management schemes for stocks, especially in inland waters and reservoirs.

Recognizing the important role played by fisheries in the economy of the country, the Government has

Thai trawlers in Songkhla harbor await next trip to Andaman Sea. Vessels usually fish for 3 days before turning to port to sell the catch.



made the fisheries sector a part of its Economic and Social Development Plans, the first of which was introduced in 1961. The general thrust of the Fourth National Economic and Social Development Plan (1977-1981) is to reduce the gap between rich and poor, and thus the government will give priority to rural development projects, including development of small-scale fish farming.

The Department of Fisheries will aim to increase fish production, conserve fisheries, improve lakes and swamps, accelerate inland and brackishwater fisheries development, develop management program to ensure maximum sustained benefits, develop post-harvest technology to maximize use and benefits from fisheries resources, and increase the income of fishermen. It will work toward maximizing production of fish farms and making aquaculture an economically sound industry which will increase employment, generate supporting industries, and increase foreign exchange earnings. The private sector will also be encouraged to undertake aquaculture ventures which will be supported by privileges allowed under the laws of the Board of Investment of Thailand.

In 1976 a total of 1.7 million mt of marine and freshwater fish and shellfish worth 7.5 billion baht were landed, with marine fish dominating the catch, both by weight (91%) and value (71%). The 1.5-million-mt marine catch comprised 75% fish, 9% crustaceans, 4% mollusks, and 2% jellyfish, algae, sea cucumbers, and turtle eggs. Of the fish landed, 54% by weight were trash fish, 39% were unclassified mixed species termed "miscellaneous," and the remainder comprised 32 species. Although trash fish are captured in quantity, their value is low (13% of total landings) in comparison to that of miscellaneous fish and shrimp which account for 32% and 36% of the catch's value, respectively. The Thai fish with a wide variety of gear but capture most fish with otter trawls, paired trawls, and Thai purse seines.

Freshwater landings, estimated at 147,000 mt, are composed primarily of miscellaneous fish, snakehead *Ophiocephalus* spp., catfish *Clarias batrachus*, and "local carp" (not identified in reference consulted), most of which is consumed fresh (67%) or dried and salted (13%). A

small percentage is steamed or smoked, or becomes fishmeal, fish sauce, or fertilizer.

Thailand's exports have steadily increased since 1973, rising from 88,200 tons to 133,500 tons worth 3 million baht in 1976. Shrimp, lobsters, and prawns command high prices, and nearly half of the total income from exports is derived from these commodities, followed by 26% from cuttlefish, 10% from other crustaceans, and 8% from fishmeal. By weight fresh and frozen fish top the list of exports at 29,000 tons, closely followed by fishmeal at 27,000 and frozen cuttlefish at 16,000.

Japan is Thailand's most important export market, purchasing 67% of all fishery products exported (by value). The United States, Singapore, Malaysia, and Hong Kong are smaller but important markets.

Thailand annually imports only 25,000 tons of fish products worth 1.5 million baht. Major imports include fresh and preserved fish (61% by value) and shrimp paste (9%) which are obtained from many countries. Fishmeal, a major import in 1975 (12%), declined to less than 0.5% in 1976.

Aquaculture's potential contribution to increased fish production is promising, and estimates project a rise from 81,000 mt in 1976 to 224,000 mt in 1983, with a surplus of 60,000 mt available for export. At present 217,000 ha comprising freshwater ponds, irrigated paddy fields, irrigation tanks, water ditches of vegetable and fruit farms, and mangrove and tidal flats are used for aquaculture. The total potential area, however, is 4.5 million ha, which includes rivers, reservoirs, and canals, none of which has yet been developed.

Only in the past 20 years has intensive fish culture been practiced in Thailand. Earlier emphasis on raising herbivorous and omnivorous species such as *Tilapia nilotica*, Thai carp *Puntius javanicus*, common carp *Cyprinus carpio*, and sepat-siam *Trichogaster pectoralis*, has given way to commercial-scale aquaculture for carnivores which fetch a high market price. Other species are also grown, e.g., catfish *Clarias batrachus* and *Pangasius sutchi*, sepat-siam, snakehead *Ophiocephalus striatus*, grass carp *Ctenopharyngodon idella*, big-head carp, silver carp, common carp, and eel *Anguilla japonicus*. Cultiva-

tion of the giant freshwater prawn *Macrobrachium rosenbergi* is gaining more attention, and a hatchery for this species is now in the pilot stage in Chacheongsao.

Brackishwater species raised include the sea bass *Lates calcarifer*, mostly in the southern provinces where fry are collected from natural stocks and grown in small ponds along the coast. Milkfish *Chanos chanos* are farmed on a limited scale due to lack of local demand, but cultivation could be intensified if domestic consumption and export demand increased. The shrimps *Penaeus* and *Metapenaeus* have traditionally been ocean-ranched, i.e., waters containing shrimp seed have been pumped into ponds and left to grow. However, fluctuating environmental conditions in ponds, high mortality of early life stages, and large numbers of predators have conspired against high yields, and now means are being sought to improve traditional methods of shrimp culture. Mangrove crabs *Scylla serrata* are raised on a limited scale, and mollusk culture is largely undeveloped, through fisheries for the bivalve *Anadara* once flourished in the inner Gulf of Thailand before the populations were reduced by pollution.

Fisheries fall under the aegis of the Ministry of Agriculture and Cooperatives, and responsibility for their management is assigned to the Department of Fisheries, the Fish Marketing Organization, and the Cold Storage Organization. Although the latter two bodies are organizationally part of the Ministry, functionally they are quasi-governmental bodies directed by boards appointed by the government.

As of 1975 the Department of Fisheries contained eight divisions: Secretariat, Finance, Fisheries Control and Conservation, Inland Fisheries, Brackishwater Fisheries, Marine Fisheries, Fish Processing Technology, and Exploratory Fishing. Two research laboratories—Marine Fisheries Laboratory and Fishery Technology Laboratory—are in Bangkok, and 20 other laboratories and stations serve the outlying provinces. Forty-eight of the 71 provinces have provincial and district officers who are members of the Department but responsible to Provincial Governments.



Fresh siganids ready to be popped into the pan can be purchased daily beginning in late afternoon at the FMO port in Songkhla.

The Fish Marketing Organization was created in 1953 to foster prosperity in the fishery industry and wholesale markets for fish and agents, and to promote welfare of fishermen, fishing villages, and fishing cooperatives. The FMO operates two wholesale markets (Bangkok and Samut Sakhon) as well as eight fishing piers, and contributes to construction of landing quays and jetties with funds it receives from the two markets (1% of gross sales). Sales at the fish markets are by auction by licensed fish agents who receive 5% of the gross sale for their services. In ports lacking FMO wholesale markets, sales are by negotiation or contract.

The Cold Storage Organization was established in 1958 and provides service in the cold storage industry to the State and public, as well as assistance, advice, and technical research services concerning general operations of cold storage plants. It presently operates three plants, and its primary activities are ice sales, freezer and cold store rental and fish trading.

Other countries and international organizations aid in development and management of the Thai fishery sector by providing monetary and technical assistance. Technical assistance has come from Canada, Denmark, Germany, Japan, New Zealand, and the United States. Perhaps the most striking aid of all was provided by Germany, whose introduction of trawlers

revolutionized the Thai fishing industry. International organizations operating in Thailand include the Southeast Asian Fisheries Development Centre (SEAFDEC) whose Training Department and Secretariat are both in Bangkok, the UNDP/South China Sea Fishery Development and Coordinating Programme (SCSP), the Indo-Pacific Fishery Commission, the Indian Ocean Fishery Commission, and the FAO Regional Office for Asia and the Far East. IPFC was responsible for establishing the SCSP in 1973 which has subsequently conducted broad studies to identify constraints and needs in the region as well as provided specific services in vessel design and fishery library development. The Mekong Committee of the Economic and Social Commission for Asia and the Pacific conducts studies and projects relating to the Mekong Basin, and the Asian Development Bank funds fisheries development projects from time to time.

Statistics and information in this article have been obtained from the following sources:

Fisheries Record of Thailand. 1975. Department of Fisheries, Ministry of Agriculture and Cooperatives, Fisheries Economics and Planning Subdivision, No. 6/1977. 104 p. (Some figures also from 1976 Record, currently being compiled).

Marr, J.C., G. Campleman, and W.R. Murdoch. 1976. An analysis of the present and recommendations for the future development and management policies, programmes, and institutional arrangements, Kingdom of Thailand. FAO/UNDP South China Sea Fisheries Development and Coordinating Programme, Manila. Doc. SCS/76/WP/45.

National Plan for Aquaculture Development in Thailand. 1976. Department of Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, Thailand. 25 p.

Approaches to Turtle Culture

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those needed for pigs or chickens, and the problems inherent in such maintenance are exacerbated by the remoteness of the region.

(b) The comparatively long period before turtles reach marketable size (3 to 4 years under good conditions), and the even longer period before they reach reproductive maturity, mean that any one self-contained project would have to maintain a number of different year groups simultaneously. This would be a considerably more complex task than with animals where there is maternal care of the young and/or marketable size is achieved within year.

(c) Details of turtle culture are yet to be fully worked out, in contrast to the wealth of information available on

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Locally caught fish is prepared for turtle food in labor-intensive operation in the Torres Strait turtle culture project.