

# Fishery Development and Management in Southeast Asia: Spotlight on TAIWAN

Hungfou Hsu

**T**AIWAN IS one of the world's foremost fishing nations, ranking about 20th in total production and belying its small landmass of 35,961 square km. An archipelago with 70-odd islands, Taiwan lies just off the coast of China and separates the South and East China Seas.

Fish is the mainstay of the Taiwanese diet and also provides livelihood to 29% of the population. As of the end of 1975, nearly 294,000 persons were actively employed in fisheries, 64% of whom were engaged full time. Fishermen's households numbered about 110,700, of which 88,200 were involved in fishing and 22,500 in aquaculture. The fishing population was much larger, totalling 592,500, of whom 464,900 depended on fishing for a living, in comparison to 127,600 depending on aquaculture.

Total fisheries production in 1975 was 800,000 mt, registering an 11.8% increase over that of the previous year. Deepsea fisheries (those operating fishing vessels over 50 t, mainly trawlers and tuna longliners) landed 41.9% of the catch, closely followed by inshore fisheries at 37.9%. Inshore fisheries are those operating vessels smaller than 50 t and are composed of primarily dragnetters, purse seiners, longliners, handliners, and spear-fishing boats. Less important sources of fish were aquaculture (16.4%) and coastal fisheries

(6.1%), the latter using non-powered boats or no boats at all, and whose methods were primarily setnet fishing, fishing with light, beach-seining, and gillnetting.

Taiwan's multispecies fisheries yield over 100 species of fish, shellfish, and algae in commercial quantities. Tunas, shrimps and lobsters, sharks, and milkfish comprise almost one-third of the total landings, with most other species contributing between 0.1-4% (Table 1).

Production of fish and shellfish through aquaculture contributes to meeting local protein demand and also provides valuable export commodities. In 1975 a total of 53,606 ha were under cultivation, about 35% of which

were brackish and devoted primarily to milkfish culture. Some brackish waters were used for mixed culture of grey mullet, tilapia, and shrimp. Shallow coastal waters amounting to 25% of cultivated areas yielded oysters and clams, in comparison to freshwater ponds (22%) which produced common, silver, and grass carps, tilapia, and mullet. Paddyfields comprising 115 ha are used to raise tilapia. As in the Philippines and Indonesia, milkfish is the most popular brackishwater fish produced.

Exemplary success has been achieved in production of fish fry for culture enterprises in the last 20 yr which is a tribute to Taiwanese determination to become self-sufficient in fry production. Before 1959, fry of species such as silver, mud, and grass carps had to be imported from Hong Kong, but with discovery of these fry in the Akongtian Reservoir and persistent experimentation with artificial propagation methods, incubation, and feed, sufficient fry were produced to satisfy domestic needs and still have enough for export. Through assistance from the government and an extension program, there are now 30 privately owned hatcheries in operation. From these hatcheries, as well as natural waters, 337.5 million

Table 1. Top ten species (by weight) landed in Taiwan, 1975.

| Species           | Weight (mt) | % of total landings |
|-------------------|-------------|---------------------|
| tunas             | 93,379      | 11.79               |
| shrimps, lobsters | 63,226      | 8.10                |
| sharks            | 58,136      | 7.45                |
| milkfish          | 33,308      | 4.27                |
| sardines          | 30,847      | 3.95                |
| cuttlefish, squid | 29,821      | 3.82                |
| hairtail          | 21,009      | 2.69                |
| lizardfish        | 20,806      | 2.66                |
| croakers          | 20,804      | 2.66                |
| carps             | 18,231      | 2.23                |

Total production, all species, 1975: 779,950 mt

NEXT PAGE



Baited hooks are loaded onto typical bottom-fishing boats in Taiwanese village.

fingerlings and juveniles of other animals were supplied for stocking purposes.

Because of the demand for and high value of shrimps in the international market, Taiwan is aiming toward their large-scale production. Experimental work on shrimp culture has been conducted at the Tungkang Marine Laboratory established by the Fishery Experiment Station of the Ministry of Aquaculture and Forestry. In addition, a shrimp culture demonstration center has been set up to promote and assist development of shrimp culture in Taiwan.


Exports of fisheries products totalled 150,000 mt valued at \$US2.8 x 10<sup>8</sup> (Present conversion rate: \$US1 = \$NT34.4828) Although weight of imports exceeded that of exports by 3000 mt, imports' value was less than that of exports by a factor of 4.46 (\$US 6.38 x 10<sup>7</sup>). Frozen fish was the most lucrative of the exported commodities, accounting for 74% of the earnings, followed by frozen shrimps at 12% and fish fry at 1%. The major products imported include fish meal (89% by weight, 72% by value) and fish fry (7% by value).

At the end of 1975, the number of fishing craft in Taiwan reached 29,100. Of these, 59% were non-powered sampans and bamboo rafts which are optimally suited for operating off the flat, broad beaches of the west coast for high tide to exit and enter. Powered vessels used for deepsea and inshore fisheries comprise 931 powered sampans, 7633 small-sized vessels of under 20 t, 1816 medium vessels from 20-50 t, 253 vessels of 50-110 t, 1357 vessels of 100-500 t, and 14 vessels over 500 t.

Although harbor construction in

Taiwan is a problem, owing to the precipitous cliffs and rough seas on the east coast and the broad beaches and shifting sands on the west, harbor engineers have surmounted these difficulties and established 108 ports. The largest harbor in terms of area is in the south at Kaohsiung and is the main base for deepsea tuna longline and inshore grey mullet fishing. Keelung City, however, lands a greater tonnage of fish (1972 figures). The port is a center for deepsea trawling, the bulk of catches consisting of croackers, sharks, lizardfish, and sea bream.

Marketing of the catch is a well organized activity in Taiwan. About 80% of the total fish production goes through the fish market. In areas of production the fish markets are managed by fishermen's associations and in areas of consumption, by city government or public office in that locality and managed by a joint committee or

PAGE 15 



Catch is unloaded and sorted at port in northern Taiwan.

ganized and participated in by the Provincial Fishermen's Association or local association. There are 68 such associations in Taiwan, comprising 80,411 persons. In return for its services, the market exacts a fee of 2½% of the fishermen's total proceeds. Fish are sold by auction. Of the existing fish markets, 99 are in the provinces, 56 in production areas, and 43 in consumption areas.

Fisheries products are transported primarily via highways and secondarily through the railways by freight cars and trucks fitted with cold storage equipment. Concerted efforts have been made to improve both storage equipment and transport trucks, with the result that fresh fish goods can be delivered from any producing locality to any consuming locality on the same day. The evenness and dependability of supply has helped to stabilize local fish prices, an improvement over earlier conditions where gluts in some areas and shortages in others sometimes led to erratic prices.

Before 1972 most fishery products were processed by individual fishermen and small-scale processors, especially dried and salted fish, and the quality was not high enough to meet international export standards. However, the fish processing industry was not encouraged to improve since fresh fish was readily available and preferable to preserved products. With governmental assistance, the industry has now been stimulated to upgrade its products. Processing plants now turn out fishmeal fish soluble, fish liver oil, canned fish fish sausages, fish balls, and sharkskin which are a valuable source of foreign exchange.

Information used in this article has been derived from the following sources:

Fisheries yearbook, Taiwan area, 1975. 1976. Taiwan Fisheries Bureau, Department of Agri-

culture and Forestry, Provincial Government of Taiwan. 230 p.

Taiwan Fisheries. 1973. Taiwan Fisheries Bureau. (in English and Chinese). 46 p. ●



Kaohsiung City is the main base for deepsea tuna longline and inshore grey mullet fishing, with marlin, sailfish, and sharks, and other demersal fishes landed in bulk as well. Here catch is being sorted at Kaohsiung City's fish market, the largest and one of the most modern in the country.

## ICLARM Staff Roster Grows

ICLARM proudly announces the arrival of Roger S.V. Pullin, who joined the staff in April as Senior Scientist in the organization's aquaculture program.

Already an experienced professor and research scientist from his 10-yr affiliation at Liverpool University, U.K., Dr. Pullin will bring his expertise in fish reproduction, aquaculture, fish diseases, and aquatic pollution to bear on problems confronting aquaculture development. His current activities include advising on the ICLARM integrated animal/fish farming project with Central Luzon State University (CLSU) and a joint project with Dr. Rafael Guerrero III of CLSU to improve the genetics of tilapia broodstocks in the Philippines.



Roger S.V. Pullin

Dr. Pullin will be featured in the "ICLARM Staff Profile" in the October newsletter. ●