

The Fisheries of Chile

Chilean fish and shellfish landings decreased slightly during the first half of 1987, compared with the same period of 1986. Export shipments, however, increased over 35 percent by value during that same period. Frozen and fresh fishery products were the most rapidly growing exports. Fishmeal remained the most important fishery export commodity. New investments in the industry continue to be concentrated in salmon aquaculture. New Zealand investors, however, formed a partnership with a major company which may increase frozen fish production. The U.S. Embassy in Santiago, Chile has submitted the following report on recent Chilean fishery developments.

Landings Decline Slightly

Small Pelagics

Most of Chile's fishery landings are small pelagic species (sardines, anchovy, and jack mackerel) which are primarily reduced to fishmeal and oil. Chilean landings of these species declined during the first half of 1987 by about 10 percent from 1986 landings during the same period. Some observers suggest that the decline may be related to the 1986-87 El Niño which has affected Ecuadorean and Peruvian fisheries. It is unclear to what extent, however, the decline has resulted from El Niño, because the sea surface temperature anomalies associated with El Niño have been most severe off Ecuador and northern Peru and not off Chile¹. Some observers believe that the declining catch may be at least partly caused by the heavy fishing effort directed at the country's small pelagic stocks during recent years. Some observers have expressed increasing concern about the level of fishing effort on Chile's small pelagic stocks. Government efforts to protect stocks may also adversely affect land-

ings, at least in the short term. The Government closed the sardine fishery off northern Chile (Regions 1 and 2)² for 41 days in mid-1987. As a result, fishermen in these two northerly regions reported a 30 percent decline in landings during the first half of 1987. This trend was offset somewhat by improved jack mackerel catches reported off Talcahuano in southern Chile (Region 8); fishermen there reported a nearly 60 percent increase in their jack mackerel catch. The increase in Region 8 resulted from the decision by several companies to redeploy part of their fleet south to compensate for the closed season and declining sardine landings in Regions 1 and 2. During 1986, Chilean landings of both sardine and jack mackerel declined, but overall landings increased because of a massive increase in anchovy landings, however, are unavailable.

Other species

Artisanal fishermen land much smaller quantities of fish, but most of their landings are more valuable, and destined for human consumption. Artisanal landings during the first half of 1987 were 7 percent higher than those during the same 6 months of 1986. Chile has also developed an important seaweed industry in the past few years. The quantity gathered in 1986 declined, but gathering remained steady during early 1987.

Fishery Exports Increasing

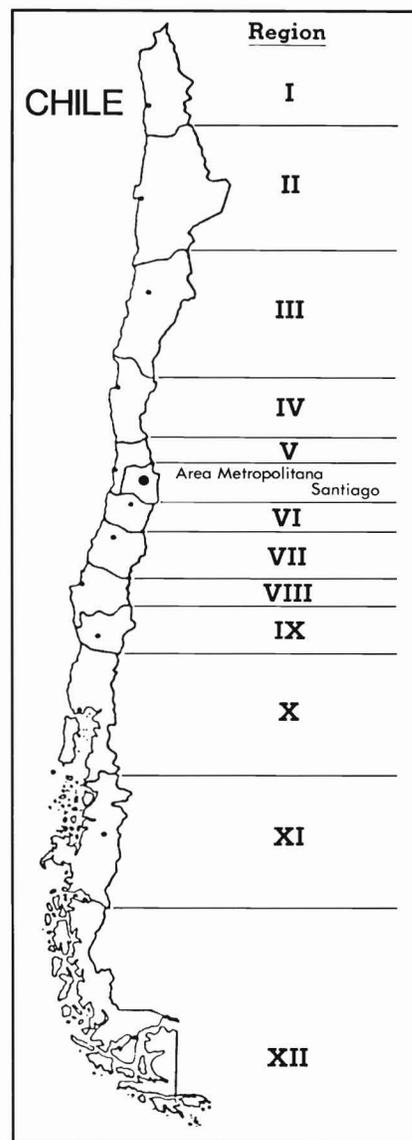
Chilean fishery exports during the first 6 months of 1987 reached over \$310 million, or 35 percent more than during the first 6 months of 1986 (Table 1). The increase was primarily caused by increased fishmeal prices, but important gains were also reported in other sectors.

ing March 1987, the peak of the anomalies off Chile. Water temperatures off Chile during the rest of the year have remained fairly constant.
²See map.

Data on 1985-86 exports are given in Table 2.

Fishmeal

Chile exported 616,000 metric tons (t) of fishmeal during the first 6 months of 1987, an increase of 20 percent over such shipments during January to June 1986. Exporters increased shipments during early 1987, despite declining landings. Exporters were able to achieve these increases by drawing on inventories to take advantage of rising world prices. As a result, the value of fishmeal exports increased 35 percent during the first 6 months of 1987. Chilean observers report



¹Sea surface temperature anomalies off Ecuador and northern Peru were 3-4°C above normal during early 1987, but only 2°C above normal dur-

that if catches continue at current levels, full year 1987 fishmeal exports should equal 1986 levels in quantity, but earn more because of the increased prices.

Fresh and Frozen

Fresh and frozen fishery exports totaled 21,600 t during the first half of 1987, nearly a 60 percent increase over the 13,700 t exported in the same period in 1986. These exports grew over 100 percent (by value), to a total of \$47.0 million compared to only \$23.5 million. International prices for both fresh and frozen products have been strong, and Chilean exporters are predicting continued growth. A new partnership developed between Chilean and New Zealand investors, may contribute to an even more rapid growth in frozen and fresh fishery exports by the end of 1987.

Canned

Canned fishery exports increased 40 percent by both quantity and value during the first 6 months of 1987 to 16,100 t worth \$12.4 million, compared to only

11,600 t worth \$8.8 during the same period in 1986. Exporting companies reported that international prices for their product increased a moderate 1.4 percent. Shellfish exports (frozen and canned product) increased by 14 percent in value, while seaweed products increased by 10 percent. Other fishery exports, such as dried or salted fish, fish offal, fish by-products and unclassified fishery products, also increased in value terms, but landings were adversely affected by seasonal closures on several different species.

Future Expansion

The most significant investment development during the first half of 1987 was the decision by New Zealand investor Carter Holt Harvey³ (CHH) to purchase a 39 percent interest in a large Chilean fishmeal company, Pesquera Iquique. After investing \$28 million, CHH became the partner of the largest Chilean fisheries industrialist, Anacleto Angelini, whose plants are responsible for some 40 percent of Chilean fishery exports. CHH is reportedly interested in expanding the company's operations which currently concentrate on fishmeal. CHH is particularly interested in increasing exports of fresh and frozen demersal fish. The CHH investment is the largest single foreign investment in Chilean fisheries.

The greatest foreign interest overall has been in Chile's booming culture of salmon in pens set along the southern coast. Production is primarily targeted for the U.S. market. Chilean farmers harvest their salmon during the northern hemisphere winter when prices in the United States are highest. Exports to the United States totaled \$4.6 million during the first 6 months of 1987, compared to only \$2.8 million during the same period of 1986. While still relatively small, some observers believe that salmon may eventually become one of Chile's principal fishery exports.

Comments

As international fishery prices continue to rise, Chilean fishery exports

should continue to generate an important source of hard currency for the Chilean economy. Fishery exports remain Chile's third largest source of hard currency, after mining and agriculture. During the first 6 months of 1987, fishery commodities represented 13 percent of total Chilean exports, compared to 11 percent during the same period in 1986. Nevertheless, the continued strength of exports will be largely dependent upon the stability of Chilean landings. The status of major small pelagic stocks is not known, and several factors could significantly affect landings by the end of 1987. The Chilean Government may decide to further limit sardine and/or other small pelagic fisheries as a resource management measure. Heaving fishing effort could adversely affect stocks. The full impact of the 1986-87 El Niño event is still unknown. Each of these factors could have a serious effect on Chilean landings. The U.S. Embassy in Santiago reports that further government restrictions on landings would provoke loud protests from the Chilean fishing industry, an important source of political support for the current administration. The Chilean fisheries industry continues to increase its ability to compete efficiently in the international markets. The large New Zealand investment should help to further improve the competitive position of the Chilean fishing industry on world markets. (Source: IFR-87/71:DW.)

Additional Information

The U.S. Embassy in Santiago has prepared a 20-page report reviewing the status of Chile's fishing industry in 1986. The report includes sections on landings, fleet development, fisheries development, new fishery investment projects, ports, aquaculture, processing, markets, government policies, and research. The report has many appendices, including lists of fishery offices, trade associations and companies, and statistical tables on landings, processing, and fishery exports. U.S. companies can obtain a copy of "Chilean Industrial Outlook Report: Fishing Industry, 1986" for \$9.95 and a \$3.00 handling fee (total \$12.95, personal checks or money orders only) by ordering report PB87-207692/GBA from NTIS, Springfield, VA 22161.

Table 1.—Chilean fisheries exports, January-June, 1986-87¹.

Product	Exports (US\$ million)	
	1986	1987
Fishmeal	138.0	186.3
Fish		
Frozen ²	23.5	47.4
Canned	8.8	12.4
Shellfish	35.7	40.5
Seaweed	13.7	14.4
Other	10.3	10.9
Total	230.0	311.6

¹Source: Indicators of Chilean Foreign Trade, Central Bank of Chile.

²May include small amounts of fresh product.

Table 2.—Chilean fisheries exports, 1985-86¹.

Product	Exports (\$ US million)	
	1985	1986
Fishmeal	279.0	314.9
Fish		
Frozen ²	47.8	67.2
Canned	10.7	26.0
Shellfish	57.9	76.6
Seaweed	23.7	23.2
Other	40.9	27.5
Total	460.0	535.4

¹Source: Indicators of Chilean Foreign Trade, Central Bank of Chile.

²May include small amounts of fresh product.

³Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

The Fisheries of Southern Thailand

Major changes have swept through the southern Thai fishing industry during the past 2 years. Strict enforcement of Exclusive Economic Zones (EEZ's) by neighboring Burma, Malaysia, and Vietnam, has nearly eliminated alleged Thai poaching in these waters. Malaysian arrests of Thai fishermen have touched off protest demonstrations in Songkhla and Pattani ports on the southeastern coast of Thailand, while a Burmese fisheries enforcement program using a Japanese-donated fleet of 42 patrol boats and 6 helicopters has crippled Ranong, formerly a port of choice on the Andaman Sea.

The EEZ squeeze has sparked an internal migration of the Thai fishermen from central provinces to the south, and from the east to the west coast, in order to gain better access to international waters. Smaller trawlers continue to fish in national waters of the Gulf of Thailand where fishery resources are rapidly declining. But larger trawlers and more sophisticated purse seiners, equipped with sonar and night-fishing gear, are ranging further afield into the international waters of the South China and Andaman Seas. Both trawler and purse-seiner fishermen have greatly benefited from two important trends. The falling diesel fuel price has reduced costs and rising fish prices have increased profits. Fish prices are 20-30 percent higher than during 1985, a result of more sophisticated processing and international marketing.

While overall catches are slightly lower, fishermen interviewed in nine southern Thai ports expressed satisfaction with current conditions—the “Year of the Golden Sea”, according to one—and are optimistic about the future. Government efforts are geared to internationalize the fleet by sponsoring joint-venture

agreements with other nations, and modernizing fishing vessel design and fishing methods to allow for more extended fishing trips. To this end, the Government recently opened the Tinsulanonda Songkhla Fishery College. The college, Thailand's first, will educate a new generation of deepsea fishermen and introduce new vessel designs, fish processing techniques, and capture methods.

Background

Thailand's rise to its position as Southeast Asia's preeminent fishing nation began with the introduction of a seagoing trawler in the early 1960's. Designed by the Thai Department of Fisheries and constructed at local shipyards with indigenous wood, the trawler was powered by a large inboard diesel, furnished with ice-storage space and equipped with winch and crane apparatus for hauling in large catches. The modern vessel was a revelation for Thai fishermen. The Thai fleet mushroomed from only 99 vessels in 1961 to 5,200 in 1974, and approximately 9,000 today. The land-based infrastructure, necessary for an export-oriented fishing industry, developed in tandem with the Thai fleet: Coastal roads, refrigerated trucks, shipyards, ice plants, fish meal factories, cold storage plants, and canneries.

The industry, however, fell victim to its own success. Throughout the 1970's, neighboring countries proclaimed 200-mile EEZ's off their coasts, barring Thai trawlers from some 110,000 square miles of fishing grounds—half the area once exploited. Though some captains continued to fish in those waters, risking arrest and confiscation of their vessels, those content to remain in safe waters may have overfished the Gulf of Thailand. Industrial pollution and dynamiting of coral

reefs has further reduced the catch along the central provinces. All told, the average catch dropped from 298 kg per hour in 1961 to a mere 47 kg in 1975. The Thai fishing fleet was also crippled, between 1972 and 1978, by a tenfold rise in the diesel fuel price—an expense which reportedly accounts for 65 percent of a trawler's operating costs.

The fortunes of the Thai fishing fleet bottomed out in 1980 when the annual catch declined by 20 percent below the 1977 record of over 2 million tons. The stabilization, and then fall, of the diesel price allowed the fishing industry to rebound. While the 1986 catch is expected to decline slightly, prices are up 20-30 percent. Besides the fuel and fish price fluctuations, improved fishing, processing, and marketing techniques have all played a role in the relatively healthy state of southern Thai fisheries. Personnel of the U.S. Consulate in Songkhla visited 10 southern Thai fishing ports in 1986, and submitted the following report which documents the ingenuity of Thai fishermen in coping with contemporary problems.

Ports and Production

In general, the northern and northeastern Thai ports are faring poorly; the southern ports, with easy access to international waters, are booming. The 10 southern ports described in this report are important because the entire marine catch of this region is landed there. Chumphon, the northernmost port in the southern half of Thailand, has fared poorly since its approach channel began silting up. In 1986, some 40 of its 422 trawlers left for more southern ports. Fishing in Vietnamese waters has long been too risky and fishermen are also prohibited from trawling closer than 3,000 m to islands offshore from Chumphon and Surat Thani provinces (in order to preserve islanders' traditional fishing grounds). Thai Navy and Marine Police Patrols strictly enforce this law.

Despite such restrictions, 138,000 metric tons (t) of fish, valued at over \$42.3 million, were landed on Chumphon docks in 1985—a nearly twofold increase over its 1980 low. Chumphon's attractions are its relative proximity to Bangkok and a good fish



market. A prosperous province, Chumphon also has much ready capital for infrastructure investments. To date, it has constructed 3 canneries, 7 fish-sauce plants, 8 fishmeal plants, 13 ice factories and 5 cold stores. Chumphon, however, bears the dubious distinction of being the only province where fishermen must contend with piracy. A captain and his crew were wounded in 1986 during a robbery attempt. Extensive use of inter-fleet and ship-to-shore radios, however, have helped to eliminate a once-common scourge in southern Thailand.

Surat Thani, 90 miles to the south, is also in serious decline as a fishing port. Not only is its channel silting up, but large rocks at the entrance makes approach in low tides increasingly dangerous. With delays at the channel mouth common, some 80 percent of the larger trawlers have abandoned Surat Thani for Khanom, 40 miles east in Nakhon Si Thammarat Province, where passage, docking space, and ice are plentiful. The catch landed in Surat Thani fell from 125,000 t in 1984 to 118,000 t in 1985; catch estimates for 1986 are much lower. Infrastructure is also less developed than at Chumphon: only 2 canneries, 3 fish-

sauce factories, 4 fishmeal plants, 8 ice factories, and 3 cold stores.

While the Government-owned fish marketing organization in Surat Thani reports a drastic decline in trawler landings, canneries and similar plants have, as yet, suffered no shortage of material. Truck convoys carrying iced fish from Khanom keep them regularly supplied. Surat Thani's harbor problems could be solved by relocating the fish market to its new port, outside the old channel. To date, however, provincial authorities have balked at the idea, preferring to receive high rents from private companies rather than give space to state enterprises. The alternative solution—demolition of the rocks in the estuary—would not be cheap: It would cost over \$6 million.

Khanom, now the premier fishing port in Nakhon Si Thammarat Province, has boomed since 1983 when Electrical Generating Authority of Thailand (EGAT) opened a major hydroelectric plant and deep-dredged its harbor channel. Private docks, ice factories, and cold stores quickly sprang up and triggered a fishing boom as trawlers from Chumphon and Surat Thani flocked to take advantage of Khanom's speedy offloading facilities. The province's fish catch, steady at around 52,000 t between 1980-1984, increased more than fivefold to 278,000 t in 1985, valued at \$14 million.

In contrast, Pak Phanang, Nakhon Si Thammarat's traditional port some 70 miles south of Khanom, has fallen on hard times. As in Chumphon and Surat Thani, its harbor is silting up, driving a third of the trawler fleet south to Songkhla. There are other special problems and fishermen prefer to offload in other ports where prices are freer and higher. By the end of 1987, however, a partial solution may be at hand. The state-owned Fish Marketing Organization will construct a dock and cold storage facility costing about \$3.5 million, financed by a Japanese loan. This, in turn, may loosen the local grip on marketing, though there is doubt that Pak Phanang will regain its former status.

Songkhla has long been southern Thailand's largest fishing port. Until 1985, it landed twice as much as the next two ports, Kantang and Pattani, combined. Songkhla's infrastructure is also the most

developed, with 11 canneries, 20 ice factories, 5 fishmeal plants, and 2 cold stores. In 1984, the fisheries catch stood at 442,000 t, valued at \$71.2 million. In 1985, however, production plummeted to 165,412 t valued at \$27.8 million. This 63 percent decline reflects, in part, the desertion of a sizable purse seiner fleet to Pattani. For the six previous years, fishing vessels had been migrating from the depleted fishing grounds of central provinces (like Samut Sakhon) to take advantage of Songkhla's proximity to international waters.

Songkhla's very success proved its bane as the press of boat traffic placed impossible demands on its dock space. Trawlers also have had to put up with long queues for ice, water, and fuel. Off-loading is similarly time-consuming as the Fish Marketing Organization's pier is too small for current volume. A municipal fishing port, scheduled for completion in 1990 (at a cost of \$9.6 million, 60 percent of which is provided by an Asian Development Bank ADB loan), will ultimately relieve congestion. Marketing problems, however, remain unsolved. Songkhla's tough fish brokers have consistently paid less for the catch than buyers in neighboring Pattani. Prices in Pattani, in fact, average one baht (about \$0.04) higher per kilo—strong incentive for migration.

Pattani is the fastest growing fishing port on the southeastern coast. Fifty miles south of Songkhla, and even closer to international waters, it has attracted a large fleet from other provinces. This fleet is also southern Thailand's most sophisticated: it comprises 200 sonar-equipped purse seiners and 250 trawlers (70 percent of which are over 50 t). All vessels being built in Pattani shipyards are purse seiners, while many large trawlers (70 to 100 t) are being converted for seining, a process spurred by ADB small loans to fishermen for sonar gear and purse seine nets. Purse seiners and large trawlers fish mainly in the international waters of the South China Sea. A promising Thai-Indonesian joint venture has been launched with 3 purse seiners. As Pattani's fleet has burgeoned, so has its infrastructure: 11 ice factories, 3 cold stores, 4 fishmeal plants, and 2 canneries. Pattani's fish market is freewheeling,

backed by a healthy cross-border trade with Malaysia. Each day about 100 pickup trucks deliver fish to customers in Malaysia and 30 ten-wheel trucks deliver to Bangkok.

Ranong, on the west coast facing Burma, is having hard times. Once southern Thailand's largest fishing port, Ranong's catch has shrunk from 110,000 t in 1977 to 68,000 in 1985. In 1986, it is estimated to have plunged another 40 percent, as the Burmese drastically increased surveillance of their EEZ following the establishment of a joint-venture with the Japanese. A Japanese firm, Nikata, has provided the Burmese with training, technology, equipment, and cold stores. Some fish are sold in Burma, but better quality marine products are processed and sold to Japan. To protect their investment, the Japanese have provided the Burmese with 42 patrol boats and 6 helicopters to discourage poaching. Thirty Thai boats were seized in 1985, 10 in 1986. Arrested Thai crewmen are now jailed for 4 years, captains for 7 years. In response, over 100 of Ranong's 277 trawlers have fled south to Phuket. Another 100 purse seiners, which once migrated to Ranong during the December-March east coast monsoon, now favor Phuket and Kantang. Limited poaching persists during the west coast's 4-month rainy season (June through September), when the Burmese refuse to brave the high seas. Ranong's infrastructure remains small at 8 fishmeal plants and ice factories, and no canneries. Most fish is sent to Bangkok, but some is also delivered to Hat Yai for export to Malaysia.

Phuket, located 140 miles south, has profited from Ranong's misfortune. Most of Ranong's trawlers now offload their fish in Phuket, and 100 purse seiners from Pattani and Songkhla call there from December to June. The increased traffic has strained Phuket's ice plants, and additional supplies are occasionally trucked from Phang Nga to make up the shortfall. Phuket's infrastructure remains primitive with 6 ice factories, 3 fishmeal plants and 1 cannery. In 1984, Phuket's domestic catch was 41,500 t, plus another 9,800 t from a joint venture with Indonesia. Nine large trawlers were involved in the joint venture. Fishermen found, however, that catches were low

and profits meager, and only a single trawler now makes monthly trips to Indonesia. A de facto Thai-Burmese joint venture has evolved, whereby the Burmese sell their catch to the Thai on the high seas (done at Kantang and Satun as well). A more official joint venture has been initiated with Bangladesh: Thai trawlers land large fish there, and small fish in Phuket. In 1985, Phuket's domestic catch increased to 56,200 t, and is expected to be substantially higher in 1986. About 40 percent of the catch is trucked to Hat Yai for sale in Malaysia; the rest is trucked to Bangkok.

Kantang, 100 miles south of Phuket, is the west coast's largest fishing port and, until the dramatic rise of Pattani, southern Thailand's second largest fish producer. Its main dock, belonging to the municipality, services some 100 trawlers. Another 240 trawlers dock privately. Kantang's fisheries infrastructure consists of 8 ice factories, 4 fishmeal plants, 2 cold stores, and a cannery. Kantang has abundant dock space, fuel, and ice supplies. A thriving shipyard industry specializes in the construction of large purse seiners, wide-beamed for greater ice storage and capable of staying at sea for over a month rather than the usual 15 days. (These large seiners no longer expend fuel for biweekly return trips, but rely on small boats to transfer the catch back to Kantang). The Kantang fleet also runs on cheap Malaysian diesel fuel, giving a hefty boost to profit margins. Although vessels fish mainly in international waters, a few may poach in Indonesian waters. None fish in Malaysian waters since the arrest of a crew last year. Roughly half of Kantang's fish catch is trucked to Hat Yai, and from there to Malaysia. Some 137,000 t were landed in 1984, and 133,254 t in 1985. The 1986 catch is expected to be about the same, but, with prices running 30 percent higher, profits will be huge.

Satun, near the Malaysian border, is also prospering, as its catch rose from 69,000 t in 1984 to 74,000 t in 1985. The port is equipped with 5 ice factories, 2 fishmeal plants, 3 cold stores, and a cannery. Satun's proximity to Malaysia has allowed a cross-border arrangement whereby Malaysians secure part ownership of Thai trawlers and register them in

Malaysia. (These owners do not appear on Thai registers, so as to avoid Thai taxes). Such jointly owned boats, crewed by Thais, then fish with impunity in Malaysian waters. None has been arrested in 2 years. Trawlers secure cheap diesel fuel in Malaysia and sell their large fish there at high prices. Smaller fish are offloaded in Satun.

Fishery Exports

Thailand's exports have boomed. Rising international demand has pushed up prices, while 1985's baht devaluation and a high sales volume have allowed Thai firms to offer extremely competitive prices. Ever more sophisticated freezing and canning facilities, catering to the high quality standards of importing countries, further guarantee sales. Marine exports fall into four main categories: 1) Frozen shrimp, 2) frozen cephalopods (squid, cuttlefish and octopus), 3) fishmeal, and 4) canned seafood.

Thailand's most important marine export is frozen shrimp. Exports have climbed steadily since 1980 when they stood at 18,000 t with a value of \$99 million. In 1986, frozen shrimp exports were expected to reach a record 29,000 t valued at nearly \$162 million. Japan generally accounts for half the shrimp market, and will likely buy more this year because of the strong yen and increased consumer confidence in the quality of Thai shrimp. The United States, Thailand's second largest customer, along with other buyers—Singapore, Hong Kong, the United Kingdom, the Federal Republic of Germany, Italy, and France—have also been placing larger orders for frozen shrimp, pushing up prices. Further strengthening Thailand's marketing position has been the decline of its competitors (Taiwan, India, and Pakistan) all of whom report dwindling shrimp catches.

Squid and cuttlefish, are still abundant in Thai waters. As heavy fishing adversely affects stocks of fish predators, cephalopod stocks have increased. Japan and Italy are the top buyers of these frozen products, each accounting for 40 percent of the market. During the first 5 months of 1986, Thailand exported 19,000 t of frozen squid, cuttlefish, and octopus, valued at \$45.8 million, an in-

crease of 14 percent by quantity and 62 percent by value over 1985. In the past, Italy has temporarily banned Thai squid imports for poor quality, causing prices to plunge. But Thai exporters seem to have greatly improved quality standards and Italian consumer confidence in Thai squid has stabilized.

Long plagued with a sluggish market, the fishmeal industry remains in the doldrums. Used primarily as livestock fodder, fishmeal is manufactured from trash fish, which represent 60 percent of fishery landings. With some two-thirds of Thai fishmeal production located in the south, the health of the industry has a profound impact on the region. Between 1984-1985, fishmeal production fell by 2,000 t to 183,000 t. Weak demand by the local livestock industry and competition from soybean meal also caused domestic prices to drop. In January-June 1986, overseas sales of fishmeal totaled 38,407 t, valued at \$12 million. Stiff competition from Peru and Chile, where the catch of pelagic species, used for reduction to fishmeal, has been increasing, is further hampering fishmeal exports. Both countries reportedly offer fishmeal of superior quality at cheaper prices.

Thailand's newest, fastest growing marine export sector is canned seafood. The industry dates only to 1974, when Thai canneries exported a mere 474 t. Four years later, exports had risen to 13,000 t, and by 1982 had increased nearly fivefold to 66,000 t. By 1984, canned seafood exports had grown another 20 percent to 82,000 t. Reflecting this growth, the number of canneries has increased from 30 to 50 percent over the past 2 years; one-third are located in the south. Exports amount to 80 percent of production. Of the total exported, 55 percent is canned fish, and 40 percent is canned shrimp, crabmeat, and clams. The United States is the largest market, followed by West Germany, Britain, Canada, and Australia. Particularly significant are tuna exports to the United States, the value of which doubled in 1985. In 1984, American tuna processors asked the U.S. International Trade Commission to impose a 35 percent tariff on Thai tuna. That request was turned down, but American and Thai cannery groups are preparing for another legal battle.

Official promotion of Thai fisheries has centered on joint fishing ventures with neighboring countries, whose ever stricter enforcement of EEZ's has cost the Thai fleet dearly. (In 1985, a total of 86 Thai trawlers with 1,246 crewmen was seized in foreign territorial waters: 38 off Vietnam, 28 off Malaysia, 14 off Burma, 4 off Indonesia, and 2 off India.) In the summers of 1985 and 1986, tension between Thai and Malaysian fishing interests ran high, leading to one clash on the high seas, numerous arrests, and prolonged protests at the Malaysian Consulate General in Songkhla. Subsequent, high-level discussions in Bangkok and Kuala Lumpur, however, settled immediate differences.

More recently, in November 1986, Burmese patrols seized 9 Thai trawlers and arrested 300 crewmen. To avoid future conflicts and provide fishery grounds for its huge fleet, the Thai Government has worked to arrange joint fishing ventures with Malaysia, Indonesia, Bangladesh, India, Saudi Arabia, Oman, China, and Australia. Full accord with Malaysia has yet to be worked out, largely because of strong opposition by east coast Malay fishermen. A *modus vivendi*, however, appears to be developing, whereby Thai trawlers headed for international waters are allowed free passage, while those trespassing too close inshore (and fishing as they head south) are liable to be arrested.

In October 1986, the Thais succeeded in signing several joint fishery ventures with India and Indonesia, the latter involving an initial fleet of 60 trawlers. That same month, the first 3 Thai trawlers arrived in Darwin to open the initial phase of a joint venture with Australia. As its fleet expands globally, Thailand hopes that it will evolve into an international enterprise akin to the Japanese and Korean fleets.

Official assistance has also come in the form of aquaculture projects, which are located in all of the 14 southern provinces. In 1981, the Thai Government opened the National Institute of Coastal Aquaculture in Songkhla and, in 1985, the Brackish Water Research Institute in Surat Thani. Besides conducting extensive research, both institutes provide seedstock and technical assistance for the

raising of sea bass, red snapper, Nile tilapia, oysters, clams, and prawns. On the west coast, Phuket, Trang, and Krabi have taken the lead in developing aquaculture in mangrove areas. The fishery department has also heavily promoted freshwater aquaculture projects in inland districts. Freshwater fish production, however, continues to be less than a tenth of marine production.

The most recent development has been the opening of Thailand's first fishery college in September 1986. Located in Prime Minister Prem's home town of Songkhla (and bearing his family name), the project is well-funded and off to a good start. An initial student body of 502 and a faculty of 34 is slated to grow within 5 years to 840 and 70, respectively. Building construction is nearly complete on a 120-acre site, with another 120 acres held in reserve for future expansion. Facilities include classrooms, laboratories, lecture theaters, workshops, processing and freezer rooms, brackish water and freshwater hatcheries, and a fish food preparation building. Foreign assistance is being provided by British experts attached to the British Council and by the Danish Government, which is providing a team of technicians and a modern freezer-equipped trawler.

Three-year course requirements include general fisheries, product preservation, aquacultural engineering, fish processing, capture methods and equipment, fishery physics, boat engineering, radio communications, navigation, fish, prawn and crab culture, and fishery marketing. Students include many sons of trawler owners who can be expected to bring their expertise back to family enterprises. Others will develop aquaculture on family coastal and inland plots. The Government also plans to recruit from the student body a cadre of trained specialists to expand its network of fishery projects. One likely by-product of the college will be improved technology for the post-harvest care of the catch. On average, a third is lost through spoilage. Looking ahead, improved technology and better preservation methods will work to extend the present range of the Thai fleet, and improve its ability to fish in international waters less fettered by EEZ's. (Source: IFR-87/23:BB/PN.)