Fishery and Aquaculture Country Profiles

The Kingdom of Thailand

Part I Statistics and main indicators

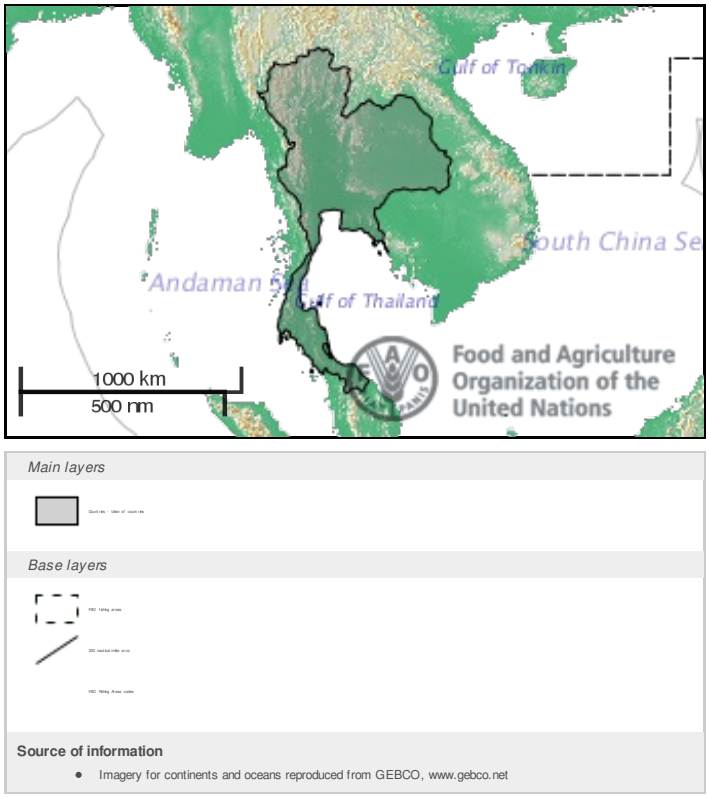
1. General geographic and economic indicators
2. FAO Fisheries statistics

Part II Narrative (2009)

3. Production sector
   - Marine sub-sector
   - Inland sub-sector
   - Aquaculture sub-sector - NASO
4. Post-harvest sector
   - Fish utilization
   - Fish markets
5. Socio-economic contribution of the fishery sector
   - Role of fisheries in the national economy
   - Supply and demand
   - Trade
   - Food security
   - Employment
6. Trends, issues and development
   - Constraints and opportunities
   - Government and non-government sector policies and development strategies
   - Research, education and training
7. Institutional framework
8. Legal framework
   - Regional and international legal framework

Additional information

9. FAO Thematic data bases
10. Publications
11. Meetings & News archive



The designations employed and the presentation of material in the map(s) are for illustration only and do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers or boundaries.

Part I Statistics and main indicators

This section provides statistics and indicators produced through FAO's Statistics programmes, available by the year reported for the narrative section.

General geographic and economic indicators

Table 1 – General geographic and economic data - Thailand

Area	514 000 km²
Water area	319 750 km²
Shelf area	394 000 km^2
Length of continental coastline	2 624 km
Population (2008)	67.4 million[1]
GDP at purchaser's value (2008)	USD 272 538 million
GDP per head (2008)	USD 4 099
Agricultural GDP (2008)	USD 31 554 million
Fisheries GDP (2008)	USD 3 121 million

(1) UN Revision 2008 (UN Population Division)

FAO Fisheries statistics

Table 2a – Fisheries data (i) – Thailand

	Production	Imports	Exports	Total Supply[2]	Per Caput Supply[3]
	tonnes (live weight)				kg/year
Fish for direct human consumption	3 073 688	1 434 419	2 499 397	2 079 893	31.1
Fish for animal feed and other purposes	785 127	28 500	224 340	589 287	

Table 2b – Fisheries data (ii) - Thailand

Estimated Employment (2008):	
(i) Primary sector (including aquaculture):	800 000
(ii) Secondary sector:	1 200 000
Gross value of fisheries output (2008):	USD 4 263 million
Trade (2008):	
Value of fisheries imports:	USD 2 396 million
Value of fisheries exports:	USD 6 016 million

(2) The Total Supply also includes 71 183 tonnes from stocks.(3) The Per Caput Supply was calculated on the

basis of a population of 66.98 millions in 2007. Source: UN Revision 2008. (UN Population Division)

Part II Narrative

Updated 2009

This section provides supplementary information based on national and other sources and valid at the time of compilation. References to these sources are provided as far as possible.

Production sector

Thailand is one of the top fish producing nations in the world. Its geographic advantage contributes to the high annual fish production. Thailand has a coastline of about 2 600 km. The marine fishing grounds in the Gulf of Thailand and in the Andaman Sea, within Thailand's Exclusive Economic Zone, cover a total area of about 316 000 km^2. Inland waters cover approximately 3 750 km^2. Besides, Thailand's coastal area has about one million hectares suitable for coastal aquaculture.Fisheries production in Thailand demonstrated a remarkable growth over the last three decades. The total production exceeded two million tonnes for the first time in 1977, then a fall in production followed, but later production recovered to over two million tonnes and has been above this volume since 1982. In 2007, total production was about 3.9 million tonnes, of which 58.2 percent came from marine capture fisheries. The balance was contributed by coastal aquaculture, freshwater aquaculture and inland capture fisheries at 22.9 percent, 13.1 percent and 5.8 percent, respectively.

Marine sub-sector

The marine fisheries are classified into small-scale fisheries and commercial fisheries. The commercial fisheries use inboard-powered boats of over 5 gross tonnage, generally deploy efficient fishing gears and have the capacity to fish offshore and spend several days at sea in one fishing trip. The typical fishing gears employed are medium- to large-size trawls, purse seines, encircling gillnets and large drift nets. The small-scale fisheries use boats that are less than 5 gross tonnage and are either non-powered, or have outboard or inboard engines. Most small-scale fishermen live at or close to subsistence level. They operate near shore and use traditional fishing gears. The typical fishing gears are small trawls, gillnets, push nets, lift nets, set bag nets, traps, hook-and-line and other stationary gears that operate in estuaries, bays and inshore waters. A census survey of marine fisheries carried out in 2000 established the total number of fishing boats to 58 119 of which 80 percent were small-scale.

Catch profile

Catch estimates for 2007 show a marine catch of about 2.2 million tonnes, valued at Baht 63 044 million. Reports on marine capture fisheries distinguish fishing in Thai waters from fishing outside Thai waters. The fishing grounds that fall within Thailand's Exclusive Economic Zone lie in the Gulf of Thailand and in the Andaman Sea. It is estimated that, of the total marine catch, 60 percent is caught in Thai waters (41 percent caught in the Gulf of Thailand and 19 percent in the Andaman Sea), the rest is from waters outside the Thai EEZ.

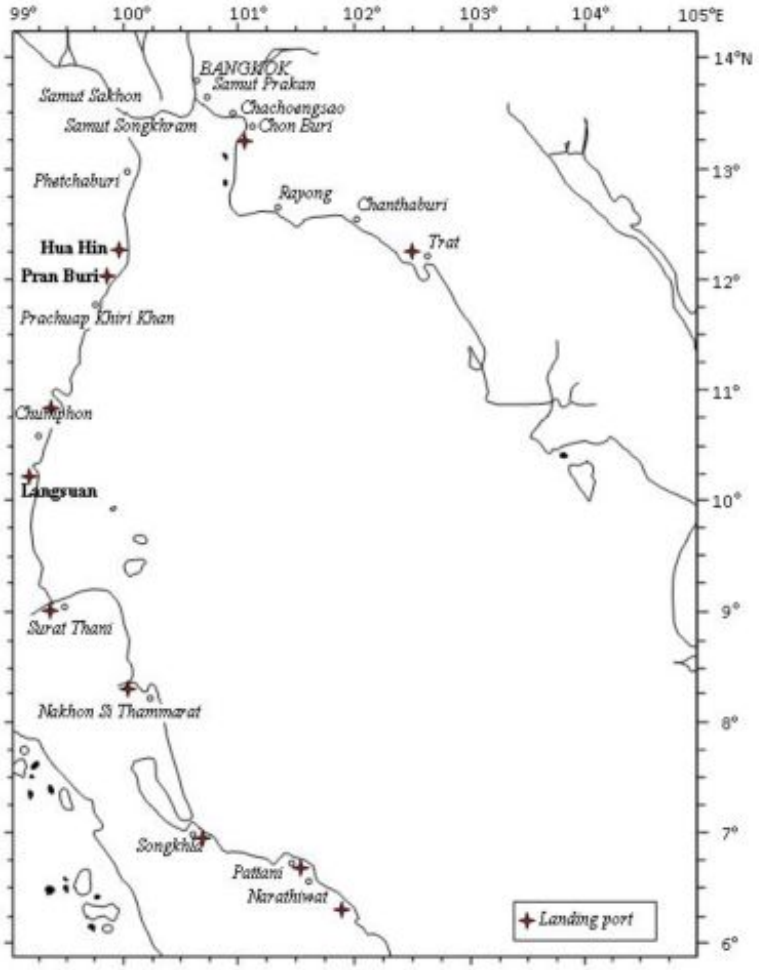
The marine catch in Thai waters in turn is broken down into commercial fishing and small-scale fishing. Both have shown a decreasing trend, especially during the period 2002-2006, when the total catch decreased at a rate of 1.7 percent per year. The commercial fishing vessels contribute about 90 percent of the marine catch, the balance is obtained by small-scale/artisanal fishing. In commercial fisheries the catch is usually reported in terms of: food fish (55 percent 2006), trash fish (28 percent), cephalopods (6 percent), shrimps (3 percent),

crabs (2 percent), mollusks (1 percent) and others (5 percent).

Landing sites

In terms of quantities of fish landed, the following species are the most important: threadfin bream, Indo-Pacific mackerel, coastal tuna, bigeye snapper, squids, sardines, round scad and anchovies. In 2006, Songkhla, Pattani, Samut Sakorn, Nakorn Si Thammarat, and Trat were the largest ports in terms of both quantities and value of landings (Fig.1).

Fig.1 - Fish landings in the Gulf of Thailand



Fishing practices/systems

In 2006 there were 12 552 registered fishing vessels. This number is broken down into the following gear types: trawlers 41 percent, stick-held falling nets 25 percent, gillnetters 14 percent, purse seiners 11 percent, and others 9 percent. Catch by type of fishing gear are as follows:

Table 3 - Catch by type of fishing gear - Thailand

Trawlers	1.42 million tonnes (57 percent)
Purse seiners	
	0.71 million tonnes (29 percent) 0.09 million tonnes (4 percent)
Others	0.26 million tonnes (10 percent)

Main resources

Demersal Fish

Demersal fish are caught mainly by otter trawls, pair trawls, beam trawls and push nets. The demersal fish resources in coastal waters have been severely depleted, as shown both by estimates of potential yields of various fish stocks and by the change in catch composition towards smaller-sized fish and low-value species. Trash fish currently constitute about 60 percent of the total trawl catch and between 18 percent and 32 percent of trash fish are juveniles of commercially important fish species[4].

The following review of demersal fish stocks illustrates their state of depletion or over-exploitation:

Decreasing catch rate of demersal resources surveyed by research vessels

Most demersal resources and some groups of pelagic fish are over-exploited. Furthermore, the catch rates recorded by government research vessels have shown decreasing trends since 1966. In 1961, before the introduction of otter trawls to Thailand by the Federation of Germany, the monthly catch rates from research vessel surveys were over 300 kg/hr. After 1966, the catch rate was 172.9 kg/hr, and it declined further to 75.1 kg/hr in 1976. The catch rate has continued to fall and was about 51.15 in 1986 and 22.31 kg/hr in 1996. Recently catch rates increased slightly and were recorded to 24.20 kg/hr in 2005.

Catch composition towards small-sized fish

Most of the trawling gear and push nets in use have cod-ends equipped with netting of small mesh size and catch fish of small size. Presently, the size of trash fish caught ranges from 3.5 to 17.5 cm total length. The bigger ones are pelagic fish e.g. sardine and Indo-Pacific mackerel, in contrast to the demersal fish, most of which are small, the exception being some long-bodied species, e.g. *Saurida elongata*. Indo-Pacific mackerel found in the trash fish ranges from 5 to 16 cm total length. Trash fish includes juveniles of commercial fish. The amount of trash fish supplied directly to fishmeal factories is high. However, the capacity of these factories is sufficient to absorb all available trash fish. Also, during the past 30 years the mean length of Indo-Pacific mackerel has shown a decreasing trend, from 18 cm to 15 cm total length. This is further evidence of over-exploitation.

Changes in benthic species

The species composition of benthos has changed markedly as a result of fishing by trawlers. Trawling disturbs the benthic environment. In 1976, 394 benthic species were recorded, in 1995 only 88 species. In 1966, shellfish were abundant followed by sea stars, sea urchins, and polychaetes. By 1989, shellfish were still highly abundant but polychaetes haddisappeared. Sea stars were also less numerous. In 1992, sea stars and sea urchins were dominant.

Using too small mesh size cod-end

Trawling gears use small mesh size cod-ends, 2.5 cm stretch mesh size for fish, and 1.5 cm for shrimp trawls, and even smaller mesh on push nets. This small mesh size results in the capture of a high percentage of trash fish, which are supplied directly to fishmeal factories.

Pelagic Fish

In the Gulf of Thailand, pelagic fish are caught by bamboo stake traps, purse seines (Chinese, Thai, through aggregation techniques and anchovy purse seining), mackerel encircling gillnets and drift nets. Important pelagic fish are mackerels (*Rastrelliger* spp.), round scads (*Decapterus* spp.), sardines (*Sardinella* spp.), anchovies (*Encrasicholina* spp. and *Stolephorus* spp.), Spanish mackerel (*Scomberomorus* spp.) and tunas

(*Thunnus* spp. and *Euthynnus* spp.). In the past, Indo-Pacific mackerel (*Rastrelliger brachysoma*) was the most popular fish for Thai consumers. Hence, this species was extensively studied. Large quantities of Indo-Pacific mackerel were caught and accounted for about 47 percent of pelagic fish catches. However, following the development of improved pelagic fishing gear and techniques, sardines and round scads became the major contributors to the small pelagic catches, accounting for 41 percent and 26 percent of the total pelagic catches, respectively. Indo-Pacific mackerel (*Rastrelliger brachysoma*) stocks in the Gulf of Thailand have been fully exploited and sardines (*Sardinella* spp.) have been over-exploited. During the past 30 years the mean length of Indo-Pacific mackerel has shown a decreasing trend, from 18 cm to 15 cm total length. This is further evidence of over-exploitation. Likewise anchovy (*Encrasicholina* spp. and *Stolephorus* spp.), the small tuna and round scad stocks have also been fully exploited. Other pelagic fish stocks including the Spanish mackerel (*Scomberomorus commersoni*), carangids and hardtail scads (*Megalaspis cordyla*) have not yet been fully exploited.

Shrimps

The penaeid prawn (*Penaeus* spp.) resources have been over-exploited. The small-sized shrimps (*Trachypenaeus* spp. and *Metapenaeopsis* spp.) have also been over-exploited.

Other Resources

Thirty species of cephalopods from ten families and 17 genera are found in Thai waters. Squids, cuttlefishes, and octopuses are exploited commercially. The most important species of the squid fishery are *Loligo chinensis*, *L. duvauceli, L. singhalensis, L. edulis, Loliolus sumatrensis* and *Sepioteuthis lessoniana*; the cuttlefishes *Sepia pharaonis, S. aculeata, S. recurvirostra, S. lycides, S. brevimana and Sepiella inermis* and the octopus *Octopus membranaceous, O. dollfusi* and *Cistopus indicus.* The squids, *L. chinensis, L. duvauceli, Sepioteuthis lessoniana and Loliolus sumatrensis* are abundant both in the Gulf and the Andaman Sea. These resources are also fully exploited.

(4) See also: FAO. 2005. APFIC Regional Workshop on Low Value and "Trash Fish" in the Asia-Pacific Region, Hanoi, Viet Nam, 7-9 June 2005. Bangkok, FAO. RAP Publication 2005/21Funge-Smith, S.; Lindebo, E. and D. Staples. Asian fisheries today: the production and use of low value/trash fish from marine fisheries in the Asia-Pacific region. Bangkok, FAO. RAP Publication 2005/16

Management applied to main fisheries

Under the "Thai Fisheries Act", fishery management measures have been formulated and implemented for the purpose of recovering depleted fisheries resources. The main fishery management measures are as follows:

Area and seasonal closures

Area and seasonal closures are imposed mainly for the recovery of the Indo-Pacific mackerel (*Rastrelliger brachysoma,* Bleeker), which is an important economic species in Thailand. In the early 1980s the catch of this species declined. Therefore, to recover the abundance of this species as well as other pelagic and demersal fish stocks, various regulations on area and seasonal closures have been implemented since 1984. From 1 February to 31 March and from 1 April to 15 May, trawlers and purse seiners using gear with mesh size smaller than 4.7 cm have been prohibited from fishing in the upper southern area of the Gulf of Thailand.

Gear Restrictions

In order to preserve coastal fisheries resources, trawlers and push netters are not allowed to operate within 3 000 m from shore. These gears are considered to be especially destructive if operated inshore as they catch much trash fish, more than half of which are juveniles of economically valuable species. Furthermore, repeated dragging of trawls over benthic habitats may impact demersal resources in some circumstances.

Limited Entry As the limited nature of fisheries resources became evident, in 1980 the Department of Fisheries (DOF) in an attempt to control the number of trawl and push nets in use announced that henceforth trawlers and push netters needed to be registered in order to be allowed to fish. From then on no more licences would be issued to fishing vessels and only those fishermen who have fishing licences can apply for an annual extension of those fishing licences. Licences will not be granted in cases of gears having been changed. The fishing licences are non-transferable to other operators except when these are fishermen's children.

Inland sub-sector

Inland capture fisheries are carried out principally in rivers, lakes, swamps and reservoirs. These fisheries have long been part of Thai culture and are an important source of animal protein for the rural people. Most fisherfolks in this sub-sector are small-scale. Only fishing in large impoundments is commercial in nature. In 2007, inland capture fisheries produced 224 000 tonnes, valued at Baht 8 442 million. Production from inland capture fisheries since 2005 has increased by almost 13 percent.Fishing gears used include gillnets, longlines, hook-and-line, scoop nets, cast nets, and lift nets. Among these fishing gears, gillnets are the most popular and efficient, particularly in swamps and reservoirs. Thai silver barb, snakehead, walking catfish, local carps, and Nile tilapia are caught.

Aquaculture sub-sector

Historically freshwater aquaculture has been important in Thailand. Today both coastal and freshwater aquaculture thrive. Coastal aquaculture has been important since 1988 when intensive marine shrimp culture developed rapidly. In 2007 total aquaculture production reached about 1.39 million tonnes, valued at USD 2.43 billion. Coastal aquaculture accounted for 64 percent of the quantity and 71 percent of the value.

Coastal aquaculture

Coastal aquaculture is practised in the interface between freshwater and seawater. This sub-sector has become more important as an alternative to produce food fish in substitution for the loss of fish due to the depletion of wild marine fish stocks. The rapid growth of coastal aquaculture is mainly due to the increasingly rapid development in culture technology. In addition, many of the marine shrimp, shellfish and marine fin-fish cultured have relatively high prices and a large market.

Marine shrimp is the predominant species and makes a major contribution to export earnings. Over 90 percent of the cultured marine shrimp is exported. In 2007 its production was 501 200 tonnes, valued at about USD 1.75 billion. Of the total production in coastal aquaculture, marine shrimps accounted for 57 percent in quantity and 93 percent in value. Once dominated by giant tiger prawn, the marine shrimp production has been overwhelmingly dominated by the whiteleg shrimp in recent years.

Most of the cultured mollusks are bivalves. In 2007 production was around 362 800 tonnes, of which green mussel contributed 76 per cent. Marine finfish culture is composed mainly of barramundi (*Lates calcarifer*) and groupers (*Epinephelus* spp.). Total production of these species in 2007 was 18 700 tonnes, of which barramundi accounted for over 84 percent.

Freshwater aquaculture

In Thailand freshwater aquaculture started a long time ago. At that time the species cultured were few; they included common carp (*Cyprinus carpio*), snakeskin gourami (*Trichogaster pectoralis*) and striped catfish (*Pangasius hypophthalmus*). From 1963 onwards, freshwater fish culture developed rapidly, following the breakthrough in artificial breeding obtained by successful hormone injection of many valuable species. Since 1984, the artificially propagated hybrid catfish (*Clarias gariepinus x C. macrocephalus*) has been cultured

commercially and increasingly gained popularity among farmers. For more than a decade, the hybrid catfish has been the second most important species for freshwater aquaculture in the country, only next to Nile tilapia.

Freshwater aquaculture is carried out either as monoculture or polyculture, depending on the species cultured. Monoculture is common for raising of carnivorous species such as hybrid catfish and snake-head, but also for freshwater prawn, stripped catfish, and sand goby. Polyculture is employed principally to raise herbivorous and filter-feeding species, such as tilapia, silver barb, common carp, Chinese carps, and mrigala. In the past, fish farming integrated with pig, poultry and horticulture, wherever possible, were encouraged and promoted. And so was the paddy-cum-fish culture. Integrated fish farming became a common practice in Thailand. However, in recent years, fish farming directly integrated with pig and poultry has been discouraged as part of the continuous nation-wide food safety campaign and promotion of good aquaculture practices (GAP).

At present, more than 20 species of fish and invertebrates are cultured in freshwater. In 2007 the cultured area was nearly 141 500 hectares and the production of freshwater species amounted to 507 000 tonnes, valued at USD 557 millions. Nile tilapia, hybrid catfish, silver barb, snakeskin gourami, giant river prawn, striped catfish and striped snake-head contributed 95 percent in quantity and 92 percent in value.
In addition to the freshwater food fish culture, breeding and culture of ornamental fish and aquatic plants recently has become increasingly popular. Ornamental fish find buyers both in Thailand and in export markets. Most of the farms are small but the rate of return on investment is quite high.

More information at: **National Aquaculture Sector Overview (NASO)**

Post-harvest sector

Fish utilization

Of the total fish production in 2006, about 81 percent was used for human consumption, the balance of 19 percent was destined to become animal feed. As far as marine fish is concerned, about 22 percent was trash fish, which was used for non-food purposes. Most of it was channeled to the fishmeal industry. The balance, 78 percent of landings, was for human consumption. Of this total 24 percent was consumed fresh and the remainder processed through chilling, freezing, canning, or was steamed or smoked, dried and/or salted, and/or converted into shrimp paste or fish sauce. All freshwater fish was used as food and as much as 76 percent was consumed fresh.The fish processing industry has grown significantly during the past two decades, especially freezing and canning in support of export growth. However, in 2006 over 85 percent of the 2 334 plants were small, traditional plants (i.e. producing fish sauce or smoking and drying fish). The freezing plants numbered 177 and the canning plants 47. There were 96 fishmeal plants.

Fish markets

Fish marketing in Thailand is complex. There are many different types of markets and a very large number of traders of different types. Fish is sold fresh as well as in processed form. Cultured fish is sold both alive and dead. Normally, fish intended to be sold alive are transported by trucks (pick-up, six-wheel trucks and ten-wheel trucks) and kept in water-filled metal boxes. However, poor transport practices may cause fish death, which will cause the price to be reduced by as much as 40-50 percent. To transfer fish to consumers several categories of traders are involved; they work in either primary markets, intermediate markets or terminal markets.

The primary market is the point where fish marketing starts. It occurs either at the landing places or at the farm gate. The intermediate market is the point where fish is redirected to the terminal market. The terminal market is the market where fish is sold to consumers through retail outlets including supermarkets, restaurants and hotels.

It should be noted that in Thailand the intermediate market level is composed of the central assembly market and the wholesale market. The central assembly market, in turn, can be divided into the state assembly market and the private assembly market. State assembly markets are managed by the Fish Marketing Organization (FMO)[5] located in central Bangkok, in the provinces of Samutsakorn and Samutprakarn. The Bangkok market handles both marine fish and freshwater fish, whereas the other two markets handle only marine fish. Fish is sold through registered fish agents[6]. Most selling and buying of fish is carried out through an auction. However, auctions are gradually being replaced by price negotiations. The second market type is the private assembly market. The markets of this type are run by private individuals, normally someone who owns land in a suitable location. Nowadays, along with the growth of cultured freshwater fish the private assembly markets have expanded significantly. In these markets the fish agent or fish trader normally has a close relationship with the fish farmers in the sense that the trader may provide the fish farmer with credit or supply the necessary inputs. Prices are determined either through auctions or negotiations. The private assembly markets are also used for cultured shrimp. There are two private assembly markets where selling and buying is carried out through auction, one in the province of Samutsakorn and the other in the province of Nakhonsrithammarat.

(5) FMO is a state enterprise under the Ministry of Agriculture and Cooperatives.(6) According to the existing Royal Decree on fish agent, fish agents must be registered with the Department of Fisheries.

Socio-economic contribution of the fishery sector

Role of fisheries in the national economy

In 2008, the gross domestic product (GDP) of the fisheries sector at current market price was Baht 104.2 billion, which was equal to about 1.2 percent and 9.9 percent of the national GDP and of the agricultural GDP, respectively. The fisheries industry has contributed directly to the growth of other related industrial activities such as ice manufacturing, cold storage, fish processing, ship building, etc. The number of people engaged in this sector was estimated at about 2 million, of which 40 percent are fishermen and fish farmers, and 60 percent are employed in other related and supporting industries.The fish produced are either consumed domestically or exported. It is an important source of animal protein and this is reflected in a per caput fish consumption fluctuating between 32 and 42 kg during the past decade. The export value of fish and fishery products has increased significantly. In 2008, the fishery sector had a trade surplus of Baht 121 billion.

Supply and demand

Fish Consumption and Demand

Fish is the primary source of animal protein for most of Thailand’s population, particularly in the coastal and near coastal provinces. During the period 1980-2006, per caput consumption of fish ranged from 17 kg to 34 kg. In 2006, per caput fish consumption was 33.6 kg, which is relatively high compared to the consumption of the other three main animal protein commodities, namely pork, beef, and chicken. Price is a decisive factor influencing consumers’ choice of product and in Thailand the price of fish generally is relatively low compared to other sources of animal protein. However, the level of per caput fish consumption varies among Thai people. Differences may be explained by differences in household income or species preference and by geographic location.

Annual per caput fish consumption (at home) by species

The annual per caput consumption of fish in the inland provinces of Thailand average 28.8 kg, 92.5 percent of which is fresh fish. Tilapia is the preferred freshwater fish (29.6 percent), followed by Thai silver barb (16.3 percent) and striped snakehead (15.4 percent). However, the average per caput consumption of residents of coastal provinces is much higher than that observed in inland areas, and averages 45.21 kg, 81.2 percent of which is consumed in fresh form. Marine fin-fish is preferred (32.4 percent), followed by shrimps (12.2 percent) and mollusks (10.8 percent). In general dried fish is in high demand and is consumed by 18 percent of the population.

Table 4 - Apparent consumption of fish in Thailand, 2002-2006

year	Total	Fish used	Trade		Apparent Consumption		
	Production	for fishmeal	Imports	Exports	Total consumption	Population	Per capita
	(mil.tons)	(mil.tons)	(mil.tons)	(mil.tons)	(mil.tons)	(mil.)	(kg)
2002	3.8	1.0	1.0	1.8	2.0	63.7	31.8
2003	3.9	1.0	1.1	2.0	2.0	64.5	30.9
2004	4.1	1.1	1.3	2.1	2.2	65.3	33.1
2005	4.1	1.2	1.5	2.2	2.2	65.9	33.9
2006	4.1	1.0	1.5	2.4	2.2	66.5	33.6

Trade

In the past decade the growth of international fish trade has been remarkable. From 1999 to 2001 Thailand ranked as the world's leading exporter of edible fisheries products, and since then it is the number three exporting nation in the world, after China and Norway. During the decade 1999-2008, the annual growth in value of fisheries exports was 4.3 percent. In 2008, fish exports were valued at Baht 200 940 million. The major markets for Thai fish products are Japan, the USA and the EU. Of the total export value, shrimp products and canned tuna contributed 36 percent and 27 percent, respectively. However, the country's balance of payment is also burdened by payments for significant quantities of tuna that are imported for processing and re-export.Thailand is the top importer of fresh, chilled and frozen tuna. Imports, generally by tuna canning factories, amount to 700 000-800 000 tonnes annually. In 2008, the expenditures on imports of fish and fish products totaled about Baht 80 012 million. This means that in that year Thailand recorded a surplus of exports over imports worth Baht 120 927 million.

Food security

Fish is an important component in the diet of Thai people. During 2002-2006, annual fish production was 3.8-4.1 million tonnes. The fish that is consumed domestically is an important source of protein as reflected in the per caput fish consumption of 32-42 kg (live weight equivalent).

There are more than 2 500 fishing villages along the Gulf of Thailand and on the Thai shores of the Andaman Sea. Over 80 percent of fishermen engage in traditional or small-scale fisheries. The fish they land is an important source of income and of food for them and neighboring communities.

Inland waters cover an area of approximately 3 750 km^2. Most rice-growing farmers know how to catch fish in their rice paddies. Also other farmers routinely catch freshwater fish for household consumption.

Employment

The labor force of Thailand was estimated at 36 million in 2006. About 43 percent of them were employed in the agricultural sector (including fisheries).

The 1995 “Census of the Marine Fishery” revealed that in the country the total number of households headed by fishers and/or fishery employees was 109 635. This total consists of 50 312 households exclusively engaged in capture fisheries; 27 388 households engaged in coastal aquaculture; 31 935 households engaged in both marine capture fisheries and coastal aquaculture; and 28 934 households with members active as fishery employees. The total population engaged in marine fisheries was 535 210 persons.

At the time of the marine fishery census no census was made of inland fisheries. But it is known that the sector provides considerable employment. Most rice-growing farmers are part-time fishers and millions of farmers routinely catch freshwater fish for household consumption. A recent survey showed that the number of freshwater fish farms increased from 281 199 in 2002 to 488 167 in 2006. This indicates that at least 980 000 persons were involved in freshwater aquaculture in 2006.Additionally, the fisheries sector supports substantial employment in industries which supply goods and services to the fisheries proper as well as to fish processing, cold storage, fishmeal manufacture, ice making, boat construction, etc.

Trends, issues and development

Constraints and opportunities

Marine capture fisheries

Those who fish in the waters of Thailand face the problems caused by overfishing. The biomass of exploitable fish stocks has fallen and this leads to conflicts among the groups that exploit these resources. The problem is amplified by the high cost of fishing, particularly fuel, and the low price of some species. Also, commercial fisheries have persistent difficulties in recruiting the crews, which leads to increasing costs for labour.Those fishing waters outside the Thai EEZ, in addition to dealing with the high cost of production and shortage of crew, must obtain assurances that they are permitted to fish before doing so in the EEZs of neighbouring countries. Nevertheless, Thai fishing vessels are frequently seized by neighbouring coastal states, and skippers accused of illegal fishing and/or unlawful intrusion in the EEZ of the country concerned.

Inland capture fisheries

A rapid urbanization and industrialization of the countryside and its attendants impacts on natural resources, including water resources, are the major drawbacks in this sub-sector. The size of freshwater fish stocks depends largely on natural circumstances.

Coastal aquaculture

Apart from inefficient farm management, the main problems encountered by shrimp farmers include: diseases of different kinds, environmental degradation, insufficient natural broodstock and increasing costs of shrimp farming.

Freshwater aquaculture

In general fish farmers lack capital and experience. They have little or no know-how of modern production technologies and their fish farms are small. For this same reason they have very limited bargaining power vis-à-vis those who buy their product. However, recently, competition has increased as fish enters Thailand from

neighbouring countries.

Those who culture ornamental fish have to deal with diseases, genetics, high feeding costs and water quality.

Post- harvesting and catch utilization

Excess capacity, unstable supply of raw materials and lack of efficient control over the quality of raw materials are the major problems encountered by the commercial fish processing plants. As for the small, traditional plants, they have difficulties to develop new products to meet evolving demand, possibly due to lack of credit and appropriate technology.

International tradeShortage of raw materials, insufficient control over the quality of imported raw materials, and several forms of non-tariff barriers are the main problems confronting Thai companies that sell fish and fish products on the international market.

Government and non-government sector policies and development strategies

National fisheries policies, as stipulated in various national strategies for fisheries and aquaculture development and management, have emphasized the need to:

- make fishers and local organizations participate in fisheries administration, management and development.
- increase the knowledge and skills of the fishers to improve their self-reliance and promote viable occupations as well as increase their capability in managing their organizations.
- ensure harmony between preservation of fisheries resources and their sustainable utilization without compromising the environment, and this under a joint administration and management by the Thai people, local communities, local organization, and the government.
- increase production from aquaculture sufficiently for the needs of domestic consumption.
- increase fishery production both in quantity and quality for both domestic consumption and sale abroad.
- accelerate research in order to support commercial aquaculture and assist the industry to increase the trade volume, improve quality standards and reduce costs of production.
- develop a sustainable marine shrimp culture system that is based on the Code of Conduct (COC) for the marine shrimp culture industry and on Good Aquaculture Practice (GAP) principles, which aims to produce for local as well as for export markets.
- develop aquaculture production and marketing of ornamental fish and aquatic plants for export in order to raise the aquaculturists' income.
- develop and raise the capacity and technology of the overseas fishing fleet so that it meets international standards for fishing in international waters.
- control and regulate fishing operations in compliance with Thailand's agreements with other coastal states and/or joint-venture partners.
- expand fishing operations on the high seas and in deep waters.
- educate and train personnel employed in the overseas fisheries sub-sector.
- maintain Thailand's fishery sector at a level such that the country can continue to be one of the important fish producing and exporting nations.

Research, education and training

Research

The principal research institutions and main research projects are:

1) Government Agencies

- The Department of Fisheries, Ministry of Agriculture and Cooperatives. Its main areas of research are marine fisheries, inland fisheries, aquaculture, genetics, food technology, and fisheries economics.
- The Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment. Its main areas of research are animal habitats, coral reefs, marine parks, marine environment, and coastal zone management.

2) Universities

- Kasetsart University. Its main areas of research are marine science, aquaculture, biology, genetics, food technology, and fisheries management.
- Chulalongkorn University. Its main areas of research are marine science, aquaculture, biology, and marine environment.
- Prince of Songkla University. Its main areas of research are aquaculture and
- biology.
- Maejo University. Its main areas of research are aquaculture and biology.
- Burapa University. Its main areas of research are aquaculture and biology.
- Rachamongkol University. Its main areas of research are aquaculture and biology.
- Walailuk University. Its main area of research is coastal zone management.

Education and training

As the fishing industry is a key sector of the national economy, education in fisheries science has been provided for nearly a century. Formal education on fisheries initiated at Maejo Agricultural College with the provision of a certificate level degree. Under the Kasetsart University Act of 1943, a Faculty of Fisheries was established on 2 February 1943 as one of the first four faculties of Kasetsart University. The Faculty offered a five-year bachelor's degree and a three-year associate program. In 1952, the Faculty of Fisheries was reorganized into three departments, i.e., Fisheries, Aquaculture and Fishery Products. In 1963, the University altered the length of all baccalaureate programs from five years to four years and the Faculty of Fisheries was re-organized into four departments: Fishery Biology, Fishery Management, Fishery Products and Aquaculture. In 1969, a Department of Marine Science was established. So far, there is only one Faculty of Fisheries in the country, the one at Kasetsart University. Other universities offer related fisheries science programs, i.e., Marine Science, Aquatic Science, and Fishery Science and Technology. In some universities, fisheries science is a department in the Faculty of Agriculture, or the University offers some fishery subjects as part of science curricula. However, with the exception of the Department of Marine Science of Chulalongkorn University, most of the curricula that are offered by other universities are modeled on the curricula followed in Kasetsart University.

Institutional framework

The Department of Fisheries (DOF) has played an active role in promoting fisheries and aquaculture development in Thailand. Since being reorganized in B.E. 2545 (2002), it has engaged in the study, research and development on fisheries resources management; in controlling of fishing and aquaculture; in promoting supply of sufficient fishery products having the sanitary standards required for domestic and export markets; and, it has promoted sustainable and optimum utilization of fisheries and aquatic resources.

The Department of Fisheries is entrusted with the following responsibilities:

- To Implement and apply the following acts: Fisheries Act, B.E. 2490 (1947); Act Governing the Right to Fish Within Thai Waters, B.E. 2482 (1939); Act Organizing the Activities of Fish Market, B.E. 2496 (1953); Wildlife Reservation and Protection Act, B.E. 2535 (1992), and other related laws and regulations;
- To undertake research and development concerning fisheries and aquaculture, stock improvement, production, stock enhancement of aquatic animals, ornamental fishes, aquatic plants, aquatic feed, aquatic animal health, fishing gears, and other related fishery matters including certification of the standard (i.e. quality and sanitary) of the source of cultured aquatic animals;
- To survey fishing grounds both within Thai waters and beyond (neighbouring states' waters or high seas) and to increase the productivity and management of the utilization of aquatic resources;
- To apply legal measures governing capture fisheries and the utilization of fishery resources, including control, prevention and suppression of activities on inland and marine fishing grounds and fish trade that do not comply with the provisions of laws or regulations;
- To research and develop preservation, food processing, including the analysis, inspection control of quality of fish and fishery products, and the certification of their compliance with international sanitary standards, laws and regulations;
- To research and develop technology in fisheries and aquaculture including fishing techniques, fish product processing and related activities, and to ensure that these research activities are relevant both for stakeholders and the general public;
- To manage international fisheries affairs related to fishing technology, exploratory research on overseas fishing areas, fishery joint-venture agreements, and other related international activities;
- To develop fishery information systems, including compilation and use of information and data, and to provide associated information technology services for stakeholders, farmers and the general public;
- To handle other operational matters as authorized by the laws regulating the responsibilities of the Department of Fisheries or to undertake other works entrusted to it by its parent Ministry or the Cabinet.

Interactions with other Agencies and the Fishery Industry Management and development of the Thai fishing industry is the responsibility of the Department of Fisheries. It works closely with various organizations, both governmental and private to ensure efficient management and sustainable development of fisheries as well as to promote the export of fish and fishery products. The DOF liaises with various public agencies such as the National Economic and Social Development Board, Thailand's Board of Investment, the Ministry of Natural Resources and Environment, the Department of Trade Negotiation, the Department of Marine and Coastal Resources, the Navy's Civil Affairs Department, the National Fisheries Association of Thailand, The Thai Overseas Fisheries Association and other related Fisheries Associations. In terms of development of the export of fishery products, the DOF works closely with the Ministry of Commerce (Department of Foreign Trade and Department of Export Promotion), the Ministry of Finance (Department of Customs), the Ministry of Public Health (Department of Medical Services and the Food and Drug Administration). Besides, the DOF cooperates with the Ministry of Industry (Department of Industrial Works) for matters related to imports related to fisheries. Various private organizations are working closely with the DOF in respect of matters concerning production and export of fishery products. These organizations include the Thai Frozen Foods Association, the Food Processors Association of Thailand, the Thai Shrimp Association, and the Ornamental Fish Association.

Legal framework

Legislation

1) The key laws for the fisheries and aquaculture sector are:

- The Fisheries Act, B.E. 2490[7] (1947) – revised in 1953 and 1985
- The Act Governing the Right to Fish in Thai Waters, B.E. 2482 (1939)
- The Thai Vessel Act, B.E. 2481 (1938)
- The Wildlife Reservation and Protection Act, B.E. 2535 (1992)
- The Enhancement and Conservation of National Environmental Quality Act, B.E. 2535(1992)

2) Other related laws:

The Constitution of the Kingdom of Thailand, B.E. 2550 (2007)

- The Act Organizing the Activities of the Fish Market, B.E. 2496 (1953)
- The National Reserved Forest Act, B.E. 2507 (1964)
- The Forestry Act, B.E. 2484 (1941)
- The National Parks Act, B.E. 2504 (1961) (impacting on marine parks and their licensing and on the management of these parks)
- The Enhancement and Conservation of National Environmental Quality Act, B.E. 2535(1992)
- The Animal Feed Quality Control Act, B.E. 2525 (1982)
- The Food Act, B.E. 2522 (1979)
- The Drug Act, B.E. 2510 (1967)
- The Endemic Animal Act, B.E. 2499 (1956)
- The Foreign Business Act, B.E. 2542 (1999)
- The Dangerous Substance, B.E. 2535 (1992)

Short description of key legislation:

1) The Fisheries Act, B.E. 2490 (1947)

In the past, before the Fisheries Act was enacted in B.E. 2490 (1947), the Thai fisheries resources were managed and conserved under the Water-Duty Act of R.E. 120[8]. In the Act, a fishing area was defined as a sanctuary and a reservation. Fishing in an area close to monasteries, or places for worship, and in a sanctuary area, was prohibited. In times of flooding, the law also prohibited fishing during a spawning season. Furthermore, fish poisoning was prohibited.

Even though the Water-Duty Act was revised in B.E. 2472 (1929), B.E. 2477 (1934), B.E. 2479 (1936), and B.E. 2481 (1938), it could not prevent the deterioration of fisheries resources which originated in the development and growth of the fishing industry. As a consequence, the Fisheries Act of B.E. 2490 (1947) was drawn up. The enactment of this Act caused the immediate abolition of the Water-Duty Act. In the Fisheries Act, "aquatic animals" are defined as all aquatic flora and fauna. Moreover, fishing areas are divided into four types[9], i.e., a sanctuary area, a leasable area, a reserved area, and a public area.

The sanctuary area includes areas nearby or in monasteries or places of worship, located in navigation locks, weirs, and dams, and places suitable for preservation of aquatic animals. Fishing in such areas is prohibited, unless a permission is received from the Fisheries Director General.

The leasable area is a fishing area that an individual can lease after a bidding process. Only the assigned bidder has the right to perform fishing in such an area. An exception is made for those who fish for household consumption by using an approved fishing gear.

The reserved area is the area kept apart for those who have an individual fishing licence. Fishing in this area is subject to compliance with the conditions set out by the Director General of the Fisheries Department or other competent officials.The public area is an open access fishing ground where anyone may fish. However, those who fish there must adhere to any conditions proclaimed by the Director General.

Generally, three different types of licences are issued to fishermen: a fishing licence, a fishing gear licence and a leasing area licence. The owner of these licences is subject to pay duty fees. Their rate is specified in the Fisheries Act.

A licence may be transferred subject to the endorsement of a competent official. The endorsement fee is collected on registration of the transfer. For a person who offends the Act, or the conditions specified in the licences, the competent officials can authorize the withdrawal of the concerned licences. Normally, a licence is valid only for one year - April 1, to March 31. A licence can be renewed for a period of one year, starting on April 1st.

The Act also determines penalties for any offence. The penalties are different depending on the nature of the offence. The severity of the penalty increases when the offence is related either to fishing in a sanctuary or in reserved areas or violates any associated regulation proclaimed by the Minister.

After B.E. 2490 (1947), the Fisheries Act was revised twice. The first revision was done in B.E. 2496 (1953). The major modifications were (a) to prohibit encroachment on fishing grounds by any construction; (b) to prohibit the use of fishing grounds for planting lotus, rice, kenaf, and other aquatic plants[10]; and, (c) to prohibit anyone to remove from its natural habitat any aquatic animal or egg of any aquatic animal specified in the Decree Ordinance.

The second revision was done in B.E. 2528 (1985). Its main purposes were: (a) to increase the severity of penalties; (b) to empower the authority force owners of fishing boats or fishing vessels to be responsible for any damage or expense that may occur if the boat or vessel violates laws and agreements concerning fishing in foreign fishing waters; and (c) to strengthen the definition of “aquatic animals”.

Although the Fisheries Act provides a law to manage the fisheries resources, the law becomes operational when the Minister issues notices concerning the conservation and management of fishing activities.

2) Act Governing the Right to Fish in Thai Waters, B.E. 2482 (1939)

Thailand has a coastline measuring approximately 2 615 kms. The coastline borders the Andaman Sea and the Gulf of Thailand. These waters are rich in natural resources, especially fish. Realizing that these natural resources belong to the nation, the Thai government issued the Act Governing the Rights to Fish in Thai Waters in B.E. 2482 (1939).Under the Act, the Thai fishing waters are defined as the Thai territorial waters, proclaimed to reach 12 miles off-shore. However, following the proclamation of a Thai Exclusive Economic Zone (EEZ) in B.E. 2524 (1981), the nation’s territorial waters were extended to 200 miles off-shore. According to the Act, all fisheries resources in the Thai territorial waters belong to the nation, which has the right to dispose of those fisheries resources. Only Thai nationals are allowed to fish in the nation’s territorial waters. Foreigners, or partnerships in which all partners are not Thai nationals or companies where all shareholders are not Thai nationals, are not eligible to obtain fishing rights. Fishing rights can be issued to limited partnerships in which Thai partners have unlimited liabilities and in which at least 70 percent of the capital is owned by the Thai partners. A limited liability company can be created when the majority of partners are Thai nationals and at least 70 percent of the capital is owned by Thai nationals. Furthermore, to be eligible for fishing rights limited liability partnerships the companies need to be registered and have their head offices located in Thailand.

The Act also prohibits fishing in Thai waters by foreign vessels or Thai vessels whose crews include

foreigners, unless otherwise agreed by Thailand and the country, or countries, concerned.

3) The Thai Vessel Act, B.E. 2481 (1938)

The Thai vessel Act was enacted in B.E. 2481 (1938). Under the Act, the owner of a fishing vessel with an engine, or a fishing vessel of 6 GT and over, is required to register his fishing rights with The Harbor Department, Ministry of Communication. To qualify for registration the boat owners must be Thai nationals or be part of a partnership, or a company, in which all the partners, or shareholders, are Thai nationals. If it is a limited partnership, at least 70 percent of the capital must be owned by the Thai partners with unlimited liabilities. In the case of a limited liability company, the majority of its shareholders must be Thai nationals and at least 70 percent of its capital needs to be owned by Thai nationals.

4) Wildlife Reservation and Protection Act B.E., 2535 (1992)

The Wildlife Reservation and Protection Act, B.E. 2535 (1992) replaced the old Wildlife Reservation and Protection Act, B.E. 2503 (1960). Only the Royal Forestry Department (RFD) was responsible for the old Wildlife Law, but the current Wildlife Reservation and Protection Act is under the mandate of both the Royal Forestry Department (RFD) and the Department of Fisheries (DOF). This is because the definition of wildlife in the new Act was widened to include aquatic animals. The Fisheries Department is hence responsible for aquatic animals and crocodiles, while the Royal Forest Department is responsible for terrestrial animals and birds. This Act provides two lists of endemic endangered species; (i) the list of reserved species notified by the Royal Decree, and (ii) the list of protected species notified by Ministerial Regulation. The Act prohibits hunting, possessing, breeding, trading, importing and exporting all species indicated in these two lists. However, for species that can be bred in captivity, the second generation offspring can be traded, possessed, exported or imported pursuant to CITES[11] regulations.

Therefore, this Act also provides another list of species bred in captivity as notified by Ministerial Regulation. Examples of endangered species bred in captivity include crocodiles, pythons and the Asian bony tongue fish (Arowana).

In relation to aquaculture, only aquatic animal species included in the captive breeding list are allowed to be cultured. Culture of other aquatic animals found in the two lists of endemic endangered species is not permitted. In addition, captive-breeding operators are required to register, obtain a permit, and pay the due tax to either the Royal Forestry Department or the Department of Fisheries. This Act provides a channel for the implementation of the CITES regulations. Article 23 of this Act empowers the Minister to proclaim the list of animal species (different from those two lists of endemic endangered species) requiring a permit for exportation or importation (not CITES permits). This provision can help control the introduction of exotic species and the use of quarantine procedures. Article 24 is in accordance with CITES regulations as it provides for issuing CITES permits for animal species listed in CITES Appendices.

5) Enhancement and Conservation of the National Environmental Quality Act, B.E. 2535 (1992)

This Act is a revised version of the previous 1975 Act. This law is under the responsibility of the Ministry of Science, Technology and Environment (MOSTE). Upon the enactment of this law in 1992, MOSTE's organization was restructured. It was divided into three agencies, i.e., (i) the Office of Environmental Policy and Planning (OEPP), (ii) the Department of Pollution Control (DPC) and (iii) the Department of Environmental Quality Promotion (DEQP). The Ministerial Regulation of Article 55 of this Act sets out the quality standards for industrial wastewater but it does not include wastewater discharged from aquaculture. This Act requires Environmental Impact Assessments (EIA) for large-scale projects. Furthermore, Articles 43, 44 and 45 of this Act empower the Minister of MOSTE to proclaim Ministerial Regulations determining "environmentally protected areas" and "pollution control areas" in addition to regulating the activities in these areas. This Act can serve as a legal instrument to protect wetlands by designating wetlands as "environmentally protected areas", regardless of whether they are private or public. Such "environmentally protected areas" can

be established by the Ministerial Regulation.

See also the FAOLEX database at http://faolex.fao.org/faolex/

(7) The Act is in the process of revision.
(8) *R. E. moons Ratanagosin Era which is equivalent to B.E. 2405 or 1962*
(9) A fishing area is defined as seas, river, cannals, swamps, ponds, reservoirs with water or water running, beaches, public resources including forests and land areas under seasonal flooding .
(10) Its purpose was to protect fresh water fishing ground
(11) Convention on International Trade in Endangered Species of Wild Fauna and Flora

More information at: **National Aquaculture Legislation Overview (NALO)**

More information at: **FAOLEX legislative database**

Regional and international legal framework

Bilateral and Multiple Agreements and Arrangements

Bilateral Arrangements

Thailand has engaged in fisheries cooperative arrangements with several foreign countries, neighboring countries prominent amongst them. At present, its fishing vessels operate in the waters of Bangladesh, Cambodia, Indonesia, Madagascar, Malaysia, Myanmar, and Somalia. Fish caught as a result of these cooperative arrangements are generally brought back to Thailand for sale on the domestic market or for processing by the Thai fish processing industry.

Multiple or Multilateral Arrangements

Apart from negotiating for fishery access, Thailand has also been involved with regional economic groups such as the Asia-Pacific Economic Cooperation (APEC), the Bay of Bengal Initiative for Multi-sectoral Technical and Economic Cooperation (BIMSTEC), the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT), and the Indian Ocean Rim Association for Regional Cooperation (IOR-ARC).

*Technical International Cooperation*Moreover, under a Technical Cooperation Program - both bilateral and multilateral - Thailand has cooperated with various international organizations such as the Food and Agriculture Organization (FAO), the Southeast Asian Fisheries Development Center (SEAFDEC), the Network of Aquaculture Centers of Asia (NACA), Codex, the European Commission, the German Technical Cooperation (GTZ), the Japanese International Cooperation Agency (JICA), the Norwegian Development Agency (NORAD), USAID, etc. Many bilateral arrangements for technical cooperation on fisheries have been concluded. Amongst the countries that have concluded such arrangements with Thailand are: Canada, China, France, the Republic of Korea, Malaysia, Norway, South Africa, the USA and Vietnam.

Additional information

FAO Thematic data bases

- FAO Country Profile
- Marine Resources reports (FIRMS)
  - Albacore - Indian Ocean
  - Bigeye tuna - Indian Ocean
  - Black Marlin - Indian Ocean
  - Blue marlin - Indian Ocean
  - Bullet tuna - Indian Ocean
  - Frigate tuna - Indian Ocean
  - Indo-Pacific king mackerel - Indian Ocean
  - Indo-Pacific sailfish - Indian Ocean
  - Kawakawa - Indian Ocean
  - Longtail tuna - Indian Ocean
  - Marine resources - Eastern Indian Ocean
  - Marine resources - Western Central Pacific
  - Narrow-barred Spanish mackerel - Indian Ocean
  - Sharks - Global
  - Skipjack tuna - Indian Ocean
  - Squid - Global
  - Striped Marlin - Indian Ocean
  - Swordfish - Indian Ocean
  - Tuna and tuna-like species - Global
  - Yellowfin tuna - Indian Ocean
- Fishery reports (FIRMS)
  - Pacific islands region : Marine fisheries : 2009
  - Thailand : Sea cucumber fisheries : 2006
  - Thailand : Shark Fisheries : 2004
  - World : Deep-sea fisheries : 2009
  - World : Global Tuna Fisheries : 2009
- National Aquaculture Sector Overview (NASO)
- National Aquaculture Legislation Overview (NALO)
- Database on Port State Measures
- FAOLEX legislative database
- Database on Introductions of Aquatic Species
- Regional Fishery Bodies (RFB)
  - Asia-Pacific Fishery Commission (APFIC)
  - Indian Ocean Tuna Commission (IOTC)
  - Mekong River Commission (MRC)
  - Network of Aquaculture Centers in Asia-Pacific (NACA)
  - Southeast Asian Fisheries Development Center (SEAFDEC)
- FAO Fishing Vessels Finder (FVF)

Publications

- List of relevant FAO publications

Meetings & News archive

- Meetings archive
- News archive