

COUNTRY PAPER: THAILAND

PART I:

THAILAND FISHERY AND ITS STATISTICS

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1. INTRODUCTION

Thailand is one of the Southeast Asian countries with a total land area of 513,115 km². It shares a border with Myanmar and Laos to the north, Cambodia and Laos to the east, Myanmar and the Indian Ocean to the west, and Malaysia and the Gulf of Thailand to the south. The total coastline is approximately 2,614 km long. The Kingdom of Thailand is divided into 76 administrative provinces called "Changwad". Each Changwad is further divided into several Amphoes (districts) and each Amphoe is subdivided into Tambon (sub-district). Each Tambon consists of about 5-10 Moobans (villages). In 1996, there were 774 Amphoes, 7,255 Tambons and 66,974 Mooban in the country. The total population is about 60 million.

Although the fishery sector contributed only 1.7% to the total GDP in 1995, since 1993 Thailand has been the world's leading fish and fish products exporting country, with annual export valued at 116.6 billion Baht (US \$4.7 billion) in 1995. Therefore, fisheries is placed as a primary important source of animal protein food as well as a means of earning foreign exchange.

2. GENERAL TRENDS IN THE FISHERY SECTOR

During the last decade Thailand's economy had expanded rapidly and according to the National Economy and Social Development Board (NESDB), the real gross national product (GNP) and gross domestic product (GDP) had reached 4,107.4 billion Baht (US \$164.3 billion) and 4,202.8 billion Baht (US \$168.1 billion) respectively, in 1995. The per capita GDP was about 70,754 Baht (US \$2,830) in the same year. The fishery sector's contribution to the GDP slightly increased from 1.5% in 1990 to 1.7% in 1995.

Results of the 1995 Marine Fishery Census indicated that there were 2,579 marine fishing villages scattered in the 24 coastal provinces of Thailand. The total number of marine fishery establishments was 80,704. Of these, 62.2% were engaged in marine capture fishery, 34.2% in coastal aquaculture, and 3.6% in both activities.

For those engaged in marine capture fishery, the total number of establishments was 53,112. Of these, the number of small-scale establishments employing traditional gears and fishing on subsistence basis was the largest group. They accounted for 89.7% of the total, whereas the number of commercial fishery establishments was only 10.3%. One half of the total small-scale fishery establishments used gill nets which were mainly shrimp gill net (39.1%) and crab gill net (27.6%). The most popular gear used among the commercial fishery establishments was otter board trawl which accounted for 38.9% of the total number of gear used.

For coastal aquaculture, the total number of establishments was 30,528 covering a culture area of 447,553 rais (71,608 hectares). Shrimp culture has been very predominant in Thailand with 25,210 establishments (82.6%) and culture area of 421,282 rais (94.1%). The other culture species were fish, mollusks and crabs. Their number of establishments accounted for 9.8%, 9.3% and 1.2% of the total coastal aquaculture establishments, and culture areas of 1.0%, 3.5% and 1.4%, respectively.

Since 1985, the structure of marine fisheries has changed dramatically. Consequently, the proportion of marine capture fishery establishments decreased from 86.6% in 1985 to 72.2% in 1990 and decreased continuously to 62.2% in 1995, whereas the proportion of coastal aquaculture establishments considerably increased from 10.2% in 1990 to 25.4% and increased continuously to 34.2% in 1995. This was attributed to the rapid increase of shrimp farming by 4.5 folds while the number of those who were engaged in other types of culture was also slightly increased.

From the 1995 census, the total number of fishing boats was 54,538. Of these, 66.8% was outboard-powered boats, 28.0% were inboard-powered boats and 5.2% non-powered boats. The non-powered and outboard powered boats are without tonnage and mostly operating with traditional gear near the coast. On the other hand, of the 15,282 inboard-powered boats, the total number of small size boats with less than 10 gross tonnage (G.T.) accounted for 45.3%, the medium size with 10-49 G.T. 42.8%, and large size with 50 G.T. and over, accounted for 11.9%.

During 1990-1995, the number of outboard powered boats considerably increased by 16.9%, whereas the number of non-powered boats significantly decreased by 43.2%. The inboard-powered boats of less than 10 G.T. also decreased by 17%. It was remarkable that the number of inboard powered boats with 10-49 G.T., and 50 G.T. and over, increased by 0.1% and 22.5%, respectively.

The 1995 Marine Fishery Census indicated that there were 80,566 marine fishery operator's households and 29,302 employees' households. The total fishery population was 535,210 of which 51.3% were male and 48.7% female. The number of fishermen who were directly engaged in fishing and coastal aquaculture as of census date was 157,377, comprising 132,718 (84.3%) male and 24,659 (15.7%) female. Majority of them accounting for 123,512 (78.5%) worked full-time while 33,865 (21.5%) worked part-time. Fishermen, residing on fishing boats or working at sea having no home on land, were excluded in 1995 census.

As for marine fishery labor force, the total number of fishermen during peak season was 161,667, comprising 47.5% family members and 52.5% employees, mostly non-local employees.

The total permanent aquaculture workers was 82,890 mostly local employees. Some 53% of the total fishermen (including coastal aquaculture worker) finished lower elementary school, 25.8% finished upper elementary, while 10.6% had no education or completed under lower elementary school only.

During 1990-1995, the total number of fishermen during peak season slightly increased by 3.3% from 156,573 in 1990 to 161,667 in 1995. Aquaculture workers also increased sharply by 52% in 1990 to 82,890 in 1995. This was due to the rapid increase of the number of shrimp farms in the country in the mid-1990s.

Over the past decades, Thailand has been the top ten world's leading fish producer. According to the Department of Fisheries (DOF), the total fishery production considerably increased by 28.6% from 2.8 million mt in 1990 to 3.6 million mt in 1995. Its value also remarkably raised from 41.4 million Baht (US \$1.6 million) to 88.3 million Baht (US \$3.5 million) during the five year period (1990-1995). This was due to the increase of shrimp production with prices higher than other species of fish.

Of the total fish production of 3.6 million mt in 1995, 79.8% came from marine capture fishery, 9.6% from coastal aquaculture, 6.9% from inland capture fishery, and 3.7% from freshwater culture. The proportion of production from marine capture fishery significantly declined from 84.8% in 1990 to 79.8% in 1995, whereas coastal aquaculture increased from 6.9% to 9.6% during the same period. Furthermore, the proportion of inland fishery production (both capture and culture) slightly increased from 8.3% in 1990 to 10.6% in 1995.

Marine production are utilized for food and non-food consumption. Of the total marine catch of 2.8 million mt in 1994, 52.2% was processed to other fishery products, 32.2% converted to fishmeal and animal foodstuff while the remaining of 15.6% was used for fresh consumption. The introduction of trawl nets and purse seines over the decades has largely influenced the increase of the total marine catch. During 1990-1994, the total catch from otter board trawl alone increased by 18.2% from 1.1 million mt in 1990 to 1.3 million mt in 1994, and purse seines by 22.1% from 175,512 mt in 1990 to 924,914 mt in 1994. In addition, the figures in 1994 showed that 46.4% of the total production were caught by otter board trawl, followed by 33.0% by purse seines and 20.6% by other fishing gears.

Since 1993, fishery products has ranked as the top ten export commodities of Thailand. According to the DOF yearbook, marine/frozen products constituted the largest export items in terms of value (58.0%) which were mainly frozen shrimps, followed by 31.3% canned products. The live fish shared only 0.3% of the total export value. During 1990-1995, exports of fish and fishery products increased by 31.8% from 904,973 mt (live weight) in 1990 to 1.2 million mt in 1995, or in value by 90.8% from 61.1 billion Baht (US \$2.4 billion) to 116.6 billion Baht (US \$4.7 billion) during the same period.

Trade balance was made up of imports of fish and fishery products which increased by 71.9% from 507,737 mt (live weight) in 1990 to 872,828 mt in 1995, or in value by 6.3% from 20.6 billion Baht (US \$82.4 million) in 1990 to 21.9 billion Baht (US \$87.6 million).

3. POLICIES AND ACTION PLANS TOWARD AD 2010

The DOF has established a policy concerning commercial marine fishery with emphasis on the effective management of marine resources maintaining optimum sustainable yield and rehabilitation of degraded fishery resources. To achieve such policy, strategies and action plans for the management of marine resources in the year 2010 will emphasize on upgrading of the administrative and managerial capabilities.

In order to conserve the country's marine fishery resources, the strategies and action plans for the management of commercial marine fisheries were conceived as follows:

- a) speed up the amendment of laws, rules, regulations and restrictions, particularly disparate regulations conceding the control of fishing activities and fishing fleets that have caused problems on the conservation and the development of fishery resources, and hinder effective enforcement;
- b) encourage the formation of associations among small-scale fishermen;
- c) strengthen the enforcement of fishery regulatory measures;
- d) improve the collection of fishery statistics information;
- e) prevent the further degradation of resources by limiting the number of fishing boats and regulating the mesh size;
- f) monitor and improve the quality of water resources, as well as prevent and solve pollution problems which may have impacts on the fishery resources, aquatic reserved areas, areas of historical importance and tourist areas;
- g) install artificial reefs in appropriate coastal areas to act as sanctuaries, spawning and seed bed areas and to reduce conflict between trawlers and small-scale fishermen;
- h) speed up research support for rehabilitation and conservation management issues;
- i) disseminate knowledge to fishermen, fishery-related operators and the public about conservation and utilization of marine fishery resources to ensure maximum benefits;
- j) formulate area/community-based master plans for fishery resources management at the provincial level, as well as set up a coastal resource information center; and
- k) speed up the demarcation of coral reef zones including the rehabilitation of coral reef resources and formulate criteria for undertaking activities in them, as well as issue rules and restrictions on the possession of corals.

On the other hand, the policy and strategies for the management of coastal fishery resources were also drawn up. Under the rural development plan, improvement are carried out by upgrading the infrastructure of the fishing communities, increasing education opportunities, improving health care, and providing better employment opportunities.

Extension services shall be conducted on the improvement of catch and post-harvest processing and extra income earning by housewives through handicraft work. Mariculture is also introduced in the fishing communities as a means of enhancing income and providing new employment opportunities. The major species for mariculture are oyster, mussels and finfish. Diversification of employment into other job areas such as the post-harvest industries, is encouraged. Attempts have been made to establish cooperative schemes for the improvement of financial management.

Public campaign on conservation and sustainable use of aquatic resources have become more important, as these resources have been generally depleted with the increasing number of fishermen and more efficient fishing methods. An education program for the public, as well as direct communications for the fishermen, are among the steps to be taken by the government.

Traditionally, resources management is carried out by the local authority and fishery officers. Thailand has no record of traditional fishing rights such as those that exist in some of the island nations in the Pacific. Increasing exploitation of the coastal resources by various means has led to the decline in productivity and degradation of the habitats. Pilot projects on community-based resource management have been established in several communities in Thailand which include self enforcement and protection of their fishing resources, and the establishment of cooperatives for sharing of profit and responsibility.

Thailand lacks information regarding coastal resources, small-scale fishing practice, fishery statistics and bio-socioeconomics of small-scale fishery communities for planning purposes. Coastal habitats such as coral reefs, grass beds and mangrove-fringe estuaries are critical for fishery resources management but their importance is only the beginning to gain recognition. The rapid coastal development has destroyed or changed the coastal environments rendering them unsuitable for marine lives thus, an understanding of coastal ecology and its human impact is urgently needed. This led to the plan to carry out research on the integration of the multiple uses of the coastal resources.

Realizing the present impact of the extension of national jurisdiction of neighboring countries, the issue on the importance of Thai overseas fishery to the national economy was raised. In order to solve the problems encountered, the government has established the following policies.

At a regional level

- a) Encourage cooperation in the exploitation of allowable marine living resources in ASEAN to achieve optimum sustainable use;
- b) Study and set up standard measurements for the development and management of migratory fish stocks and straddling fish stocks; and
- c) Encourage cooperation in the development and management of shared stocks in the ASEAN region.

At the national level

- d) **Promote and encourage overseas fishery through intensification of access negotiations with foreign countries, by government initiatives;**
- e) **Develop and manage overseas fishery by incorporating this into the national social and economic development plan;**
- f) **Promote and support capital investment for fishermen to modify their fishing vessels and make these capable for operation in distant and new fishing grounds;**
- g) **Protect the investment of private companies in foreign countries through fishery cooperation; and**
- h) **Amend the Fishery Act to enforce punishment for skippers and fishing vessel owners violating the laws and regulations of foreign countries.**

It is very likely that a rapid decline in the genetic diversity of wild and domesticated stocks would result from the introduction of new aquaculture breeds. The DOF is now conducting a genetic-biodiversity program to develop suitable research leading to an economically sustainable genetic conservation. Fish stocking programs in small reservoirs and community fish ponds of less than 5,000 hectares, shall be continued in order to increase fish production where natural recruitment is difficult, but management is simple.

Effective fishing regulations, such as those for closed seasons and restricted areas must be continued. Destructive fishing must be prohibited. Scientific cooperation between biologists and fishermen must be facilitated. Since the ecological system in inland water is dynamic, information on catches, fishing effort, and some useful scientific data will be collected. In order to attain a sustainable inland capture fishery development and management for the year 2010, four major components shall be actively involved. These include the fishery resources, the communities, socio-economic and institutional sustainabilities. Finally, trade-offs between economic benefits from fish production will have to be balanced with fishery conservation and abundance of fish stocks.

On the other hand, the Thai Government formulated an important policy related to marine shrimp culture, which comprises:

- a) **Limiting the total culture area to the existing 76,000 hectares;**
- b) **Converting traditional and semi-intensive culture system to intensive culture;**
- c) **Enforcing shrimp farms to treat discharged water before releasing them to the environment;**
- d) **Implementing sea-water irrigation systems in all major areas of shrimp culture, in order to increase the quantity available and to improve its quality and the effluents as well;**

- e) Strengthen hatchery and farm regulations to ensure shrimp production quality;
- f) Establish production investigation laboratory in every coastal province to investigate antibiotic residues before harvesting and sale of the produce to cold storage operators; and
- g) Undertake research on marine shrimp spawner maturation in captivity to minimize the use of wild spawners.

4. STATUS OF NATIONAL FISHERY STATISTICAL SYSTEMS

The statistical system of Thailand is decentralized. Each ministry has its own statistical unit to collect statistics for administrative purposes. There are three government agencies which are responsible for collecting, compiling and disseminating fishery statistics, the National Statistics Office (NSO), DOF, and the Fish Marketing Organization (FMO).

- a) NSO is a government agency with a departmental status under the Office of the Prime Minister. It plays a leading role in producing basic statistics at national and regional levels while serving as the coordinating body for all statistical activities of government agencies. The main responsibility of NSO is to conduct all censuses and large-scale surveys such as labor force survey, socio-economic survey, etc. The Marine Fishery Census is one of the statistical activities of the NSO.
- b) The DOF is one of the government agencies under the Ministry of Agriculture and Cooperatives. Its statistical unit, the Fisheries Economics Division, is responsible for collecting, compiling and disseminating all current fishery statistics.
- c) FMO is a state enterprise under the Ministry of Agriculture and Cooperatives. The fishery statistics collected by FMO includes quantity and value of fresh fish landing at various fish markets and fishing ports, by species, aquatic animal price, number of fish wholesalers, etc.

5. FISHERY CENSUS

The marine fishery census of Thailand was conducted three times: in 1967, 1986 and 1995, by the NSO in collaboration with the DOF. However, inland fishery census has never been carried out.

The objectives of the 1995 marine fishery census were:

- a) To collect data on basic economic structure of marine capture fishery and coastal aquaculture and socio-economic characteristics of marine fishery households, fishery employees' households, fishermen and aquaculture workers; and
- b) To provide data to be used as a sampling frame for other related surveys.

The marine fishery census covered all marine capture fishery and coastal aquaculture households/establishments and fishery employees' households (excluding foreign fishery employees' household) located in the 24 coastal provinces in the central and the southern parts of the country. Complete enumeration by interview method was applied in this census.

Approximately 920 enumerators were set out to list all households in the area covered (3,500 enumeration districts). This is in order to identify the fishery household/establishments and the fishery employees' households. Subsequently, the detailed information are included in the items for interview.

Specifically, the data collected from marine fishery households/establishments and fishery employees; households include the following:

- a) Marine capture fishery/coastal aquaculture management to include type of management, type of fishery engaged, and number of persons engaged;
- b) Marine capture fishery to include fishing boat (type of boat, length of boat, gross tonnage, type of equipment installed, ownership of boat, etc.), main fishing gear, and main fishing areas, etc.;
- c) Coastal aquaculture to include type of culture and species; and area under culture and tenant status, method of culture, etc.;
- d) Socio-economic characteristics of fishery household;
- e) Members of fishery household;
- f) Socio-economic characteristics of fishery employees' household; and
- g) Member of fishery employees' household.

All census data are processed by the mainframe computer at the central office but data from listing form, are processed using micro computers at the provincial statistical offices, for the preliminary report. The 1995 census publications are as follows:

- a) Preliminary report.;
- b) Final report of 6 series: the report of the coastal zone 1-5 and the whole country (24 coastal provinces); and
- c) Two additional reports: 1995 Marine Shrimp Culture, and 1995 Marine Fishery Indicators of Thailand.

6. CURRENT FISHERY STATISTICS SURVEYS

The annual regular surveys conducted by DOF are classified as follows:

- I. Marine Production Survey, divided into six surveys:
 - a) Log Book survey (Major fishing gears production survey)

- b) Fishing village production survey (Fishing gears other the major fishing gears production survey);
- c) Coastal aquaculture production survey; and
- d) Marine aquatic animals collecting production survey.

These four surveys provide the principal information on marine production. However, such information do not usually reveal the complete profile of the marine fishery industry. Therefore, another two surveys are added:

- e) Marine fish landing place survey; and
- f) Associated fishery industry survey.

II. Freshwater (Inland) Production Survey, divided into four surveys:

- a) Freshwater culture production survey;
- b) Luring pond or small water tank survey;
- c) Natural water tank survey; and
- d) Freshwater fish landing place survey.

The objective of the Log Book Survey (Major Fishing gears production survey) is to collect data on monthly catch and fishing effort of nine major fishing gear, i.e., Otter board trawl, Pair trawl, Beam trawl, Purse seine, Anchovy purse seine, King mackerel gill net, Mackerel encircling gill net, Push net and Bamboo stake trap, in 22 coastal provinces. The data are used to estimate the total production of these fishing gear to determine the data from large-scale fishery, and conduct a stock assessment of the marine natural resources.

Sample survey by interview method was used for the Log Book survey. The fishing units registered at DOF for operating the nine major types of fishing gear mentioned above, are used as the sample units. Selection is by random from each type of fishing gear except otter board and pair trawl which are drawn from the group of boat sizes. Consequently, the operators of the sample units are interviewed every month by the provincial fishery enumerators about catch and fishing effort on a monthly basis, i.e., quantity of monthly catch by species, number of trips a month, number of fishing days and hauling per trip, etc. All survey data are then sent to the DOF central office for processing.

The objective of the Fishing Village Production Survey is to collect data on quantity and value of annual catch of all fishing gear except the nine major fishing gears in the Log Book survey, and on the fish species composition of the catch. The data are used to estimate the total production from small-scale fishery. The sample survey is based on two-stage random sampling where the first stage is the fishing village selected randomly from the census frame. The provincial fishery enumerators visit the head of the sample villages for the listing of the heads of fishing households, grouped by fishing gear employed.

For the second stage, five fishing households are selected from each type of fishing gears in the list by simple random sampling. The sample heads are interviewed for the detailed information on the number of fishing months, number of trips per month, quantity of catch per trip, percentage of fish species, composition of catch, etc. The field work is conducted once a year, and all data are sent for processing at the DOF central office.

The objective of the Coastal Aquaculture Production Survey is to collect data on production and culture area of shrimps, fish, horse mussel, sea mussel, bloody cockle and oyster farming. The data is used for the estimation of coastal aquaculture production.

Here, the enumerators from the provincial fishery offices update the list of aquaculture farms in the sub-districts, prepared by the central office, by interviewing the heads of the sub-districts. The sample farms are randomly selected from each sub-district farm list, using the following pattern:

<u>Total no. of farms in sub-district</u>	<u>No. of farms selected</u>
1-5	All
6-25	5
26 and over	20% of total farms

The enumerators then interview the operators of the sample aquaculture farms for detailed information. All completed questionnaires are sent to DOF central office for data processing.

The objective of the Marine Aquatic Animals Collecting Production Survey is to collect data on marine production of collecting natural shellfish (excluding shellfish culture), collecting of seaweeds, sea cucumber, jellyfish, etc. These data are used to estimate the production of aquatic animals collected from marine sources.

The objective of the Marine Fish Landing Place Survey is to collect data on fishing boats landed and their production at landing places, and quantity and value of catch landed by fish species and fishing gears. Sample survey by interview method is used, and for the first step, the provincial fishery enumerators visit all marine fish landing places for the recording of the total number of fishing boats, by size of boat and fishing gear employed, landing at these places every day in a month. Fishing boats which called at a particular selected landing place, are then randomly selected according to size and fishing gear employed, and interviewed for their catch landing at a sampling day of every week. All monthly data are sent for processing at the DOF central office, and in order to get the annual production landing.

The objective of the Associated Fisheries Industry Survey is to collect data on the associated fishery industries such ship yards, docks, ice plants, cold storage, processing plants, fish meal plants, and their production capacity, etc. Complete data enumeration is used for all associated industries while random sampling is used for the fish processing industries, i.e., fish/shrimp paste plants, dry shrimps/squid and salted fish plants, selected at 10% of the total number. The samples are then considered for enumeration.

On the other hand, the objective of the Freshwater Culture Production Survey is to collect data on cultured species, production and culture area of four farming practices, i.e., pond culture, paddy field culture, ditch culture, and pen/cage culture.

For the first step, the enumerators update the list of freshwater culture farms in sub-districts, prepared by the central office. Then, the sample farms were randomly selected from each type of farm practices and cultured species using 10% of the total farms in each group. Exceptions were that of "sepat siam" farms, the samples of which were selected at 5% of the total number of farms. The enumerators then interview the operators of the sample fish farms for the detailed information. This is carried out once a year, and all completed questionnaires are sent to the DOF central office for data processing.

The objective of the Luring Pond or Small Water Table Survey is to collect data on fish catch from luring ponds or small water tanks. The farmers should have been granted permission from the government to culture in these small water tanks. The data collected are for size of luring ponds, quantity, value and species of catch, etc. A 10% sample of the luring ponds in each district is drawn at random, from the list of operators receiving fishing permission by the District Fisheries Office. Then, the fishermen fishing in the sample ponds are interviewed for the catch information.

The objective of the Natural Water Tank Survey is to collect data on fish catch from the natural water tanks. The data collected includes quantity and value of fish catch, fish species, fishing gear operated, etc. The enumerators first update the list of all natural water tanks classified into three types: large scale water tanks such as reservoirs and lakes; public water bodies such as swamps; and water tanks constructed under the national rural job-raising program.

The natural water tanks of each type are grouped by water area size of the tanks and randomly selected at 10% of each total group. Then the provincial fishery enumerators interview the operators for the detailed information from fishermen engaged in fishing in the sample natural water tanks.

The objective of the Freshwater Fish Landing Place Survey is to collect data on freshwater fish catch landed at freshwater fish landing places. The items collected include the number of fishing boats at landing places, quantity and value of catch, etc. These data are used for the development of information on animal protein as food source, occupation, and extension. The method of data collection is similar to that of the marine fish landing place survey.

Lastly, information on fishing vessel statistics are compiled from the fishing gear registration forms issued by the provincial fishery offices. These are sent out to the DOF central office for data processing annually.

7. FOLLOW-UP TO THE NATIONAL RECOMMENDATIONS FROM THE 1994 WORKSHOP

The recommendations affecting the statistical system in Thailand during the 1994 Workshop, which aimed to improve the collection and compilation of fishery statistics, were as follows:

- a) Training course on the use of computer on-line system for data processing at central and provincial levels should be conducted,

The NSO of Thailand regularly organize several in-service training courses for its staff, the personnel of other government agencies and state enterprises. The training courses covered statistical methods and computer data processing. The main objectives of the training are to develop the expertise and skills of the statistical personnel. However, the regional training course in statistical methods on specific subject, e.g., fishery statistics, is needed for improving the statistical skills, regional standardization, and coordination of the statistical staff.

- b) Regional training course on the analysis of catch statistics should be conducted so that the analysis can be included in the statistics yearbook of each country.

This regional training course is needed and essential for the development of their knowledge and skills of fishery statisticians. However, the course has never been organized by any agency or organization in the country.

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