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# **DEVELOPMENT OF FISHERIES STATISTICS IN THAILAND**

By  
**TOSHIFUMI SAKURAI**

杉本 俊文

**OVERSEAS TECHNICAL COOPERATION AGENCY  
TOKYO , JAPAN  
June , 1974**

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## FOREWORD

Time flies like an arrow. It has been more than ten years since April 1964, when the Government of Japan started to render her technical assistance to Thailand in the field of fishery statistics. Meanwhile, three Colombo Plan Experts, i.e. Dr. Tadashi Yamamoto, Mr. Kazuo Inoue and myself served this country, in succession, under this project. I believe that this is an extremely rare case in the history of the Japanese Colombo Plan aid that a technical assistance was rendered to the same project for over ten years.

The present report intends to keep a summary record on how fishery statistics in Thailand were developed in the past, which would serve as a good basis for further development of the system in the future. However, I regret that this report is not complete especially the section concerning the development in the first six years, since I served only the last four years. During my assignment many fruits came out in the form of statistical reports, but such a success could not be achieved without the foundation laid by my predecessors.

Although our technical assistance rendered in the past has been greatly appreciated by the Thai fisheries authorities, it may be worthwhile to mention certain impediments which do not allow the progress to reach at a very satisfactory level. The main obstacle is the incompleteness of the fishing licensing system, fishing gear registration system and fishing boat registration, other obstacles include the absence of active fishermen's cooperative or association and less development of fish marketing system. As a matter of fact, all these elements hampered the establishment of a sound national fishery statistical system.

On the occasion of issuing the present report, I should express my sincere gratitude to Mr. Sant Bandukul, Director-General of Fisheries Department, Mr. Tuanthai Bamrajarinpai, Dy. Director-General of Fisheries Department, Mr. Chertchai Amatayakul, Director of Inland Fisheries Division, Mr. Sanan Ruamragsa, Chief of Marine Fisheries Division and Mr. Sod Tauglek, chief of Secretariate for their heartfelt support to our statistical activities. My thanks are also extended to Mr. Sumon Swegwan, Chief of the Fishery Statistics Section and all of his colleagues for their fineless cooperation on such an extremely useful undertaking.

Finally, I would like to express my sincere appreciation to Dr. T. Yamamoto, who always paid his constant attention and advice to our works and further accepted, with his pleasure, my request on the edition of the present report.

June, 1974

Toshifumi Sakurai

Fisheries Statistician assigned

to the Thai Government under the Colombo Plan





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## I FISHERIES OF THAILAND IN GENERAL ( BACKGROUND OF FISHERIES STATISTICS )

### 1. HISTORICAL DEVELOPMENT OF THE FISHERIES

In earlier days, the marine fisheries of Thailand were operated almost entirely in the inshore waters of the Gulf of Thailand. Fishing boats employed in those days were virtually non-mechanized, and the majority of the fishing gears used were of the traditional types such as bamboo stake trap, set bag net, etc. Later on, more conventional types of fishing gear like Chinese purse seine were introduced to catch inshore pelagic fish such as Indo-Pacific mackerel, sardine-like fish, etc. with gradual mechanization of fishing boats. It was only within the last decade i.e. in the 1960s that the marine fisheries of Thailand have expanded rapidly mainly due to the rapid development of trawl fishery in the Thai waters. Since then, the fishing grounds of trawlers as well as purse seiners have been extended further from shore. With this new development gill net fishing also contributed to the expansion of marine fisheries of the country. In 1972, the total catch of both marine and inland fish was estimated at 1,679,540 metric tons which was eight fold of that of 1960.

In spite of the rapid development of marine fisheries which occurred during the 1960s the fisheries production from inland water has been more or less stagnant. This is mainly due to the disappearance of flood water in the central low land area. It is said that in the past a flood water area produced about 80 percent of the inland fisheries production of the country. However, the establishment of the electrical power and irrigation projects has now reduced the area of such flood waters. On the contrary, fish farming is now becoming popular among rice farmers by converting their farm lands into fish ponds. Common species cultured are catfish (*Clarias* sp.), Sepat Siam (*Trichogaster* sp.), Common Carp, Grass Carp, Silver Carp and Tilapia. Nowadays, it is likely that the production of fish farmings has exceeded fifty per cent of the total inland fish production although there is no data available to warrant the conclusion.

### 2. FISHING GROUNDS

The total area of brackish waters in Thailand is approximately 162,000 ha. of mangrove swamps, tidal land and lagoons, most of which are suitable for brackish water fish culture.

Marine fishing grounds comprise of the coastal waters of the Gulf of Thailand and the eastern shore of the Indian Ocean between Burma and Malaysia. The Gulf of Thailand is situated between latitude 6° N and 13° N with the coast line of 1784 km. The Indian Ocean side has the coast line of 740 km. Therefore, Thailand has the total coast line of 2614 km. The whole Gulf of Thailand is divided into the Inner Gulf and the Outer Gulf. Four major rivers flow into the Inner Gulf. The Outer Gulf extends into the South China Sea. An average depth of the Inner Gulf is 20 m. and the maximum depth in the Outer Gulf is 87 m. Bottom characteristics in the coastal zones of the Outer Gulf and in the entire area of Inner Gulf are found to be muddy, while the central parts of the Outer Gulf are mostly covered with very soft mud.

However, soft corals can be found almost everywhere except on the east side of the outer Gulf where stony and calcy corals are frequently found. In comparison with the Gulf of Thailand, the grounds on the Indian Ocean side are much rougher, consisting of rocks and sea mounts, and the depth increases abruptly outward from shore.

Inland fishing areas include rivers, canals, lakes, swamps, streams and man-made reservoirs. Fish farming is done with the use of pond, paddy field, non-paddy field, ditch, cage, etc.

### 3. FISHERMEN

According to the result of the survey on marine fisheries inventory items in 1970, the total number of marine fishing households was 43,520. The total number of family members for those households were 271,132, of which 74,086 were engaged in fishing and aqua-culture.

The fishing household in Thailand could be divided into four categories, i.e. Enterprise Fishing Households, Partnership Fishing Households, Subsistence Fishing Households and Fisheries Employee's Households. Those numbers were 2,660 (or 6.1 %), 3,092 (or 7.1 %), 29,151 (or 67.0 %) and 8,617 (or 19.8 %) respectively. Out of the total number of fisheries operator's households, those which income came from fishing solely, mainly and partly were 60.3 % 28.4 % and 11.3 % respectively.

As for the inland fishery, although no fisheries census has yet been conducted, it is apparent that the majority of farmers operate their fishing or fish culture in combination with their agricultural undertakings. However, the livelihood of these farmers can hardly depend only on fishing alone. It can be seen everywhere in upcountry that many farmers possess several types of locally made fishing gear.

### 4. FISHERMEN'S CO-OPERATIVES

In spite of the fact that the Government has attempted to establish fishermen's co-operatives to enable them to buy their supplies of fishing gear, fuel and accessories at lower prices to sell their products at reasonable prices and to provide loans for their smooth operations, there exist at present only three co-operatives in the country i.e. Central Fisheries Co-operative, Pissanu Fisheries Co-operative and Lamsing Shrimp Farms Co-operative.

Most of the Thai fishermen borrow money from merchant or middleman. Hence, they are obliged to sell their catches through those creditors. Further more their necessities for fishing are often supplied by them. These conditions prevent those fishermen to establish effective co-operatives on their own initiative. Shortage of working capital owned by the fishermen and absence of competent personnel who lead fishermen are also other factors that hamper the establishment of fishermen's co-operatives.

Thus, the absence of efficient fishermen's cooperatives in the country is the major obstacle to the development of fisheries statistics.

## 5. FISHING FLEET

According to the results of the survey on fisheries inventory items in 1970, the total number of fishing boats used for marine fishing was 27,521, of which the number of powered boats and non-powered boats were 19,208 (or 69.8 %) and 8,313 (or 30.2 %) respectively. Almost all fishing boats are made of wood. The maximum size of a powered boat was about 30 meters in length, the average being about 10 meters. All of these fishing boats are built by local shipyards. There are about 100 shipyards in major coastal provinces along the coast of both Gulf of Thailand and Indian Ocean. However, the majority of these shipyards are located along the coast of the inner Gulf of Thailand.

## 6. FISHING GEAR IN USE

### 6.1 MARINE FISHERIES

The number of fishing boats registered in 1972 were as follows :

THE NUMBER OF FISHING BOATS BY TYPE OF FISHING GEAR, 1972

Type of Fishing Gear	Size of Boats in Length				
	Total	Less than 14 m	14 - 18 m	18 - 25 m	25 m. and over
Otter Trawl	3,185	1,323	1,321	463	78
Pair Trawl	702	124	303	272	3
Beam Trawl	599	588	11	—	—
Thai Purse Seine	371	84	188	99	—
Chinese Purse Seine	66	10	40	16	—
Anchovy Purse Seine	68	36	20	12	—
Spanish Mackerel	138	56	73	9	—
Drift Gill Net					
Mackerel Encircling	254	213	39	2	—
Gill Net					
Push Net	1,327	1,303	24	—	—

Beside the fishing gears as listed above, Bamboo Stake Trap, Set Bag Net, Squid Cast Net, Wing Set Bag Net, Pomfret Gill Net, Shrimp Gill Net, etc. are popularly in use.

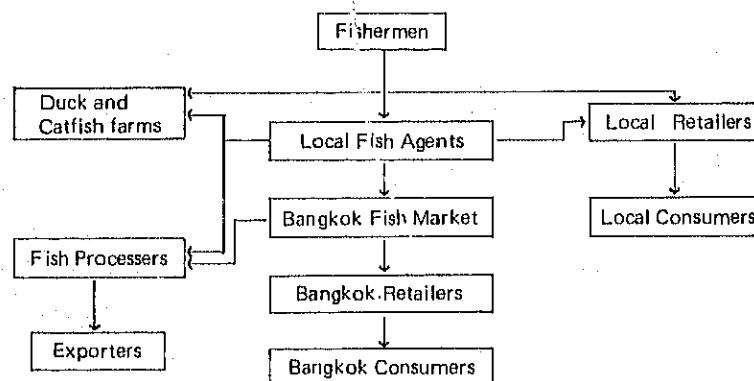
## 6.2 INLAND FISHERIES

Inland fishing is normally operated in the rivers, canals, swamps and lakes throughout the country. The gear in use depends on the nature of the waters and the kind of fish to be caught. However, the types of fishing gear commonly in use are bag net, various types of seine and gill net, cast net, scoop net, a variety of traps and baskets, lines and spears. Where swamps and lakes discharge water through narrow passages, various types of barriers are in use during the annual upstream migration of the small cyprinoid fish. Furthermore almost every household along the bank of a stream or canal operates a dip or lift net.

## 7. MARKETING SYSTEM

The Fish Marketing Organization (F M O ) established by the Government in 1953 is responsible for the development of fishing port facilities, the operation of wholesale fish markets and the control of the fish marketing system. There are about 40 major fish landing centers along the coasts of the Gulf of Thailand and of the Indian Ocean. The Fish Marketing Organization operates two wholesale fish markets one in Bangkok and the other in Samut Sakorn and manages eight fishing ports in Ranong, Hua Hin, Songkhla, Pran Buri, Trat, Surattani, Pattani and Ang Sila. At the above two fish markets fish transaction is done by auction, at other landing centers it is done by negotiation between fishermen and buyers.

Bangkok is the largest city in Thailand with a population of 4.0 million. Hence, the Bangkok fish market is the largest whole sale market in the country. Fish is transported to this market mainly by truck from almost all of the local fish landing centers throughout the country. The fish marketing channel in the country is roughly summarized as follows.



Fresh water fish are transported by boats, rails or trucks to the Bangkok Fish Market or local fish markets. The fish which are mostly air breathers such as catfish, is transported by keeping them alive in a standard container made of galvanized iron reinforced with a wooden frame.

## 8. IMPORT AND EXPORT OF FISHERIES PRODUCT

During the 1950's foreign trade of fisheries product was in an unfavorable balance. However, it turned into a favourable balance in 1963 owing to the development of marine fisheries. Since then, the export of fisheries products has been rapidly increased. In 1972, the export reached 82,381 metric tons valued at 807,165 thousand Baht or approximately 40 million U S dollars while the import was 15,139 metric tons or 83,692 thousand Baht (4.2 million U S dollars). It is likely that the export for 1973 exceeded one billion Baht (50 million U S dollars) constituting 4.3 percent of the total foreign exchange earning in the country.

Major fisheries commodities for export are frozen shrimp, dried or frozen squid and cuttlefish, fish meal and fresh or frozen fish. The exported value of these commodities in 1972 were 359,324 (44.5 %), 244,422 (30.3 %), 90,981 (11.3 %) and 70,574 thousand Baht (8.7 %) respectively. Shrimps are mainly exported to Japan and the U S A whereas squid and cuttlefish are for Japan, Italy, Hong Kong and Singapore. Further, fish meal is exported to Singapore and Japan, and fresh or frozen fish mainly to Malaysia.

Major import commodities of the fisheries product are fresh fish from Malaysia and Burma and shrimp paste from Malaysia.

## 9. FISHERY ADMINISTRATION

There are three organizations which are responsible for fishery administration and services at the national level, i.e. the Department of Fisheries, Ministry of Agriculture and Cooperatives which was established in 1926, the Fish Marketing Organization founded by the Act of Organizing the Activities of the Fish Market in 1953 and the Cold Storages Organization established by the Royal Decree of Cold Storage Organization in 1958. These three organizations are somewhat different in terms of legislative status, authorization and administrative function.

### 9.1 DEPARTMENT OF FISHERIES

The Department of Fisheries is responsible for fisheries research, development of fisheries, training of fishermen and so forth with the following four divisions in its head office. (See the organizational chart at the end of this section)

1. Office of Secretariat
2. Division of Fisheries Administration and Control
3. Division of Marine Fisheries Research and Investigation
4. Division of Inland Fisheries

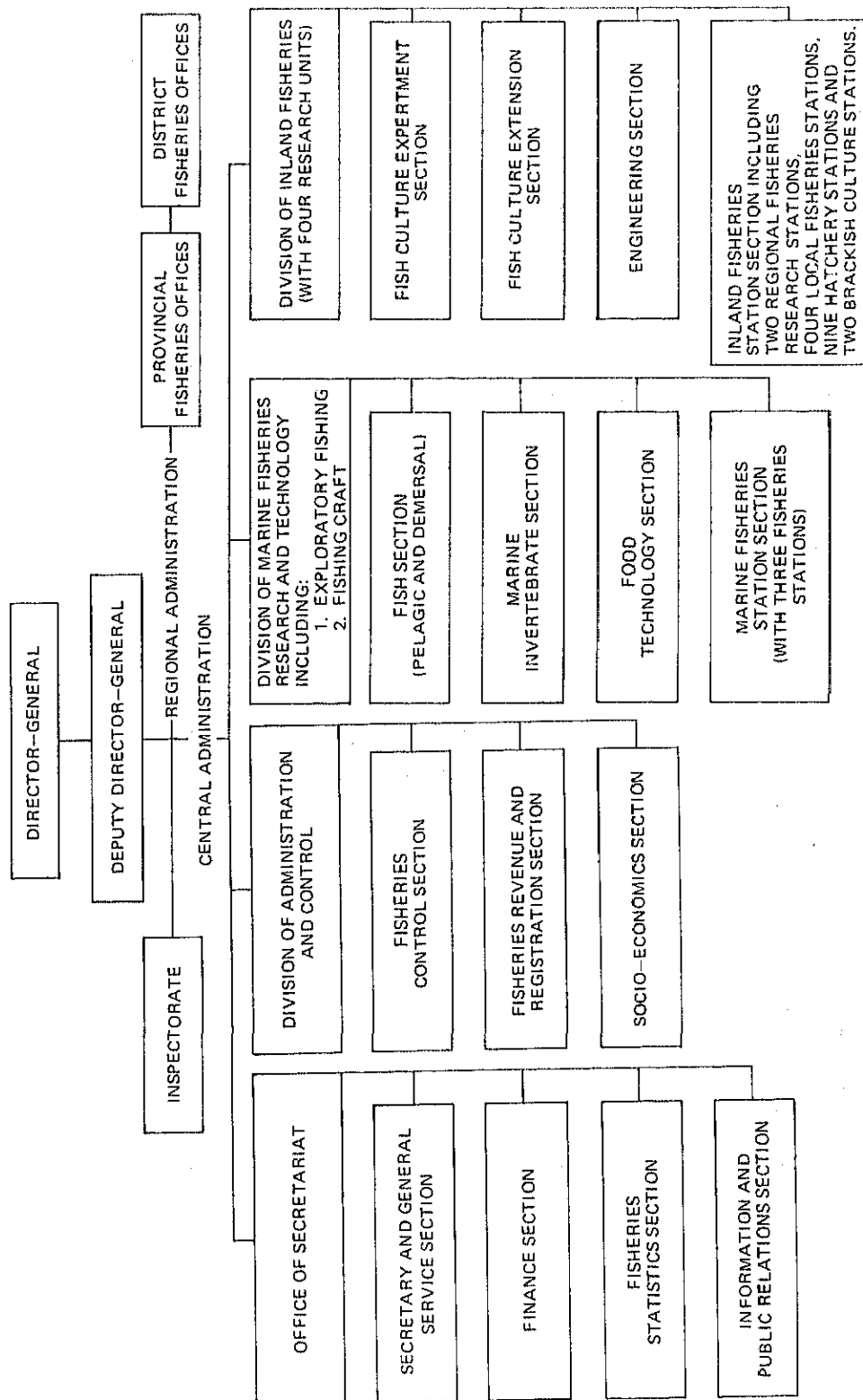
In the local field, the Department of fisheries has provincial and district fisheries offices. The provincial fisheries office, under the superintendence of the governor, is responsible for the following tasks :

1. Supervision and inspection over the district fisheries offices in its own area
2. Enforcement of fisheries laws and regulation
3. Fisheries administration provided by the fisheries laws, bylaws and ministerial regulations
4. Fisheries extension services
5. Registration of fishing waters
6. Fisheries statistical collection
7. Surveys, investigations and other activities regarding fisheries as directed by the Department of Fisheries

The district fisheries office, under the superintendence of the district chief, carries out the following activities:

1. Fisheries license as authorized by the fisheries laws, bylaws and ministerial regulation and proclamations
2. Collection of fisheries revenue
3. Enforcement of fisheries laws, bylaws and ministerial regulations and proclamations
4. Fisheries extension services
5. Fisheries statistical collection
6. Surveys, investigations and other fisheries activities as directed by the provincial fisheries office.

# THE EXISTING ORGANIZATIONAL CHART OF THE DEPARTMENT OF FISHERIES





## 9.2 FISH MARKETING ORGANIZATION

The organization is of semi-governmental nature and its major responsibilities are:

1. To carry out and improve the business of fish market and fishing industry,
2. To control and direct the service with respect to the business of fish agents and transport,
3. To promote the welfare by providing various facilities to fishing village and
4. To promote the activities of fishing cooperative societies and associations.

As described earlier the organization operates two fish markets, one in Bangkok which is the largest fish consuming area in the country and the other in Samut Sakorn which is the biggest fish landing center for marine fishery.

The fisheries promotion projects under the Fish Marketing Organization may be classified into six categories as follows.

1. Construction and maintenance of fishing ports,
2. Construction and maintenance of concrete reservoirs or freshwater wells,
3. Construction and maintenance of roads,
4. Construction of lighthouses, navigation sign posts, etc.,
5. Construction of schools for the fishermen's communities and supply of its necessary facilities,
6. Other Assistance.

## 9.3 COLD STORAGE ORGANIZATION

The primary objective of this organization is to introduce, promote and expand freezing and cold storage facilities throughout the country to accelerate the development of marine fishing industry.

The organization operates two refrigerating plants; one in the same compound of the Bangkok Fish Market and the other at Paknam Chumpon which is one of major fish landing center on the west coast of the Gulf of Thailand.

# 10. FISHERIES DEVELOPMENT PLAN

The fisheries development projects in the Third National Economic and Social Development Plan (1972 - 1976) are as follows.

## 10.1 FISHERIES DEVELOPMENT POLICIES

The fisheries development policies of the Department of Fisheries include the following :

- (a) To maintain the production levels of both marine and freshwater fish by appropriate conservation measures,
- (b) To increase the production of brackishwater fish with special emphasis to the rational development of coastal aquaculture,
- (c) To promote the expansion of deep-sea fishing industry,
- (d) To increase the productivity of inland fisheries by improving the existing operations,
- (e) To raise the living standard of fishermen.

## **10.2 OBJECTIVES OF FISHERIES DEVELOPMENT**

In the Third National Economic and Social Development plan (1972 - 1976), a target has been set to attain an annual average increasing rate of more than 7 per cent of fish production.

## **10.3 DEVELOPMENT PROGRAM**

To fulfill the above-mentioned target, the Department of Fisheries has set up the following programs:

### **1) INLAND FISHERIES**

#### **(1) Continuation of Existing Projects**

- (a) Inland fisheries development
- (b) Development of fish culture in ponds and rice field
- (c) Inland fisheries research and investigation carried out at the Agricultural Research Center, Khonkaen, Northeastern Thailand
- (d) Fisheries demonstration carried out at the Srithon Brook, Kalasin, Northeastern Thailand
- (e) Improvement of fishing grounds
- (f) Intensification of reservoir fisheries development of the Ubolratana Dam located in the northeastern part of the country.

#### **(2) New Projects**

- (a) Development of large inland river basins and watersheds
- (b) Establishment of the National Inland Fisheries Institute under the Technical Assistance Program provided by the Government of Canada.

### **2) BRACKISHWATER FISHERIES**

#### **(1) Continuation of Existing Project**

- (a) Brackishwater fisheries development

#### **(2) New Projects**

- (a) Cultivation of shrimp.

### **3) MARINE FISHERIES**

#### **(1) Continuation of Existing Project**

- (a) Marine fisheries development
- (b) Establishment of the Marine Biological Center at Phuket, Southern Thailand.

### **4) FISH MARKETING**

#### **(1) Continuation of Existing Project**

- (a) Improvements in handling, processing and distribution of fish and fishery products.

### **5) CONSERVATION OF FISHERIES RESOURCES**

#### **(1) New Projects**

- (a) Conservation of fisheries resources.

#### 10.4 SPECIAL DEVELOPMENT PROGRAM

Among various development programs listed above, the development of shrimp culture program received the highest priority in view of the existence of vast water areas suitable for such a culture and a great demand in the international market for the products. It became one of programs under the Accelerated Program of Agricultural Development which has been set up by the Ministry of Agriculture and Cooperatives based on the Third National Economic and Social Development Plan. The Accelerated Program of Agricultural Development was established for increasing agricultural productivity to provide employment with higher level of income to agriculturists and to attain higher favourable balance of trade.

In the above mentioned Program, the target of marine shrimp production has been set to reach 112 thousand metric tons in 1976.

### 11 STATISTICAL ORGANIZATION

#### 11.1 NATIONAL STATISTICAL OFFICE

The National Statistical Office in the Office of the Prime Minister has responsibility to co-ordinate and to set standards for all statistical activities in the country. The Statistical Act authorizes the National Statistical Office to review and to approve of statistical projects being proposed to be undertaken in other statistical units in the government. All budget allocations for statistical projects are reviewed by the National Statistical Office. This office also has the responsibility for conducting all censuses covering population, agriculture, fishery, industry, etc. It is also responsible for large scale statistical surveys such as the Labour Force Survey, Crop Estimation Survey, Household Income and Expenditure Survey, etc.

#### 11.2 FISHERIES STATISTICS SECTION

The Fisheries Statistics Section in the Office of Secretariate, Department of Fisheries, Ministry of Agriculture and Cooperatives is responsible for the development of statistical collection system and implementation of fisheries statistical surveys and the compilation of a fisheries statistical yearbook.

Under the Fisheries Statistics Section a field organization was set up in 1969 for the Marine Fisheries Production Survey with 5 supervisor and 73 enumerators.

The supervisors are stationed at the Fisheries Statistics Section in Bangkok and are responsible for training the enumerators of their respective jurisdiction and checking the data collected by the enumerators. The enumerators are stationed at 22 coastal provincial fisheries offices and collect the data under the supervision of provincial fisheries officers.

The total amount of budget spent by the Fisheries Statistics Section in 1972 is shown in the table below with brief note.

**EXPENSES FOR THE FISHERIES STATISTICS SECTION, 1972**

Items	Cost (Baht)	Remark
<b>Total</b>	1,285,628	
<b>1. Remuneration</b>		
Head Office Officials	310,240	1 chief, 3 senior officers, 4 junior officers, 4 clerks, 4 typists, 1 driver and 11 tabulation workers.
Field Officials	576,120	5 supervisors and 73 enumerators
<b>2. Training Expense</b>		
Head Office Official	10,623	
Field Official	32,038	for enumerators only
<b>3. Travel Expense</b>		
Head Office Official	41,692	
Field Official	249,623	for enumerators only
<b>4. Printing Cost</b>		
Survey Forms	9,500	by contract only
Report	27,000	
<b>5. Other</b>	28,792	maintenance and fuel for office car

## II FISHERIES STATISTICAL SURVEYS

### 1 FISHERIES CENSUS AND SIMILAR SURVEYS

#### 1.1 MARINE FISHERIES CENSUS (1967)

#### INTRODUCTION

In early 1960s, a rapid development of trawl fishery occurred in the Gulf of Thailand. In those days even the number of fishing units for large scale fishery like trawl and purse seine fishery was not clearly known. Hence, the Department of Fisheries planned to improve and expand the fisheries statistics as much as it should be for stock assessment of fisheries resources and fisheries administration. Thus, after having a preparatory period of two years, the first marine fisheries census was implemented in 1967 by receiving a cooperation from the National Statistics Office with the Department of Fisheries.

#### OBJECTIVES

The objectives of the census were:

- (1) to secure the data in regard to the number and nature of fish producing factors such as fishing households, fishing boats, fishing manpower, fishing units, etc., and thus to clarify the economic structure of the fishing industry and
- (2) to provide a sampling frame for the designing of a marine fisheries production survey.

#### DATE OF THE CENSUS

The census was carried out as of the 1st May 1967, with a time reference of past one year from May 1, 1966 to April 30, 1967.

#### SURVEY OBJECTS

The census covered the following two objects which were engaged in capture or culture in marine water during the period of one year prior to the date of the census;

- (1) Fishing households or firms that were engaged in capture or culture of aquatic animals and plants regardless of sale or home consumption.
- (2) Households whose family members were employed by others as fishing labourers.

(Note)

Fishing households or fishing labourer's households that were located outside the area of the coastal village were not covered by the census due to difficulties for the identification and access of these households.

#### SURVEY PROCEDURE

- (1) A preliminary survey was conducted in 1964 to identify all marine fishing communities. Each fishing community identified was regarded as an enumeration district in the Census.
- (2) For each enumeration district concerned, a complete enumeration was made by the enumerators under the guidance and supervision of provincial statistical officers.
- (3) The census adopted two forms, i.e. 1) a list type form and 2) a questionnaire, (See these forms in Appendix I)

The former was used not only for the identification of fisheries household but also for the enumeration of basic items such as fishing boats, fishing manpower, area of culture farm, etc.

The latter was used only for the fisheries households employed more than three permanent fishing labourers in order to secure more detailed data such as the number and type of fishing boat, the number of fishing units, the source of fisheries finance, etc.

- (4) The tabulation of the result of the census was carried out at the Department of Fisheries.
- (5) After compilation of the census field work the post enumeration survey took place in September, 1967 in order to secure the precision on the result of the census. Forty sample fishing communities were selected and a complete enumeration was repeated in those areas.

#### PUBLICATION

A report entitled "The First Census of Marine Fisheries in Thailand, 1967" was published by the Department of Fisheries. This was the first report in the history of Thailand ever revealed an economic structure of the marine fisheries.

The contents of the statistical table in the report is as follows.

#### STATISTICAL TABLE BY REGION AND BY PROVINCE

- 1 Total number of fishing households by strata
- 2 Number of enterprise fishing households by type of management
- 3 Total number of fishing population and total number of family members engaged in fishing
- 4 Total number of fishing boats by type of boat
- 5 Number of powered boats possessed by enterprise fishing households by length of boat and type of engine
- 6 Number of powered boats under construction possessed by enterprise fishing households
- 7 Number of fishing households by strata and by type of major fishing method
- 8 Number of fishing units by type of major fishing method
- 9 Number of fishing units by type of major fishing method and by size of fishing boat
- 10 Number of fishing units, horse power, crew member by size of boat and by type of major fishing method
- 11 Number of fishing households engaged in costal culture and acreage of culture farm by type of costal culture
- 12 Total number of fishing households by type of economic activities

## 1.2 SURVEY ON TRAWL FISHING ACTIVITY (1968)

### INTRODUCTION

Until the First Marine Fisheries Census took place in May, 1967, very little was known about trawl fishery with the exception of trawl research data assembled by the Department of Fisheries since 1962.

The census covered all Thai marine fisheries including trawl fishery and tried to provide a list of all fishing units as a basis for designing a sample survey for estimating its catch and fishing effort. However, since this was the first experience of having such a census, the census could not provide a complete list of trawl fishing units. Furthermore, there existed a real need for having more detailed data on trawl fishery so as to meet the requirements of fisheries administration as well as of fisheries research.

With this in mind an ad-hoc survey of trawl fishery was implemented on a sampling basis in May and June of 1968.

### OBJECTIVES

The objectives of the survey were:

- (1) to ascertain the accuracy of the list of trawl fishing units obtained by the 1967 Marine Fisheries Census and to estimate a more reliable total number of trawl fishing units and
- (2) to obtain a basic data on trawl fishery which were necessary for designing a sample survey on production and also for improving the fishery administration of trawl fishing industry.

### SURVEY OBJECTS

The survey covered the following types of trawl fishery.

- (1) Other board trawl
- (2) Pair trawl
- (3) Beam trawl

### DATE OF THE SURVEY

The survey was conducted from the 1st of May to the end of June, 1968.

### FIELD ORGANIZATION

The survey was carried out by district fisheries officers stationed at district offices.

### SURVEY METHOD

- (1) Selection of Sample Fishing Communities

Since most of the trawlers are based at a limited number of major fishing communities, the survey covered 19 communities in which the number of trawlers were composed of about 80% of the total.

- (2) Revision of the List of Trawl Fishing Units

Since the list of trawl fishing units obtained by the 1967 Marine Fisheries Census was considered to be incomplete, the revision of the list was made as follows.

1) At first, the list of trawl fishing units derived from the Census was compared with the record of fishing gear registration kept in the district fisheries offices, and the name of fishing units which did not appear in the list were added in the form.

2) Thereafter, district fisheries officers interviewed some of the fishermen who were acquainted with fisheries in their communities to check whether or not the owners whose names appeared in the revised list were really engaged in trawl fishing. At the same time, when the answer was affirmative, questions were raised on the following items.

(i) The type of trawl fishing employed

(ii) The length of boat used

(3) Selection of Sample Fishing Units

Based on the revised list of trawl fishing units, a sample fishing unit was selected by means of a systematic random sample method. Consequently, 546 sample fishing units were obtained for the survey.

#### SURVEY ITEMS

(1) Fishing Boat

- 1) Name of boat
- 2) Length of boat
- 3) Gross tonnage
- 4) Horse power of main engine
- 5) Type of winch for drawing the warp
- 6) Number of crew

(2) Type and Size of Trawl Net

- 1) Type of trawl net
- 2) Size of trawl net
- 3) Mesh size of major parts of trawl net.

(3) Fishing Operation

- 1) Fishing area
- 2) Fishing season
- 3) Average number of trips per month
- 4) Average number of fishing days absent per trip
- 5) Average number of hauls per day
- 6) Average trawling hours per haul
- 7) Average catch and value per trip.

(4) Comparison of trawl operations between those of 1968 and 1963.

#### PUBLICATION OF THE RESULT

The result of this survey was published in a report entitled "Trawl Fishery in Thailand (Report on an Ad-hoc Survey on Trawl Fishery)" in March, 1969 by the Fisheries Statistics Section, Department of Fisheries.



### 1.3 ANNUAL SAMPLE SURVEY ON MARINE FISHERIES INVENTORY ITEMS (1969 and onward)

#### OBJECTIVES

The survey aims at providing the data on marine fisheries inventory items such as the number of fishing households, fishing manpower and fishing boats, and thus to clarify the change of structure on marine fisheries industry.

#### COMMENCEMENT OF THE SURVEY

The survey implemented for the first time in May 1970 by referring to the facts appeared during 1969, and a similar survey was carried out in 1971 consecutively. However, it was decided that the survey be conducted every three year after 1971 due to the fact that the structure of fisheries industry is not always changed so rapidly as it needs to conduct every year. Thus, the third survey would be conducted in 1974 for the year of 1973.

#### AREAL COVERAGE

The survey covers the marine fishing communities covered by the 1967 Marine Fisheries Census excluding the Pattalung Province.

#### SAMPLING UNIT

A fishing community is used as a sampling unit as same as the Fishing Community Survey for the Marine Fisheries Production Survey.

#### SELECTION OF SAMPLE

A sample fishing community is selected from the list which was secured in the 1967 Marine Fisheries Census in accordance with the geographical region and the size of community.

The entire coast is divided into five regions. Fishing communities are classified into three categories in accordance with the weighted number of fishing boats. Category of fishing community and corresponding weighted number of boats are as follows.

Category of Fishing Community	Weighted number of Fishing Boats
A	200 and over
B	100 to 200
C	1 to 100

For counting on weighted number of fishing boats in a community, one non-powered boat was counted one and one powered boat two.

For the allocation of a sample to regions and categories of fishing community, the Neyman's optimum allocation method was adopted. The total number of fishing communities and the number of sample fishing communities allocated for the survey of 1974 were shown in the table below.

Category of Community	Total number of Communities						Number of Sample Communities					
	Total	Region I	II	III	IV	V	Total	Region I	II	III	IV	V
Total	1,393	235	344	290	220	304	200	29	56	44	36	35
A	21	3	10	5	3	—	20	3	10	5	2	—
B	99	13	18	25	28	15	57	8	14	13	14	8
C	1,273	219	316	260	189	289	123	18	32	26	20	27

#### ENUMERATION METHOD

A complete enumeration is done for all households in the area of a sample fishing community regardless whether a household is engaged in fishing or not.

#### SURVEY ITEMS

The survey items are as follow.

1. Name of head of household
2. Type of household (whether a household was engaged in fishing in the previous year or not)
3. Type of fishing household
4. Fishing manpower
5. Fishing boats
6. Type of fishing method
7. Income source

(Note)

1. If a household was not engaged in fishing in the previous year the items from 3 to 7 would not be asked.
2. More details of the survey items are shown in the questionnaire attached in Appendix I.

#### ESTIMATION METHOD

The ratio estimation is applied with the following formula.

$$\hat{Y} = Y \times \frac{\sum_{k=1}^n x_k}{\sum_{k=1}^n y_k}$$

where  $\hat{Y}$  = Estimate of total number of fishing households

$Y$  = Total number of fishing households in the 1967 Fisheries Census

$x_k$  = Number of fishing households in the k-th sample community in the survey year

$y_k$  = Number of fishing households in the k-th sample community in the 1967 Fisheries Census

$n$  = Number of sample fishing communities

(Note)

Estimates of total number of fishing manpower and fishing boats are obtained by using the same formula above.

#### **PUBLICATION**

The results of the survey on marine fisheries inventory items in 1969 and 1970 were compiled into the report of the Marine Fisheries Statistics, 1969 and 1970.

### **1.4 SOCIO-ECONOMIC SURVEY ON SHRIMP FARMING (1972)**

#### **OBJECTIVES**

Development of shrimp farming is one of the major projects for the fisheries under the Third Economic and Social Development Five Year Plan (1972 - 1976).

The survey therefore aimed at providing an accurate list of the existing shrimp farms and necessary informations on the present situation of shrimp farming for the planning of shrimp farming development program.

#### **AREA COVERED**

The entire areas of Thailand were covered.

#### **DATE OF SURVEY**

February and March, 1973

#### **SURVEY STAFF**

The survey was conducted by officials working at the Fisheries Statistics Section with a help of those from the Marine Research Investigation Division and Fisheries Provincial Offices concerned.

#### **SURVEY ITEMS**

##### **(1) Listing Survey**

The following items were surveyed by means of a complete enumeration.

- 1) Name of head of household
- 2) Location of the farm
- 3) Total area of shrimp pond

##### **(2) Sample Survey**

The following items were questioned to the selected sample farms.

- 1) Name of family member
- 2) Income source of family

- 3) Area of land in use
- 4) Operational Status of shrimp farming
  - I. Manpower
  - II. Structure of shrimp pond (type of farming area of pond and water depth)
  - III. Year when shrimp farming was initiated
  - IV. Water gate and irrigation machine
  - V. Dike
  - VI. Water source
- 5) Production
- 6) Price of shrimp
- 7) Loan
- 8) Problems encountered
- 9) Assistance required from the Government

#### SURVEY METHOD

##### (1) Listing Survey

The list was obtained from a chief of Tombol by correcting the existing list of shrimp farms which had been made by the Fisheries Provincial Officer. In case where there could not get complete list from a chief of Tombol the list was prepared with the help of those who were acquainted with shrimp farming in Tombol.

##### (2) Sampling Survey

A Sample Survey was undertaken simultaneously together with the listing survey by means of an interview with sample farmers by referring to the fact appeared for the year of 1972. The sample farms were systematically selected for each Tombol as follows.

Total number of shrimp farms in a Tombol	Number of sample farms selected
1 - 5	complet enumeration
6 - 25	5
26 and over	One fifth of farms

Eventually, of 1,154 farms identified in the listing survey 285 farms were selected for the survey.

#### DEFINITIONS AND EXPLANATION OF MAJOR SURVEY ITEMS

##### (1) Shrimp farms

Establishment or household engaged in shrimp farming

##### (2) Area of shrimp pond

Area of shrimp pond including that of dike

(3) Water surface areas

Area of shrimp pond which are usually covered with water, and hence area exposed above water surface is excluded.

(4) Land areas by Tenure Status

Land area used for any purpose including shrimp farming during the past one year was surveyed by the following classification:

Owned : the land which was registered as owned land

Rented : the land which was rented from other person, cooperatives, Government, etc.

Occupied: the land which was occupied by himself without any permission from the Government.

### ESTIMATION PROCEDURE

The following two formula were used for estimation. Firstly the data were estimated by Tombol one by one and hence they were accumulated to provincial and national level.

(1) Yield and pond or land area

$$\hat{Y} = A \times \frac{\sum_{k=1}^n y_k}{\sum_{k=1}^n a_k}$$

where :  $\hat{Y}$  = Total estimate of yield

$A$  = Total area of shrimp pond in a Tombol

$y_k$  = Yield reported by the k-th sample farm

$a_k$  = Area of shrimp pond reported by the k-th sample farm pond or land area was estimated by the same formula.

(2) Items other than yield and pond or land area

$$\hat{\mu} = \frac{N}{n} \sum_{k=1}^n x_k$$

where :  $\hat{\mu}$  = Total estimate

$N$  = Total number of farms in a Tombol

$n$  = Number of sample farms in a Tombol

$x_k$  = The data reported by the k-th sample farm

### PUBLICATION

The result of the survey was relased by a report entitled "Shrimp Farming in Thailand".

## 2. FISHERIES PRODUCTION SURVEY

### 2.1 TRADITIONAL FISHERIES PRODUCTION SURVEY (1952 and onward)

#### COMMENCEMENT OF THE TRADITIONAL PRODUCTION SURVEY

The Department of Fisheries in Thailand was established in 1926 within the Ministry of Agriculture with a function of conserving natural fisheries resources. However, there was no systematic fisheries statistical collections until 1944. In 1944 an annual reporting system was set up to collect information and data for fisheries throughout the country. The catch data was a part among various informations and data collected in the system. The annual reporting system covered not only fishereies production data but also such informations and data as (1) activities of control, propagation and extension at province (2) situation of fisheries industry including processing (3) general information of fishermen (4) other statistics concerning fishery (5) plans which provincial governer is going to implement in next year and (6) idea to be taken into account for the development of fishery. Owing to a very sophisticated nature of the annual reporting system in terms of the number of informations the system completly revised in 1952 and hence the catch data collection system became independent being away from collection of other informations.

#### DATA COLLECTION METHOD

However, so far no instruction as to how to collect data has been prepared with an exception of forms to be used for reporting figures. The following is real collection method currently practiced.

A provincial officer who received forms from Department of Fisheries is forced to collect data in his jurisdiction by himself or with a help of his district officer. As there is no special field setup to collect the catch data, he has to fill out the forms with his knowledge obtained through his day-to-day administration work. Thailand at present is administratively divided into 71 provinces, of which certain provinces do not have either provincial or district fisheries officer due to a less importance of the fishery. In such province a revenue officer is responsible for the work, which naturally resulted in low accuracy of data reported.

#### SURVEY ITEMS

Survey items placed in the forms were revised three times since 1944 in accordance with the development of the fisheries and the requirement of the Indo-Pacific Fisheries Council (IPFC) and the Food and Agriculture Organization (FAO) of the United Nations.

##### (1) From 1944 to 1951

Species classification was not given but it was left to provincial officer. Also, no fishing gear classification was applied.

(2) From 1952 to 1964

Species classification and disposition channels as given below were introduced for the first time.

SPECIES (Marine Fish)	DISPOSITION (Both Marine and Fresh Water Fish)
Mackerels	Fresh Consumption
Sharks	Dried and Salted
Miscellaneous Fish	Steamed or Smoked
Prawns, Shrimps and Crabs	Shrimp Paste
Molluscs	Fish Sauce
(Fresh Water Fish)	Others
Air Breathers	
Carps	
Miscellaneous Fish	
Prawns	

(Note)

The forms completed were supposed to be forwarded to the Department of Fisheries from Provincial Office for every three months and figures reported must have been based on those reported by fishermen to whom a fishery licence were issued. However, such a practice was not well followed, and hence at a late stage the forms completed were sent to the Department only once a year.

(3) From 1965 to Present

Contents of species classification and disposition channels were expanded as below.

SPECIES (Marine Fish)	DISPOSITION (Marine Fish)
Indo-Pacific Mackerel	Fresh Consumption
Indian Mackerel	Frozen
Sharks	Dried and Salted
Rays	Steamed or Smoked
Miscellaneous Fish	Shrimp Paste
Trash Fish	Dried Shrimp
Shrimps	Fish Meal
Lobsters	Fertilizer
Acetes	Fish Sauce
Crabs	Others

SPECIES	DISPOSITION
Shellfish	(Fresh Water Fish)
Squid and Cuttlefish	Fresh Consumption
Seaweeds	Dried and Salted
Sea Cucumber	Steamed or Smoked
(Fresh Water Fish)	Fermented
Snake-head Fish	Shrimp Paste
Catfish (Pla duk)	Dried Shrimp
Climbing perch (Pla mae)	Fish Meal
Swamp Eel	Fertilizer
Common Carp	Fish Sauce
Chinese Carp	Others
Sepat Siam	
Cat fish (Pla swai)	
Miscellaneous Fish	
Prawn	
Others	

#### PUBLICATION

A report entitled "the fisheries Record of Thailand" was published for the first time in September, 1959 covering catch data from 1952 to 1958. Since then, the Record has been published annually. Unfortunately the catch data before 1952 have never been published in any form of report.

#### (Note)

The above survey has still been continuing even after a new marine catch survey was launched in 1969. The reason is not to lose the continuation of fisheries production figures disclosed in the past. However, it is intended that this survey in the field of marine fishery is discontinued in the near future when the new survey have been well stabilized.



## 2.2 MARINE FISHERIES PRODUCTION SURVEY (1969 and onward)

### INTRODUCTION

As envisaged earlier, with the use of results of the 1967 Marine Fisheries Census a new marine fisheries production survey which was basically designed on sample theory was launched in 1969. As a matter of fact, the commencement of the new survey which was supposed to be right after the 1967, it was considerably delayed due to certain difficulties for securing a new budget and for the recruitment and training of new field personnels.

### OBJECTIVES

The objectives of the survey is to secure data necessary for fisheries administration and fish stock assessment by providing catch data by species and fishing efforts for each type of fishing gear.

### COMMENCEMENT OF THE SURVEY

The survey was commenced in May, 1969 although it was initially intended to be started from January, 1969 to cover the entire calendar year of 1969. This was resulted from the delay of the preparatory work and the shortage of the national budget. For the same, the survey launched in 1969 could cover only the capture of marine fisheries leaving the coastal culture. Unfortunately the new survey for 1970 again encountered a shortage of budget, and the survey could cover only for the period from June to December 1970. Thus, the new survey was fully implemented only from 1971 covering the entire calendar year.

### FIELD ORGANIZATION

The survey is conducted through the field setup of the Department of Fisheries, in which five supervisors and 73 enumerators have been assigned to this survey.

### COVERAGE

The survey covers all types of marine fisheries including mariculture.

### STRUCTURE OF SURVEY

Marine fisheries in Thailand are broadly classified into three categories; (1) Large scale (off shore) fisheries in which the number of fishing units is relatively limited but the productivity per fishing unit is quite high, (2) small scale (coastal fisheries) which are scattered along the entire coast of the country but the productivity is generally low and (3) some special fisheries like sea mussel collection and marine culture which appear in certain limited area. Taking into account those fact, the survey is divided into three types of survey as follows:

Type of Survey	Type of Fisheries Covered
1. Log Book Survey	1. Otter Board Trawl 2. Pair Trawl 3. Beam Trawl 4. Push Net 5. Thai Purse Seine 6. Chinese Purse Seine 7. Anchovy Purse Seine 8. Mackerel Encircling Gill Net 9. Spanish Mackerel Gill Net 10. Bamboo Stake Trap
2. Fishing Community Survey	The survey covers all types of fishing method which are not covered by the Log Book Survey as mentioned above and the special survey as mentioned below.
3. Special Survey	1. Collecting Shellfish, Seaweed, Seacucumber and Turtle egg, etc. 2. Culture (1) Shrimp (2) Oyster (3) Sea mussel (4) Ark shell

(Note)

As a matter of fact the survey was started in 1969 with two survey, i.e. (i) Log book survey and (ii) fishing community survey, both of which were monthly survey. Initially, the log book survey covered only otter trawl, pair trawl, purse seine and bamboo stake trap fisheries. However, its coverage was enlarged as seen in the above table. On the other hand, since the fishing community survey which is a sample survey using fishing community as a sampling unit could not cover well some fisheries which appear in some limited communities, a special survey was independently established. It must be, therefore, noted that the description given below are referred to the latest status of the survey.

#### DETAILS FOR EACH TYPE OF SURVEY

In general there are two approaches for the collection of catch data; one is to approach to fishermen and the other to approach to fish dealers who might maintain the records of his fish transaction. In the new survey the former approach was adopted, since it was considered that the survey might be able to receive better cooperation from fishermen than fish dealers.

#### (1) LOG BOOK SURVEY

##### 1) Survey Objects

The survey is applied to major types of fishing method. In 1971, the estimated catch from the Log Book Survey was about 70% of the total catch.

When the survey was commenced in 1969, the survey covered only 5 types of fishing method, i.e. Otter Trawl, Pair Trawl, Thai Purse Seine, Chinese Purse Seine and Bamboo Stake Trap. However, in 1973 the number of fishing methods covered by this survey was increased to 10 as shown in the previous table. In the future the coverage of the Log Book Survey may be further expanded by shifting some of fisheries which are currently covered by the Fishing Community Survey. The reasons are as follows:

(1) Comparing with the Fishing Community Survey the Log Book Survey can provide estimate at a higher accuracy.

(2) For estimation of fishing effort data the Log Book Survey is much easier than the Fishing Community Survey.

## 2) Sampling Unit

In the survey, a fishing unit is regarded as a sampling unit. A fishing unit is defined as a technical unit for a fishing operation normally consisting of boats, gear and crew. In the case of pair trawl, two boats forms one fishing unit. As for chinese purse seine, one mechanized boat and two non-powered boats is regarded as a fishing unit. Each set of bamboo stake trap is regarded as one unit.

A complete list of fishing units is obtainable through the record of Fishing Gear Registration the system of which was set up in March 1970. (See the appendix attached in the end of this section).

### POPULATION AND SAMPLE SIZES IN 1973

Type of Fishing Method	Strata	Total Number of Fishing Units Registered	Number of Sample Fishing Units Allocated
Otter Trawl	Total	3,185	169
	-14 m.	1,323	16
	14-18 m.	1,321	50
	18-25 m.	463	60
	25 m. -	78	43
Pair Trawl	Total	351	56
	-14 m.	50	3
	14-18 m.	174	27
	18 m. -	127	26
Beam Trawl	*	599	35
Thai Purse Seine	Total	371	58
	-14 m.	84	3
	14 m. -	287	55
Chinese Purse Seine	*	66	8
Anchovy Purse Seine	*	62	12
Mackerel Encircling Gill Net	*	254	22
Spanish Mackerel Gill Net	*	138	28
Push Net	*	1,327	111
Bamboo Stake Trap	*	319	37

\* No stratification is applied.

### 3) Enumeration Method

The operator of sample fishing unit is requested to keep a record of catch and fishing efforts for each trip by means of a log book. Such a record is verified by enumerator with an invoice of fish transaction kept by the operator. However, in the case of Beam Trawl and Push Net fishings, the operators do not always keep an invoice of fish transaction. Therefore, a sample operator is asked by the enumerator about the number of fishing days and average catch per day in the previous month from which catch is estimated.

### 4) Type of Questionnaire and Survey Items

Four types of questionnaire are in use for the Log Book Survey so as to fix operational condition of each fishery. These are:

- (1) Otter Trawl and Pair Trawl
- (2) Thai Purse Seine, Chinese Purse Seine, Anchovy Purse Seine, Mackerel Encircling Gill Net and Spanish Mackerel Gill Net
- (3) Bamboo Stake Trap
- (4) Beam Trawl and Push Net.

The survey items placed in those questionnaires can be seen in Appendix I.

### 5) Estimation Method

The estimation method adopted in the Log Book Survey is as follows.

1. A simple estimation is applied with the following formula.

$$\hat{\bar{X}} = \frac{N}{n} \sum_{k=1}^n x_k$$

Where  $\hat{\bar{X}}$  = Estimate of Catch

$N$  = Total number of fishing units

$n$  = Number of fishing units

$x_k$  = Catch of the  $k$ -th sample fishing unit

(Note) For the estimation of the number of trip, fishing days and haulings the same formula is applied.

2. The estimation work is done at the office of the Fisheries Statistic Section on monthly basis after all questionnaires were recovered from the enumerators and scrutinized by the supervisors and the number of fishing units registered for the year were become available.
3. Monthly data so estimated are accumulated to derive an annual total.
4. The number of fishing units actually operated in each month may varies from month to month. However, due to the shortage of field staff and the absence of fisheries cooperative such figures are not obtainable. Therefore, for the estimation of monthly figures the number of fishing units registered in the year ( $N$ ) are used always constant. This may, therefore, have resulted in some bias to the estimates.

## (2) FISHING COMMUNITY SURVEY

### 1) Survey Objects

The survey is applied to small scale fisheries, which consists of a variety of small fishing gears.

### 2) Sampling Unit

A fishing community identified in the 1967 Marine Fisheries Census 1967 is used as a sampling unit.

### 3) Selection of Sample Fishing Communities

For the purpose of fisheries statistics, the entire coast of Thailand is divided into five region as described in the survey on fisheries inventory items previously. Within each region fishing communities are stratified into A and B in terms of the weighted number of boats.

For allocation of the number of sample fishing communities to region and A and B fishing communities the Neyman's Optimum Allocation is applied.

NUMBER OF SAMPLE FISHING COMMUNITIES ALLOCATED 1973

Region	Total		A Strata		B Strata	
	Total Number of fishing communities	Number of sample fishing communities	Total Number of fishing communities	Number of sample fishing communities	Total Number of fishing communities	Number of sample fishing communities
Total	1,268	366	105	89	1,163	267
I	211	49	11	10	200	39
II	291	90	27	26	264	64
III	278	76	27	20	251	56
IV	203	75	28	22	175	53
V	285	66	12	11	273	55

(Note)

For deriving the weighted number of fishing boats for each fishing community the weight for non-powered boat and powered boat is considered as 1 and 2 respectively. Then, fishing communities with more than 100 and those with less than 100 are stratified into A and B respectively.

### 4) Enumeration in A sample Fishing Community

The enumeration for each sample fishing community is done only once a year in January with the following two steps to estimate catch by gear and by species in the previous year.

#### 1. Listing Survey

At first a complete list of the fishing households in the previous year is prepared with a help of chief of the community or some fishermen who are acquainted with fishing status in the community. Then for each fishing household the type of fishing method employed in the previous year is enquired.

## 2. Production Survey

- (1) Based on the results of the listing survey at least five fishing households each are selected at random from each type of fishing method.
- (2) Then, an enumerator visits sample fishing households and ask such survey items as;
  1. Fishing seasons (total number of months in operation)
  2. Average monthly catch
  3. Species composition (% of the total)

With the use of these figures an annual catch by species for each sample fishing household is estimated. (See the questionnaire in Appendix I)

(3) After completion of the field work an enumerator submits the questionnaire together with the list to the Fisheries Statistic Section.

(4) In the Fisheries Statistic Section the catch by species and by type of fishing method for each sample fishing community is estimated by using the following formula.

$$\hat{\bar{X}}_j = \sum_{k=1}^n x_k \frac{N}{n}$$

where  $\hat{\bar{X}}_j$  = Estimate of catch for the j-th sample community

N = Total number of fishing households

n = Number of sample fishing households

$x_k$  = Catch for the k-th sample fishing household

## 5) Estimation Method

For each type of fishing method the total catch is estimated with the following formula.

$$\hat{\bar{X}} = \frac{M}{m} \sum_{j=1}^m \hat{\bar{X}}_j$$

where  $\hat{\bar{X}}$  = Estimate of catch

M = Total number of fishing communities

m = Number of sample fishing communities

j = Catch for the j-th sample fishing community

The above estimation is separately done for each type of fishing method and region.

## 6) Additional Note for Fishing Community Survey

Until 1972 the survey was conducted on monthly basis with a sample of about 200 fishing communities. As a result, it was noted that there were two points, for which some improvements had to be made. One was that in spite of the fact that the survey spent 70 % of the total travel expense, catch estimated from the survey was only 10 % of the total catch. Furthermore, due to an uneasy accessibility of some sample fishing communities the enumerators encountered a great difficulty in keeping a regular monthly survey. The other was that in spite of a variety of fishing methods in use which often varies from community to community the number of fishing communities selected were relatively small, resulting a great difficulty for estimating catch by type of fishing method even at regional level.

It was, therefore, decided that from 1973 and onward the survey be conducted on yearly basis with a view of raising survey efficiency for the marine catch survey as a whole. This will, no doubt, cope with the principle of Neyman's Optimum Allocation, by which a given cost will be optimally allocated to large and small scale fisheries in accordance with the size of their catches. It was, further, decided that the sample size of fishing communities be increased from 200 to 357 so as to ensure the estimation of catch by type of fishing method.

### (3) SPECIAL SURVEY

#### 1) Survey Objects

Until 1970 survey objects of this survey were supposed to have been covered by the fishing community survey. However, this special survey was newly established in 1971, since it was noted that the community survey could not well cover shellfish, seaweeds, sea cucumber, turtle eggs, etc. which are produced in very limited areas.

#### 2) Enumeration Method

Prior to an enumeration a list of the fishing villages which produce above unusual species is prepared according to the informations collected through the Provincial Fisheries Officers. Some staffs of the Fisheries Statistics Section visit the fishing villages identified in every January, and collect respective data of the previous years. No specific questionnaire is in use for this survey. However in order to avoid any unreasonable error the enumerators are urged to contact as many local people as possible covering both fishermen and fish dealers, and collect not only catch data but also data closely related to catch such as fishing season, fishing condition, cost of operation, etc. as checking materials. In principle, catch is estimated as a product of either average catch and number of fishermen or average quantity transacted per fish dealer and number of fish dealers.

The table below shows the number of fishing villages which are concerned with the production of these unusual species.

NO. OF FISHING VILLAGES PRODUCING UNUSUAL SPECIES, 1972

Name of Species	Number of Province concerned	Number of Fishing Communities concerned
Shellfish		
Ark shell	9	18
Sea mussel	6	8
Oyster	7	10
Horse mussel	5	6
Short necked clam	6	6
Jack knife clam	1	1
Other shell	2	2
See weed	3	6
Jellyfish	3	3
Sea cucumber	2	3
Turtle Egg	4	22

(Note) Shrimp farming is not included in the above table.

## PUBLICATION

The statistical reports so far published are as follows.

1. The Marine Fisheries Statistics, 1969
2. " , 1970
3. " , 1971
4. " , 1972

The contents of the statistical tables for each report are as follows.

1. Annual catch by type of fishing method and by species
2. Monthly catch
  - 2.1 Catch by type of fishing method
  - 2.2 Catch by species
  - 2.3 Catch by species for each type of fishing method
3. Catch by region
  - 3.1 Catch by type of fishing method
  - 3.2 Catch by species
4. Catch and fishing efforts for each major fisheries

The classification of type of fishing method and species, the divisions of region and fishing area adopted in the survey can be seen in the end of this section.

## ANNEX 1. FISHING GEAR REGISTRATION

The Fishing Gear Registration is undertaken under the Ministerial Notification and Order of the Department of Fisheries.

### MINISTRIAL NOTIFICATION

Subject : The owner or the Possessor of the fishing gear must register his or her fishing gear in possession.

The Ministry of Agriculture deems appropriate to improve fisheries statistics work so as to acquire reliable fisheries statistics data to be used for the development of fisheries, conservation of the resources, and the assistance for fishermen in economic, financial and investment aspects in accordance with the national social and economic development program.

Therefore, according to Article 26 of the Fisheries Act B.E. 2490 the Minister of Agriculture is empowered to announce and enact as follows :—



1. The owner or possessor of the otter-board trawl fishing gear, bull or pair trawl fishing gear, beam trawl fishing gear, Thai purse seine fishing gear, Chinese purse seine fishing gear, Spanish mackerel drift net or chub mackerel gill net or fishing gear under other names which have similar function and operation to the above-mentioned ones, who wishes to use the said fishing gear for fisheries must register his or her possession of the said gear and at the same time, must submit his or her application for a permit to operate the said fishing gear to the authority at the District Office where the applicant has domicile, or to the authority at the District Office where the application for a permit to use fishing gear is made.

2. In registering the fishing gear in possession according to 1. the owner or the possessor of the fishing gear, who received the permit to operate the fishing gear prior to the date of this notification and wishes to continue operating the said fishing gear, must submit his or her application to the authority within 1st April to 30th May of every year.

For those who have their fishing gear constructed after 30th May and wish to use the said gear for fisheries, may have their gear registered after the said date in accordance with procedure of the Department of Fisheries.

3. In registering the possession of fishing gear according to this notification, the registration must be made once for every twelve months starting from 1st April to 31st March, and if the registration is to be made after 1st April of the year of registration, the registration made in this period must expire on 31st March of the next year.

4. The Director-General of the Department of Fisheries is empowered to lay out the procedures for registration of the fishing gear such as, registration and conditions of the registration as well as assignment of duty to the officials and others, so as to satisfy this notification as it seems appropriate.

This notification shall come into force after the expiration of thirty days from the date notified in accordance with Article 60 of the Fisheries Act, B.E. 2490 on.

#### ORDER OF THE DEPARTMENT OF FISHERIES NO. 87/1970

Subject : Procedures for registering the fishing gear in possession

Following the notification of the Ministry of Agriculture dated 9 March 1970 that the owner or the possessor of fishing gear in possession, the Director-General of the Department of Fisheries is empowered to lay out the procedures for registering the fishing gear in possession, such as acceptance of application and conditions of registration, as well as the assignment of duty to the officials and others, as he deems appropriate. The Department of Fisheries has therefore laid out the procedures as follows :-

Any person who wishes to apply for registration of fishing gear in possession in accordance with the notification of the Ministry of Agriculture dated 9 March 1970 concerning that the owner or the possessor of fishing gear must register his or her fishing gear in possession, must submit his or her application to the authority at the District Office where the applicant has domicile, or the authority at the District Office where the applicant operates the fisheries in accordance with the following conditions :-

1. Application for the registration of fishing gear in possession must be made by using the application form of the Department of Fisheries, and submitted together with the application for a permit to operate the fishing gear.

2. In case that the owner or the possessor of fishing gear is unable to submit the application by himself or herself according to No.1, he or she may authorise another person by using re-authorization form of the Department of Fisheries.

3. When the application form is received by the authority, and considered to be correct according to the procedures, official seal must then be made and registration number will be given on the back side of fishing gear permitted and signed by chief of the district (the sheriff) in the seal column evidence.

4. When the official of the District Office has performed registration correctly in No.3, the registration following the form of the Department of Fisheries together with copies of application form for each registrant must be reported to the Department of Fisheries within seven days after the date of registration.

5. When the Department of Fisheries has been notified regarding the registration in No.4, the authority concerned, Division of Fisheries Administration, must inform the chief of the District office (the sheriff) where the registrant has domicile, of the registration made, and send the registration documents to the Statistics Section for filling.

6. Local District officers must prepare the registration form regarding the possession of fishing gear following the form of the Department of Fisheries by separating one form for the registrant who has domicile outside the District and one form for that who is inside the District which must be kept at the district fisheries office each registration year, and copies of the registration must also be sent to the Provincial Fisheries Office for information.

These procedures shall come into force from 1 April 1970 onward.

Given on 17 March 1970

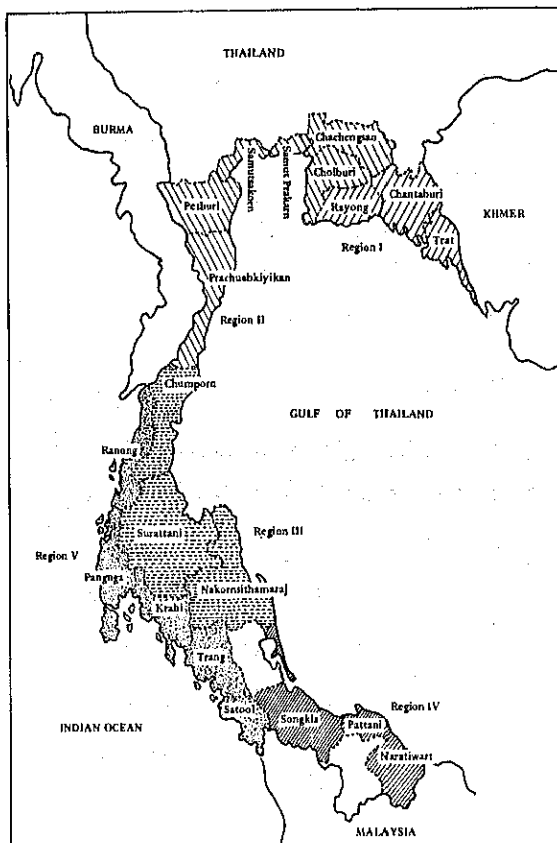
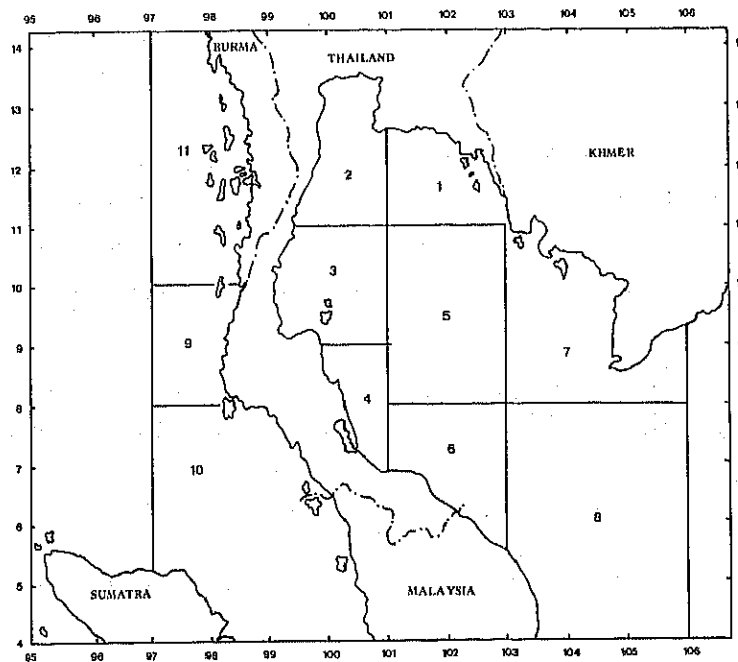
## ANNEX 2. CLASSIFICATION OF TYPE OF FISHING METHOD

Type	English Name	Thai Name
Trawl	Otter board trawl	Uan-Lak-phan-ta-khe
Purse Seine	Pair trawl	Uan-lak-khu
	Beam trawl	Uan-lak-khan-thang
	Thai purse seine	Uan-dum, Uan-cha-lom
	Chinese purse seine	Uan-thang-ke
	Anchovy purse seine	Uan-lom-chub-pla-katak
Gill Net	Spanish mackerel gill net	Uan-loi-pla-in-si
	Pomfret gill net	Uan-loi-pla-cha-la-med
	Mackerel encircling gill net	Uan-tid-pla-tu
	Shrimp gill net	Uan-loi-kung
	Other gill nets	Uan-loi-un-un
Luring Lift Net	Luring lift net	Uan-sang
Other Mobile Nets	Squid cast net	Hae-pla-muk
	Push net	Uan-run
Hook and line	Long line	Bed-rao
	Hook	Bed-tok
Stationary Gear	Bamboo stake trap	Po
	Set bag net	Phong-pang
	Wing set bag net	Rua-sai-man
	Edd tide bamboo stake trap	La-mu
	Shrimp bamboo fence trap	Mo-ra
	Fish trap	Lop-pla
	Crab trap	Yo-pu, Roco-pu
Culture and Other Fishings	Shellfish collecting	Kep-hoi, Ngom-hoi
	Other fishing	Karn-pra-mong un-un
	Shrimp Culture	Liang-kung

# ANNEX 3. CLASSIFICATION OF SPECIES

Thai Name	English Name	Scientific Name
Pla Too	Indo-pacific mackerel	Rastrelliger neglectus
Pla Lang	Indian mackerel	Rastrelliger kanagurta
Pla In-See	Spanish mackerel	SCOMBEROMORUS
Pla Dab-lao	Dorab	Chirocentrus dorab
Pla O	Bonito	THUNNIDAE
Pla Too-keg	Russel's scad	Decapterus russelli
Pla Keang-kai	Torpedo travally	Megalaspis cordyla
Pla Si-kul	Caranx	CARANGIDAE
Pla Ku-rao	Treadfin	POLYNEMIDAE
Pla Lang-kieo	Sardine	Sardinella spp.
Pla Ka-tak	Anchovy	Anchoviella spp.
Pla Ka-bok	Mullet	MUGILLIDAE
Pla Chalamed-dum	Black pomfret	Parastromaleus niger
Pla Chalamed-kao	White Pomfret	Pampus argenteus
Pla Bai-kha-nun	Silvery lactarid	Lactarius lactarius
Pla Num-dok-mai	Baracuda	Sphyræna spp.
Pla Chuad	Jewfish	SCIAENIDAE
Pla Sai-dang	Threadfin bream	Nemipterus spp.
Pla Sai-kao	Monocle bream	Scolopsis spp.
Pla Pak-kom	Lizard fish	Saurida spp.
Pla Dab-ngoen	Hair tail	Trichiurus haumela
Pla Ka-pong	Snapper	LUTIANIDAE
Pla Soy-nok-kuo	Painted sweet lip	PLECTORHYNCHIDAE
Pla Tato	Big eye	Priacanthus tayenus
Pla Hed-khon	Whiting	Sillago spp.
Pla Duk-tale	Marine striped catfish	Plotosus spp.
Pla Kod-tale	Marine catfish	TACHYSURIDAE
Pla Ka-ben	Ray	TRYGONIDAE, MYLIOBATIDAE
Pla Chalarm	Shark	SPHYRNIDAE, CARCHARHIIDAE
Pla Loei	Miscellaneous fishes	ORECTOLOBIDAE
Pla Ped	Trash fishes	—
Kung Chae-bauy	Wite shrimp	Penaeus merguensis P.indicus
Kung Kula-dam	Jumbo shrimp	Penaeus monodon
Kung Kula-lai	Tiger shrimp	Penaeus semisulcatus
Kung Luang	Yellow shrimp	Penaeus latissulcatus
Kung Ta-kad	Pink shrimp	Metapenaeus spp.
Kung un-un	Other shrimp	—
Kang Ka-dan	Lobster	Thenus orientalis
Koei	Acetes	Acetes spp.
Poo Ma	Swimming crab	Portunus pelagicus
Poo Tale	Mangrove Crab or Blue Crab	Scylla spp.
Muk Khuai	Squid	Loligo spp.
Muk Kra dong	Cuttle fish	Se pia spp.
Muk Sai	Octopus	Octopus spp.
Hoi Klang	Ark shell	Arca spp.
Hoi Malangpoo	Sea mussel	Mytilus smaragdinus
Hoi Nang-rom	Oyster	Crassostrea spp.
Hoi Ka-pong	Horse mussel	Modiolus spp.
Hoi Lai	Short necked clam	Puphia spp.
Hoi Seab	Jack knife clam	Sinovacula spp.
Hoi un-un	Other shellfish	—
Mang Ka-prun	Jelly fish	Rhopilema spp.

#### ANNEX 4. DIVISION OF FISHING AREA



#### ANNEX 5.

#### DIVISION OF FISHERIES STATISTICAL REGION

## 2.3 SURVEY ON MAJOR FISH LANDING CENTER ( 1973 and on word)

### INTRODUCTION

The marine fishery production survey as referred in the previous section can provide fishery production figures at regional as well as national level. However, the fishery administration often requires the size of fish landings and associated data at least for major fish landing centers for the purpose of providing fisheries infrastructural facilities such as fishing port, cold storage, ice plant, transportation means, fish processing plant, etc. The survey was, therefore, created to meet such requirement.

### OBJECTIVES

The survey aims at providing the data on fish landings by species in both quantity and value on monthly basis, and thus clarifying the magnitude of fish landings and the trend of fish price for each major fish landing center in the country.

### COVERAGE

The following major fish landing centers totalling 17 were selected for the survey as a first step.

#### THE MAJOR FISH LANDING CENTERS SELECTED

Region	Name of Fish Landing Center
I	<u>Muang</u> and <u>Klongyai</u> in Trad Province <u>Thachalab Muang</u> and <u>Lamsing</u> in Chantavuri Province <u>Ban Pae Muang</u> in Rayong Province
II	<u>Paknam Muang</u> in Samut Prakan Province
III	<u>Paknam Chumpon</u> and <u>Paknam Lungsuan</u> in Chumpon Province <u>Pagpanang</u> and <u>Sichol</u> in Nakonsrittamara Province
IV	<u>Muang</u> in Songkhla Province <u>Muang</u> in Pattani Province
V	<u>Muang</u> in Ranong Province <u>Muang</u> in Puket Province <u>Kantang</u> in Trang Province <u>Muang</u> in Satul Province

## COMMENCEMENT OF SURVEY

The survey was commenced in May 1973.

## FIELD ORGANIZATION

The survey is carried out through the same field set up as described with the Marine Fisheries Production Survey.

## SURVEY OBJECTS

Owing to the absence of well organized fish market in the majority of fish landing centers, fish are usually landed through a pier which was privately constructed by either fishing operator or fish dealer. Normally, a good number of such private owned piers are found in a same fish landing center.

In the survey the owner of such a pier is used as the survey object. However, in view of saving the work load of enumerators only major pier owners are selected as the survey objects in order that the total quantity of fish transacted through such major piers may be exceeded about 80% of the total landings at the selected fish landing center.

## ENUMERATION METHOD

The survey consists of the following two component.

### (1) Survey on Number of Fishing Boats Landed through Piers

All pier owners selected are requested to inform the number of fishing boats landed through their piers in the previous month to the enumerator.

### (2) Survey on fish landings

Limiting to every Wednesday all pier owners are requested to inform the fish landings in quantity and value to the enumerator.

## SURVEY ITEMS

The survey items are as follows (For detail see the questionnaires in Appendix I).

### (1) Survey on Number of Fishing Boats Landed Their Catch

Number of fishing boats landed fish by type of fishing method

### (2) Survey on Fish Landings

Fish landings by species and by type of fishing method in both quantity and value

(Note) 1. Types of fishing method is simply divided into three types i.e. Trawl, Purse Seine and Others.

2. Classification of species is the same as the classification in use for the Marine Fisheries Production Survey.

## ESTIMATION METHOD

Fish landing is estimated with following formula.

$$\hat{X} = \frac{N}{n} \sum_{k=1}^n x_k$$

where  $\hat{X}$  = Estimate of fish landings

$N$  = Total number of fishing boats landed their catch in a month

$n$  = Number of fishing boats landed their catch on Wednesdays

$x_k$  = Fish landings of the k-th fishing boat on Wednesdays

Firstly the fish landings is estimated by type of fishing method, and then the estimates is aggregated into total.

## PUBLICATION

The report dealing with the survey will be issued in August 1974.

## 2.4 INLAND FISH FARM PRODUCTION SURVEY (1974)

### OBJECTIVES

Capture of fisheries resources in inland water which was once an important sector of Thai fisheries is now becoming of less importance due to the development of irrigation system. On the contrary fish farming has made in recent years a steady growth, but the statistics necessary for the planning of fisheries development program for this sector is entirely lacking.

The survey aims, therefore, at providing the following data:

- (1) Number of farms, Number of farming units and farming area by type of farming and
- (2) Yield and fish seeds released in both quantity and value.

### AREAL COVERAGE

The survey should cover the entire area of the country from the view point of its objectives. However, the areal coverage in 1974 is limited to the 28 provinces out of 71 total provinces due to the limited manpower and budget available. It is however, expected that the survey will cover the remaining provinces as soon as additional manpower and budget become available.

### FIELD ORGANIZATION

For the development of fish farming the Inland Fisheries Division of the Department of Fisheries has established 20 inland fisheries stations throughout the country. The survey, therefore, makes best use of such a field setup as its field organization. However, some staffs working at the Department of Fisheries are also utilized to fulfill the field works. To ensure the implementation of the field enumeration precisely 17 working teams was organized as seen in the table below.

Working Teams	Area assigned
Extension Service Section Fisheries Development Unit for the area under the developed irrigation system	Bangkok, Chachengsao Chainat (a part of the province) Nakornnayok, Nakornpatom, Nonthaburi, Pathumthani, Ayuthaya, Peaburi, Lopburi, Saraburi, Singburi, Angthong Supanburi
Chiengmai I.F.S.	Chiengmai
Chiengrai I.F.S.	Chiengrai
Tak I.F.S.	Tak
Nakornsawan I.F.S.	Nakornsawan (a part of the province)
Chainat I.F.S.	Chainat (a part of the province)
Khonkean I.F.S.	Khonkean
Mahasarakan I.F.S.	Mahasarakan
Sakonakon I.F.S.	Sakonakon
Surin I.F.S.	Surin
Nongkhai I.F.S.	Nongkhai
Udonthani I.F.S.	Udonthani
Ubolrajdhani I.F.S.	Ubolrajdhani
Nakornrajsima I.F.S.	Nakornrajsima
Kalasin Extension Service Unit	Kalasin
Pattani I.F.S.	Pattani

I.F.S. : Inland Fisheries Station

#### TYPE OF SURVEYS

The survey consists of the following component :

(1) Listing Survey

The complete list of existing fish farms throughout the provinces covered are prepared prior to the sample survey. Furthermore, during the course of the listing survey the number of farms, number of farming units and farming area are sought for each type of fish farming.

(2) Sample Survey

The sampling survey is conducted for selected fish farms, and yield and fish seeds released are sought.



### TIME REFERENCE

Both the listing survey and sample survey are conducted in the period from February to May 1974 referring to the fact appeared in the past one year.

### SURVEY ITEMS

(1) Listing Survey (See a form in appendix I)

- 1) Name of farm owner
- 2) Address of farm
- 3) Type of farming
- 4) Number of farming units
- 5) Farming area
- 6) Major species of fish

(2) Sampling Survey (See a form in appendix II)

- 1) Size of farm
- 2) Yield
- 3) Fish seeds released

### SURVEY PROCEDURE

(1) Listing Survey

The following two steps are followed :

1) Identification of Tambol (Village)

At first a list of Tambols which involve any number of fish farm is prepared with the help of

- a. Local governmental organization
- b. Record of extension service kept by a Fisheries Station and
- c. Any other person who is acquainted with fish farming.

2) Listing

Then, for every Tambol so identified a complete list of fish farming is prepared by means of an interview with the chief of community, which is an ultimate administrative setup within a Tambol. Such a list is further verified with the use of the record of extension service kept by a Fisheries Station.

(2) Sample Survey

A sample of fish farms are selected systematically for each Tambol during the course of the listing survey, and an interview is made with sample farms with the use of questionnaire. The sampling ratios adopted are given in the table below.

Total Number of Fish Farms by Type of Fish Farming in a Tambol	Sample Size
1-4 farms	1
5-9	2
10-14	3
15-19	4
20 and over	One in every five farms

The sample farms are selected according to the type of fish farming regardless its size and species under culture. Therefore, for example when in a same Tambol there are five fish farms of which 2 are for pond culture 2 for paddy culture and 2 for cage culture, a sample is selected one each from each type of farming.

#### ESTIMATION

Questionnaires completed are scrutinized by each working team, and then are submitted to the Fisheries Statistical Section, where estimation work is done in cooperation with the Inland Fisheries Division, Department of Fisheries.

The following formula is used for the estimation of yield.

$$\hat{Y} = A \times \frac{\sum_{k=1}^n x_k}{\sum_{k=1}^n a_k}$$

where  $\hat{Y}$  = Estimate of yield

A = Total farming area

$x_k$  = Yield of the k-th sample

$a_k$  = Farming area of the k-th sample

Items other than yield are also estimated with the same formula above.

#### DEFINITION AND EXPLANATION OF MAJOR SURVEY ITEMS

##### (1) Farm

A farm refers to a management unit of fish farming, and it is generally a household. The farm which produce fish seeds is also included into the category.

##### (2) Farming Unit

A farming unit refers to a smallest operation unit for fish farming, in which an independent fish culture operation takes place. Hence, an individual pond, piece of parcel, a portion of ditch and a unit of cage are considered as a farming unit.

##### (3) Type of Fish Farming

According to the difference of culture facilities a fish farming is classified into as follows :

1. Pond culture
2. Paddy field culture
3. Non-paddy field culture
4. Ditch culture
5. Cage culture

##### (4) Yield

Yield includes all fish harvested including those consumed at home. And, also the fish which were harvested as fish seeds to sell them to the other farms are included.

Furthermore, the fish which were naturally introduced into pond and harvested are also included.

##### (5) Fish Seeds Released

Fish seeds released refers to that put into the farming units for rearing.

### 3. COST AND EARNING SURVEY

#### 3.1 COST AND EARNING SURVEY ON TRAWL FISHERY (1969)

##### INTRODUCTION

In early 1960's, the trawl fishery developed rapidly and in 1969 the number of trawlers exceeded 3,000 units. However, according to the result of a research boat survey, the catch efficiency of trawlers in the Gulf of Thailand was decreasing yearly. And, there was a tendency that the fishing ground would shift from the Gulf of Thailand to the west coast of the Malay peninsula, and that the trawlers would accordingly enlarge their size so as to sail outside the Gulf of Thailand.

For the Government, it was an urgent need to establish a deep sea fishing development plan, therefore, the survey was introduced to clarify the economic status of trawl fishery for the planning.

##### OBJECTIVES

The survey aimed at clarifying the fishing productivity and profitability for each type and size of trawl fishery.

##### OBJECT OF SURVEY

The survey covered the following two types of trawl fishery.

- (1) Otter trawler
- (2) Pair trawler

##### DATE OF SURVEY

The survey was conducted in February, 1969.

##### FIELD ORGANIZATION

The survey was carried out by the staffs working at the Fisheries Statistical Section, Department of Fisheries under close collaboration with the provincial and district fisheries officers.

##### ENUMERATION METHOD

The data were collected by means of an interview with the owners of trawler.

##### SELECTION OF THE SAMPLE FISHING UNITS

In this survey, 10 sample trawlers were selected for each type and size of trawler. So as to get reasonable and typical data the following trawlers were purposely selected :

- (1) A trawler which engaged exclusively in a single fishing during the past one year and
- (2) A trawler which did not have any change on both boat and main engine during the past one year.

##### SURVEY ITEMS

The survey items were as follows. (See the questionnaire in Appendix I for detail)

- (1) Fishing boat
- (2) Main engine
- (3) Number of persons engaged in fishing
- (4) Wage payment system
- (5) Status of fishing operation
- (6) Catch, earning and running cost per trip
- (7) Other necessary fishing cost per year
- (8) Surplus

#### ADDITIONAL EXPLANATION TO SURVEY METHOD AND SURVEY ITEMS

##### (1) Survey method

It is certain that since such an economic survey is so complicated, it is therefore advisable to introduce a book-keeping method into the survey for keeping a high accuracy of the data collected. However, in this survey an interview system was adopted because of it is much easier to collect data than a book-keeping system which takes a many time and needs a good co-operation of sample owners.

##### (2) Special counting measure applied

In order to cope with the obstacle of interview system adopted, the following special counting measures were applied.

###### 1) Catch, Earning and running cost

Firstly, average catch, earning and running cost were enumerated for a trip in the questionnaire, thereafter annual data were estimated by multiplying them by the number of trips operated for the year.

###### 2) Salary or wages

For it, wage payment system was classified into two types, e.g. (a) fixed salary system and (b) share system.

###### (a) Fixed Salary system

Annual salary was estimated by multiplying the monthly fixed salary paid by the number of months of trawl fishing for the year.

###### (b) Share system

The share system was further divided into following two types : (A) sharing wages before deduction of running cost and (b) sharing wages after deduction of running cost.

###### a) Share system (A)

Annual wages was estimated by multiplying the ratio of share of employees by the total earning.

###### b) Share system (B)

It was estimated by multiplying the ratio of share for employees by the net earning after deduction of running cost.

### 3) Other costs

Other costs than those mentioned above 1) and 2), e.g. cost of maintenance, repair and renewal for fishing boat, engine and gears and cost of administration were inquired for the year.

### (3) Depreciation Cost

#### 1) Items to be regarded as fixed assets

In this survey, only fishing boat and main engine were regarded as fixed assets to be depreciated. Other items e.g. fishing gear and net were not computed a depreciation cost but its renewal or repairing costs were counted into running cost.

#### 2) Calculation method

Depreciation cost was calculated by the following formula.

$$A.D. = \frac{P.V. - R.V.}{E.C.}$$

Where

A.D.	=	Annual depreciation cost
P.V.	=	Purchase value
R.V.	=	Residual value
E.C.	=	Economic life

In this survey the economic life and residual value were standardized as follows.

#### STANDARD OF ECONOMIC LIFE AND RESIDUAL VALUE

Items		Economic Life	Residual Value
		years	%
Fishing Boat	Less than 14 m.	10	15
	14 m. and over	10	30
Main Engine	Car engine	5	10
	High speed engine	10	10
	Low & medium speed engine	10	15

### PUBLICATION OF THE RESULT

The result of the survey was published in a report entitled "Cost and Earning Survey on Trawl Fishing in Thailand" in April 1969.

## 3.2 COST AND EARNING SURVEY ON SHRIMP FARMING (1971)

### INTRODUCTION

The marine shrimp culture was becoming important on the fisheries industries. Because, shrimp is one of important export items to gain foreign exchange. The Government expected that the increasing of marine shrimp product might not be successful by only developing fishing, because of the limited natural resources. Therefore, the Government was paying more attention to shrimp culture as a major policy to increase the shrimp product. At the time, the necessary data in terms of economic and techniques of shrimp

culture were very rare, then, it was difficult to set up an appropriate target as well as the way to reach the goal. According to the reasons above, the first sample survey on shrimp culture was conducted in the economic point of view in three provinces, i.e. Samut Prakan, Samut Sakon and Samut Songkhram in which most shrimp farms were concentrated in the country.

#### OBJECTIVES

The survey aimed at clarifying the present situation on shrimp culture in Thailand from the view point of economics.

#### DATE OF SURVEY

The survey was conducted in May, 1971.

#### SURVEY STAFF

The survey was carried out by officials working at the Fisheries Statistical Section with a help of those from the Socio-Economic Section and Marine Fishery Laboratory, Department of Fisheries.

#### SURVEY METHOD

The survey was conducted by means of an interview with sample farmers by referring to the fact appeared for the period from April 1, 1970 to March 31, 1971.

#### AREAL COVERAGE AND SAMPLE SIZE

Province	Strata	Sample Size
Total	—	45
Samut Prakan	Small	5
	Medium	6
	Large	5
Samut Sakhon	Small	5
	Medium	5
	Large	5
Samut Songkram	Small	5
	Medium	5
	Large	5

Prior to the survey a list of the shrimp farms was prepared by respective Provincial Office. As a result 926 farms were identified. Based on such records, a distribution curve of pond in terms of pond area was drawn to establish certain strata in terms of the size of shrimp farms. As a result, three modes were noted. Therefore, for each of these three modes the following strata were established giving a range of pond area for each.

Small	:	Areas of pond is less than 20 "Rai"
Medium	:	Areas of pond is 20-80 "Rai"
Large	:	Areas of pond is 81 "Rai" and over
1 Rai	=	1,600 m <sup>2</sup>

## SELECTION OF SAMPLE

Five sample farms each which are supposed to be representatives of that stratum were purposively selected from each stratum of each province. In this regard, to estimate a reasonable average cost the farms with the following conditions were not selected.

- (1) A farm which operated shrimp culture in the form of partnership and
- (2) A farm which engaged in a shrimp culture only for a limited period during the survey period.

## SURVEY ITEMS

The survey items were as follows. (For detail see the questionnaires in Appendix 1 )

- (1) General status of pond  
Area, water depth of pond, distance to the mouth of river from a pond
- (2) General status of operation  
Period for which shrimps were under culture and period for which pond was dried.
- (3) Socio-economical status of farm  
Number of family members, income source, status of pond possession, selling form of shrimp and loan
- (4) Cost and earning on shrimp farming
- (5) Capital invested
- (6) Fixed assets in possession

## DEFINITIONS AND TREATMENTS FOLLOWED IN THE SURVEY

Since such a cost and earning survey involves a lot of complication, therefore, the survey established the following definitions and treatments to avoid a lack of unity on the data collected.

- (1) Area of pond  
Water area surrounded by dike
- (2) Earnings  
Value of shrimps and fishes which were harvested from the pond during the survey period
- (3) Cost

For easy understanding of the survey results by the readers two types of cost were computed as follows :

- 1) Primary Cost  
The cost excluded both land rent and capital interest.
- 2) Secondary Cost  
The cost included both land rent and capital interest.
- (4) Production Cost  
The production cost of shrimp was estimated from the survey results in terms of
  - a. per unit area (Rai) and
  - b. per unit weight (kg).

(5) Net Return

Net Return (A) = Earnings - Primary Cost

Net Return (B) = Earnings - Secondary Costs

(6) Gross Receipt

Gross Receipt = Net Return (A) + Family Labour Cost

(7) Price of Shrimp

Price of Shrimp = Value of Shrimp/Quantity of Shrimp

(8) Maintenance and Repairing Cost

The amount of money spent during the survey period for the maintenance and repair of fixed assets such as pond, building, boat, water gate, dragon wheel, pump, motor, etc.

(9) Cost of Implement

The amount of expenses required for the purchase of implements which were actually used for a shrimp culture during the survey period. An implement is defined as all kind of equipments other than fixed assets e.g. bamboo screen, trap, net, lamp, shovel, etc.

(10) Cost of Material

The amount of money spent for the purchase of materials such as fuel, lubrication oil, light oil, ice, etc, which were used for day-to-day culture operation during the survey period.

(11) Depreciation Cost

In the survey the amount of depreciation was computed for the following items :

- 1) Building (living house and workshop)
- 2) Boat (hull and engine)
- 3) Water gate
- 4) Motor and pump
- 5) Dragon wheel
- 6) Others

"Others" mentioned 6 above are defined as equipments that can be used over a year and has a value of more than 500 Baht for each item.

A depreciation cost was estimated for all fixed assets other than land by following formula.

$$\text{Depreciation Cost/year} = \frac{\text{Current Value of a fixed asset}}{\text{Economic Life}}$$

The current value of a fixed asset was assessed at a current price assuming that such a fixed asset was purchased at the time of the survey. For the estimation of depreciation the following standard economic life was established.



Kind of Fixed Assets		Economic life
Living House	built by wood only	30 years
	built by wood and bamboo	30 years
	column was built by wood	
	but roof was built by bamboo	10 years
Workshop	built by wood	10 years
	built by bamboo	5 years
Boat Hull	built by wood	5 years
Dragon Wheel	made of teak	10 years
	made of other kind of wood	8 years
Water Gate	made of wood	3 years
	made of concrete	6 years

Economic life of the fixed assets other than the above items were assessed by the respondent based on his actual experience.

#### (12) Charge and Fee

Charge and fee such as transportation fee, annual fee paid to the Land Cooperative etc, excluding income tax.

#### (13) Labour Cost

##### 1) Family Labour Cost

Under a current status of shrimp culture day-to-day labour devoted by family members does not require a full day work. Therefore, at first a yearly working hours was estimated as a product of the number of hours engaged in culture per day, average number of days engaged in culture per month and the number of months engaged in culture. Then, such a yearly working hour was converted into the number of working days by dividing it by 8 hours.

##### 2) Casual employee's Labour Cost

The cost which a casual employee engaged in repairing pond was excluded from this category's cost and it was covered in a maintenance and repairing cost.

A casual employee's labour cost was estimated as a product of number of persons employed, number of days employed and average daily wage.

##### 3) Permanent employee's labour cost

Payment for permanent employee is made in terms of either monthly salary or daily wage. Therefore, a salary was estimated by multiplying the number of months employed by average monthly salary and a wage was estimated by multiplying the number of days employed by average daily wage.

#### (14) Land Rent

To keep a consistency in the survey results land rent was assumed 80 Baht per "Rai" regardless of the location of a culture pond.

#### (15) Capital Interest

For the estimation of production cost it is a common practice that capital interest is included as a part of production cost regardless of whether it was paid or not. The amount of capital interest was estimated by multiplying the amount of capital invested by annual rate of 7.5 %.

#### (16) Capital Invested

Amount of capital invested is normally assessed to all fixed assets including land in terms of residual value at the time of survey.

Residual value of fixed asset was estimated by deducting the current value of fixed asset by the amount of depreciation which had made in the past.

When a fixed asset e.g. pump was used not only for shrimp culture but also for other purposes, the value of fixed asset was assessed by deducting the amount proportional to the percentage of the use of such a fixed asset for other purposes.

However, no depreciation was taken into account for land and current value of land was assessed at a price of 2,000 Baht per "Rai".

### PUBLICATION

The survey results were released in a report entitled "The result of Cost and Earning Survey on Shrimp Culture in Thailand 1970" which gives various average figures as well as individual figures by Province and by strata.

## 3.3 .COST AND EARNING SURVEY ON MAJOR MARINE FISHERIES (1974)

### OBJECTIVES

The survey aimed at clarifying the present economic situation of major marine fisheries in the country for the improvement of fisheries administration in view of the fisheries management.

Since late 1973, the inflation and oil crisis have hit the marine fisheries too. Meantime, it happened that the fishermen went on a demonstration in March, 1974 by stopping their fishing operations and requested to the Government to solve their problems encountered. It was said that a fishing was very hard to get a profit because of fuel shortage and soaring the prices of fishing gear and equipment while the prices of fish caught were not so increased. Therefore, the survey was promptly requested to undertake to clarify the present economic situation for the major marine fisheries.

## TYPES OF MARINE FISHERIES COVERED AND THEIR SAMPLE SIZE

Types of marine fisheries covered and their sample size allocated were shown in the table below.

Type of Marine Fisheries		Sample Size
Otter Trawl	Less than 14 m.	10
	14 – 18 m.	10
	18 – 25 m.	10
	25 m. and over	10
Pair Trawl	Less than 14 m.	3
	14 – 18 m.	10
	18 m. and over	10
Beam Trawl		10
Thai Purse Seine	Less than 14 m.	3
	14 m. and over	10
Chinese Purse Seine		8
Anchovy Purse Seine		10
Mackerel Encircling Gill Net		10
Spanish Mackerel Gill Net		10
Push Net		25
Bamboo Stake Trap		10

## SELECTION OF SAMPLE FISHING UNIT

A sample fishing unit was purposely selected among the sample fishing units currently in use for the Marine Fisheries Production Survey to get a good co-operation with a reliable data.

## ENUMERATION METHOD

The survey was applied by means of an interview with the owner of sample fishing units.

## DATE OF THE SURVEY

The survey was carried out in April, 1974.

## FIELD ORGANIZATION

The survey was undertaken by the officials working at the Fisheries Statistical Section, Department of Fisheries.

## SURVEY ITEMS

The survey items were as follows. (See the questionnaire in Appendix I for detail)

- (1) Fixed assets
  - 1) Fishing boat
  - 2) Main engine
  - 3) Other machinery

- (2) Number of crew engaged in fishing
- (3) Wage payment system
- (4) Status of fishing operation
- (5) Cost and earning
  - 1) Earning for one month
  - 2) Running cost for one month
  - 3) Other costs for the past one year

#### ADDITIONAL EXPLANATION FOR THE SURVEY METHOD AND ITEMS

In principle the definition of survey items were adopted the same as those in use for the survey on Trawl Fisheries (1969) so as to enable a comparison between the two surveys.

##### (1) Fixed assets

Items which are regarded as fixed assets in this survey were limited to the following three categories.

- 1) Fishing boat
- 2) Main engine
- 3) Other machinery

(Note) 1. "Fishing boat consists of hull, navigation equipment and the other accessory attached to boat.  
 2. "Other machinery" includes auxiliary engine, generator, radio, rader, fish finder, echo sounder.  
 3. When an owner assessed machineries together with the fishing boat it was allowed to do so in this survey too.

##### (2) Enumeration period of cost and earning

Since the survey was conducted by means of an interview on the basis of owner's memory, the enumeration period of cost and earning, therefore, limited to only one month to keep a high accuracy of the data collected. And practically the calculation was made on the fact occured in February, 1974.

##### (3) Enumeration method of cost and earning

Running costs and earning were directly enumerated for the February. But, the other costs e.g. (1) cost of maintenance and repair of boat and engine (2) cost of maintenance, repair and renewal of fishing gears and equipments (3) charge and fee (4) administration cost and (5) depreciation cost were inquired for one year. Afterward, monthly costs were estimated by dividing them by 12 months.

##### (4) Depreciation Cost

Based on the purchase value a depreciation cost was calculated by using the following formula.

$$A.D. = \frac{P.V. - R.V.}{E.L.}$$

where A.D. = Annual depreciation cost  
 P.V. = Purchase value  
 R.V. = Residual value  
 E.L. = Economic life

In this survey, the economic life and residual value were standardized as follows.

## STANDARD OF ECONOMIC LIFE AND RESIDUAL VALUE

Items		Economic life	Residual value
		years	%
Fishing Boat	Less than 14 m.	10	10
	14 m. and over	10	30
Main Engine	Car engine	5	10
	High speed engine	10	10
	Low speed engine	10	15
Other Machinery		10	10

### PUBLICATION OF THE RESULT

A publication of the result will be issued by August 1974.

## 3.4 COST AND EARNING SURVEY ON CATFISH FARMING (1974)

### OBJECTIVES

The survey aims at clarifying the present situation of catfish farming from the view point of economics. More specifically, the survey intends to reveal the status of the following two aspects of catfish farming;

(1) Economic aspect

Productivity, profitability, production cost and the size of capital investment

(2) Technical aspect

Feed requirement, supply of seeds and survival rate of fish.

Catfish is one of the most important inland fish cultured in the country. The survey covered only Supanburi Province, since the province has been considered as the biggest catfish farming area in the country.

## FIELD ORGANIZATION

The survey is conducted by the field personals under the Inland Fisheries Division, Department of Fisheries.

## METHOD OF ENUMERATION

The survey is conducted by means of a book-keeping system, and hence a sample farmer is requested to keep the record of his day-to-day culture operation with a note book delivered by the Department of Fisheries.

## SELECTION OF SAMPLE FARMS

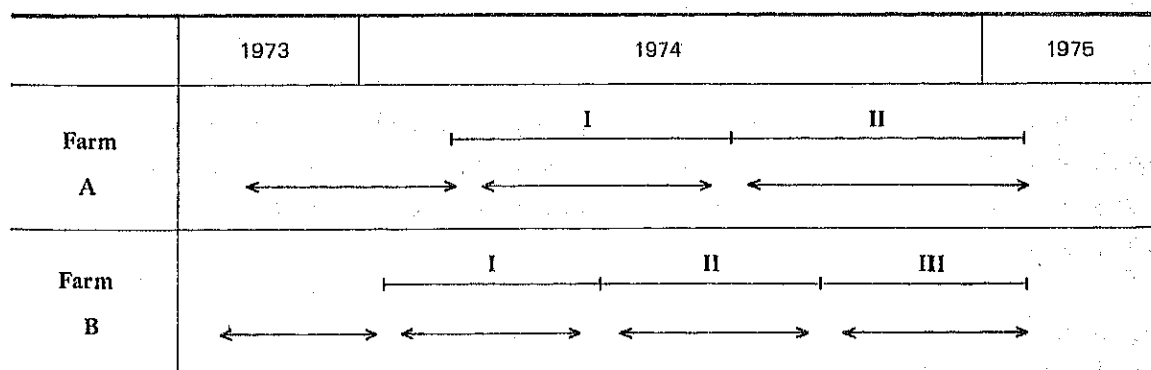
A sample of 35 farmers are purposely selected from those who are supposed to be co-operative to the survey. These sample farmers are selected by districts and by size of farm as shown in the table below.

SAMPLE SIZE

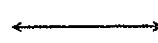

District	Sample size	by Size of Farm		
		1 pond	2 - 4 ponds	5 ponds and more
Muang	10	5	5	—
Bang-Plama	15	5	5	5
Song-Peenong	10	5	5	—

## TIME REFERENCE

The survey covers the calendar year of 1974. However, as shown in the chart below, in a same year a fish farm operates two or three cycles of culture operation, and further the last cycle is often run beyond the survey year. Therefore, attempt is made to cover all cycles of culture operation which might be completed within 12 months.



(Note)

 ..... Fish in pond  
 ..... A cycle of culture operation with its serial number.

A sample farmer is requested to keep the record of his culture operation for the period from the end of the last cycle of 1973 to the end of the last cycle of 1974 as shown on A and B farms in the chart above.

#### **SURVEY ITEMS**

The major survey items covered are as follows. (For detail see the questionnaires in Appendix I)

- (1) Size of fish pond
- (2) Duration of fish farming
- (3) Production cost  
Labour cost, cost of fish seeds, cost of feeds, other costs, depreciation cost, land rent
- (4) Production
- (5) Capital investment
- (6) Others

#### **SURVEY PROCEDURE**

- (1) Collection of data

To ensure the accuracy and completeness of the survey the note book keeping the record of day-to-day culture operation is recovered on monthly basis. When the records kept by sample operators are found to be incomplete, an enumerator make it complete as far as possible whenever he visits the sample farm.

- (2) Yearly total

After completing a survey for each sample farm yearly total is made by an enumerator with a help of supervisor assigned to this survey.

#### **PRINCIPLE FOLLOWED FOR KEEPING THE RECORD OF DAY-TO-DAY CULTURE OPERATION**

Keeping the record of day-to-day culture operation is made on the basis of occurrence of a fact regardless of whether cash transaction was made or not. Therefore, e.g. quantity and value of rice bran fed to fish on a certain date is recorded for that date regardless of whether it was purchased on that day or before that day.

#### **DEFINITION AND EXPLANATION OF MAJOR SURVEY ITEMS**

- (1) Duration of fish farming

Duration of fish farming refers to a period for which fish were kept in pond, i.e. a period from the day when fish seeds were planted in the pond to the day when fish were harvested.

(2) Production Cost

1) Labour cost

As for permanent and temporary employees the amount of wage or the salary actually paid is used as it is. However, labour cost for family member is computed as a product of the number of man-days engaged in culture operation and average daily wage obtained from the amount paid to temporary workers.

2) Cost for fish seeds

As for fish seed purchased the amount actually paid is used as it is. However, when fish seed produced by fish farmer himself is used, the value is computed based on a market price of fish seed on sale.

3) Cost for feeds

Cost for feeds is estimated based on the quantity of feed given to fish during the survey period regardless of whether the feed is purchased on that day or before that day.

4) Other costs

Payment made for all items other than above three items and equipment/instrument of less than 500 Baht in value is considered as other costs.

5) Depreciation cost

Depreciation is made for all durable goods of 500 Baht and more in value. For computing the depreciation cost, the original value is assessed at a current price assuming that the asset was purchased at the end of survey period. Further, a standard of economic life for each item is established by the Department of Fisheries.

Depreciation cost/year is obtained by dividing the original value by the economic life.

6) Land Rent

A Standard of land rent is established by the Department of Fisheries by referring of the actual amount being paid by farmers in the survey area.

(4) Capital Investment

1) Value of land

All such land areas occupied for pond dike, water way and buildings using for the fish farming are included. The value of land is assessed by a prevailing purchase price on similar land in the survey area.



**2) Construction cost of pond**

Construction cost of pond is assessed by a prevailing cost per unit area on similar land in the survey area.

**3) Current price**

Current price of equipment and instrument is computed with the following formula.

Current price = Original price — (Number of years used x Depreciation cost/year)

**PUBLICATION**

The survey result will be released sometimes in 1975 as soon as the survey is over.

**APPENDIX I**  
**SURVEY FORMS FOR EACH SURVEY**

## (1) LISTING FORM

L1 1967 MARINE FISHERIES

Serial Number	House Number	Name of Head of Household	Type of Economic Activity of Household ( / Mark)				Households Engaged in Fishing ( / Mark)		
			Fishing Including Culture	Fish Processing	Agri-culture	Other	Enterprise Fishing Household (Employing more than 3 permanent employees)	Subsistence Fishing With Power Boats	With Non Power Boats
0	1	2	3.1	3.2	3.3	3.4	4.1	4.2a	4.2b
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
Total									

## MARINE FISHERIES CENSUS

Community Number.....Tambol.....District.....Province.....

[illegible]

Signature of Enumerator .....

Date \_\_\_\_\_

Signature of Statistical Officer.....

Date \_\_\_\_\_

## (2) QUESTIONNAIRE FOR ENTERPRISE FISHING HOUSEHOLD

Home Number \_\_\_\_\_ Name of Head of Household \_\_\_\_\_ Province \_\_\_\_\_

District \_\_\_\_\_ Tambol \_\_\_\_\_ Community Number \_\_\_\_\_

Serial Number of Enterprise Fishing Household \_\_\_\_\_ Enumeration District Number \_\_\_\_\_

The purpose of this Census is to clarify the present situation of the fisheries industry for the development of fisheries industry. Therefore, it is strictly prohibited to disclose any fact enumerated in this Census to others.

### 1. TYPE OF ENTERPRISE FISHING HOUSEHOLD

1.1 Did you engage in your fishing in the form of Company or Cooperative?

Yes ( ) No ( )

1.2 Did you engage in your fishing in the form of partnership ?

Yes ( ) No ( )

## 2. FISHING BOAT

2.1 Did you use any boats in your fishing? (insert ✓ mark where applicable)

(1) Powered Boats was used ( )      (2) Only Non-Powered Boats was used ( )

(Ask item 2.2) (3) No Boat was used ( )

(Ask item 3 and continue)

## 2.2 Powered Fishing Boats (Ask the following items for each fishing boat used)

Name of Boat		Length		Type of Engine		* 1	* 2	
		Wa	Sok	In-Board		Out-Board	Length	Gross Tonnage
				Diesel	Others			
Total (      )								

## 3. TYPE OF FISHING METHOD EMPLOYED AND NUMBER OF FISHING UNITS

Code No.	Type of Fishing Method	✓ Mark	No. of Fishing Units	Code No.	Type of Fishing Method	✓ Mark	No. of Fishing Units
01	Otter Trawl			13	Squid Cast Net		
02	Pair Trawl			14	Crab Trap		
03	Beam Trawl			15	Long Line		
04	Thai Purse Seine			16	Set Bag Net		
05	Chinese Purse Seine			17	Wing Set Bag Net		
06	Anchovy Purse Seine			18	Others		
07	Luring Lift Net			19	Shrimp Culture		
08	Spanish Mackerel Gill Net			20	Oyster Culture		
09	Pomfret Gill Net			21	Sea Bass Culture		
10	Mackerel Encirc - ling Gill Net			22	Sea Mussel Culture		
11	Shrimp Gill Net			23	Arkshell Culture		
12	Bamboo Stake Trap			24	Other Culture		

\* 1 Length of Boat

1	Less than 5m.
2	5 - 10
3	10 - 15
4	15 - 20
5	20 - 25
6	25 - 30
7	30m. and over

\* 2 Gross Tonnage  
of Boat

1	Less than 5 tons
2	5 - 10
3	10 - 30
4	30 - 100
5	100 - 200
6	200 tons and over

# FISHERIES CENSUS ( Concluded )

## 4. FISHING UNITS

(Ask the following items for each fishing unit)

Type of Fishing Method Code No.	Name of Fishing Boat Used	Length		Horse Power	No. of Crew		
		Wa	Sok		Total	Family Members	Employees

\* 4 Size of Enterprise Fishing Household

## 5. NO. OF CREW ENGAGED DURING PEAK FISHING SEASON

(1) Family Members ( ) (2) Employees ( )

## 6. FISHING BOAT UNDER CONSTRUCTION

Do you have any fishing boat under construction?

Yes ( ) No ( )

No.	Length			Type of Fishing Method to be expected	Code No.	Purpose of Construction	
	Wa	Sok	* 2 Code No.			For Replacement	For Increasing the No. of boats

## 7. FISHERIES FUND

7.1 Do you have any debt in your fisheries management?

Yes ( ) No ( )

(Ask the following item)

7.2 Type of Fund

Source		✓ Mark	Outstanding Sum of Debt	Interest Rate /year	Purpose * 3 Code No.
1	Government				
2	Bank				
3	Fish Dealer				
4	Local Fish Dealer				
5	Local Merchant				
6	Private Personal				
7	Relative				
8	Other				

\* 3 Purpose of Debt

1	To Purchase Hull
2	To Purchase Engine
3	To Purchase Net
4	For Running Cost
5	For Others

Signature of Enumerator

Date

Signature of Statistical Officer

Date

## 1.2 SURVEY ON TRAWL

## QUESTIONNAIRE FOR SAMPLE FISHING UNIT

The purpose of this survey is to clarify the tendency of the trawl fishing activity in recent years for improving the fisheries administration. Therefore, it is strictly prohibited to disclose any fact enumerated by this survey to others.

Province ..... District .....  
 "Tambol" ..... Serial Number of Community .....  
 Name of Head ..... House Number .....  
 of Household .....

Type	Strata	✓ mark
Otter board trawl	1st class	
	2nd class	
	3rd class	
Two boat trawl	1st class	
	2nd class	
	3rd class	
Beam trawl	1st class	
	2nd class	
Otter board boom-trawl		

## 1. TYPE OF TRAWL FISHING (insert ✓ mark where applicable)

- I) Otter board trawl ( )      III) Otter board boom-trawl ( )  
 II) Two boats trawl ( )      IV) Beam trawl ( )

## 2. FOR THE TRAWL FISHING BOAT CURRENTLY USED

Name of boat	Length		Tonnage	Horse Power	Winch for drawing up the warp(✓mark)				Number of crew		
	“Wa”	“Sok”			Mechanical winch		Manual Winch	No Winch	Total	Family member	Empl- oyees
					Conected with main engine	with Separate mortor					
Total											

## 3. FOR THE TRAWL NET ON BOARD

- I) How many trawl nets do you have? (insert the number of nets)  
 a. Main net ( )    b. Spare net ( )    c. Others ( )  
 II) Type and size of main net  
 (1) What type of trawl net do you have? (insert ✓ mark)  
 a. Two sheets type ( )    b. Four sheets type ( )    c. Others ( )  
 (2) Length and mesh size of major parts of trawl net (exclude beam trawl)

# FISHING ACTIVITY (1968)

Parts of trawl net	Two sheets type		Four sheets type	
	(wa)	(sok)	(wa)	(sok)
1. Length of head rope				
2. Total length of net				
3. Length of cod end				
4. Length of square part				
5. Depth of square part				
6. Circumference of bosom				
7. Mesh size of wing part		m/m		m/m
8. Mesh size of cod end		m/m		m/m

(3) Length and mesh size of major part of beam trawl net.

- a. Length of beam \_\_\_\_\_ wa \_\_\_\_\_ sok \_\_\_\_\_
- b. Mesh size of cod end \_\_\_\_\_ m/m \_\_\_\_\_

## 4. FOR THE OPERATION OF TRAWL FISHING IN THE PAST ONE YEAR

I) Please give the answer for the following items

Serial No. of fishing ground	Fishing Season		No. of months engaged	Average trips in one month	Average days in one trip	Average fishing days in one trip	Average hauls in one day	Average hours in one haul	Average catch per trip (Kg)	Average catch value per trip
	from	to								
1st										
2nd										
3rd										
4th										
5th										
6th										

II) Did the fishing unit engage in trawl fishing all the year round?

(1) Yes ( )

(2) No ( ) → fill the name of fishing method employed other than trawl fishing.

Name \_\_\_\_\_ No. \_\_\_\_\_

Name \_\_\_\_\_ No. \_\_\_\_\_

## 5. DID YOU ENGAGE IN TRAWL FISHING IN 1963? (insert ✓ mark)

I) Yes ( ) -----→ Ask item 6 and continue

II) No ( ) -----→ What type of fishing did you engage in 1963?

Name of major fishing \_\_\_\_\_ No. \_\_\_\_\_



## 1.2 SURVEY ON TRAWL

### 6. FOR THE FISHING BOAT

I) Is the trawl fishing boat currently used the same as the boat used in 1963?

(insert ☐ mark where applicable)

- (1) Completely same ( )
- (2) Length of the boat has changed ( )
- (3) Number of horse power has changed ( )
- (4) Length of boat and horse power has changed ( )
- (5) Unknown ( )

II) For the case where the length of boat has changed

(insert ☐ mark)

Whether the number of horse powers has increased or not to compare with that used in 1963?

- (1) Enlarged ( )
- (2) Reduced ( )
- (3) Unknown ( )

III) For the case where the number of horse powers has changed

(insert ☐ mark)

Whether the number of horse powers has increased or not to compare with that used in 1963?

- (1) Increased ( )
- (2) Decreased ( )
- (3) Unknown ( )

IV) Was the winch, that is used for drawing up the warp, equipped on board in 1963?

(insert ☐ mark where applicable)

- (1) Yes ( )
  - (2) No ( )
- { a. Manual winch ( )  
 b. Mechanical winch connected with marine engine ( )  
 c. Mechanical winch with separate mortar ( )

### 7. FOR THE TYPE OF FISHING METHOD, COMPARE WITH THESE BETWEEN THAT CURRENTLY USED AND THAT USED IN 1963.

Whether the type of fishing method has changed or not?

- I) Changed ( )
  - II) Unchanged ( )
  - III) Unknown ( )
- { (1) Otter board trawl type ( )  
 (2) Two boats trawl type ( )  
 (3) Otter boat boom trawl type ( )  
 (4) Beam trawl type ( )
- What type of fishing method did you engaged in 1963?

### 8. FOR THE TYPE AND SIZE OF TRAWL NET, COMPARE WITH THOSE BETWEEN THAT CURRENTLY USED AND THAT USED IN 1963

(for the beam trawl, the items 8 - II) & III) are inquired)

I) Whether the type of trawl net has changed or not?

- (1) Changed ( )
  - (2) Unchanged ( )
  - (3) Unknown ( )
- { 1. From four sheets type to two sheets type ( )  
 2. From two sheets type to four sheets type ( )

## FISHING ACTIVITY (Continued)

II) Whether the length of the head rope or length of beam (only for beam trawl) has changed or not?

(insert ✓ mark where applicable)

- (1) Changed ( ) \_\_\_\_\_ → the length of head rope used in 1963 \_\_\_\_\_ m  
 (2) Unchanged ( ) \_\_\_\_\_  
 (3) Unknown ( ) \_\_\_\_\_

III) Whether the mesh size of cod end has changed or not?

- (1) Changed ( ) \_\_\_\_\_ → the mesh size of cod end used in 1963 \_\_\_\_\_ m/m  
 (2) Unchanged ( ) \_\_\_\_\_  
 (3) Unknown ( ) \_\_\_\_\_

9. FOR THE FISHING GROUND UTILIZED, COMPARE WITH THOSE BETWEEN THAT CURRENTLY USED AND THAT USED IN 1963

I) Has the fishing ground mainly used changed?

- (1) Changed ( ) \_\_\_\_\_ → the serial number of fishing ground used in 1963 \_\_\_\_\_  
 (2) Unchanged ( ) \_\_\_\_\_  
 (3) Unknown ( ) \_\_\_\_\_

II) Has the depth of major fishing ground fished changed?

- (1) Changed ( ) \_\_\_\_\_  
 (2) Unchanged ( ) \_\_\_\_\_  
 (3) Unknown ( ) \_\_\_\_\_
- Depth of major fishing ground  
 { in 1963 \_\_\_\_\_ m  
 { in 1968 \_\_\_\_\_ m

10. FOR FISHING OPERATION COMPARE WITH THOSE BETWEEN IN 1968 AND IN 1963

I) Whether the number of trips in one month has changed or not?

- (1) Changed ( ) \_\_\_\_\_ → Number of trips in one month in 1963 \_\_\_\_\_ times  
 (2) Unchanged ( ) \_\_\_\_\_  
 (3) Unknown ( ) \_\_\_\_\_

II) Whether the average number of days in a trip has changed or not?

- (1) Changed ( ) \_\_\_\_\_ → Number of days in a trip in 1963 \_\_\_\_\_ days  
 (2) Unchanged ( ) \_\_\_\_\_  
 (3) Unknown ( ) \_\_\_\_\_

III) Whether the average number of hauls in a day has changed or not?

- (1) Changed ( ) \_\_\_\_\_ → Average number of hauls in one day in 1963 \_\_\_\_\_ times  
 (2) Unchanged ( ) \_\_\_\_\_  
 (3) Unknown ( ) \_\_\_\_\_

## 1.2 SURVEY ON TRAW

### IV) Whether the average hours per haul has changed or not?

- (1) Changed ( )  $\longrightarrow$  Average hours in one haul in 1963  
 (2) Unchanged ( ) \_\_\_\_\_ hours  
 (3) Unknown ( )

### 11. FOR CATCH PER HAUL

#### I) Whether average catch per haul has changed or not to compare with that in 1963?

(insert  $\checkmark$  mark where applicable)

- (1) Increased ( ) (2) Nearly same ( )  
 (3) Decreased ( ) (4) Unknown ( )

#### II) Whether the length of fish caught has changed or not?

- (1) Changed ( )  $\longrightarrow$  Length of fish  $\left\{ \begin{array}{l} \text{bigger ( )} \\ \text{smaller ( )} \end{array} \right.$   
 (2) Unchanged ( )  
 (3) Unknown ( )

#### III) Whether the species composition of fish caught has changed or not?

- (1) Changed ( )  $\longrightarrow$   $\left\{ \begin{array}{l} \text{a. Which fish are predominant in the catch?} \\ \text{1 _____ 2 _____ 3 _____} \\ \text{b. What species of fish has decreased in the catch?} \\ \text{1 _____ 2 _____ 3 _____} \end{array} \right.$   
 (2) Unchanged ( )  
 (3) Unknown ( )

#### IV) For the owner who answered the catch per haul has increased.

(insert  $\checkmark$  mark where applicable)

How about the main reason for the catch per haul has increased?

- (1) Fish resources increased ..... ( )  
 (2) Fishing technics improved ..... ( )  
 (3) Accident of fishing boat or engine has decreased ..... ( )  
 (4) Others ..... ( )  
 (5) Unknown ..... ( )

#### V) For the owner who answered the catch per haul has decreased

How about the main reason for the catch per haul has decreased?

(insert  $\checkmark$  mark where applicable)

- (1) Fish resources has decreased ..... ( )  
 (2) Length of fish caught has decreased ..... ( )  
 (3) Fish species composition has changed ..... ( )  
 (4) Accident of fishing boat or engine has increased ..... ( )  
 (5) Others ..... ( )  
 (6) Unknown ..... ( )

## FISHING ACTIVITY (Concluded)

### VI) Whether the fishery profit has increased or not?

- (1) Increased ( )      (2) Decreased ( )      (3) Unknown ( )

<p>Ask the reason why the profit has increased</p>
--

<p>Ask the reason why the profit has decreased</p>
--

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (1)—a Catch increased ( )        | (2)—a Catch decreased ( )        |
| (1)—b Fish price went up ( )     | (2)—b Fish price went down ( )   |
| (1)—c Fishing cost decreased ( ) | (2)—c Fishing cost increased ( ) |
| (1)—d Others ( )                 | (2)—d Others ( )                 |
| (1)—e Unknown ( )                | (2)—e Unknown ( )                |

### 12. FOR ALL OWNERS OF TRAWL FISHING .

Please tell your opinion on the counter measures for conservation of demersal fish resources.

#### I) How about the necessity of measure for conservation of demersal fish resources.

- (1) It is necessary to conserve the demersal fish resources ( )
- (2) It is not necessary to conserve the demersal fish resources ( )
- (3) Unknown ( )

#### II) For the owner who answered that it is necessary to conserve the demersal fish resources.

What types of the regulation are to be undertaken by the government?

- (1) The regulation on number and size of fishing boats ( )
- (2) The regulation on fishing area for trawl fishing ( )
- (3) The regulation on total catch ( )
- (4) The regulation on mesh size ( )
- (5) The regulation on fishing season ( )
- (6) Others ( )
- (7) Unknown ( )

## MA

Papi

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NaB

10

DN:

1

PLATE 1

ed

#### 1.4 SOCIO- ECONOMIC SURVEY

### (1) LIST OF SHRIMP FARMS

Province ..... District ..... Tombol<sup>r</sup> .....

Name of Enumerator ..... Survey Date .....

[illegible]

# ON SHRIMP FARMING (1972)

## (2) QUESTIONNAIRE FOR SAMPLE FARMS

The survey aims at providing a basic data showing the present situation on shrimp farming in the country. The data collected would be used for the planning of the national development project on shrimp farming which helps to improve its techniques and thus to raise up its production and living standard for the farmers.

Therefore, it is strictly prohibited to disclose any individual fact enumerated by the survey to others.

Province \_\_\_\_\_ District \_\_\_\_\_  
 Tombol \_\_\_\_\_ Community No. \_\_\_\_\_  
 Name of Head of Household \_\_\_\_\_ House No. \_\_\_\_\_  
 Serial No. of Shrimp Farm \_\_\_\_\_ Serial No. of Sample Farm \_\_\_\_\_  
 Name of Group of Cooperative \_\_\_\_\_  
 Name of Enumerator \_\_\_\_\_ Survey Date \_\_\_\_\_

### 1. FAMILY MEMBER (AS OF JANUARY 1, 1973)

1.1 Total number \_\_\_\_\_ Male \_\_\_\_\_ Female \_\_\_\_\_  
 1.2 No. of family members who are  
 11 years old or more \_\_\_\_\_ Male \_\_\_\_\_ Female \_\_\_\_\_

### 2. INCOME SOURCE (DURING THE PAST ONE YEAR)

(Insert the mark ✓ wherever applicable, and (✓) for major one)

#### 2.1 Own Account Business

2.1.1 Shrimp farm ☐  
 2.1.2 Salt farm ☐  
 2.1.3 Paddy farm ☐  
 2.1.4 Wood farm ☐  
 2.1.5 Nippa farm ☐  
 2.1.6 Fish farm ☐  
 2.1.7 Fishing ☐  
 2.1.8 Trading ☐  
 2.1.9 Others ☐

#### 2.2 Salary and Wage

2.2.1 Shrimp farm ☐  
 2.2.2 Salt farm ☐  
 2.2.3 Paddy farm ☐  
 2.2.4 Wood farm ☐  
 2.2.5 Nippa farm ☐  
 2.2.6 Fish farm ☐  
 2.2.7 Fishing ☐  
 2.2.8 Shop or office ☐  
 2.2.9 Others ☐



## 1.4 SOCIO ECONOMIC SURVEY

### 3. LAND AREA IN USE (DURING THE PAST ONE YEAR)

	<u>Owned</u>	<u>Rented</u>	<u>Occupied</u>
	<u>Rai</u>	<u>Rai</u>	<u>Rai</u>
3.1 Total	_____	_____	_____
3.2 Shrimp farm	_____	_____	_____
3.3 Salt farm	_____	_____	_____
3.4 Paddy farm	_____	_____	_____
3.5 Wood farm	_____	_____	_____
3.6 Nippa farm	_____	_____	_____
3.7 Others	_____	_____	_____

### 4. OPERATIONAL STATUS OF SHRIMP FARMING

#### 4.1 Manpower (Engaged in shrimp farming only)

4.1.1 Number of family members \_\_\_\_\_

4.1.2 Number of parmanent employees \_\_\_\_\_ Average salary \_\_\_\_\_ B/Month

4.1.3 Temporary employees (During the past one year)

Yes ☐ No ☐

#### 4.2 Shrimp Pond

No.	Type	Total area	Water surface area	Water depth	Year in which the operation begun
1	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____
Total	_____	_____	_____	_____	_____

#### 4.3 Water Gate and Irrigation Machine

##### 4.3.1 No. of water gates

##### 4.3.2 No. of irrigation machines

No.	In only	Out only	In and out	Dragon wheel	Propella pump	Others
1	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____
Total	_____	_____	_____	_____	_____	_____

## ON SHRIMP FARMING ( Continued )

### 4.4 Material of Dike

No.	Made by soil only	Made by soil mixed with other material	Name of material
1	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>

### 4.5 Water Source

No.	Water Source			Distance from the sea to the pond km
	From main canal	From branch canal	From sub-branch canal	
1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

## 5. PRODUCTION

### 5.1 Yield

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Shrimp were in pond (←→)														
Shrimps were harvested (←→)														
No. of days shrimps were harvested														
Yield/day (kg)	Total													
	White shrimp													
	Pink shrimp													
	Other shrimps													
	Fish													
Estimate of Yield (kg)	Total													
	White shrimp													
	Pink shrimp													
	Other shrimps													
	Fish													

(Note) If a farmer can not answer the monthly yield above, estimate the yearly total only by using the following formula. Yearly total yield = No. of days shrimps were harvested x Average yield/day

## 5.2 Frequency of Shrimp Harvest

(Insert the mark ✓ wherever applicable)

- ### 5.2.1 Every days in a season

- ### 5.2.2 Occasionally

11

### 5.3 Type of Harvesting Method

(Insert the mark ✓ wherever applicable, and (✓) for major one

- ### 5.3.1 Trap

- ### 5.3.2 Drag Net

□

- ### 5.3.3 Draining water out from pond

## 6. PRICE OF SHRIMPS/KG (DURING THE PAST ONE YEAR)

	High price	Med. price	Low price
White shrimp	<u>£</u>	<u>£</u>	<u>£</u>
Pink shrimp	<u>£</u>	<u>£</u>	<u>£</u>

## 7. LOAN

- 7.1 Do you need a loan for the improvement of your shrimp farming?

Yes ☐ No ☐

- 7.2 What purposes do you need the loan?**

(Insert the mark ✓ where applicable, and (✓) for major one)

- ### 7.2.1 For running expenses

11

- ### 7.2.2 To purchase the land

- ### 7.2.3 To purchase the equipments

The diagram shows a rectangular domain with a central square hole. The domain is divided into four quadrants by a horizontal line (y=0) and a vertical line (x=0). The central square hole is centered at the origin. The domain is labeled with 'x' and 'y' axes. The central square hole is labeled 'hole'.

- #### 7.2.4 For living expenses

- 7.3 Do you have a loan outstanding at present?

Yes ☐ No ☐

- ### 7.3.1 Total amount

---

12

- ### 7.3.2 Amount outstanding

---

B

- ### 7.3.3 Financial source

[illegible]

ON SHRIMP FARMING ( Continued )

8. PROBLEMS ENCOUNTERED

8.1 Do you have any problem about loan?

Yes

☐

No

☐

What problem do you have? (Insert the mark ✓ )

8.1.1 No financial source

☐

8.1.3 No mortgage

☐

8.1.2 High interest rate

☐

8.1.4 Others

☐

Specify \_\_\_\_\_

8.2 Do you have any problem about water system?

Yes

☐

No

☐

What problem do you have? (Insert the mark ✓ )

8.2.1 Water is not supplied enough

☐

8.2.2 Water can not be well kept in pond with the following reasons :

☐

Holes made by animals

☐

Dike is not strong enough

☐

Other reasons

☐

Specify \_\_\_\_\_

8.3 Do you have any problem about shrimp seeds?

Yes

☐

No

☐

What problem do you have?

8.3.1 Water pollution

☐

8.3.2 Fish enemy which kills shrimp

☐

8.3.3 Other enemy that kill shrimp

☐

8.3.4 Shortage of shrimp seeds supply

☐

8.3.5 Other problem

☐

Specify \_\_\_\_\_

#### 1.4 SOCIO ECONOMIC SURVEY ON SHRIMP FARMING (Concluded)

##### 9. REQUIRED ASSISTANCE FROM THE GOVERNMENT

What kind of assistance do you require from the Government for the improvement of your shrimp farming?

9.1 Loan

☐

9.2 Use of fertilizer

☐

9.3 How to kill enemy

☐

9.4 Improvement of pond structure

☐

9.5 Establishment of fishermen's group or cooperative

☐

9.6 Establishment of shrimp culture center

☐

9.7 Establishment of system supporting shrimp price by the Government

☐

9.8 Others

☐

Specify \_\_\_\_\_

2.1 TRADITIONAL FISHERIES PRODUCTION SURVEY  
(1) REPORTING FORM FOR MARINE CATCH AND DISPOSITION

District \_\_\_\_\_ Province \_\_\_\_\_ (kg)

Species	Catch	Disposed for									
		Fresh Consumption	Frozen	Dried and Salted	Steamed or Smoked	Shrimp Paste	Dried Shrimp	Fish Meal	Fertilizer	Fish Source	Others
1. Indo-Pacific mackerel											
2. Indian mackerel											
3. Sharks											
4. Rays											
5. Miscellaneous fish											
6. Trash fish											
7. Shrimps											
8. Lobsters											
9. Acetes											
10. Crabs											
11. Shellfish											
12. Squid and Cuttlefish											
13. Seaweeds											
14. Sea Cucumber											
Total											

**Foot Note (1)** Catch for home consumption is included (2) If there were other local disposition channel than the noted above, the data have to be filled out in terms of a local disposition, after the above terms were revised. (3) Frozen includes catch which is sent or sold out to a cold storage.

2.1 TRADITIONAL FISHERIES PRODUCTION SURVEY ( Concluded )  
(2) REPORTING FORM FOR INLAND CATCH AND DISPOSITION

District ..... Province ..... (kg)

Species	Catch	Disposed for									
		Fresh Consumption	Dried and Salted	Steamed or Smoked	Fermented	Shrimp Paste	Fish Meal	Dried Shrimp	Fertilizer	Fish Sauce	Others
1. Snake head fish (Pla chon)											
2. Cat fish (Pla duk)											
3. Climbing perch (Pla mae)											
4. Swamp eel											
5. Common Carp											
6. Chinese Carp											
7. Sepat Siam (Pla slid)											
8. Cat fish (Pla Swai)											
9. Miscellaneous fish											
10. Prawn											
11. Others											
Total											

**Foot Note** (1) Catch for home consumption is included.(2) If there were other local disposition other than noted above, data have to be filled out in terms of a local disposition after the above terms were revised.





## 2.2 MARINE FISHERIES

## (1) LOG BOOK FOR TRAWL

Fishing Efforts			
1. Main Fishing Area		5. No. of Haulings	Haul
2. Landing Place		6. Hauling Hour	Hour
3. No. of Trips	Trip	7. Total Catch	kg.
4. No. of Fishing Days	Day		

Catch by Species (Kg.)	
Whiting	
Catfish	
Indian Halibut	
Sole	
Eel	
Ray	
Shark	
Miscellaneous fish	
Trash fish	
White Shrimp	
Janbo Shrimp	
Tiger Shrimp	
Yellow Shrimp	
Pink Shrimp	
Other Shrimps	
Lobster	
Swimming Crab	
Squid	
Cuttlefish	
Octopus	

### PRODUCTION SURVEY (Continued)

## (2) LOG BOOK FOR PURSE SEINE AND GILL NET

Sample No. \_\_\_\_\_ Province \_\_\_\_\_ District \_\_\_\_\_

Name of Reporter ..... Month ..... Year .....

Date of Interview ..... Name of Enumerator .....

Fishing Boat		Type of Fishing Method ( ✓ mark)	Thai Purse Seine	
1. Name of Owner			Chinese Purse Seine	
2. Name of Boat			Mackerel Encircling Gill Net	
3. Length of Boat			Spanish Mackerel Gill Net	
			Anchovy Purse Seine	

[illegible]

1

### PRODUCTION SURVEY (Continued)

## (3) LOG BOOK FOR BAMBOO STAKE TRAP

Region ..... Name of Reporter ..... Sample Number .....

Community Number ..... Tambol ..... Date of Interview .....

Month.....Year.....District.....Province.....Name of Enumerator.....

[illegible]

## 2.2 MARINE FISHERIES

## (3) LOG BOOK FOR BAMBOO STAKE TRAP

[illegible]

PRODUCTION SURVEY (Continued)

(4) QUESTIONNAIRE FOR BEAM TRAWL AND PUSH NET

Sample No. .... Province ..... District ..... Name of Reporter .....

Month ..... Year ..... Date of Interview ..... Name of Enumerator .....

Fishing Boat			Type of Fishing Method		1. Main Fishing Area	
1. Name of Owner			Beam Trawl		2. Landing Place	
2. Name of Boat					3. No. of Fishing Days	
3. Length of Boat					4. Hauling Hours	
4. Type of Engine	Out-Board	In-Board	Push Net		5. Average No. of Hauls/Day	
					6. Estimated No. of Hauls	

Species	Catch per Day (Kg.)	Estimated Monthly Catch (Kg.)
Total		
Dorab		
Anchovy		
Baracuda		
Jew fish		
Whiting		
Catfish		
Miscellaneous fish		
Trash fish		
White Shrimp		
Jumbo Shrimp		
Tiger Shrimp		
Yellow Shrimp		
Pink Shrimp		
Other Shrimp		
Acetes		
Swimming Crab		
Blue Crab		
Other Crabs		
Squid		
Cuttlefish		
Octopus		
Shellfish		

## 2.2 MARINE FISHERIES

## (5) LIST OF FISHING HOUSEHOLDS FOR COMMUNITY SURVEY

Sample No. .... Community No. .... Tambol ..... District ..... Province .....

Name of Enumerator..... Survey Date..... Sheet No...../.....

[illegible]

## PRODUCTION SURVEY (Concluded)

## (6) CATCH FOR COMMUNITY SURVEY

Name of Reporter.....House No.....Sample No.....Community No.....

Type of Fishing Method ..... Code No. .... Tambol ..... District .....

Name of Enumerator ..... Province .....

Survey Date ..... Sheet No. .... / .....

## 1. FISHING SEASON

[illegible]

## 2. MONTHLY CATCH

Catch/Month (1)	Total No. of Months Operated (2)	Catch estimated (3) = (1) x (2)

### 3. CATCH BY SPECIES

[illegible]



### 2.3 SURVEY ON FISH

(1) SURVEY FORM (A)

Name of Fish Landing Center \_\_\_\_\_

Month ..... Name of Enumerator .....

## 1. SUMMARY

[illegible]

# LANDING CENTER

## (2) SURVEY FORM (B)

Name of Fish Landing Center.....

Name of Pier Owner or Fishmeal Plant.....

Month.....Name of Enumerator .....

### 2. SURVEY ON NUMBER OF FISHING BOATS

(For all pier owner and fishmeal plants)

Date	Number of fishing boats landed fish			Date	Number of fishing boats landed fish		
	Trawl	Purse Seine	Others		Trawl	Purse Seine	Others
1				17			
2				18			
3				19			
4				20			
5				21			
6				22			
7				23			
8				24			
9				25			
10				26			
11				27			
12				28			
13				29			
14				30			
15				31			
16				Total			

(For fish meal plants only)

		1st Wednesday	2nd Wednesday	3rd Wednesday	4th Wednesday	5th Wednesday
Number of boats landed fish						
Fish landings	Quantity (kg)					
	Value (Baht)					

### 2.3 SURVEY ON FISH LANDING CENTER (Concluded)

(3) SURVEY FORM (C)

Name of Fish Landing Center .....

Name of Pier Owner \_\_\_\_\_

Survey Week No. \_\_\_\_\_ Date \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_

### 3. SURVEY ON FISH LANDINGS

unit  $\left\{ \begin{array}{l} \text{Quantity} = \text{kg} \\ \text{Value} = \text{Baht} \end{array} \right.$

[illegible]

## 2.4 INLAND FISH FARM PRODUCTION SURVEY (1964)

(1) LIST OF SURVEY DISTRICTS AND TOMBONS

Province ..... Working Unit ..... Data Source .....

[illegible]

## 2.4 INLAND FISH FARM

## (2) LIST OF FISH FARMS

Province ..... Working Unit.....

District ..... Name of Enumerator .....

Tombol ..... Survey Date .....

[illegible]

# PRODUCTION SURVEY (Concluded)

## (3) QUESTIONNAIRE FOR SAMPLE FISH FARM

Province..... Name of Farm Owner.....  
 District..... Sample No.....  
 Tombol..... Name of Enumerator.....  
 Community..... Survey Date.....

### 1. SIZE OF FARMING UNIT

Serial No. of Unit	Type of Farming	Major Species	Size of Farming Unit				No. of crops in the past one year
			Length (m)	Width(m)	Area (m <sup>2</sup> )	Depth(cm)	

### 2. YIELD (IN THE PAST ONE YEAR)

Species & Size	Yield			No. of fish/kg	Price/kg (Baht)
	Number	Weight(kg)	Value(Baht)		

### 3. FISH SEEDS RELEASED (IN THE PAST ONE YEAR)

Species & Size	Fish Seeds			No. of fish/kg	Price/kg (Baht)
	Number	Weight(kg)	Value(Baht)		

### 3.1 COST AND EARNING SURVEY

Province ..... District .....

Tambol ..... Community No. ....

House No. .... Name of owner .....

Strata		mark
otter board	less than 14 m.	
	14 - 18 m.	
trawl	18 m. and over	
Pair trawl	less than 18 m.	
	18 m. and over	

#### 1. FISHING BOAT USED

Name of boat	Status of possession		Length of boat		Gross tonnage	Type of fishery	Year obtained	Type of boat obtained		Age of boat	Purchase price of new boat	How many years can be used
	owned	hired	wa	sok				new boat	used boat			

#### 2. MAIN ENGINE OF BOAT USED

Name of boat	Name of engine	Horse power	Type of engine		No. of revolution			Year obtained	Type of engine		How many years used	Purchase price of engine	How many years can be use
			4 Cicle dessel	Others	Less than 400 vpm.	400 to 1000 vpm.	1,000 and over		new one	used one			

#### 3. NUMBER OF PERSONS ENGAGED IN FISHING.

1) How many number of crew go on board.

(1) Total ..... (2) Family member ..... (3) Employees .....

2) How many number of persons work on land as permanent worker.

(1) Total ..... (2) Family member ..... (3) Employees .....

# ON TRAWL FISHERY (1969)

## 4. WAGE PAYMENT SYSTEM

1) Type of wage payment system (✓ mark is inserted where applicable)

- (1) Fixed salary system —————→
- |                           |          |
|---------------------------|----------|
| 1) Covered all crew       | (      ) |
| 2) Some crew was excluded | (      ) |

Ask the position of crew for above 2)

\_\_\_\_\_

\_\_\_\_\_

(2) Fixed minimum salary plus share (      )

(3) Fully share system (      )

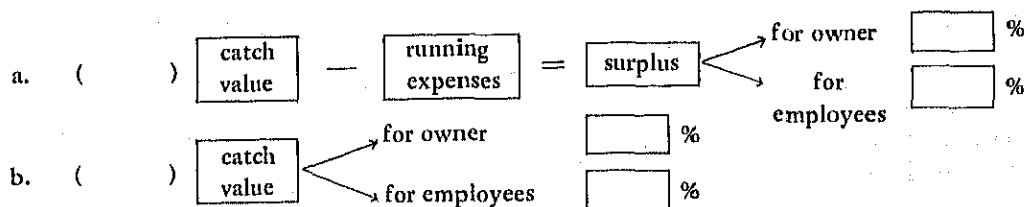
2) Monthly fixed salary

Ask the amount of salary per month for the case of fixed salary (above 4-1) - (1) )

Position of crew		Amount of fixed salary per month	No. of crew	Total
Master				
Skipper				
Assistant of skipper				
Engineer				
Assistant of engineer				
Cook				
Chief of fisherman				
Net man				
Crew	1			
	2			
	3			
Total —————→				

3) Type of Share System (ask for the case of share system above 4-1)-(2) and (3) )

- (1) Whether or not, the owner deducted the running expenses (ice, fuel, food etc) before divided the catch value among the owner and employees?





### 3.1 COST AND EARNING SURVEY

(2) For the case of above a type

What kind of running expenses were deducted? (fill all items)

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_  
4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_

(3) For the case of a and b above 3

How many percent of catch value or surplus was shared for the employees ?

(fill the percentage of share for employee into the above a or b)

(4) Period of payment (✓ mark is inserted wherever applicable)

- (1) Pay the salary in each trip ( )  
(2) Pay the salary in each month ( )  
(3) Others ( )

(5) Type of Salary (✓ mark is inserted wherever applicable)

- (1) Pay only by money ( )  
(2) Pay money plus kind ( )

#### ( 5) STATUS OF FISHING OPERATION

Items	Fishing Area				
Fishing season. (1) Engaged in fishing (2) Others (repairing docking, etc.)	Jan.				
	Feb.				
	Mar.				
	Apri.				
	May				
	June				
	July				
	Aug.				
	Sept.				
	Oct.				
	Nov.				
	Dec.				
No. of months engaged in fishing					
No. of trips per month					
Average no. of days per trip					

# NETRAWL FISHERY ( Continued)

## 6. AVERAGE COST AND EARNING PER TRIP

### 1) Total catch and earnings per trip.

		Valuable fish				Trash fish	Total (1,000 bahts)
		Fish kept in box	Fish counted by number	Shark and ray	Crab		
Catch	Sold in fresh						
	For home processing						
	Total						
Average price per unit							
Total earning							

### 2) Running Cost, Remuneration and Charge for Selling

Items			Quantity	Unit price	Total
Running expenditure	Fuel and lubricating oil				
	Ice				
	Food				
	Water				
	Fish boxes or baskets				
	Other materials				
	Total				
Remuneration	Paid	Fixed salary			
	in cash	Share			
	Pay in kind				
	Total				
Charge for selling					

### 3.1 COST AND EARNING SURVEY

#### 8. OTHER COSTS FOR ONE YEAR

Items	Contents	Amount
<b>Maintenance and repair of boat.</b> 1) Vessel Hull 2) Main Engine 3) Machinery (Winch, generator) 4) Fishing and navigation equipment Total		
<b>Repair and renewal of fishing gear</b> 1) Fishing net 2) Rope 3) Others (float, sinker, hook, dye ect.) Total		
<b>Shore cost</b> 1) Wharfage and dock rental 2) Unloading labour charge Total		
<b>Fishing equipment on land</b>		
<b>Other charge and fee</b> 1) Fee for hired boat 2) Fee for boat registration and fishing gear registration 3) Other Chinese Festival Total		
<b>Depreciation cost</b> 1) Boat 2) Engine Total		
<b>Administration expenses</b>		

# NET TRAWL FISHERY (Concluded)

TABULATION TABLE

Items			Amount estimated
Total catch (1000 kg.)			
Fisheries gross earnings			
Fisheries cost	Remuneration (include food)		
	Running cost	Fuel and lubucating cost	
		Ice	
		Fish boxes or baskets	
		Others	
		Total	
	Boat maintenance		
	Repair and renewal of fishing gear		
	Shore cost	Charge for fish selling	
		Others	
	Other charge and fee		
	Depreciation cost		
Administration expenses			
Total			
Owners' surplus			

### 3.2 COST AND EARNING SURVEY

#### QUESTIONNAIRE FOR SAMPLE FAOM

Serial Number ..... Strata ..... Survey Date .....

Name of Shrimp Farm Owner ..... Name of Enumerator .....

Address of Shrimp Farm .....

#### 1. GENERAL

##### 1.1 STATUS OF FAMILY MEMBERS

Name of Family Members	Sex ( ✓ )		Age	Relationship with the Head of Family	Type of Job Mainly Engaged ( ✓ )						
	Male	Female			Own Account Business			Employed by Others	Person without any Job		
					Shrimp Culture	Agriculture	Others				
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
Total											

## SHRIMP FARMING

### 1.2 INCOME SOURCE OF FAMILY

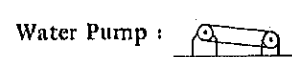
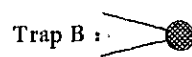
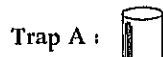
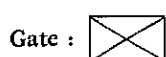
Income Source		The persons engaged (give Serial No. from 1-1)	Gross Income (Roughly)	
			1,000 Baht	Percentage
Own Account Business	Shrimp Culture			
	Agriculture			
	Others			
Salary and Wage				
Total				100%

## 2. STATUS OF SHRIMP CULTURE OPERATION

### 2-1 SKETCH OF SHRIMP FARM

The following items should be covered in the sketch referring to the model showing in the next page.

1. Dimension of pond in length and width in metre
2. Area of pond in terms of Rai
3. Location of Gate, Trap, Water Pump, Cabin and House with the following signs



4. Water way with canal and river
5. Direction of water flow with the following signs  
flow in, flow out
6. Distance to sea or mouth of river in terms of Km
7. Average water depth in pond in metre

### 3.2 COST AND EARNING SURVEY

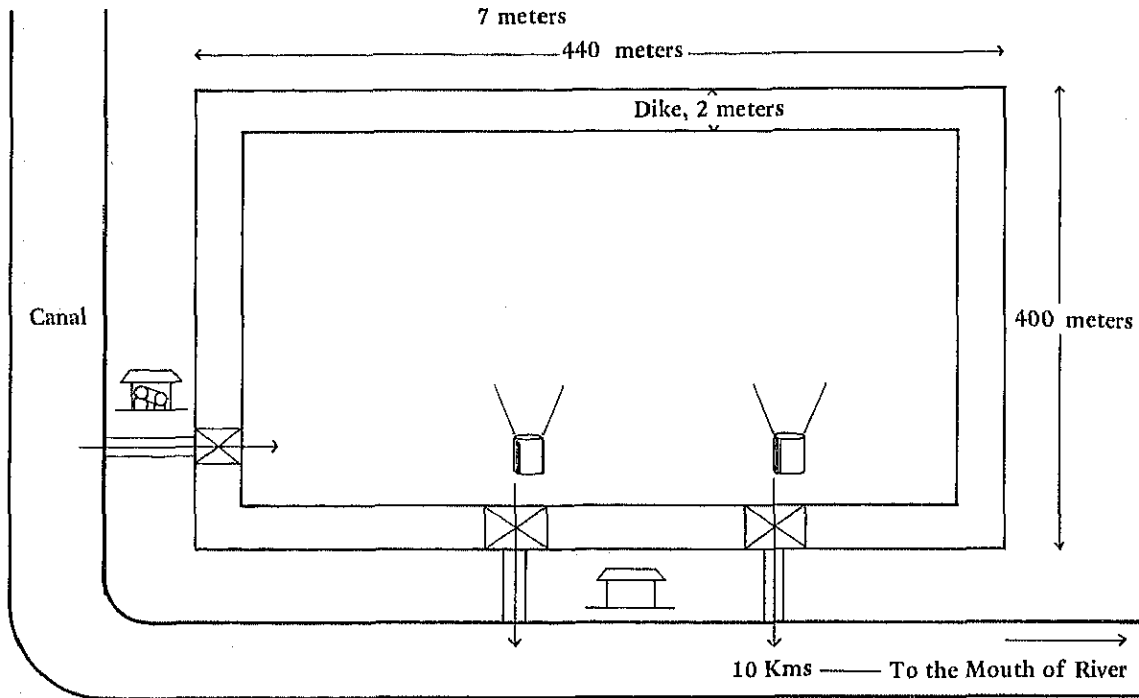
(For Example) A MODEL SKETCH OF SHRIMP FARM

1. Area of Shrimp Farm

110 RAI

2. Average water Depth in the Pond

7 meters



#### 2-2 PERIOD OF OPERATION

Items	1970 Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	1971 Jan.	Feb.	Mar.
(1) Period for which Shrimps were in pond Sign : $\longleftrightarrow$												
(2) Period for which pond was dried Sign : $\longleftrightarrow$												
(3) Period for which Shrimp were harvested Sign : $\longleftrightarrow$												

# SHRIMP FARMING (Continued)

## 3. INPUT

### 3.1 LAND USED FOR SHRIMP FARM

1. Is your land currently in use for shrimp farming your owned land or rented land?

(Ask about the majority of the total land. If it is owned land, please ask the following 3-6 items, and if it is rented land, please ask the following 2 and 6 only.)

(ownership)

Owned Land	Rented Land

( ✓ )

(Land Rent)

2. How much is your land rent?

Baht/Rai
----------

3. When did you get your land for shrimp farm?

(Year of Land Purchased)

After 1966	1961-1965	1951-1960	Before 1950

( ✓ )

4. From whom did you get it?

(Original Source of Land)

Directly from Government	Through Land Cooperative	From Individual Land Owner	Others

( ✓ )

(Price of Land)

5. How much did you pay for it when the land was purchased?

Baht/Rai
----------

6. How much did you pay for the maintenance and repair of your shrimp pond for the last year?

(Wage and salary of permanent employees who engaged in the work has to be excluded from this cost. Because it includes in the cost of labour.)

( Cost of maintenance and  
repair of shrimp pond )

Baht
------



### 3.2 COST AND EARNING SURVEY

#### 3-2 FIXED ASSETS OTHER THAN LAND.

Type of Fixed Assets (give the name of type, model and size)		Current Value (Baht) (1)	Economic Life (2)	No. of Years used (3)	Depreciation Cost Per Year (Baht) (1) ÷ (2) (4)	Amount already Depreciated (Baht) (4) x (3) (5)	Residual Value (Baht) (1) - (5) (6)	Maintenance and Repairing Cost spent for the last year (7)
Cottage and House	1							
	2							
	3							
	4							
	5							
	Total							
Boat	1							
	2							
	3							
	Total							
	1							
	2							
Water Gate	3							
	4							
	Total							
	1							
	2							
	3							

SHRIMP FARMING (Continued)

3-2 FIXED ASSETS OTHER THAN LAND: (CONTINUED)

Type of Fixed Assets (give the name of type, model and size)		Rate of use for Shrimp Culture (%) A	Depreciation Cost to be shared by shrimp culture		
			Residual value (8) = (6) x A	Depreciation (9) = (4) x A	Maintenance and Raparing Cost (10) = (7) X A
Cabin and House	1				
	2				
	3				
	4				
	5				
	Total				
Boat	1				
	2				
	3				
	Total				
	1				
	2				
Engine	3				
	Total				
	1				
	2				
	3				
	Total				
Water Gate	1				
	2				
	3				
	4				
	Total				

# 3.2 COST AND EARNING SURVEY

## 3-2 FIXED ASSETS OTHER THAN LAND (CONTINUED)

Type of Fixed Assets (give the name of type, model and size)	Current Value (Baht) (1)	Economic Life (2)	No. of years used (3)	Depreciation Cost Per year (1) - (2) (4)	Amount already depreciated (4) x (3) (5) (Baht)	Residual Value (1) - (5) (6) (Baht)	Maintenance and Repairing Cost spent for the last year (7) (Baht)
<b>Motor</b>							
1							
2							
3							
4							
Total							
<b>Pump</b>							
1							
2							
3							
4							
Total							
<b>Dragon Wheel</b>							
1							
2							
3							
4							
Total							
<b>Others</b>							
1							
2							
3							
4							
Total							
Grand Total							

# SHRIMP FARMING (Continued)

## 3-2 FIXED ASSETS OTHER THAN LAND (CONTINUED)

Type of Fixed Assets (give the name of type, model and size)	Rate of use for shrimp Culture (%) A	Amount of Depreciation cost to be shared by shrimp culture		
		Residual value (8) = (6) x A	Depreciation Cost/year (9) = (4) x A	Maintenance and Repairing Cost (10) = (7) x A
Motor				
1				
2				
3				
4				
Total				
Pump				
1				
2				
3				
4				
Total				
Dragon Wheel				
1				
2				
3				
4				
Total				
Others				
1				
2				
3				
4				
Total				
Grand Total				

## 3.2 COST AND EARNING SURVEY

### 3-3 IMPLEMENTS

Items		No. of Implements (1)	Current Value for each unit (2) (Baht)	Estimated Total Value (1) x (2) (3) (Baht)
Others	Bamboo Screen			
	Trap			
	Dip Net			
	Lamp			
	Shovel			
Total				

### 3-4 MATERIALS

Kind of materials		Unit	Quantity			Unit Price (Baht)	Estimated Cost (Baht)
			Quantity used/month	No. of months used	Estimated quantity		
Others	Electricity	KW					
	Fuel	Litre					
	Lubricating oil	Litre					
	Light oil	Litre					
	Ice						
Total							

### 3-5 CHARGE AND FEE

Items		Total amount per year (Baht)
Others	Transportation Fee	
	Land Fee	
Total		

# SHRIMP FARMING (Continued)

## 3-6 LABOUR COST

(1) Temporary Employee (Excluding the wage of the employees engaged in the maintenance and repairing of shrimp pond.)

Kind of Work	Number of persons employed		Number of days employed	Unit price of wage (including cost of food)	Estimate of wage
	(1)	(2)		(3)	(4) = (1) x (2) x (3)

## 3-6 LABOUR COST (CONTINUED)

(2) Permanent Employee

Name	Salary			Wage			Total Amount paid (7)=(3)+(6)
	Period employed in man-month (1)	Unit price (2)	Amount paid (3) = (1) x (2)	Period employed in man-day (4)	Unit price (5)	Amount paid (6) = (4) x (5)	
1							
2							
3							
4							
5							
Total							

### 3.2 COST AND EARNING SURVEY

#### (3) Family Member

Kind of Job	No. of person engaged (Referring to 1-1)	Average No. of hours engaged/day	Average No. of days engaged/month	No. of months engaged/year	No. of mandays estimated (1) x (2) x (3) x (4) ÷ (8) hours	Unit price (5)	Labour Cost Computed (6) x (5)
Maintenance and repair of pond	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Operation of water gate							
Operation of motor							
Setting of trap							
Collection of Shrimps							
Selling of Shrimps							
Others							
Total							

#### 4. YIELD 1/

##### 4-1 ESTIMATION OF TOTAL YIELD

Items	No. of days harvested (1)	Average yield per day (2)	Estimated yield (3) = (1) x (2)
Quantity			kg I)
Value	days 2/		Baht II)

1/ Refer to the record of yield kept by the operator, if he agree to show it for this survey.

2/ Refer to 2-2, (3)

##### 4-2 SPECIES COMPOSITION OF YIELD

Species	Quantity (4)	Value (5)
Total	100.0 (%)	100.0(%)
Total		
Fishes		

##### 4-3 ESTIMATE OF YIELD BY SPECIES

Quantity of Yield (6) = (3) I) x (4)	Value of Yield (7) = (3) II) x (5)

# SHRIMP FARMING (Continued)

## 5. SUMMARY

### 5-1 CAPITAL INVESTED

Items	Size or No. of unit	Value (Baht)
Total		
Land	Rai	
Cabin and House		
Boat	Hull	
	Engine	
Water Gate		
Motor		
Pump		
Dragon Wheel		
Others		

### 5-2 CAPITAL INTEREST

Capital Invested x Annual Interest Rate

\_\_\_\_\_ Baht x 0.075 = \_\_\_\_\_ Baht

### 5-4 PRODUCTION COST

Total Cost / Unit area (Rai)	
Cost / unit weight of shrimp (kg)	

### 5-3 COST

Items	Baht
Total	
Maintenance and Repair	
Pond	
Machinery and Equipment	
Operation Expenses	
Implements	
Materials	
Other Expenditure (Charge and Fee)	
Labour Cost	
Employee	
Family Member	
Depreciation	
Cabin and House	
Boat	
Water Gate	
Motor	
Pump	
Dragon Wheel	
Others	
Capital Interest	

### 5-5 NET RETURN

Gross Receipt - Total Cost

\_\_\_\_\_ Baht - \_\_\_\_\_ Baht = \_\_\_\_\_ Baht

### 5-6 PRODUCTIVITY AND PROFITABILITY

- Quantity of Shrimp (kg)

/unit area (Rai) = \_\_\_\_\_ kg

- Value of Shrimp

/unit area (Rai) = \_\_\_\_\_ Baht

- Capital Invested

/unit area (Rai) = \_\_\_\_\_ Baht

- Net Return

/unit area (Rai) = \_\_\_\_\_ Baht

- Net Return

/Capital Invested \_\_\_\_\_ %



### 3.2 COST AND EARNING SURVEY ON SHRIMP FARMING (Concluded)

#### 5. SUPPLEMENTARY INQUIRIES

##### 5-1 BEGINING TIME OF SHRIMP CULTURE OPERATION

When did you begin your operation for the shrimp Culture?

After 1966	1961 - 1965	1951 - 1960	Before 1950

##### 5-2 MARKETING

(1) To whom do you sell your shrimps?

to a definit person	to indefinit persons

(2) In what form do you sell your shrimp?

in alive	with ice	without ice

##### 5-3 LOAN

(1) Have you borrowed any loan?

yes	no

If the answer is yes, ask the following question.

(2) How much have you borrowed it?

\_\_\_\_\_ BAHT

(3) From whom have you borrowed it?

Government	Land Co-operative	Bank	Merchant	Relatives	Neigh-bours	Others

(4) For what purpose have you borrowed it?

Payment of land	Payment of equipment	Family expenditure	Others

(5) What is the annual rate of interest?

\_\_\_\_\_ % / year

##### 5-4 LIVING STANDARD

(1) Do you have any of the following items?

Radio		T.V.		Sewing Machine	
yes	no	yes	no	yes	no

### 3.3 COST AND EARNING SURVEY ON MAJOR MARINE FISHERIES (1974)

#### QUESTIONNAIRE FOR SAMPLE FISHING UNIT

The purpose of the survey is to clarify the current situation of major marine fisheries in view of fisheries management to improve fisheries administration.  
It is strictly prohibited to disclose any individual fact enumerated by this survey to others.

Province \_\_\_\_\_ District \_\_\_\_\_ Tambol \_\_\_\_\_  
Name of Owner \_\_\_\_\_ Name of Enumerator \_\_\_\_\_  
Type of Fishing Method \_\_\_\_\_ Strata \_\_\_\_\_ Sample No. \_\_\_\_\_

#### 1. FIXED ASSETS

##### 1.1 FISHING BOAT

1 Name of boat	2 Length of boat	3 Gross tonnage	4 Year obtained	5 Status of possession		6 Type of boat Purchased		7 Purchase value	8 Age of boat	
				Owned	Hired	New boat	Used boat		In the past	In the future

(Note) Items of 6, 7 and 8 are not inquired for hired boat.

##### 1.2 MAIN ENGINE

1 Name of boat	2 Name of engine	3 Horse Power	4 Type of engine	5 No. of revolution	6 Year obtained	7 Status of Possession		8 Type of engine purchased		9 Purchase Value	10 Age of Engine	
						Owned	Hired	New one	Old one		In the past	In the future

(Note) Items of 8, 9 and 10 are not inquired for hired boat.

### 3.3 COST AND EARNING SURVEY ON

#### 1.3 OTHER MACHINERY

Items	1 Name of boat	2 Type	3 Year obtained	4 Status of Possession		5 Type of Machinery Purchased		6 Purchase Value	7 Age	
				Owned	Hired	New one	Used one		Past	Future
Auxiliary Engine										
Generator										
Radio										
Radar										
Fish finder/Echo sounder										

(Note) Items of 5, 6 and 7 are not inquired for hired boat.

#### 2. NUMBER OF CREW ENGAGED IN FISHING

	No. of crew
Total	
Family Member	
Employee	

#### 3. WAGE PAYMENT SYSTEM

##### 3.1 TYPE OF WAGE PAYMENT SYSTEM

Fixed salary system	Covered all crew	
	Some crew are excluded	
Fixed minimum salary plus share		
Fully share system		

##### 3.2 MONTHLY FIXED SALARY

Position		(1) Unit Salary (Baht)	(2) No. of crew	(3) Total = (1)x(2) (Baht)
Master				
Skipper				
Assistant of skipper				
Engineer				
Assistant of engineer				
Cook				
Chief of fishermen				
Net man				
Crew	1			
	2			
	3			
Total				

## MAJOR MARINE FISHERIES (Continued)

### 3.3 TYPE OF SHARE SYSTEM

(Insert ✓ mark where applicable and percentage)

Type A ( ) 

Catch value
-------------

 - 

Running expenses
------------------

 = 

Surplus
---------

→ For owner	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr></table> %	
→ For crew	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr></table> %	

Type B ( ) 

Catch value
-------------

→ For owner	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr></table> %	
→ For crew	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr></table> %	

### 3.4 PERIOD OF PAYMENT

( ✓ mark)

Each trip	
Each month	
Others (Specify)	

## 4. STATUS OF FISHING OPERATION

### 4.1 FISHING SEASON AND FISHING GROUND

1973										1974	
Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.

4.2 No. of months engaged in the fishing \_\_\_\_\_ months

4.3 Average No. of trips per month \_\_\_\_\_ trips

4.4 Average No. of fishing days per trip \_\_\_\_\_ days

4.5 No. of trips and no. of days in the last month \_\_\_\_\_ trips \_\_\_\_\_ days

## 5. COST AND EARNING

### 5.1 CATCH EARNING FOR ONE MONTH

Species	Quantity (kg)	Value (Baht)
Total		
Indopacific mackerel		
Indian mackerel		
Spanish mackerel		
Miscellaneous fish		
Trash fish		
Exportable shrimps		
Other shrimps		
Crab		
Shellfish		
Squid & Cuttlefish		
Others		

### 3.3 COST AND EARNING SURVEY

#### 5.2 RUNNING COST FOR ONE MONTH

##### 5.2.1 REMUNERATION TO CREW

		For one trip	For one month
Paid in cash	Fixed salary		
	Share		
Paid in kind			
Food for crew			
Others			
Total			

##### 5.2.2 RUNNING EXPENDITURE

Items	For one trip			For one month		
	Quantity	Unit price (Baht)	Value (Baht)	Quantity	Unit price (Baht)	Value (Baht)
Fuel						
Lubricating oil						
Ice						
Water						
Other expenditure						
Renewal of fish containers & baskets						
Charge of selling fish						

#### 5.3 OTHER COSTS FOR THE PAST ONE YEAR

Items	Contents	Cost paid
1. Maintenance and repair of boat and engine (1) Fishing boat (2) Main Engine (3) Other machineries and equipments		
2. Maintenance, repair and renewal of fishing gear (1) Fishing net (2) Rope (3) Others (float, sinker hook, dye, etc.)		
3. Charge and fee (1) Fee for hired boat (2) Fee for boat registration, fishing gear registration, etc. (3) Other fee and charge (Wharfage, dock rental, unloading labour charge, etc.)		
4. Administration cost		
5. Depreciation cost (1) Fishing boat (2) Main engine (3) Other machinery		
Total		

## MAJOR MARINE FISHERIES (Continued)

## 6. SUMMARY TABLE

Fishing Boat	No. of fishing boats .....		1	
	Length .....		2	
	Gross Tonnage .....		3	
	Horse power .....		4	
No. of Crew	Family .....		5	
	Employee .....		6	
Fishing Operation (For one month)	No. of trips .....		7	
	No. of fishing days .....		8	
	No. of mandays operated in fishing .....		9	
Earnings (For one month)	Species		Quantity (kg)	Value(Baht)
	Total		10	
	Indo-Pacific mackerel .....		11	
	Indian mackerel .....		12	
	Spanish mackerel .....		13	
	Miscellaneous fish .....		14	
	Trash fish .....		15	
	Exportable shrimps .....		16	
	Other shrimps .....		17	
	Crab .....		18	
	Shellfish .....		19	
	Squid & Cuttlefish .....		20	
	Others .....		21	
Cost (For one month)	Remuneration to crew	Salary	Fixed salary .....	22
			Share .....	23
			Food .....	24
			Others .....	25
	Items		Quantity (kg)	Value (Baht)
	Fuel .....		26	
	Lubricating Oil .....		27	
	Ice .....		tons .....	28
	Water .....		29	
	Fish containers & baskets .....		30	
	Charge and fee on selling fish .....		31	
	Other running expenses .....		32	
	Maintenance and repair of boat .....		33	
	Maintenance, repair and renewal of fishing gear .....		34	
	Other charge and fee .....		35	
	Administration cost .....		36	
	Depreciation Cost	Boat .....	37	
		Main engine .....	38	
		Other machineries .....	39	
	Total		40	
	Owners surplus		41	

### 3.3 COST AND EARNING SURVEY ON MAJOR MARINE FISHERIES (Concluded)

#### 7. ASSESSMENT OF CAPITAL INVESTMENT

##### 1. FISHING BOAT

1	2	3	4	5	6	7
Serial No.	Length of boat	Purchase Value	Annual Depreciation Cost	Age	Aggregate Depreciation Cost	Residual Value

##### 2. MAIN ENGINE

1	2	3	4	5	6	7
Serial No.	Horse Power	Purchase Value	Annual Depreciation Cost	Age	Aggregate Depreciation Cost	Residual Value

##### 3. OTHER MACHINERY

	1	2	3	4	5
Items	Purchase Value	Annual Depreciation Cost	Age	Aggregate Depreciation Cost	Residual Value
Auxiliary Engine.....					
Generator.....					
Radio.....					
Radar.....					
Fish finder/Echo sounder.....					

### 3.4 COST AND EARNING SURVEY ON CATFISH FARMING, 1974

#### (1) MONTHLY RECORD OF FISH FARMING

Month \_\_\_\_\_ Province \_\_\_\_\_ District \_\_\_\_\_  
 Tambol \_\_\_\_\_ Community No. \_\_\_\_\_ House No. \_\_\_\_\_  
 Name of Head of Household \_\_\_\_\_ Sample No. \_\_\_\_\_ Name of Enumerator \_\_\_\_\_

## 1. FISH SEEDS RELEASED

[illegible]

## 2. YIELD

[illegible]



(1) MONTHLY RECORD (CONTINUED)  
3. DAILY EXPENSES FOR FARMING

(1) Feed				(2) Any Other Payment						
Date	Trash Fish		Rice Bran		Broken Rice		Items (Specify)	Quantity	Price (Baht)	Value (Baht)
	Quantity (kg)	Price (Baht)	Quantity (kg)	Price (Baht)	Quantity (kg)	Price (Baht)				
1										
2										
3										
4										
5										
6										
7										
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24										
25										
26										
27										
28										
29										
30										
31										
Total										

## CATFISH FARMING 1974 (Continued)

## (2) YEARLY RECORD OF FISH FARMING

Province _____	Name of Farm _____
District _____	House No. _____
Tambol _____	Sample No. _____
Community No. _____	Name of Enumerator _____

1. SURVEY PERIOD From \_\_\_\_\_ To \_\_\_\_\_

## 2. SIZE OF FISH PONDS AND DURATION OF FISH FARMING

Serial No. of Pond	Size of Fish Ponds				Duration of Fish Farming					
	Length m	Width m	Area m <sup>2</sup>	Depth cm	1st Crop		2nd Crop		3rd Crop	
					From	To	From	To	From	To
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
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27										
28										
29										
30										
31										
32										
Total										

### 3.4 COST AND EARNING SURVEY

#### 3. PRODUCTION COST

##### (1) LABOUR COST

Month	Family		Permanent Employee		Temporary Employee		Total Cost (Baht)
	No. of Man-days	Cost (Baht)	No. of Man-Days	Cost (Baht)	No. of Man-Days	Cost (Baht)	
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
Total							

##### (2) COST FOR FISH SEEDS

	Fish Seeds			Ponds for which fish seeds were released	
	Number	Weight (kgs)	Value (Baht)	Serial No. of Ponds	Total pond Areas (m <sup>2</sup> )
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
Total					

# CATFISH FARMING 1974 (Continued)

## (3) COST OF FEEDS

Month	Trash Fish		Rice Bran		Brocken Rice		Medicine		Others		Total Value (Baht)
	Weight (kgs)	Value (Baht)	Weight (kgs)	Value (Baht)	Weight (kgs)	Value (Baht)	Weight (kgs)	Value (Baht)	Weight (kgs)	Value (Baht)	
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											
Total											

## (4) OTHER COSTS

(Baht)

Month	Equipment and Instrument	Material and Spare Parts	Fuel	Electricity					Total
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
Total									

### 3.4 COST AND EARNING SURVEY

(5) DEPRECIATION COST

Items	Original Price (Baht)	Economic Life	Depreciation Cost
Total			

#### (6) LAND RENT

Total Land Areas	Land Rent/Rai/Year	Total Land Rent/year
Rai	Baht	Baht

## (7) TOTAL PRODUCTION COST

Baht

#### 4. PRODUCTION

Month	Yield			Ponds from which fish were harvested	
	Number	Weight (kgs)	Value (Baht)	Serial No. of Ponds	Total Pond Areas (m <sup>2</sup> )
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
Total					

## 5. CAPITAL INVESTMENT

## 5. CAPITAL INVESTMENT

1) Total land areas for fish farming \_\_\_\_\_ Rai

2) Unit Price	Baht
---------------	------

3) Total value \_\_\_\_\_ Baht

1) Total areas of pond \_\_\_\_\_ m<sup>2</sup>

2) Unit Price \_\_\_\_\_ Baht

3) Total Cost \_\_\_\_\_ Baht

Items	Original Price (Baht)	Number of year used	Depreciation cost/year (Baht)	Present Price (Baht)
<b>Total</b>				

(4) Total capital investment \_\_\_\_\_ Baht

## 6. EXPLANATORY NOTES OR REMARKS FOR DATA ANALYSIS

## (2) Water Quantity and Quality

### (3) Tenure Status of Pond and Source of Feeds

(4) Others



## **APPENDIX II**

### **BASIC STATISTICAL FIGURES**



# 1. ANNUAL CATCH 1952-1972

Metric Tons

Year	TOTAL	MARINE FISH	FRESH WATER FISH
1952	191,500	138,500	53,000
1953	204,500	148,200	56,300
1954	229,800	166,400	63,400
1955	212,970	151,400	61,570
1956	217,960	152,240	65,720
1957	234,570	170,900	63,670
1958	196,300	145,000	51,300
1959	204,790	147,770	57,020
1960	219,045	146,471	72,574
1961	305,605	233,275	72,330
1962	339,788	269,709	70,079
1963	393,855	323,374	70,481
1964	576,986	494,196	82,790
1965	615,120	529,483	85,637
1966	720,282	635,165	85,117
1967	847,443	762,187	85,256
1968	1,089,303	1,004,058	85,245
1969	1,270,034	1,179,595	90,439
1970	1,448,404	1,335,690	112,714
1971	1,587,077	1,470,289	116,788
1972	1,679,540	1,548,157	131,383

Source : Traditional Production Survey

# 2. CATCH BY SPECIES 1968-1972

Metric ton

Species	1968	1969	1970	1971	1972
GRAND TOTAL	1,089,303	1,270,034	1,448,404	1,587,077	1,679,540
MARINE FISH TOTAL	1,004,058	1,179,595	1,335,690	1,470,289	1,548,157
Indo-Pacific Mackerel	107,730	83,987	123,693	111,487	78,064
Indian Mackerel	40,418	47,898	42,615	37,589	41,126
Sharks	5,809	8,714	9,717	9,502	10,540
Rays	6,559	10,132	11,995	11,164	10,195
Miscellaneous Fish	224,341	280,851	262,244	286,078	316,234
Trash Fish	377,891	492,427	487,675	655,329	719,091
Shrimp	59,755	58,313	63,652	67,614	66,887
Lobster	4,008	5,613	2,397	3,665	3,318
Acetes	11,290	13,059	15,617	14,019	19,129
Sea Crab	24,251	14,154	47,957	41,864	56,391
Shellfish	112,164	139,860	207,987	181,019	161,613
Squid & Cuttlefish	29,733	24,529	59,973	50,647	65,290
Sea Weed	107	56	122	154	223
Sea Cucumber	2	2	46	158	56

Species	1968	1969	1970	1971	1972
<b>FRESH WATER FISH TOTAL</b>	85,245	90,439	112,714	116,788	131,383
Snake-head fish	17,176	15,410	20,232	20,600	26,480
Catfish (Pla-duk)	13,897	18,323	16,730	20,847	34,446
Climbing perch (Plamoe)	9,965	6,882	8,458	7,466	9,700
Swamp eel	1,123	1,146	1,634	1,411	1,729
Common Carp	7,354	8,073	12,223	10,030	12,068
Chinese Carp	378	596	509	742	828
Sepat Siam	5,677	8,080	11,152	11,029	8,869
Catfish (Pla-Sawai)	955	1,071	1,516	1,405	1,346
Miscellaneous Fish	22,668	25,403	32,518	28,414	29,039
Prawn	4,008	3,898	4,058	2,919	3,648
Other kind of aquatic animal	2,044	1,557	3,684	11,925	3,230

Source : Traditional Production Survey

### 3. DISPOSITION OF CATCH 1968-1972

Disposition	1968	1969	1970	1971	1972
<b>GRAND TOTAL</b>	1,089,303	1,270,034	1,448,404	1,587,077	1,679,540
<b>(MARINE FISH)</b>					
<b>TOTAL</b>	1,004,058	1,179,595	1,335,690	1,470,289	1,548,157
Fresh Consumption	484,282	500,355	612,192	577,354	526,404
Frozen	34,790	4,391	21,785	34,722	28,200
Dried and Salted	65,367	64,779	65,882	64,544	83,029
Steamed or Smoked	16,219	24,211	10,239	17,638	15,693
Shrimp Paste	12,294	15,006	16,150	14,779	19,597
Dried Shrimp	20,705	15,130	18,585	17,832	19,423
Fish Meal	162,168	296,550	324,298	316,227	365,882
Fertilizer	336	22,563	559	4,652	319
Fish Sauce	59,288	54,900	50,815	107,043	112,729
Others	148,609	181,710	215,185	315,498	376,881
<b>(FRESH WATER FISH)</b>					
<b>TOTAL</b>	85,245	90,439	112,714	116,788	131,383
Sold or Consumed Fresh	49,398	64,880	68,339	63,910	91,624
Dried and Salted	9,157	10,351	18,420	16,013	11,041
Steamed or Smoked	4,594	3,778	6,372	8,284	6,667
Fermented	19,253	8,432	13,761	19,221	18,774
Shrimp Paste	236	187	176	332	158
Dried Shrimp	77	114	136	142	109
Fish Meal	178	225	202	1,216	184
Fertilizer	26	31	42	220	27
Fish Sauce	1,703	1,594	4,322	5,770	2,320
Others	623	847	944	1,680	479

Source : Traditional Production Survey

# 4. CATCH BY TYPE OF FISHINETH

Metric Ton																		
Species		Total	Trawl			Purse Seine		Gill Net					Luring Lift Net	Other Mobile Nets				
			Otter Board Trawl	Pair Trawl	Beam Trawl	Thai Purse Seine and Chinese Purse Seine	Anchovy Purse Seine	Spanish Mackerel Gill Net	Pomfret Gill Net	Mackerel Encircling Gill Net	Shrimp Gill Net	Other Gill Net		Squid Cast Net	Push Net			
A	Total	1,245,200	515,599	138,334	4,989	66,520	8,585	11,578	938	53,722	10,195	38,118	4,454	363	14,200	A	A	
	%	100.0	41.4	11.1	0.4	5.3	0.7	0.9	0.1	4.3	0.8	3.1	0.4	0.0	1.1			
B	Sub-Total Fish	828,223	455,349	121,474	777	66,520	8,179	11,570	913	53,678	4,484	30,594	4,454	-	7,039	B	B	
1.	Indo-Pacific mackerel	100,505	8.1	5,789	4,513	-	38,493	-	2	47,309	34	398	1,099	-	-	1.	1.	
2.	Indian mackerel	14,916	1.2	-	-	-	9,026	78	185	-	2,285	126	383	962	-	2.	2.	
3.	Spanish Mackerel	9,701	0.7	-	-	6	264	52	6,495	44	157	130	884	19	-	3.	3.	
4.	Dorab	4,273	0.3	-	-	-	-	-	1,765	48	235	103	1,975	-	-	4.	4.	
5.	Bonito	6,548	0.5	-	-	-	5,090	1	689	12	232	-	360	24	-	5.	5.	
6.	Russel's Scad	4,167	0.3	-	-	-	2,269	-	-	-	43	-	128	-	-	6.	6.	
7.	Torpedo travally	4,271	0.3	-	-	-	2,167	-	1	-	1,135	-	134	-	-	7.	7.	
8.	Caranx	7,121	0.6	2,506	986	-	-	110	16	918	11	162	1,520	-	-	8.	8.	
9.	Threadfin	2,046	0.1	118	271	-	-	18	7	82	18	1,310	1	-	-	9.	9.	
10.	Sardine	28,904	2.3	-	-	-	-	335	-	-	265	876	11,591	387	-	10.	10.	
11.	Anchovy	15,513	1.2	-	-	-	-	7,692	-	-	-	-	-	-	252	11.	11.	
12.	Mullet	3,647	0.3	-	-	2	-	-	-	2	356	3,044	-	-	65	12.	12.	
13.	Black pomfret	2,219	0.2	580	266	-	-	203	415	106	17	148	274	-	-	13.	13.	
14.	White pomfret	925	0.1	516	168	-	-	-	114	108	-	-	7	8	-	14.	14.	
15.	Silvery lacterid	626	0.1	307	319	-	-	-	-	-	-	-	-	-	-	15.	15.	
16.	Barracuda	4,770	0.4	2,830	1,652	1	-	35	-	3	-	54	-	-	4	16.	16.	
17.	Jew fish	13,254	1.1	9,505	2,560	25	-	-	-	15	113	544	-	-	199	17.	17.	
18.	Threadfin bream	14,896	1.2	10,298	3,804	-	-	-	-	1	4	31	-	-	1	18.	18.	
19.	Monoche bream	5,212	0.4	3,336	1,876	-	-	-	-	-	-	-	-	-	-	19.	19.	
20.	Lizard fish	11,066	0.9	8,353	2,713	-	-	-	-	-	-	-	-	-	-	20.	20.	
21.	Hair tail	3,185	0.3	2,103	556	-	-	2	-	9	286	28	-	-	-	21.	21.	
22.	Snapper	4,832	0.4	3,127	495	-	-	3	-	2	6	100	-	-	-	22.	22.	
23.	Painted sweetlip	1,485	0.1	989	496	-	-	-	-	-	-	-	-	-	-	23.	23.	
24.	Big-eye	10,627	0.9	7,333	3,289	-	-	-	-	5	-	-	-	-	-	24.	24.	
25.	Whiting fish	788	0.1	621	49	-	-	-	-	-	-	5	-	-	13	25.	25.	
26.	Marine striped catfish	1,848	0.1	-	-	-	-	33	-	-	93	527	-	-	277	26.	26.	
27.	Marine catfish	11,872	1.0	5,124	3,488	-	-	275	29	-	344	1,153	-	-	143	27.	27.	
28.	Ray	8,969	0.6	4,474	1,109	-	-	367	17	1	83	280	-	-	-	28.	28.	
29.	Shark	5,631	0.4	2,883	909	-	-	401	8	-	-	200	-	-	-	29.	29.	
30.	Miscellaneous fish	88,109	7.1	42,063	12,018	286	9,211	18	874	211	876	1,868	6,440	160	-	1,523	30.	30.
31.	Trach fish	438,999	35.2	341,594	79,936	397	-	-	-	-	16	678	-	-	-	4,572	31.	31.
C	Sub-Total, Crustaceans	87,619	7.0	37,368	4,832	2,157	-	406	8	25	44	5,585	7,322	-	-	7,158	C	C
32.	White Shrimp	10,641	0.9	2,475	103	32	-	-	-	4	3,407	882	-	-	174	32.	32.	
33.	Jumbo Shrimp	258	0.0	185	5	-	-	-	2	11	-	6	3	-	-	32	33.	33.
34.	Tiger Shrimp	1,677	0.1	1,379	38	133	-	-	-	-	23	72	-	-	5	34.	34.	34.
35.	Yellow Shrimp	558	0.1	554	4	-	-	-	-	-	-	-	-	-	-	35.	35.	35.
36.	Pink Shrimp	10,903	0.9	5,058	182	34	-	-	-	-	545	530	-	-	495	36.	36.	36.
37.	Other Shrimp	34,219	2.7	21,147	1,205	1,904	-	-	-	32	1,109	767	-	-	3,127	37.	37.	37.
38.	Lobster	1,617	0.1	1,031	567	-	-	-	-	-	-	-	-	-	-	38.	38.	38.
39.	Acetes	8,870	0.7	-	10	-	406	-	-	-	-	-	-	-	2,477	39.	39.	39.
40.	Swimming crab	15,336	1.2	5,528	2,728	39	-	6	13	7	357	4,531	-	-	744	40.	40.	40.
41.	Blue crab	3,540	0.3	-	5	-	-	-	1	1	139	537	-	-	104	41.	41.	41.
D	Sub-Total, Molluscs	330,319	26.5	22,892	12,028	2,115	-	-	-	-	126	202	-	363	3	D	D	D
42.	Squid	23,528	1.9	13,350	8,149	-	-	-	-	-	76	1	-	356	-	42.	42.	42.
43.	Cuttlefish	13,263	1.1	9,161	3,809	3	-	-	-	-	-	-	-	6	2	43.	43.	43.
44.	Octopus	740	0.1	361	70	12	-	-	-	-	50	201	-	1	1	44.	44.	44.
45.	Ark shell	12,582	1.0	-	-	-	-	-	-	-	-	-	-	-	-	45.	45.	45.
46.	Sea mussel	214,593	17.2	-	-	-	-	-	-	-	-	-	-	-	-	46.	46.	46.
47.	Oyster	2,832	0.2	-	-	-	-	-	-	-	-	-	-	-	-	47.	47.	47.
48.	Horse mussel	39,139	3.1	-	-	-	-	-	-	-	-	-	-	-	-	48.	48.	48.
49.	Short necked clam	8,406	0.5	-	-	-	-	-	-	-	-	-	-	-	-	49.	49.	49.
50.	Jack Knife Clam	4,320	0.4	-	-	-	-	-	-	-	-	-	-	-	-	50.	50.	50.
51.	Other shellfish	12,928	1.0	-	-	2,100	-	-	-	-	-	-	-	-	-	51.	51.	51.
E	Sub-Total, Others	39	0.0	-	-	-	-	-	-	-	-	-	-	-	-	E	E	E
52.	Jellyfish	39	0.0	-	-	-	-	-	-	-	-	-	-	-	-	52.	52.	52.

# OF FISHINETHOD AND BY SPECIES 1971

Metric Ton			Metric Ton																	
Other Mobile Nets			Species	Other Mobile Net		Hook & Line		Stationary Gear								Culture and Particular Fishery				
Guided Net	Push Net	Scoop Net		Other	Long Line	Hook	Bamboo Stake Trap	Set Bag Net	Wing Set Bag Net	Edd Tide Bamboo Fence Trap	Shrimp Bamboo Fence Trap	Fish Trap	Crab Trap	Other Stationary Gear	Collecting Shell fish	Other Fishing	Shrimp Culture			
13	14,200	A	A	Total	143	30,576	6,576	5,732	19,672	14,914	313	356	5,152	733	2,992	1,825	288,632	35	954	A
0.0	1.1			%	0.0	2.5	0.5	0.5	1.6	1.2	0.0	0.0	0.4	0.1	0.2	0.1	23.2	0.0	0.1	
	7,039	B	B	Sub-Total Fish	5	21,886	8,576	5,083	19,009	7,162	88	318	1,705	605	-	972	-	-	43	B
		1.	1.	Indo-Pacific mackerel	-	1,071	-	-	1,797	-	-	-	-	-	-	-	-	-	-	1.
		2.	2.	Indian mackerel	-	1,651	-	-	220	-	-	-	-	-	-	-	-	-	-	2.
		3.	3.	Spanish mackerel	-	28	33	1,006	68	8	-	-	-	-	-	1	-	-	-	3.
		4.	4.	Dorab	-	-	-	28	116	2	-	-	-	-	-	1	-	-	-	4.
		5.	5.	Bonito	-	11	2	2	95	-	-	-	-	-	-	-	-	-	-	5.
		6.	6.	Russel's scad	-	1,721	-	-	8	-	-	-	-	-	-	-	-	-	-	6.
		7.	7.	Torpedo travally	-	587	7	182	58	-	-	-	-	-	-	-	-	-	-	7.
		8.	8.	Caranx	-	75	10	301	268	-	-	125	3	-	-	-	-	-	-	8.
		9.	9.	Threadfin	-	-	23	160	-	2	-	1	34	-	-	-	-	-	-	9.
		10.	10.	Sardine	-	13,172	-	-	2,160	-	-	18	-	-	-	-	-	-	-	10.
	252	11.	11.	Anchovy	-	108	-	-	7,173	28	1	-	-	-	-	259	-	-	-	11.
	65	12.	12.	Mullet	-	147	-	-	-	8	-	-	-	4	-	29	-	-	-	12.
		13.	13.	Black pomfret	-	172	-	-	38	-	-	-	-	-	-	-	-	-	-	13.
		14.	14.	White pomfret	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	14.
		15.	15.	Silvery lacterid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.
	4	16.	16.	Barracuda	-	60	11	42	-	5	-	73	-	-	-	-	-	-	-	16.
	199	17.	17.	Jew fish	-	103	-	-	155	20	-	3	-	-	-	12	-	-	-	17.
	1	18.	18.	Threadfin bream	-	201	-	552	-	-	-	-	-	-	-	4	-	-	-	18.
		19.	19.	Monocle bream	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.
		20.	20.	Lizard fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.
		21.	21.	Half tail	-	-	-	25	179	-	-	-	-	-	-	-	-	-	-	21.
		22.	22.	Snapper	-	21	906	49	-	107	-	7	-	7	-	1	-	-	-	22.
		23.	23.	Painted sweetlip	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.
		24.	24.	Big-eye	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.
	13	25.	25.	Whiting fish	-	7	-	79	-	11	-	-	-	-	-	1	-	-	-	25.
	277	26.	26.	Marine striped catfish	-	132	425	53	-	22	-	1	160	70	-	55	-	-	-	26.
	143	27.	27.	Marine catfish	-	78	580	348	-	107	-	-	180	19	-	6	-	-	-	27.
		28.	28.	Ray	-	2	492	40	-	2	-	1	1	-	-	-	-	-	-	28.
		29.	29.	Shark	-	23	1,101	40	-	-	-	-	68	-	-	-	-	-	-	29.
	1,523	30.	30.	Miscellaneous fish	4	1,529	2,979	2,071	1,366	1,900	12	89	1,004	495	-	169	-	-	43	30.
	4,972	31.	31.	Trash fish	1	789	1	15	5,285	4,940	75	-	255	10	-	434	-	-	-	31.
	7,158	C	C	Sub-Total, Crustaceans	138	6,693	-	4	-	7,502	225	37	3,447	128	2,992	647	-	-	911	C
	174	32.	32.	White Shrimp	-	279	-	-	-	1,640	9	-	1,245	-	-	15	-	-	374	32.
	32	33.	33.	Jumbo Shrimp	-	4	-	-	-	6	-	2	-	-	-	2	-	-	-	33.
	5	34.	34.	Tiger Shrimp	-	5	-	-	-	17	-	4	-	-	-	1	-	-	-	34.
		35.	35.	Yellow Shrimp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.
	495	36.	36.	Pink Shrimp	-	65	-	-	-	2,211	33	2	1,203	-	-	53	-	-	492	36.
	3,127	37.	37.	Other Shrimp	14	1,133	-	-	-	2,333	67	1	971	48	-	317	-	-	45	37.
		38.	38.	Lobster	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	38.
	2,477	39.	39.	Acetes	124	4,586	-	-	-	970	116	5	-	-	-	176	-	-	-	39.
	744	40.	40.	Swimming crab	-	245	-	4	-	252	-	7	28	16	753	78	-	-	-	40.
	104	41.	41.	Blue crab	-	357	-	-	-	73	-	18	-	64	2,239	4	-	-	-	41.
83	3	D	D	Sub-Total, Molluscs	-	2,197	-	645	663	246	-	1	-	-	-	6	288,832	-	-	D
56		42.	42.	Squid	-	273	-	621	632	68	-	1	-	-	-	1	-	-	-	42.
6	2	43.	43.	Cuttlefish	-	58	-	18	31	160	-	-	-	-	-	5	-	-	-	43.
1	1	44.	44.	Octopus	-	-	-	6	-	18	-	-	-	-	-	-	-	-	-	44.
		45.	45.	Ark shell	-	1,866	-	-	-	-	-	-	-	-	-	-	10,716	-	-	45.
		46.	46.	Sea mussel	-	-	-	-	-	-	-	-	-	-	-	-	214,583	-	-	46.
		47.	47.	Oyster	-	-	-	-	-	-	-	-	-	-	-	-	2,832	-	-	47.
		48.	48.	Horse mussel	-	-	-	-	-	-	-	-	-	-	-	-	39,139	-	-	48.
		49.	49.	Short necked clam	-	-	-	-	-	-	-	-	-	-	-	-	6,406	-	-	49.
		50.	50.	Jack Knife Clam	-	-	-	-	-	-	-	-	-	-	-	-	4,320	-	-	50.
		51.	51.	Other shellfish	-	-	-	-	-	-	-	-	-	-	-	-	10,826	-	-	51.
	8	E	E	Sub-Total, Others	-	-	-	-	-	4	-	-	-	-	-	-	-	-	35	E
		52.	52.	Jellyfish	-	-	-	-	-	4	-	-	-	-	-	-	-	-	35	52.

# 5. NUMBER OF FISHING HOUSEHOLDS, FISHERMEN AND FISHING BOATS, 1970

Region	Number of Fishing Households										Number of fishing operator's households by extent of dependency on fishing			
	Fishing Operator's Households													
	Total	Engaged in own fishing			Participated in partnership fishing			Fishing Employee's Household						
		Total	with more than 3 employees	with out any employees or with less than 2 employees	Total	with own boat	with out own boat							
	Total	I	II	III	IV	V	Total	Solely	Mainly	Partly				
	43,520	34,903	31,811	2,660	29,151	3,092	1,003	2,089	8,617	34,903	21,032	9,910	3,961	
	5,925	5,251	5,101	412	4,689	150	131	19	674	5,251	2,631	961	1,659	
	11,138	6,942	6,895	1,027	5,868	47	29	18	4,196	6,942	5,116	1,277	549	
	6,934	6,221	6,169	466	5,703	52	35	17	713	6,221	4,417	1,263	541	
	11,389	9,207	6,519	535	5,984	2,688	702	1,986	2,182	9,207	5,423	3,176	608	
	8,134	7,282	7,127	220	6,907	155	106	49	852	7,282	3,445	3,233	604	

Region	Fishing population (Number of family member of fishing household)	Number of Fishermen engaged in fishing				Number of Boats				Number of powered boats by length						
						Powered boat		Non- power- ed boat								
						Total	in board engine		Out board engine							
		Total	Solely	Mainly	Partly					Total	~ 4 m	4-8 m	8-14 m	14-18 m	18-25 m	25 m-
Total	271,132	74,086	56,708	11,985	5,393	27,521	8,760	10,448	8,313	19,208	225	9,125	7,933	1,224	658	43
I	37,744	8,432	5,202	2,100	1,130	3,649	1,654	906	1,089	2,560	90	1,720	614	123	13	-
II	74,466	20,855	18,436	1,856	563	6,050	4,048	974	1,028	5,022	131	2,496	1,456	532	377	30
III	42,610	12,681	9,498	2,549	634	5,425	1,191	2,650	1,584	3,841	4	1,617	1,744	326	142	8
IV	65,135	15,454	11,374	3,014	1,066	6,495	1,111	3,442	1,942	4,553	-	1,111	3,146	191	100	5
V	51,177	16,664	12,198	2,466	2,000	5,902	756	2,476	2,670	3,232	-	2,181	973	52	26	-

Source : Survey on Fisheries Inventory Items, 1970

## 6. BALANCE OF IMPORTS AND EXPORTS ON FISHERIES PRODUCTS 1958-1972

Quantity : Tons

Value : 1,000 Baht

Year	Imports		Exports		Balance in Value
	Quantity	Value	Quantity	Value	
1958	5,324	52,698	12,359	35,764	- 16,934
1959	8,933	95,151	8,869	29,553	- 65,598
1960	9,287	70,189	8,959	34,259	- 35,930
1961	10,229	63,058	10,640	42,492	- 20,566
1962	7,865	55,738	9,078	41,235	- 14,503
1963	6,578	48,645	9,049	72,723	+ 24,078
1964	8,346	55,211	10,911	95,755	+ 40,544
1965	11,878	69,099	17,251	149,951	+ 80,852
1966	10,132	63,889	18,639	234,971	+ 171,082
1967	10,026	65,256	17,390	286,553	+ 221,297
1968	9,337	64,134	16,186	309,000	+ 244,866
1969	12,196	88,480	21,758	324,105	+ 235,625
1970	14,229	85,607	44,956	369,818	+ 284,211
1971	15,934	82,325	55,111	497,558	+ 415,233
1972	15,139	83,692	82,381	807,165	+ 723,473

Source : Department of Customs

Remark : - Unfavorable balance

+ Favorable balance

## 7. IMPORTS OF FISHERIES PRODUCTS BY KINDS, 1970-1972

Quantity : Tons

Value : 1,000 Baht

Kinds & Source	1970		1971		1972	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	14,299	85,607	15,934	82,325	15,139	83,692
Fish Crustaceans, Molluscs (fresh, alive, preserved)	( 7,006 )	(36,308)	(11,080)	(54,615)	(11,307)	(52,797)
Malaysia	906	3,567	889	2,920	7,885	8,447
Burma	242	913	7,274	9,068	362	3,601
Japan	675	12,266	1,180	17,233	1,512	17,224
Others	5,183	19,562	1,737	25,394	1,548	23,525
Fish canned	(1,692)	(19,220)	( 325)	( 4,113)	( 117)	( 1,672)
Cuttlefish (Dried)	( 277)	( 4,464)	( 258)	( 2,967)	( 307)	( 3,709)
S. Korea	262	4,269	213	2,603	270	3,344
Others	15	195	45	364	37	365
Shrimp Paste	( 4,783)	(23,248)	( 3,917)	(18,847)	( 2,955)	(23,420)
Malaysia	4,060	20,174	3,346	16,163	116	502
Others	723	3,074	571	2,684	2,839	22,918
Fish Meal	( 541)	( 2,367)	( 354)	( 1,783)	( 453)	( 2,094)
UN.S. Africa	462	2,065	351	1,762	250	1,179
Others	79	302	3	21	203	915

Source : Department of Customs

# 8. EXPORTS OF FISHERIES PRODUCTS BY KINDS, 1970-1972

Quantity : Tons  
Value : 1,000 Baht

Kinds & Destination	1970		1971		1972	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	44,966	369,818	55,111	497,558	82,381	807,165
1. Fish (alive, fresh chilled, frozen, preserved)	(20,705)	(58,651)	(23,913)	(89,500)	(28,867)	(93,657)
Malaysia	15,459	27,354	17,501	30,210	25,105	46,529
Others	5,246	31,297	6,412	59,290	3,762	47,128
2. Squid & Cuttlefish ( chilled frozen, salted, dired)	( 2,905)	(37,775)	( 6,008)	(96,053)	(15,982)	(244,422)
Italy	512	5,349	1,016	9,624	3,098	29,285
Singapore	97	1,245	627	17,868	604	23,058
Hong Kong	873	12,982	1,448	25,853	1,740	40,968
Japan	514	7,831	1,269	23,270	5,733	128,776
Others	909	10,368	1,648	19,438	4,807	22,335
3. Shrimps & Prawns (Fresh, chilled frozen, salted, dried)	( 6,421)	(224,053)	( 5,593)	(246,960)	( 7,303)	(359,324)
Japan	3,643	153,364	3,446	178,869	3,902	233,011
U.S.A.	1,152	41,246	469	29,760	1,276	75,491
Others	1,626	29,443	1,678	38,331	2,125	50,822
4. Fish Sauce	( 782)	( 1,963)	( 630)	( 1,917)	( 989)	( 3,822)
Laos	600	1,097	462	973	607	1,881
France	174	841	123	644	213	1,103
Others	8	25	45	300	169	838
5. Fish Meal	(13,215)	(35,915)	(18,339)	(50,183)	(28,194)	(90,381)
Singapore	9,813	28,114	12,767	37,202	17,779	53,301
Japan	296	833	1,442	2,517	2,288	6,384
Others	3,106	6,968	4,130	10,464	8,127	30,696
6. Other Crustaceans & Molluscs	( 928)	(11,461)	( 628)	(12,945)	( 1,046)	(15,559)

Source : Department of Costoms

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