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SOCIAL SCIENCE INFORMATION SYSTEMS FOR
SMALL-SCALE FISHERIES MANAGEMENT AND
DEVELOPMENT IN MALAYSIA, PHILIPPINES
AND THAILAND

Prepared for the Fishery Development Planning
Service of the United Nations Food and
Agriculture Organization (Ref: PE 13/1)

by

Dr. Brian A. Lockwood, Coordinator
ICLARM Fisheries Social Science Research Network

February 1984

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SOCIAL SCIENCE INFORMATION SYSTEMS FOR
SPECIALIZED SERVICES MANAGEMENT AND
DEVELOPMENT IN MALAYSIA, BRITISH
MALAYA

Proceedings of the First Development Planning
Seminar of the United Nations Food and
Agriculture Organization (Ref: FAO/UNEP)

Dr. Brian A. Lockwood, Coordinator
ICLARM Fisheries Social Science Research Network

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1. TERMS OF REFERENCE (AS PROVIDED BY FAO)

1. In many developing countries the threat of overexploitation of coastal and inland water fisheries resources is a matter of concern as are the low income levels of the small-scale fishing families that depend upon these resources. Intrusion of industrial fishing fleets into coastal waters, increasing numbers of small-scale fishermen, higher efficient harvesting technologies and competition with alternative users of water resources and shore land are among the important reasons for increasing pressure on limited fish resources and stagnating or declining living standards in small-scale fisheries.
2. In many instances, the occurrence of excess fishing effort, overcapitalization and socioeconomic imbalances, such as increasing regional and personal income disparities, declining incomes, rising costs of fishing at constant or declining levels of catch, increasing unemployment or reduced supply of fish to rural areas is partly a corollary of poor development planning and lack of timely implementation of fishery management measures.
3. Good development planning and timely and appropriate management interventions require an adequate base of biological, economic and social data that is lacking in many small-scale fisheries of developing countries.
4. At present, continuing data collection systems in small-scale fisheries - if they exist at all - refer usually only to biological information, viz. species-wise catch statistics, and to some technical data on fishing craft and gear. The collection of economic and social data on a continuing basis is still very rare though there is a growing awareness of the paramount importance of this information for fisheries development planning and management, especially with regard to small-scale fisheries.
5. To promote and improve the collection of socioeconomic data, FAO's Fishery Development Planning Service intends to prepare a manual on socioeconomic information systems for fisheries development planning and management. As preparatory work for writing this manual, two consultants are engaged to study the data collection systems in some selected countries of Asia and Africa which already regularly acquire some socioeconomic information.
6. Specifically the consultants will study the present collection systems of economic and social data in terms of:
 - (1) institutions entrusted with data collection;
 - (2) survey methodologies and periodicities of data collection;

- (3) scope, specificity and accuracy of collected data;
- (4) methods of data processing;
- (5) time-lag between data collection and finalization of data processing;
- (6) forms and periodicities of publishing processed data;
- (7) numbers and specific tasks of staff involved in data collection and processing;
- (8) estimated costs of data collection and processing;
- (9) institutions and organization which use the data;
- (10) purposes and frequencies of data utilization.

7. The consultancy, while concentrating on the harvesting side of the fisheries sector should take due account of data collected in backward sectors (boat-building, engine manufacturing, net-making) and forward sectors (fish processing and marketing) as well as the data available from secondary sources (population census etc.).

8. The countries selected in Asia are Malaysia, the Philippines and Thailand.

11. SCHEDULE AND INSTITUTIONS CONTACTED

The consultant (Dr. Brian Lockwood based in Malaysia) spent the following time and effort to fulfill the FAO terms of reference:

October 24-25	Planning/correspondence
November 1-3, 7	Information gathering in Malaysia
November 19	Travel to Philippines
21-25	Information gathering in Philippines
29	Travel to Malaysia
December 12	Travel to Thailand
December 13-17	Information gathering in Thailand
18	Return to Malaysia
December 21-22	Report preparation (in Malaysia)
January 3-5, 7, 9-11	

The following institutions were contacted:

MALAYSIA

1. Fisheries Division, Ministry of Agriculture
2. Malaysian Fisheries Development Authority
- *3. Agricultural University of Malaysia
- *4. University of Malaya
- *5. Malaysian Agricultural Research Development Institute

* Yielded no specific data files collected on a sustained basis, but provided "users" point of view.

PHILIPPINES

1. Bureau of Fisheries and Aquatic Resources
2. Bureau of Agricultural Economics
- *3. Fishery Industry Development Council
4. Philippine Fisheries Development Authority
5. National Census and Statistics Office
- *6. Philippine Council of Agricultural and Resources Research and Development

THAILAND

1. Department of Fisheries, Ministry of Agriculture and Cooperatives
2. Fish Marketing Organization
3. Southeast Asian Fisheries Development Center (SEAFDEC)
- *4. Kasetsart University, Department of Agricultural Economics
- *5. Chulalongkorn University, Institute of Population Studies

III. INTRODUCTION

1. Paragraph 4 of the Terms of Reference states (in part):
"at present, continuing data collection systems in small-scale fisheries - if they exist at all - refer usually only to biological information, viz. species-wise catch statistics, and to some technical data on fishing craft and gear. The collection of economic and social data on a continuing basis is still very rare..."
Enquiries in Malaysia, the Philippines and Thailand uncovered little information that would challenge this statement as a fair summary of the current situation in each of these countries, and indeed, as a fair summary of this report.

2. In each country there are two types of agencies with major responsibilities for the collection and processing of fisheries sector data on a regular, sustained basis. One, the Fisheries Department or Bureau of the Ministry responsible for fisheries management and regulation is concerned mainly with measuring and valuing production of species, and with registering/licensing fishing vessels and gears. These data are combined to give estimates of production by gear-types and vessel-types and similar cross-tabulations. The data are often broken down by fishing ground, or more usually, by some administrative district such as a state or province. There is usually an attempt to measure harvesting costs and to produce estimates of costs per unit effort for the most important (in terms of production) gears. In order to value production some attempt is made to collect fish price data at one or two points in the market chain (e.g., some form of wholesale and/or ex-vessel price and retail price). In each country the Fisheries Department maintains special statistical sections to collect and process these data,

* Yielded no specific data files collected on a sustained basis, but provided "users" point of view.

applies systematic sampling and estimating procedures, and publishes the results annually. Each Department attempts to include small-scale fishing units in its data collection system in order, mainly, to complete the records of total production: small-scale fishermen are included in the data collection systems through a gear-type sampling procedure and/or through a fish landing sampling procedure that includes the often scattered landing sites used by small-scale fishermen.

3. The second type of agency is responsible mainly for fisheries development and marketing. Its main contribution to fisheries sector data is the collection and processing of price information, usually for market intelligence purposes. In the Philippines, more than one agency of this type collects fish price data, while in Thailand and Malaysia the Departments of Fisheries also collect price data.

4. Thailand and the Philippines have both carried out fisheries censuses (Thailand in 1967 and the Philippines in 1971) and both plan second fisheries censuses in 1984. The censuses contain some basic socioeconomic data on fishing households, such as age and sex composition, vessel and gear ownership and organization of fishing enterprises. A partial fisheries census is being carried out in Peninsular Malaysia at the present time, to obtain a wide range of socioeconomic data on small-scale fishing households. Unfortunately, the project was not adequately planned or well implemented and the accuracy of much of the data being collected must be regarded with suspicion.

5. In each country some data are collected on what the Terms of Reference refer to as backward and forward sectors. In general these data consist of listings of enterprises engaged, say, in fish processing, fish trading or the supply of certain inputs such as diesel fuel and ice. In each country there is an "informal" monitoring of input prices, and, through the vessel licensing systems, of vessel construction and the installation of engines.

6. In addition to the national data collection systems outlined above, the Southeast Asian Fisheries Development Center (SEAFDEC) based in Bangkok publishes an annual Fishery Statistical Bulletin for South China Sea Area. The first issue of this Bulletin was published in 1976. The data compiled in the Bulletin are based upon returns received from governments to a questionnaire prepared by SEAFDEC. Data summarized include geographic, demographic and economic statistics (national level, not fishing communities per se), fishery production and value, fresh fish prices, catch disposition, processing (number of establishments), export and import volume. This Bulletin thus basically summarizes national data and is not based upon a separate data collection system.

7. Attempts to obtain cost breakdowns for data collection systems were not entirely successful. This is because data collectors are often performing this function as part of their other duties (e.g., extension). No agency maintained reliable estimates of data collection and processing costs per se.

8. In addition to these "official" kinds of data collected on a regular basis and covering as far as possible the entire fisheries sector, there have been many ad hoc studies of a more definite socioeconomic nature on many aspects of the sector by government agencies (such as "economics" sections within Departments of Fisheries), universities and research institutions in each of the three countries. These studies are not part of "continuing data collection systems" of the kind referred to in the Terms of Reference of this report but many of them deal specifically with small-scale fisheries and they constitute the main, if fragmentary, source of socioeconomic information on small-scale fisheries in Malaysia, the Philippines and Thailand.

9. In this report the regular data collection systems of the Departments of Fisheries and other government or quasi-government institutions such as marketing and development agencies are first described (Section VI). Most of the data collected by these institutions are biological and technical rather than socioeconomic, and generally they do not deal specifically with the small-scale fisheries of the country. Details of these systems, arranged according to the items given in paragraph 6 of the Terms of Reference, are presented as Appendices to this report. In Section V, information is presented on the collection of socioeconomic data on small-scale fisheries.

IV. PRINCIPAL NATIONAL DATA COLLECTION SYSTEMS

A. MALAYSIA

1. Fisheries Division, Ministry of Agriculture

Since 1981 the statistics section of the Fisheries Division has based its routine fisheries data collection on the recommendations of a report by the FAO South China Sea Fisheries Development and Coordinating Programme (Hooker, Savariraj, 1981, See Appendix A2). Edwin Savariraj was, and remains the head of the statistics section of the Fisheries Division. He informed me that the recommendations of this report are fully implimented in Peninsular Malaysia although not fully in Sarawak, and not at all in Sabah.

The main components of the data collection system are as follows:

a. Fishing fleet data:

Number of fishing boats licensed by month and State.

Certain information about the boats are collected and recorded: operational base, dimensions and tonnage, horsepower and engine type, main and secondary gears used (at time of registration), and number of fishermen working the boat.

Number of fishing gears licensed by month, State and type.

These data are inventory statistics obtained from the license registries in each State. Annual aggregates are published. See appendix A2 for details.

b. Marine catch and earnings data:

Marine catch. Statistics are collected on a monthly basis through a continuous systematic survey of fish landing centers, and are tabulated by State, fisheries district, gear type and fish species.

Fishing effort. Statistics are collected from samples of trawlers and purse seiners and include: number of trips/month, number of days/trip, number of hauls/day, and average duration per haul. Estimates of effort for other gear types (mainly small-scale gears) are also made.

Fish prices. Data are collected at landing centers at several levels: producer (ex-vessel), wholesale, and retail.

Details of the survey methods used to collect these data are given in Appendix A1.

c. Miscellaneous fisheries statistics:

Other routine data collection activities of the Fisheries Division are conducted to obtain information on the following:

- * Number and capacity of operating ice factories, refrigerated storage facilities and firms dealing with preserved fish products.
- * Data on processed marine products: quantity and type.
- * Information on fishing input costs such as diesel fuel, lubrication oil, salt and fish transportation.

- * Revenues obtained by the Fisheries Division from license fees, fines, etc.
- * Data on quantities of marine products imported and exported: These data are obtained from the Customs Department.

Details are given in appendix A2.

2. Malaysian Fisheries Development Authority, Lembaga Kemajuan Ikan Malaysia (LKIM)

Since 1978 LKIM has collected and publicized daily market intelligence data consisting of quantities and wholesale prices of fish by major species and grade marketed at eight major wholesale market centers in Peninsular Malaysia, and retail prices by species and grade of fish in eight urban centers.

Details are given in appendix A3. These data have not been published except as daily market reports but the detailed time series is currently being analyzed by the fisheries economics staff at Universiti Pertanian Malaysia as part of a major study of the fish marketing system of Peninsular Malaysia being carried out by UPM in cooperation with LKIM and ICLARM.

In July 1983, LKIM, in cooperation with the Fisheries Division and the Ministry of Agriculture, began a "Census of Fishing Households" for Peninsular Malaysia. The data collection activity is still underway and details will be available later in 1984.

B. THAILAND

1. Department of Fisheries, Ministry of Agriculture and Cooperatives

The routine collection of fisheries statistics by the Statistics Section of the Department of Fisheries was reorganized in 1969 after the first Marine Fisheries Census of 1967 and the system has remained substantially unchanged since. It is concerned primarily with the measurement of catch/production by major and minor gear types. Data are collected through a number of continuous and annual surveys. The data collection system is described in some detail in Toshifumi Sakurai, DEVELOPMENT OF FISHERIES STATISTICS IN THAILAND, Department of Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, June 1974 (see appendix B.1).

a. Fishing fleet data:

Number of fishing vessels registered by size and type of fishing method used (gear), and by province. These data are drawn from provincial registers, and have been published annually since 1971. Twenty-one "types of fishing methods" are identified in the registration process. They are: (1) otter board trawl, (2) pair trawl, (3) beam trawl, (4) Thai purse seine, (5) Chinese purse seine, (6) anchovy purse seine, (7) luring purse seine, (8) king mackerel gillnet, (9) pomfret gillnet, (10) mackerel encircling gillnet, (11) other gillnets, (12) mackerel gillnet, (3) grabs gillnet, (14) sardinellas gillnet, (15) mullet gillnet,

The main components of the data collection system are as follows:

a. Fishing fleet data:

Number of fishing boats licensed by month and State. Certain information about the boats are collected and recorded: operational base, dimensions and tonnage, horsepower and engine type, main and secondary gears used (at time of registration), and number of fishermen working the boat.

Number of fishing gears licensed by month, State and type.

These data are inventory statistics obtained from the license registries in each State. Annual aggregates are published. See appendix A2 for details.

b. Marine catch and earnings data:

Marine catch. Statistics are collected on a monthly basis through a continuous systematic survey of fish landing centers, and are tabulated by State, fisheries district, gear type and fish species.

Fishing effort. Statistics are collected from samples of trawlers and purse seiners and include: number of trips/month, number of days/trip, number of hauls/day, and average duration per haul. Estimates of effort for other gear types (mainly small-scale gears) are also made.

Fish prices. Data are collected at landing centers at several levels: producer (ex-vessel), wholesale, and retail.

Details of the survey methods used to collect these data are given in Appendix A1.

c. Miscellaneous fisheries statistics:

Other routine data collection activities of the Fisheries Division are conducted to obtain information on the following:

- * Number and capacity of operating ice factories, refrigerated storage facilities and firms dealing with preserved fish products.
- * Data on processed marine products: quantity and type.
- * Information on fishing input costs such as diesel fuel, lubrication oil, salt and fish transportation.

(16) threadfins gillnet, (17) push net, (18) shrimp gillnet, (19) other nets, (20) long line, and (21) squid cast net.

b. Catch and effort data, commercial fishing gears:

A "Marine fisheries production survey" based on log book information provided by a sample of fishing vessels/gears has been in operation since 1969. This continuous survey provides costs and effort data for the following major gear types:

- (1) otter trawl
- (2) pair trawl
- (3) beam trawl
- (4) Thai purse seine
- (5) Chinese purse seine
- (6) anchovy purse seine
- (7) mackerel encircling gillnet
- (8) Spanish mackerel gillnet
- (9) push net
- (10) bamboo stake trap.

The Department of Fisheries estimates these gears normally account for about 70% of total landings.

Details of the Marine fisheries production survey is given in Appendix B1.

c. Catch and effort, other (small-scale) gears:

A Fishing community survey carried out annually in 400 coastal villages has been in operation since 1970. It is an attempt to capture the production by species of the fishing methods and gears not included in the Marine Fisheries Production Survey, that is, a miscellany of small-scale gear types scattered throughout coastal Thailand. While the community is the primary sampling unit, the data are collected from sub-samples of gears drawn in each community from an annually updated listing. The survey is conducted during January of each year and surveyors obtain the following information from gear operators for the previous year:

- (1) fishing season (total number of months the gear was in operation),
- (2) average monthly catch, and,
- (3) species composition of catch - % of total.

No information is collected on the fishing household or on the village (other than a listing of gears).

Details of this survey are given in Appendix B2.

d. Coastal culture survey:

This survey of coastal aquaculture is based on an annually updated list for each sub-district (Tambol) from which samples of each type of culture (shrimp, cockle, etc) are drawn for a single interview with the operator regarding his previous year's operation. The objectives are to estimate production and productivity per unit area for each cultured species. (see Appendix B2).

2. Fish Marketing Organization (FMO)

The FMO collects market intelligence data from major fish landings and from three wholesale markets it administers. This is mainly daily price information although quantities landed by species are also recorded for each vessel unloading at the landings operated by FMO. Landings prices (paid by fish dealers to fishermen) and wholesale market prices are obtained daily and made available to the public media and to fishermen's associations and cooperatives. Details are given in Appendix B3 .

C. PHILIPPINES

1. Bureau of Fisheries and Aquatic Resources, Ministry of Natural Resources.

The Statistics Department of Fisheries Economics and Information Division of BFAR is responsible for the collection and processing of all data related to the status and management of marine fisheries and aquaculture in the Philippines. The basic system for the collection and processing of data currently in use is based on, and is described in two reports of the FAO South China Sea Fisheries Development and Coordinating Programme (Chakraborty 1976; Wheeland and Hooker 1980. Both attached in Appendix C1).

The Chakraborty report gives the system currently being implemented to the extent possible within BFAR's annual budget; that is, there remain some deficiencies in the collection of data from outlying areas.

a. Catch and effort data:

Commercial fisheries. This is based on a continuous survey of the 15 most important commercial landing centers and 45 other landings covering all coastal provinces. At each center the number of boats over 3 gross tons landing is recorded daily and a random sample is drawn for the collection, by interview, of the following data:

- a. weight of catch by species landed that day,
- b. location of fishing ground,
- c. depth of fishing
- d. number of fishing trips
- e. number of hauls
- f. search and fishing times.

Small-scale or municipal fisheries. The coastline of each province is divided into a number of zones with each zone containing about 27 landing centers. Nine centers per zone are visited once every 30 days for a period of 2 consecutive days according to a plan of work prepared at the HQ in Manila. In each month, therefore, 9 centers will be observed, each for two consecutive days. At each center all boats landing fish are counted and recorded. A sample of boats is drawn for collection by interview of catch and effort data.

Fish price data. Wholesale fish prices by species are collected at the major landings but there is still no real effort to do this systematically. Similarly, retail prices are collected at selected markets in Manila but again, not systematically. BFAR does not publish its price data.

b. Other data:

Fish imports and exports(quantities). Compiled from records of other government departments such as Customs and Central Bank.

Inventory data on vessels and gears. An inventory of fishing units (vessel plus gear) was completed in 1979 and a second is planned for 1984. There is some concern that the 1979 inventory did not cover some areas fully.

Seen Appendix C1 for details of the BFAR data collection system.

2. Philippine Fisheries Development Authority (PFDA) and the Bureau of Agricultural Economics (BAEcon).

Both of these agencies systematically collect and process fish price data. PFDA manages the large Navotas fish landing complex and wholesale market in Manila and a number of landings/markets in the larger provincial cities. It records daily landings and wholesale price statistics at these centers. It receives monthly reports of provincial quantities and prices at HQ in Manila and sends out to the provinces daily reports of Navotas quantities and prices by species.

BAEcon maintains a produce market intelligence service on a national level which includes wholesale and retail prices of a range of fish species and sizes. Price data are collected systematically on four days each week in all major market/urban centers.

For further information see Appendix C2.

V. COLLECTION SYSTEMS FOR SOCIOECONOMIC DATA ON SMALL-SCALE FISHERIES

1. The main national fisheries statistics collection systems in Malaysia, Thailand and the Philippines are concerned primarily with the estimation of production. These estimates are broken down by administrative areas (rarely by resource areas or fisheries), by catch units (vessel size and gear types) and by fish species or groups of species. In each case separate data collection methods are employed to obtain these data for "commercial" and "other" (we may assume "small-scale") fishing units but generally the method used to measure the catch of the small-scale units is less effective (in obtaining accurate estimates) and less efficient (cost of data collection relative to the proportion of national catch covered). Much the same must be said for the attempts to obtain fishing effort data. The only other information collected systematically which relates to small-scale fisheries is the inventory or estimate of numbers of fishing vessels and gears. It is possible in each country to identify the small-scale fishing sector (numbers by vessel size and gear type) and approximately to locate it or its components, from the catch and effort surveys, the inventories, and the national fisheries censuses.
2. Wholesale or producer fish price data are collected mainly from the main commercial fisheries landing centers and there is no reason to assume that these prices are similar to the prices received by small-scale fishermen at scattered rural landings. Similarly, the retail fish prices are generally obtained from large urban markets and these may not reflect prices for fish in rural areas which often are supplied by small-scale fishermen.
3. Data on the fisheries-related earnings and costs of small-scale fishermen and fishing units are not collected systematically at all and no data are collected on any aspect of fishing households or fishing communities.
4. However, there are numerous special studies of small-scale fisheries and fishing communities. These cannot be classified as systematic data collection systems but they do provide useful information on the small-scale sector in each of the countries surveyed and they are the only source of such information. Each of the departments of fisheries has a section responsible for "special studies" of various kinds but it is only the Economics section of the Thailand Department of Fisheries that has been active in this respect with a series of at least seven socioeconomic studies of fishing villages containing sections and data on geography, population, occupations, land-use and ownership, production from farming, livestock and fishing, credit, marketing, institutions and infrastructure, education and training, and women's roles, etc.

The reports are in Thai and English. There are a number of other socioeconomic studies of small-scale fish producers. The newly formed Economics section of the Philippine Bureau of Fisheries and Aquatic Resources has plans for a number of socioeconomic studies of small-scale fishing communities. But, perhaps the largest source of single studies on various aspects of small-scale fisheries in each of the countries surveyed is the university system, and various social science research institutions. Most if not all of the single studies are based on one shot survey data rather than the systematic collection of data over time. The only exception to this approach was the multidisciplinary study of the small-scale fisheries of San Miguel Bay, Philippines conducted by the College of Fisheries, University of the Philippines in the Visayas in collaboration with ICLARM. Methodologies of most studies therefore tend to be similar but not particularly relevant to this consultancy and its objectives.

5. One of the main reasons put forward in each of the departments of fisheries for not collecting socioeconomic data on small-scale fisheries on a systematic and continuous basis was the cost of collection and the difficulties of interpretation and analysis. It is their belief that small-scale fishermen are too scattered, too numerous, use too many fishing methods and gears, and produce only a small proportion of the total fish catch which enters the national fish marketing system.

VI. SUMMARY OF APPENDICES

Appendices are organized according to Paragraph 6 of the FAO Terms of Reference and consist of the following:

<u>Appendix Number</u>	<u>Country</u>	<u>Agency</u>	<u>Data File</u> ^{1/}
A.1.	Malaysia	Dept. of Fisheries	(1) Marine catch, effort and prices
A.2.	Malaysia	Dept. of Fisheries	(2) Fishing fleet data (3) Miscellaneous statistics
A.3.	Malaysia	Fishery Development Authority	(1) Market intelligence data
B.1.	Thailand	Dept. of Fisheries	(1) Marine (commercial) fisheries production survey
B.2.	Thailand	Dept. of Fisheries	(2) Fishing community survey (3) Coastal culture survey
B.3.	Thailand	Fish Marketing Organization	(1) Fish prices
C.1.	Philippines	Bureau of Fisheries and Aquatic Resources	(1) Catch and effort (2) Fish prices (3) Miscellaneous
C.2.	Philippines	Philippines Fish Development Authority and Bureau of Agricultural Economics	(1) Fish prices
D.	Malaysia	Fishery Development Authority	(1) Fisheries Census
	Philippines	National Census and Statistics	
	Thailand	Department of Fisheries	
E.	Southeast Asia Regional	SEAFDEC	Summaries of national data

^{1/} A data file is a data category compiled by the respective agency (e.g., MDOF data file(2) is Fishing Fleet Data compiled by the Malaysian Department of Fisheries).

Appendix A.1.

COUNTRY MALAYSIA

AGENCY DEPARTMENT OF FISHERIES (DOF)
FISHERIES DIVISION, MINISTRY OF AGRICULTURE

Interviewed 1. Tengku Datuk Ubaidillah B. Abd. Kadir
(Director-General)
2. Edwin J. Savariraj (Fisheries Officer,
Statistics)
3. Puan Rabihah bt Mamud (Fisheries Officer,
Economics)

MDOF DATA FILE (1) MARINE CATCH, EFFORT AND PRICES DATA

- a. Marine catch statistics
- b. Fishing effort statistics
- c. Price statistics

NATURE OF DATA

1. Marine catch statistics

Sample observations of marine catch are collected on a monthly basis during a continuous systematic survey of fish landing sites in each fishing district (and state) by gear type. The data are published in ANNUAL FISHERIES STATISTICS in the following forms:

- (1) catch broken down by state, district and month,
- (2) catch classified by state, district and gear type,
- (3) catch classified by state, month and gear type,
- (4) catch classified by state, gear type and type of fish,
- (5) catch classified by month and type of fish
- (6) trawl catch by state, tonnage class and type of fish
- (7) statistics on disposition of fish by state and disposition channel.

2. Fishing effort statistics

Since 1981 data collected on samples of trawlers and purse seiners (by tonnage categories) include:

- (1) number of trips made per month,
- (2) number of days per trip,
- (3) number of hauls per day,
- (4) average duration per haul.

3. Other gear types

For each of the other gear types sample data are collected to estimate effort by gear categories:

- (1) number of units in operation during the month,
- (2) number of days fished per month.

4. Price statistics

Data on wholesale, retail and ex-vessel fish prices are collected monthly at selected markets and landing sites and published annually. These data are the basis for valuing marine catch, also, annually. The published annual value estimates are as follows:

- (1) wholesale market value of marine catch by state and grade of fish,
- (2) retail market value of marine catch by state and grade of fish,
- (3) producer value of marine catch by state and month,
- (4) wholesale and retail value of catch by gear types and grade of fish.

INSTITUTIONS ENTRUSTED WITH DATA COLLECTION

Statistics Section, Fisheries Division, Ministry of Agriculture

NUMBERS AND SPECIFIC TASKS OF STAFF INVOLVED IN COLLECTION AND PROCESSING

The staff of the Statistics Section comprises:

- (1) one officer (div. 1): graduate in economics (HQ)
- (2) one officer (div. 2): diploma in fisheries (HQ)
- (3) six officers (div. 3): School certificate (HQ)
- (4) twenty officers (div. 3): School certificate (FIELD)

The field officers act as enumerators and are stationed in the state offices of the Division. Their main function is the collection and compilation of fisheries statistics.

SURVEY METHODOLOGY

Catch data: Monthly surveys as outlined on page 3. Data are reported to HQ as monthly figures, that is, processing to this point is done in the state offices.

Effort data: Methodology given on page 3. Estimates are calculated at HQ from effort per unit data forwarded from state offices.

Earlier this year (1983) a pilot survey was conducted in Johore State to obtain information on fishing area. The data are being plotted and if the methodology used is judged to be adequate, this additional survey will be implemented throughout the peninsula.

SCOPE, SPECIFICITY AND ACCURACY OF DATA

Two methods are used to estimate marine catch and effort: one for trawl and purse seine, and another for other gears. The latter are generally small-scale gears.

1. Trawl and purse seine catch and effort data.

A two-stage probability-proportional-to-size sampling technique is used to estimate trawl and purse seine catch. Gears are stratified as follows:

Trawls and purse seines by tonnage classes:

- under 10 gross tons
- 10 - 24.9 gross tons
- 25 - 39.9 gross tons
- 40 - 69.9 gross tons
- 70 and above gross tons

Purse seines are also classified by type:

- fish purse seines
- anchovy purse seines.

The first step in the survey procedure is to prepare a sampling frame for each state showing all the 'N' number of landing centers in the state with the number of trawl and purse seines operating from each center. Three centers in each state are then selected randomly using the probability-proportional-to-size sampling technique. These centers become the primary sampling units and they are selected anew once in every four months. The number of units in operation is continuously updated.

A team of two fisheries assistants (FAs) visit the selected centers once a month and observe fishing unit arrivals and catches for four consecutive days. Thus each gear stratum is observed for 12 sampling days in a month. One FA observes and counts the number of units landing at the center on a particular day and enters these on a form "arrivals of fishing units" by gear type and tonnage class. The other FA selects 3-5 sample boats for each gear type to observe its catch for the day. The sample boats are selected in a systematic way and they are the secondary sampling units. Catch data are entered on prescribed forms.

Details of procedures and methods of estimating average monthly catch by gear type and size are given in SCS/81/WP/99, February 1981: Paul J. Hooker and Edwin J. Savariraj, A FISHERIES INFORMATION SYSTEM FOR PENINSULAR MALAYSIA (attached). The recommendations of this working paper are the basis of the DOF statistics collection system.

2. Catch-effort estimation for other (small-scale) gears

At the time of preparing the sampling frame for the trawls and purse seines the number of other gear types operating in every landing center in each state is also surveyed and listed in the sampling frame. The frame therefore also assists the FAs by indicating the number of other gear types based and operating in the various landing centers in the state. The FA then visits every landing center listed in the

sampling frame once a month and at each landing center selects a number of samples for each gear type based on the sampling fraction for the particular population group. He then interviews the sample boat operator to determine his average catch for a day during the interview period, by quantity and by species. He also finds by way of enquiry the number of fishing days the sample boat operates in the particular month. In this way he then estimates the monthly catch for each gear type in the landing center.

Then by way of ratio estimation the FA computes the monthly catch for each gear type in the landing center. This process is repeated at all other landing centers in the state to arrive at the monthly catches by gear type and species for the state. The data are then entered into the same form where the catches for trawls and purse seines are entered and the completed forms are sent to HQ in Kuala Lumpur.

3. Price statistics

(a) Average monthly wholesale and retail fish prices. The FAs on their visits to the various landing centers also visit selected wholesale and retail markets twice a month to determine the prices ruling in these markets. The data are entered into prescribed forms and sent to HQ where national average monthly price series are compiled for selected types of fish.

(b) Average monthly producer (ex-vessel) prices. During their visits to the major landing centers the FAs also enquire from the fishermen the prices received for their catches by types of fish. Based on these the average monthly producer price for the state is calculated and sent to HQ in prescribed forms for compilation. This procedure was introduced in 1980 and producer fish price series have been published along with wholesale and retail prices since 1981.

DATA PROCESSING

By hand held and desk calculators at both state offices and HQ.

TIME LAG BETWEEN COLLECTION AND FINALIZATION OF DATA PROCESSING

The data are compiled at the state offices on a monthly basis and forwarded to HQ in Kuala Lumpur. The monthly state data are prepared for internal use after about two months delay. The monthly records are not published.

The statistics are compiled on an annual basis for publication in ANNUAL FISHERIES STATISTICS. Final tables are ready for publication about ten months after the close of the year, i.e. in October or November.

FORMS AND PERIODICITIES OF PUBLISHING PROCESSED DATA

The ANNUAL FISHERIES STATISTICS is the only publication of fisheries data: this comes out in November-December of the year following the data collection year.

ESTIMATED COSTS OF DATA COLLECTION AND PROCESSING

See under MDOF Data File (2) Fishing fleet data (Appendix A.2.)

INSTITUTIONS AND ORGANIZATIONS WHICH USE THE DATA

See under MDOF Data File (2) Fishing fleet data (Appendix A.2.)

PURPOSE AND FREQUENCIES OF DATA UTILIZATION

See under MDOF Data File (2) Fishing fleet data (Appendix A.2.)

Appendix A.2.

COUNTRY MALAYSIA

AGENCY DEPARTMENT OF FISHERIES
FISHERIES DIVISION, MINISTRY OF AGRICULTURE

Interviewed

1. Tengku Datuk Ubaidillah b.Abd Kadir, (Director-General)
2. Edwin J. Savariraj, (Fisheries Officer, Statistics)

MDOF DATA FILE (2) FISHING FLEET DATA

- a. Number of fishermen working on licensed boats
- b. Number of fishing boats licensed
- c. Number of fishing gears licensed

(3) MISCELLANEOUS STATISTICS

- a. Ice factories, refrigerated storage and preserved marine products
- b. Processed marine products
- c. Costs of fishing inputs
- d. Fisheries revenue
- e. Import/export statistics

NATURE OF DATA**1. Fishing fleet data**

These data are mainly inventory statistics based on records of licenses issued for boats and gears by the Licensing Sections of the Fisheries Division in each State. They are compiled on a monthly basis and sent to HQ in Kuala Lumpur where they are aggregated to annual figures for publication in the ANNUAL FISHERIES STATISTICS publication of the Division.

Boats:

The following information is collected in the licensing process and maintained at the state offices (excluding Sabah).

- a. registration number of boat
- b. operational base
- c. dimensions and tonnage
- d. horsepower, maker and country of production of engine
- e. main and second gears used
- f. number of fishermen working the boat.

The following tonnage classification is used:

- under 10 gross tons
- 10 - 24.9 gross tons
- 25 - 38.9 gross tons
- 30 - 69.9 gross tons
- 70 and over gross tons.

Gears

- a. Number of licensed fishing gears by state, fisheries district and gear type,
- b. Estimates of number of fishing gears in operation by state, fisheries district and gear type. (These data are also collected by fishing villages but are not published in this detail).

Fishermen

- a. Number of fishermen working on licensed boats, classified by state and by ethnicity.
2. Miscellaneous data
 - a. Data on ice factories, refrigerated storage facilities and preserved marine products are collected by the Fisheries Assistants (FAs) who visit all such establishments in their state and interview the operators. The data are entered into prescribed forms and sent to HQ with the monthly reports.
 - b. Data on processed marine products - quantity and type of product - are collected by FAs from owners of processing business during their visits throughout the state. They are compiled in a listing of processors for internal use.
 - c. Information on fishing input costs are obtained by interviewing the various distributors, dealers and operators who retail or offer these products or services such as diesel fuel, lubrication oil, salt, and fish transportation. The data are entered into prescribed forms for attachment to the monthly reports sent to HQ.
 - d. Fisheries revenue, that is, fees collected by the licensing FA such as license fees, fines etc. are entered into a cashbook at the district fisheries office. The information is then entered onto a prescribed form and sent to HQ for compilation/storage.

- e. Import and export data are collected by the Statistics Department with the cooperation of various government agencies such as the Customs Department. The Fisheries Division obtains this information for publication in ANNUAL FISHERIES STATISTICS.

NUMBERS AND SPECIFIC TASKS OF STAFF INVOLVED IN COLLECTION AND PROCESSING

See under MDOF Data File (2) Marine catch and earnings data.

SURVEY METHODOLOGY

Fishing fleet data are compiled mainly from license information. Miscellaneous data are collected by FAs as part of their normal data collection duties.

SCOPE, SPECIFICITY AND ACCURACY OF DATA

Fishing fleet data cover all fishing boats and gears licensed in each state each month.

Boat statistics are collected through the licensing system. Under the Merchant Shipping Ordinance 1952 it is required by law for all fishing boats to be licensed. The following data are entered on the boat license:

- a. registration number
- b. date the boat was first registered
- c. name and address of boat owner
- d. type of propulsion, trade name and horsepower of engine
- e. boat dimensions and gross registered tonnage
- f. operational base of boat
- g. main and secondary gear used
- h. number and ethnicity of crew members.

The license counterfoil is sent to the state office where the above information is entered on a punchcard (part of a manual sorting system) which is the official boat register. From these records an annual list of boats licensed is prepared and this is the source for preparing boat and fishermen statistics.

In addition, the licensing FA sends to HQ on a prescribed form (D attached) the number of boats, gears and fishermen licensed each month. The monthly returns are used as a countercheck against the annual list prepared by each state from the punchcards.

The weakness of this system is that it does not record any information about unlicensed boats. However, the number is thought to be small and thus not to seriously effect the accuracy of the data.

Gear statistics are also collected through the licensing system: under the Fisheries Act 1963 all gears are required by law to be licensed. The number and type of gear licensed are reported by the licensing FA to HQ each month (form attached). The gear license data are considered to be more complete than the gear information collected with boat licenses. The weakness in gear data is that some boats may be licensed for one type of gear but in practice may operate a different type. This weakness is overcome to some extent through the effort statistics which indicate the actual number of gears in operation.

DATA PROCESSING

Desk and hand held calculators at state offices and HQ.

TIME LAG BETWEEN COLLECTION AND FINALIZATION OF PROCESSING

The data are compiled at the state offices of the DOF on a monthly basis and forwarded to HQ in that form. The monthly state data are prepared for internal use after about two months delay. The monthly records are not published.

FORMS AND PERIODICITIES OF PUBLISHED PROCESSED DATA

The data are compiled on an annual basis for publication in ANNUAL FISHERIES STATISTICS which comes out in November or December of the following year.

ESTIMATED COSTS OF DATA COLLECTION AND PROCESSING

The following data are for the entire Statistics Section and therefore cover the collection and processing of all this section's fisheries data (that is, it includes the collection and processing of catch and effort data - see MDOF (2)).

The responsibility for the collection and processing of all fisheries statistics is with the Statistics Section of the DOF. At present the Section has a full time staff of 28 officers of whom eight are located at HQ and are mainly responsible for direction/supervision of data collection, the checking of data returns from state offices, and the preparation of final tables for internal use and publication. Twenty officers are stationed as enumerators (FAs) in the state offices of the DOF and are responsible for data collection and first stage tabulation.

The total annual costs of the Statistics Section are approximately as follows: 1/

1/ M\$2.30 (approx.) = US\$1.00.

a. salaries

Div. 1 officer (Director)	M\$2000/month
Div. 2 & 3 officers at M\$700 a month x 27	18900/month

b. travel

M\$250,800/year

110,000/year

c. supplies

10,000/year

d. publication

20,000/year

M\$390,800/year

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A division between data collection and processing costs is not clear but data collection and supervision takes roughly 70% of the total, processing about 20%, and supplies and publications about 10%.

INSTITUTIONS AND ORGANIZATIONS WHICH USE THE DATA

The main user of the DOF data, both prior to and after publication, is the DOF itself and the Ministry of Agriculture. Other important users are: Treasury, Economic Planning Unit, and the National Banks.

500 copies of ANNUAL FISHERIES STATISTICS (copy attached) are published. About 100 are retained for internal use, 150 are distributed widely to other Federal and State government agencies and research institutions/universities within Malaysia, and 50 or so are distributed abroad (usually on an exchange basis) free of charge. About 200 are sold. A copy of the current free distribution list is attached.

PURPOSES AND FREQUENCIES OF DATA UTILIZATION

The main, and most frequent user is the DOF/Ministry of Agriculture which are responsible for managing Malaysia's fishery resources. Data are made available to other government agencies on a "needs" basis. The DOF prepares an annual STATUS REPORT for internal government use and this eventually is published in the DOF ANNUAL REPORT.

Appendix A.3.

COUNTRY	MALAYSIA
AGENCY	LEMBAGA KEMAJUAN IKAN MALAYSIA (LKIM) FISHERY DEVELOPMENT AUTHORITY
Interviewed	1. Tuan HJ. Hariri Abu Taif (D.G.) 2. Tan Cheng Eng (Dir. Planning) 3. Puan Jamilah Haron (Dir. Marketing) 4. Mohamad Noor Bin Had (Market Intelligence) 5. Others
LKIM DATA FILE	(1) MARKET INTELLIGENCE DATA a. Wholesale fish prices b. Retail fish prices c. Wholesale fish quantities d. Retail fish quantities
NATURE OF DATA	

LKIM collects daily wholesale and retail prices and quantities from eight major consumption centers in Peninsular Malaysia.

These centers, and the average monthly volume of fish handled by their wholesale markets are as follows:

<u>CENTER</u>	<u>AVERAGE VOLUME FISH HANDLED BY WHOLESALE MARKET (KG/MONTH, 1983)</u>
1. Kuala Lumpur-Petaling Jaya	
2. Ipoh	
3. Penang	
4. Alor Setar	
5. Johor Baru	
6. Kuantan	
7. Kuala Trengganu	
8. Kota Bharu	
9. Melaka	
10. Seremban	

Note: The following description of data collection methods, etc. apply to Centers 1-8 only. Information for 9 and 10 are not collected as systematically as for the other centers.

In addition, fishermen/ex-vessel prices by species are collected and processed for internal use at the six fish landing complexes operated by LKIM.

Fish export and import data are obtained from Customs Department, also for internal use.

INSTITUTIONS ENTRUSTED WITH DATA COLLECTION

LKIM, Market Intelligence Unit

NUMBERS AND SPECIFIC TASKS OF STAFF INVOLVED IN COLLECTION AND PROCESSING (LEVEL OF TRAINING, ETC.).

LKIM maintains a staff of enumerators (Grade 3 Officers: Senior Cambridge Certificate) in KL and the seven other centers listed above whose primary responsibility is the collection and partial processing of market intelligence data. Four officers (including the Head of Unit who is the only professional grade officer) are stationed at the HQ in KL and 2-3 officers are stationed in each of the other centers.

Daily these officers visit and collect price information at

- (1) wholesale market (5-6 am)
- (2) selected retail outlets (9-10 am)

These data are then processed to give average prices by species and grade for the day and these are then sent to HQ by telephone. At HQ the data are scrutinized and entered on a prescribed form "HARGA IKAN" which is sent to the National Broadcasting Network where the price information is broadcast over the national network at 1:45 pm and the Kuala Lumpur city network at 8:30 am. On every Monday and Thursday the pricelist is also submitted to two other Government agencies (Ministries of Agriculture and Defense) and one leading English language newspaper (New Straits Times).

A separate list "Harga Ikan" is prepared and circulated once a week to all the fishermen's cooperatives in the country which are actively involved in fish trading. Quantity data are obtained directly from registered wholesalers who are required to provide LKIM with figures of daily quantities by three grades on prescribed forms which are collected by LKIM officers each week.

SURVEY METHODOLOGY

Wholesale price data are collected by observation/inspection from selected wholesalers while business is being transacted. These are entered on prescribed worksheet forms and later processed as "average" prices for each species, and, from a fixed short list of species as "average" prices for each of three grades. These prices are simple, and somewhat subjective averages as they are not based on quantities transacted and therefore are not weighted averages. The collection system and method of data processing does not provide for price changes during the trading period, or for price differences between traders, that is, there is no attempt to provide a range of prices. They are intended, quite simply, to provide (delayed by one day) the industry and consumers with reasonably accurate daily prices of selected species at each of the major wholesale markets.

Retail prices are collected by much the same method - observations at selected outlets - and processed in much the same way into simple average prices for selected species and for each of the three grades.

Wholesale quantity data, by grade and not by species, are obtained from all registered wholesalers who fill in daily forms for collection by LKIM officers. These data are not considered to be accurate as there is no checking of returns against wholesalers' records and there are no incentives for wholesalers to give accurate figures nor are there sanctions against inaccuracies or false returns even if they were known.

Retail quantity data, by selected species are obtained by observation at selected retail outlets while retail price information is being recorded. They are then processed to give quantities by grade. These data seem to have no meaning whatsoever as they do not cover all retail outlets nor even a systematic sample of retail outlets.

SCOPE, SPECIFICITY AND ACCURACY OF DATA

Price data (wholesale).

Price data are collected daily from eight wholesale markets through observation by experienced enumerators according to a prescribed list of species and specie sizes. Single prices are obtained rather than a range of prices per species and these and grade averages are calculated as simple averages without benefit of quantity data. Particularly in calculating average daily, weekly and monthly prices by grade the results can be grossly misleading. For example, grade A average prices are based on observed "average" daily prices of three species (black pomfret, spanish mackerel and wolf herring, taking into account the prices of large, medium and small fishes).

Certain grade A fish are often scarce (and expensive) at certain periods of the year in certain markets and when this is the case this tends to give an upward bias to the grade average. In general, the average prices per species/size are reasonable daily figures, based on observation in the market, but the calculations of weekly averages and grade averages, are inaccurate and misleading.

Price Data (Retail)

These data are collected daily by species at two or three selected retail outlets in the cities listed earlier in which major wholesale markets operate. While these are the main urban fish consumption centers they do not represent the retail fish markets of the country; that is, they do not include small towns and rural villages. Also, even within the cities covered, smaller retail outlets and hawkers are not contacted.

As with the wholesale data, once the price-by-species data are processed to provide daily, weekly and monthly average prices by grade the accuracy of the figures is considerably reduced and the results may be misleading.

Quantity Data (Wholesale)

For the reasons given on page 2 the quantity data cannot be considered to be accurate and, worse, LKIM has no means by which to judge the degree of accuracy or inaccuracy in the data it collects from registered wholesalers in the markets it controls. Further, quantity data are not collected by species and this leads to problems in developing accurate price statistics.

Quantity Data (Retail)

These are simply estimates of quantities available in the retail outlets contacted daily for the purpose of collecting retail price information. They are not considered to be at all accurate.

DATA PROCESSING

Desk and pocket calculators are used at HQ and pocket calculators at all state offices. No computer facilities are available.

TIME LAG BETWEEN COLLECTION AND FINALIZATION OF DATA PROCESSING

Speed is of the essence and data collected in the morning of each day are available for broadcasting and distribution at the end of each day. Price data are sent to HQ from each market center by telephone and final compilation is done at HQ. Written returns of daily data are sent to HQ at the end of each month where they are reprocessed on standard forms for storage, and for producing summary tables such as average monthly prices and quantities.

FORMS AND PERIODICITIES OF PUBLISHING PROCESSED DATA

The market intelligence data are produced daily for broadcasting and distribution to interested parties in the industry on single sheet daily reports. Summary figures are used in various internal reports such as monthly status reports and in the LKIM annual report.

ESTIMATED COSTS OF DATA COLLECTION AND PROCESSING

There is no clear division between the costs of collection and processing as the same unit and personnel are involved continuously in both activities. The basic costs of the Market Intelligence Unit within LKIM consist of staff salaries and travel claims and these are not broken down between data collection and processing, or between the collection and processing of the various kinds of data produced. The following is a rough estimate of total costs of the Unit: 1/

a. salaries	25 officers x M\$500/month	M\$150,000/year
	1 officer x M\$1500/month	18,000/year
		<hr/>
		168,000/year
b. travel claims		18,000/year
		<hr/>
		M\$186,000/year
		vvvvvvvvvvvvvvvv

Source of funds: internal operating fund.

INSTITUTIONS AND ORGANIZATIONS WHICH USE THE DATA (e.g. GOVERNMENT RESEARCH INSTITUTIONS, PRIVATE FIRMS, FISHERMEN ORGANIZATIONS).

The market intelligence data, reported daily by radio is intended as an aid to the industry in general including fishermen, market intermediaries, and consumers. Some institutions such as Fishermen Associations and Cooperatives, and agencies which have supply contracts with LKIM, request written price reports.

Universiti Pertanian Malaysia (Fisheries Economics Unit) is currently using the daily price (wholesale and retail) and quantity (wholesale) series, which go back to mid-1978, to analyze trends and compare market centers as part of a major study of the Malaysian fish marketing system. These series have not been analyzed before.

1/ M\$2.30 (approx.) = US\$1.00.

PURPOSES AND FREQUENCIES OF DATA UTILIZATION (e.g., MONITORING OF SECTOR PERFORMANCE, DEVELOPMENT PLANNING, MANAGEMENT DECISIONS OF PRIVATE INVESTORS, GOVERNMENT POLICY WITH RESPECT TO TAXES, SUBSIDIES, CREDIT SCHEMES).

The data are used internally (LKIM) to monitor prices and quantities on a monthly and annual basis and this information reaches government departments through monthly status and annual reports. LKIM itself is a fisheries development agency and the data are used in planning and implementing its own development projects.

Appendix B.1.

COUNTRY THAILAND

AGENCY DEPARTMENT OF FISHERIES (DOF)
MINISTRY OF AGRICULTURE AND COOPERATIVES

Interviewed 1. Mr. Kachornsak Wetchagarun, Chief
Fisheries Economics Section
2. Mr. Chongchai
Chief, Fisheries Statistics Section

TDOF DATA FILE (1) MARINE FISHERIES PRODUCTION SURVEY
(COMMERCIAL FISHING GEARS)

NATURE OF DATA

Catch and effort data through a Log book survey of major commercial fishing gears:

- a. otter trawl
- b. pair trawl
- c. beam trawl
- d. Thai purse seine
- e. Chinese purse seine
- f. anchovy purse seine
- g. mackerel encircling gillnet
- h. Spanish mackerel gillnet
- i. push net
- j. bamboo stake trap

DOF estimates that these gears account for about 70% of total production of Thai marine fisheries.

The log book survey has been conducted continuously since 1969.

NUMBERS AND SPECIFIC TASKS OF STAFF INVOLVED IN COLLECTION AND PROCESSING OF DATA

The main "sub-division" of the DOF concerned with fisheries statistics, the FISHERIES ECONOMICS AND PLANNING SUB-DIVISION, contains three Sections:

Section	Percent of sub-div budget	Number of staff
1. Fisheries Economics	10	10
2. Fisheries Statistics	80	142
3. Project Evaluation	10	10

The Fisheries Statistics Section is responsible for all regular data collection and processing. Its importance is reflected in the level of staffing and its budget. The staff is divided between supervisors (5) who are based at the DOF in Bangkok, and some 90 enumerators who

are stationed at 22 provincial fisheries offices. The director and several specialist statisticians are Masters degree holders, the supervisors also have degrees (economics statistics) and the enumerators are vocational school certificate holders.

In 1982 the Fisheries Statistics Section installed a computer and specialist staff were engaged. Nineteen staff are engaged full time in data processing (including the computer staff).

SURVEY METHODOLOGY

The Marine Fisheries Production Survey, Log Book Survey, was set up in 1969 and has continued unchanged since then. Details of the methodology are given in Toshifumi Sakurai, DEVELOPMENT OF FISHERIES STATISTICS IN THAILAND, Department of Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, Thailand, June 1974 (attached).

In this continuous survey the fishing unit is the primary sampling unit. A complete list of fishing units is obtained through the record of a Fishing Gear Registration system which was set up in 1970. The operators of sample fishing units are required to keep records of catch and effort for each trip in a log book. The records are checked by DOF field enumerators against invoices of fish transactions kept by the operators. Examples of log books are given in Sakurai pp. 79-85.

Raw data are sent to Bangkok where all tabulation and processing is done. Since 1983, all data have been coded, stored and processed using a computer.

SCOPE, SPECIFICITY AND ACCURACY OF DATA

The survey depends on the diligence and honesty of gear operators and on the thoroughness of DOF field staff in checking log book returns. I have no reason to question the latter: the staff is permanent and adequately trained for the task and I was told that the Bangkok based supervisors carry out a fairly heavy schedule of travel to the regional offices. Time series data from this source carried out by my colleagues at Kasetsart University indicate that the data do reflect fairly well the changes that have taken place in species composition of catch, and the levels of catch.

DATA PROCESSING

The 1983 data were and all future data will be entirely processed by computer (a NEC System 100 Model 85) located in the Fisheries Statistics Section in Bangkok.

FORMS AND PERIODICITIES OF PUBLISHED PROCESSED DATA

DOF publishes its annual statistics in six reports, one of which, THE MARINE FISHERIES STATISTICS (YEAR) BASED ON THE SAMPLE SURVEY carries only the results of the log book survey. The FISHERIES RECORD OF THAILAND (YEAR) summarizes all fisheries data, including data from the log book survey.

The first publication contains the following groups of tables:

1. Total catch of Marine Fisheries
2. Catch by type of marine fisheries: fishes, crustaceans, molluscs, others
3. Catch by type of fishing methods
4. Quantity and value of marine catch 1973-current year
5. Catch by type of fishing method and by species
6. Monthly catch by major fishing methods
7. Details of major fisheries, 1973-current year
8. Coastal aquaculture

ESTIMATED COSTS OF DATA COLLECTION AND PROCESSING

The Fisheries Statistics Section has an annual budget of about Baht 2 million. ^{1/} As the same field and HQ staff are responsible for all fisheries data collection and processing it was not possible to cost each survey or kind of data, although in general it was possible to make a rough division of the total budget between data collection and data processing.

Prior to the acquisition of the computer the breakdown was roughly

collection	45%	
processing	45%	of (1983) Bt 2.0 million
publications and materials	10%	

Currently the computer is used only for processing and storage of fisheries statistics, and the total costs are allocated to this task. In due course other DOF tasks such as personnel records, salaries, etc. will be transferred to the computer and the total costs of computer rental and operation will be shared between sections.

^{1/} Baht 23.00 (approx.) = US\$1.00.

Appendix B.2.

COUNTRY THAILAND

AGENCY DEPARTMENT OF FISHERIES
MINISTRY OF AGRICULTURE AND COOPERATIVES

Interviewed 1. Mr. Kachornsak, Chief, Fisheries Economics Section
2. Mr. Chongchai, Chief, Fisheries Statistics Section

TDOF DATA FILE (2) FISHING COMMUNITY SURVEY
(SMALL SCALE GEARS)
(3) COASTAL CULTURE SURVEY

NATURE OF DATA**Fishing Community Survey**

Catch data for a variety of small-scale gears (all gears not covered by the log book survey (TDOF DATA FILE 1)). The data collected are:

1. Fishing season (total number of months in operation)
2. Average monthly catch
3. Species composition (% of total)

From these data an annual catch by species for each sample fishing household is estimated.

Coastal Culture Survey

Coastal aquaculture production and estimates of yield per unit area for each type of culture (e.g. shrimp, sea-mussel, bloody cockle, horse mussel, etc).

NUMBER AND SPECIFIC TASKS OF STAFF INVOLVED IN DATA COLLECTION

See TDOF DATA FILE 1 (Appendix B.1.)

SURVEY METHODOLOGY

Refer to Toshifumi Sakurai, DEVELOPMENT OF FISHERIES STATISTICS IN THAILAND, DOF, 1974 pp. 28-30 for details of survey methodologies.

Fishing Community Survey

The basic methodology is as follows:

1. A fishing community is the basic sampling unit. Four hundred communities are surveyed each year. The sample communities were based on/identified in the 1967 Marine Fisheries Census and have not been changed since the survey was started in 1970. A second Marine Fisheries Census is planned for 1984 and this will allow the drawing of a new sample of fishing communities in due course.

2. Enumeration in each sample fishing community is done once a year (each January) with the following two steps:
 - a. a listing survey: this amounts to an updating of the previous years list of fishing households and gears with the village headman.
 - b. a sub-sample of at least five households per fishing gear type is selected and the enumerator visits each household in this sample to ask information on number of months the gear was used in the previous year, the average monthly catch by the gear, and the percentage species composition of the catch.

It should be noted that this is not a survey of fishing households but rather a survey of gear types. No data on the fishing households are collected as all information refers to the gear. A household with more than one gear can be used more than once: the enumerator simply has a fixed number of gears to obtain information on and normally he will fill his quota from as few households as possible.

Coastal Culture Survey

1. An enumeration of aquaculture enterprises is updated each year for each coastal Tambol (province).
2. A sample of farmers is interviewed once a year regarding their previous year's operation.

SCOPE, SPECIFICITY AND ACCURACY OF DATA

Fishing Community Survey

The objective of the Fishing Community Survey is to complete the overall national catch data not covered by the (quantitatively) larger log-book survey of ten major gears. The geographical coverage is quite wide (400 fishing communities: about 32% of the total identified in the 1967 Census of Marine Fisheries) but as the same communities have been surveyed each year since 1973 there is the possibility that changes over time in the location and use of gears covered have not been recorded. Further, since the sample gear-operators are interviewed only once a year, the accuracy of the information requested, covering the previous 12 months, cannot be very high.

Coastal Culture Survey

The objective of this annual survey is similar to that of the Fishing Community Survey, that is, to estimate production of the main cultured species and to obtain a rough indication of yields per unit area.

DATA PROCESSING

Since 1982 all survey data have been processed using a computer.

TIM LAG

The survey is carried out in January each year and the basic tables are now available in April. Prior to the computerization of data processing the basic tables were out in August.

Appendix B.3.

COUNTRY	THAILAND
AGENCY	FISH MARKETING ORGANIZATION (FMO)
Interviewed	<ol style="list-style-type: none"> 1. Mr. Manus Hemnukul, Director Fisheries Development Division 2. Mr. Praon Siripanich, Chief Planning and Evaluation Section 3. Mr. Pramuan Rujjai, Economist Planning and Evaluation Section

FMO DATA FILE FISH PRICES

NATURE OF DATA

The Fish Marketing Organization (FMO) was established by Government in 1953 as an autonomous body under the supervision of the Ministry of Agriculture and Cooperatives. It has the following responsibilities:

1. To undertake various activities in the development and improvement of wholesale fish markets, local fish markets and fishing industry in general.
2. To arrange, control, supervise and render services to fish agents including transportation and other activities connected with the business of fish agents.
3. To improve the living standard and to promote welfare and profession of fishermen and their communities.
4. To encourage the establishment of fishermen cooperatives or associations.

FMO collects wholesale and retail price data on a systematic basis both as a service to the industry and as a means of monitoring supplies and prices.

1. Daily wholesale prices by species at the Bangkok wholesale market, and wholesale markets at Sumakakorn and Sumatplakan.
2. Daily per boat landings by species, and prices received by registered fish agents at eight major landing sites. This covers about 30% of total marine landings.

NUMBERS AND SPECIFIC TASKS OF STAFF INVOLVED IN COLLECTION AND PROCESSING

FMO maintains staff at the wholesale markets and eight major landings whose specific responsibility is the collection of quantity and price data. Information on numbers and training was not obtained.

SURVEY METHODOLOGY

1. Wholesale market prices:
Daily collection at three large markets by observation.
2. Landings quantity and price data:
Continuous monitoring of all boats unloading at the eight landings administered by FMO to obtain quantities by species. Species prices paid to the fish agents by fish buyers are obtained from the fish agents. These prices are paid to the fishermen less 3-5% agent commission.

DATA PROCESSING

By desk and hand calculators.

TIME LAG

All data are sent within hours (telex) to HQ in Bangkok (located in the central fish market) where they are made available to fish agents/dealers by the next day. Bangkok wholesale prices are sent to the landings, fishermen's cooperatives/associations and radio stations daily giving the previous day's data. Prices quoted are the low, median and high prices for a long list of major species.

PUBLICATION OF DATA

1. Daily FISH PRICE NEWS: a single mimeo sheet distributed widely throughout the trade (sample attached).
2. An annual compilation of FMO quantity and price data, FISHERIES RECORD, THE FISH MARKETING ORGANIZATION (YEAR) published in June of the next year (sample attached).

Appendix C.1.

COUNTRY	PHILIPPINES
AGENCY	BUREAU OF FISHERIES AND AQUATIC RESOURCES (BFAR)
Interviewed	1. Mrs. L. Bautista, Senior Statistician 2. Mr. Dionelo D. Ibabao Fishery Economic 3. Others
BFAR DATA FILE	(1) CATCH AND EFFORT (2) FISH PRICE STATISTICS (3) MISCELLANEOUS DATA

NATURE OF DATA

The main government functions with respect to fisheries in the Philippines are divided between three organizations. Fisheries conservation and management functions are the responsibility of the Bureau of Fisheries and Aquatic Resources (BFAR), fisheries development activities are conducted by BFAR and the Philippines Fish Development Authority (PFDA) previously called Philippines Fish Marketing Authority (PFMA), and fisheries research is conducted by BFAR, PFDA (marketing research) and by the University of the Philippines. These activities are coordinated (to some extent) by the Fishery Industry Development Council (FIDC) which also develops policy related to critical fishery issues. Although FIDC provides a coordinating mechanism, each fishery organization conducts day to day business in a fairly autonomous fashion.

BFAR is the main agency responsible for the collection of data related to the status and management of marine (municipal and commercial) fisheries, and brackish and fresh water aquaculture. Certain data are collected at fixed intervals (inventories of fishing establishments, boats and gears) and other data are collected by continuous monthly surveys (catch and effort data, gathered fishery products, fish prices, exports and imports, and fish utilization). BFAR is also beginning to conduct special studies through its Economics Section:

1. Determination of life status of small scale fishermen
2. Socioeconomic study of manpower in commercial fishing
3. Fishing household survey - processors (by region), and
4. Socioeconomic study of fishpond size.

Since 1976 BFAR has received considerable assistance in developing its data collection system from the South China Sea Fisheries Development and Coordinating Programme (SCSFDCP) of the FAO. Two relevant papers are:

1. Chakraborty, D. Fisheries Statistics in the Philippines: A Plan for a New and Expanded Data Collection Programme: SCS/76/WP/44; and
2. Wheeland, Hoyt A., and Paul J. Hooker, Recommendations for a Fisheries Information System ; SCS/80/WP/95.

Copies of both are attached. Mr. Chakraborty was assigned to BFAR in 1977 to guide the agency in the implementation of the data collection system which he recommended. This system has remained in effect since then although BFAR has had problems, mainly budgetary problems affecting staffing and therefore the coverage of the data collected.

One other paper relevant to an evaluation of the fisheries statistics system of the Philippines is:

3. Skillman, Robert A, and Hoyt A. Wheeland, "Rainfed Resources Development Project: Design of Fish Resource Assessment Activity, Report 1, Producing Information for Fishery Policy in the Philippines with Emphasis on Assessment of Coastal Fish Stocks," USAID, June 13, 1983.

Skillman and Wheeland report that "the statistics program has been improved to the point where reasonably reliable national and regional estimates of fish production by commercial and municipal fishermen are now available. The statistics group also is collecting data on fishing effort and fishing grounds that can be used in resource assessment." (P.1.) "A major problem in statistics is having sufficient funding and personnel to adequately cover all the fish landing centers in the Philippines."

INSTITUTIONS ENTRUSTED WITH DATA COLLECTION

Bureau of Fisheries and Aquatic Resources (BFAR)

NUMBERS AND SPECIFIC TASKS OF STAFF INVOLVED IN COLLECTION AND PROCESSING (LEVEL OF TRAINING, ETC.)

In 1983 the staff of the statistics section of BFAR was as follows:

	Permanent Officers	Casual Hire
At HQ (Manila)	17	7
Regional Offices	<u>103</u>	<u>37</u>
	120	44

Full staffing of the statistics programme requires:

Processing (HQ)	12	30
Collection (reg. off.)	120	50
	<u>132</u>	<u>80</u>

The permanent staff officers are normally university graduates. The casual hire enumerators' basic qualification is high school graduation, although some are university graduates.

SURVEY METHODOLOGY

Refer to SCS/76/WP/44. The survey methodology designed by Chakraborty for the collection of catch and effort data has been fully implemented in principle and in practice it varies only to the extent of coverage of landing sites and the numbers of sites allocated to each enumerator. In 1983 there were only enough enumerators to cover an average of about 27 landings sites per enumerator whereas the original sampling plan recommended about 15 sites per enumerator.

Data on gathered fishery products are compiled by BFAR based on "auxiliary invoices" which relate only to those products which are transported from one place to another.

Fish price statistics are collected daily by the Marketing Section of BFAR at some selected markets in the Greater Manila Area. In the regions, variety-wise retail prices are collected at selected markets on 4 days a week. Manila prices are sent to the regional offices of BFAR each week and Regional prices are sent to HQ each month. None of these data are published, and their reliability is in doubt.

Export/import statistics are compiled by BFAR from figures supplied by such offices as Customs and the Central Bank of the Philippines.

Data on the utilization of fish (fresh, frozen, canned etc) are not collected.

SCOPE, SPECIFICITY AND ACCURACY OF DATA

The procedures now being used by BFAR to arrive at estimates of catch and effort are based on SCS/76/WP/44. It is generally accepted that this methodology will result in reliable statistics provided sufficient funding and personnel are made available to carry it out. Under this methodology, a landing center is used as the primary sampling unit. Each BFAR Region is divided into zones that are separated by readily identified physical features. The sampling plan calls for each zone to contain about 15 landing centers (although in fact there is an average of 27 centers per zone). Nine landing centers in each zone are visited according to a plan of work provided by the HQ office. At each landing center, the number of boats landing is recorded and some are selected for obtaining detailed data. The number of boats selected depends on the total number of fishing craft landing at the center. If 10 or fewer boats land, all are selected; if 11-20 land, half are selected, 21-50 land 20% are selected, and if more than 50 land 10% are selected. A table of random numbers

is used to decide which boats are selected. For each selected boat detailed data are obtained on weight of catch by species landed that day, location of fishing ground, depth of fishing, number of fishing trips, number of hauls, searching time and fishing time. An average catch per boat is calculated for the sample boats, and this figure is multiplied by the total number of boats to arrive at an estimate of total landings at the center. These estimates are forwarded to the Regional Office for checking, and then to the HQ where monthly estimates for Zones and Regions are calculated using raising factors based on the level of sampling for each zone.

BFAR follows the procedure described above to collect data on commercial (boats greater than 3 gross tons) landings at the 15 most important commercial landing centers in the Philippines plus about 45 other centers. The 15 most important centers account for most of the commercial landings, with Navotas (Manila) alone accounting for nearly two-thirds of commercial landings. For those centers that BFAR is unable to cover, they use the "Monthly Report of Fish Catch" form that must be submitted by the vessel operators before receiving clearance for the next trip. BFAR uses a ratio between catch estimates obtained by BFAR enumerators using the standard data collection form, and catch estimates from the catch forms, to arrive at "raising factors" to apply to Fish Catch data obtained at the uncovered landing centers. Copies of the data collection forms and the Fish Catch forms and the Fish Catch form are in Appendix 5 of Skillman and Wheeland.

The main problems of data collection are:

1. Transportation: data must be collected from many hard-to-reach fish landings and transportation to such centers is extremely difficult and time consuming.
2. Species identification: many species of fish and shellfish are normally landed at each center and identification of some species, particularly if they are immature, requires special examination and a sound knowledge. There is also a problem of variation in the local names given to fish.
3. Fishing ground: difficulty of getting the boat owner to properly identify his fishing ground.
4. Checking of data at Regional Offices requires various mathematical calculations which, in some cases, are being made by hand or with the help of personal electronic calculators.

DATA PROCESSING

At collection centers and regional offices data are prepared and checked manually or with the use of small hand-held calculators.

The final data collection forms are forwarded each month to HQ in Manila where they are checked for accuracy and completeness, also manually, coded on data entry sheets and sent to NRMC for computer processing. All data on the forms are being entered and tabulations are generated by the computer program.

TIME LAG BETWEEN COLLECTION AND FINALIZATION OF DATA PROCESSING

Data on municipal fisheries: HQ in Manila usually receives the checked data returns from the regional offices after about 15 days from the end of the month. The HQ checking and coding usually takes about another 30 days (during which some tabulations for internal use are prepared) after which the data are sent to the computer. However, there are often quite long delays (up to one and a half months in transfer from some remote areas) and these delay the whole process accordingly as only full sets of data are sent to the computer. In preparing tables NRMC follows the standard formats found in "Fisheries Statistics of the Philippines".

FORMS AND PERIODICITIES OF PUBLISHING PROCESSED DATA

The annual "Fisheries Statistics of the Philippines" is the only official publication of BFAR statistics. One thousand copies are published, after a delay of 10-12 months. In November 1983 at the time of my visit to the Philippines only the volume for 1981 (attached) was available.

ESTIMATED COSTS OF DATA COLLECTION AND PROCESSING

BFAR allocated 4.3 million pesos for the collection and processing of fisheries statistics in 1983 out of which about 350,000 pesos were given to the computer unit of the National Resources Management Center for processing the data and preparing statistical tables for the annual fisheries statistics publication. ^{1/}

In 1980 a plan for sufficient staff strength to implement the Chakraborty system was estimated to cost 5.45 million pesos of which 58% was for collecting and 42% for processing the data. Since there has been a steep rise in costs since 1980, the 4.3 million pesos available in 1983 probably represents somewhat less than two-thirds of the costs for full implementation in 1983.

The budget of the statistics division for 1983 has the following breakdown:

^{1/} As of the end of 1983, ₱14.00 = US\$1.00.

	Full time positions	Services	Wages	Allow- ance	MOE	TOTAL
HQ office	17	P278,130	71,920	49,800	523,000	922,850
Computer			600,000		400,000	1,000,000
Regional Offices (13)	99	764,252	207,080	125,000	1,314,000	2,310,332
Totals:	116	1,042,382	879,000	174,800	2,237,000	4,333,000

INSTITUTIONS AND ORGANIZATIONS WHICH USE THE DATA

The data are used internally on a continuous basis. Tables are prepared from each set of monthly data sent in from the regions so that BFAR is able to monitor fairly closely the performance of the sector. These working tables and other data are made available to other government agencies such as the National Economic Development Agency, Philippines Fisheries Development Authority as required. The annual statistics publication is sent to a wide range of national and international bodies both within and outside the Philippines (see attached mailing list) and copies are available for purchase by the public at large.

Appendix C.2.

COUNTRY	PHILIPPINES
AGENCY	(1) PHILIPPINE FISHERIES DEVELOPMENT AUTHORITY (PFDA) (2) BUREAU OF AGRICULTURAL ECONOMICS (BAECON)
Interviewed	1. Teresita Lee Monsale, Staff Asst/Info. Analyst, Corporate Management Staff, PFDA 2. Lino Alvarez, Division Chief, Public Information Staff, PFDA 3. BAEcon

PFDA/BAEcon DATA FILE FISH PRICE DATA

NATURE OF DATA

At least three agencies collect fish price data in the Philippines, BFAR, (see Appendix C.1.; BFAR DATA FILE (2)), BAECON and PFDA.

PFDA

PFDA manages the large Navotas fish landing and wholesale market in Manila, and landing/markets in 16 provincial cities throughout the Philippines. At these centers PFDA staff collect daily data on fish landings and wholesale prices by species, and monitor retail prices.

BAEcon

The Market Intelligence Section of BAEcon collects wholesale and retail prices of a long list of food commodities including 16 species of fish and other seafoods at 13 public markets and 4 supermarkets in Manila, and in 42 provincial trading centers. Since March 1980 price data have been collected four times a week.

METHODOLOGY

Both agencies employ full time enumerators who attend markets at appropriate times (early morning) each day in the case of PFDA and four days a week in the case of BAEcon. The markets/landings are fixed and represent either those where the agency operates (PFDA) or a sample of significant markets throughout the country (BAEcon).

PFDA collects prices (and quantities) from fish dealers, that is, prices paid by buyers to dealers. BAEcon enumerators visit markets and record prevailing prices of a long list of food commodities.

DATA PROCESSING

PFDA: Navotas data are computerized (monthly), provincial data are processed manually.

BAEcon: Daily data are handled manually but in 1980 data have been filed and partly processed by computer.

TIME LAG

Both agencies are responsible for producing market intelligence data and therefore data are relayed to HQ daily by telex, telegram, telephone, or special messenger. The information flow is generally two ways: in the case of PFDA, data from the provinces are sent to the Manila HQ every two weeks by private mail service, and Manila data (prices and quantities of 10 major species) from Navotas, are sent to the provinces daily by telegram. BAEcon price data are released to the public (by radio and through a printed MARKET PRICE BULLETIN) the day after collection.

FORMS AND PERIODICITIES OF PUBLISHED PROCESSED DATA

PFDA produces several regular publications containing the data it collects. The most important is FISH MARKETING REVIEW which is a quarterly magazine of articles and information related to the fish business, and a separate supplement FACTS IN FIGURES which presents quarterly data aggregates (examples attached).

BAEcon issues a MARKET PRICE BULLETIN four times a week, that is, on the day following collection, to all parties on request (currently there are some 200 subscribers), and makes the information available to the media for public consumption. It also produces a WEEKLY MARKET REVIEW each Wednesday.

STAFFING AND COSTS

PFDA Costs Per Month: 1/

Costs:	Processing	Pesos	29,000	34%
	Collection		55,000	66%
Staff:	Processing	Statisticians	10	
		Mgt. Info Systems	15	
		Data Custodians	2	
			<hr/>	
			27	
	Collection	Enumerators from Central office	30	
		Enumerators from regional offices	25	
		Supervisors from Central office	5	
		Others	10	
			<hr/>	
			70	

1/ As of the end of 1983, ₱14.00 = US\$1.00.

Appendix D.

COUNTRY MALAYSIA, PHILIPPINES AND THAILAND

AGENCIES (1) MALAYSIA: FISHERIES DEVELOPMENT AUTHORITY
(2) PHILIPPINES: NATIONAL CENSUS AND STATISTICS OFFICE
(3) THAILAND : DEPARTMENT OF FISHERIES

DATA FILE: FISHERIES CENSUS

NATURE OF DATA

Malaysia: There has been no special census of the fishing industry to date, but during the second half of 1983 the Fisheries Development Authority in cooperation with the Department of Fisheries and Ministry of Agriculture carried out a partial census of fishing households. The data have not yet been processed.

Philippines: The National Census and Statistics Office of the National Economic and Development Authority carried out a Census of Fisheries in 1971. This was an attempt to cover marine and inland fisheries. A second Census of Fisheries is planned for 1984.

Thailand: The Department of Fisheries carried out the first Census of Marine Fisheries in 1967. A second Census is planned for 1984.

Appendix E.

COUNTRY	SOUTH CHINA SEA
AGENCY	SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER (SEAFDEC)
SEAFDEC DATA FILE	(1) GEOGRAPHIC, DEMOGRAPHIC AND ECONOMIC STATISTICS (NATIONAL LEVEL) (2) FISHERY PRODUCTION AND VALUE (3) FRESH FISH PRICES (4) CATCH DISPOSITION (5) PROCESSING (NO. OF ESTABLISHMENTS) (6) EXPORT AND IMPORT VOLUME

The data compiled in the annual Fishery Statistical Bulletin For South China Sea Area (first issue in 1976) are based upon returns received from governments to a questionnaire prepared by SEAFDEC. The bulletin thus basically summarizes national data and is not based upon an independent data collection system.

Further details, and summary data for 1980, are attached. Detailed statistical tables have been omitted from this report.