4. CURRENT LEVEL OF FISHERIES PRODUCTION IN SOUTH CHINA SEA AREA

Owing to a great difference on the reliability of catch statistics among countries there is a great danger to give the magnitude of fisheries production in the area. However, an attempt was made to do so based on catch data currently available in each area, and the result is given in Table 3.

From figures given in Table 3 particular natures of marine fisheries in South China Sea area may be summarized as follows:

(1) **Magnitude of Total Marine Fisheries Production**
The magnitude of total marine fisheries production throughout the area is now supposed to be some 3.75 million metric tons excluding catches taken by China Mainland and North Vietnam . If 250 thousand metric tons of catches is assumed for those two areas, the total marine fisheries production for the South China Sea area would be some 4 million metric tons..
If an average price of US$0.2 per Kilogramme or US$200 per metric ton is assumed, the total value of fisheries production for the area as a whole would be some *US$800 million.*

(2) **Major Fisheries**
Due to the tropical nature of the waters a variety of fishes are caught by a number of different types of fishing gears. However, as seen in Table 3 major types of fisheries which play a leading role in the total fisheries production are very limited. Trawl, purse seine and drift gill net fisheries are those which more or less commonly appear in each country, producing 55% of the total marine catch in the area. Besides those three major fisheries each country or area has its own locally important fisheries, the examples of which are given in Table 3.
Of the three major types of fisheries trawl fisheries alone produce 41% of the total marine catch. However, one must be aware that 60 to 80% of trawler's catch is trash fish which is not edible by human being. Thus, out of 1.5 million metric tons of fishes caught by trawlers only 450 thousand metric tons of fishes are supposed to have been consumed by human being.
The share of purse seine and drift gill net fisheries to the total marine fishery production is at present only 8 and 6% respectively though these are commercially important fisheries in the area. This implies that there is a certain possibility to increase fish production with those fishing gears provided that further exploitable pelagic resources are available.
Finally, it may be worthwhile to stress that long line fishery either in the form of a drift or bottom long line has hardly been developed in the area with the exception of Hong Kong and Singapore. The reason may be that a rapid and massive development of trawl fisheries in the area has hampered the development of this fishery. However, in the light of the fact that a long line can be effectively used in untrawlable areas like coral reef, rocky sea area, etc. and the cost of constructing the gear is far cheaper than that for purse seine and drift gill net, the possibility of exploiting untouched fisheries resources with this gear should be explored.

SEAFDEC/SCS.73: S-2

Fishery Statistics Required for the Stock Assessment of Fisheries Resources in South China Sea Area

by

Tadashi Yamamoto
FAO Fishery Statistician
FAO Regional Office for Asia and the Far East

Abstract

Existing national marine fishery statistics and proposals for the improvement are reviewed under the following headings;

(1) Definition of Catch
(2) Measurement of Gross Tonnage
(3) Standardization of National Statistical classifications
  i. Tonnage classification
  ii. Species classification
  iii. Fishing Gear Classification
(4) Establishment of Fishing Area Classification in South China Sea Area
(5) Types of Statistical Tables Required for International Comparison.

In designing any statistical survey the first thing to do is (I) to establish clear definitions or concepts for survey items and classifications to be used in the survey and (2) to work out statistical tables which might well meet the requirements of users. These kinds of works are particularly important when international comparison of fishery statistics is required. Therefore, reviews and proposals hereunder are made along the above line with respect to some pertinent points.

1. DEFINITION OF CATCH

"Catch" is the most important survey item among a number of survey items being sought in fishery statistics. However, when a review is made to the instructions of catch survey throughout countries under study, the definition of catch is either entirely lacking or incomplete. This will naturally lead to inconsistency to catch figure being collected not only within the same country but also between countries. For example, in certain countries only the meat of shellfish is considered as catch, whereas in other countries both meat and shell are treated as catch.

FAO definition of catch is described by referring to the case of advanced fisheries in other regions. As a result, it is too difficult for Asians to understand the exact meaning. It is, therefore, proposed that another version of catch definition which will really fit to the status of Asian fisheries be worked out without destroying anything about the meaning of catch defined by FAO. Perhaps, IPFC/IOFC JWP is the most appropriate organ to take up this matter, since the above difficulty has been encountered by the majority of countries in the region of IPFC/IOFC.

As has been reviewed at country level, in Sabah and Sarawak, trash fish caught by trawlers are discarded into the sea, whereas in other countries trash fish are normally brought back to ashore for fish meal, manure, etc. Hence, the national catch of Sabah and Sarawak does not include trash fish, whereas that of other countries includes trash fish. According to catch definition established by FAO both treatments are correct. However, these facts may cause a serious problem when a biological productivity of fisheries resources in South China Sea is studied. Therefore, a certain principle with regard to the treatment of trash fish may have to be established as an exceptional case of FAO catch definition.

2. MEASUREMENT OF GROSS TONNAGE

Tonnage record for an individual powered fishing boat is available throughout countries under study. However, as has been pointed out by the 2nd session of IPFC/IOFC JWP, there are great differences among countries with respect to the measurement of gross tonnage. It is apparent that this situation will cause a serious problem for international comparison of fishing fleet statistics as well as catch/fishing effort data, since comparative studies of these data among countries will often have to be made according to the tonnage classes of a fishing boat.

However, it is unlikely that this problem can be easily solved within a short period, since in many countries the way of measuring gross tonnage has been firmly established by Government organization other than the Department of Fisheries and it is also applied to boats other than fishing boats. Therefore, one of the solutions would be to seek a certain coefficient for each country, by which tonnage figures which have already been measured by present methods are converted into comparable tonnage among countries.

Once such a coefficient is obtained for each country, the work of converting national tonnage into comparable tonnage would be very simple. However, in order to obtain an adequate coefficient a good knowledge of a gross tonnage measurement and a good amount of patient work to measure actual tonnage of fishing boats are required. In practice, a sample of say 50 inboard powered boats are selected for each country, and the mearuesment of real gross tonnage is made for each sample boat in a standardized way. In this way, the coefficient is obtainable by dividing the sum of local tonnages which are already available by the sum of real tonnages which are newly measured. It may be apparent that in order to achieve this task throughout all countries concerned at least one year's service of a UNDP expert in the field of naval architecture is required.

3. STANDARDIZATION OF NATIONAL STATISTICAL CLASSIFICATIONS

There are three classifications for which the review and proposals are required.

3.1 Tonnage Classification

Only Philippines, Khmer, West Malaysia and Sarawak have established tonnage classifications, of which the one for West Malaysia has to be revised so as to cope with IPFC/IOFC proposed tonnage classification. Since a tonnage classification proposed by IPFC/IOFC will fit to the structure of fishing fleet in the area, there will be no difficulty for the rest of countries to adopt a similar tonnage classification.

3.2 Species Classification

Of 10 countries under review Hong Kong, Philippines, Thailand, West Malaysia, Sarawak and Singapore have a fairly comprehensive species classification. Species classification in Khmer is in need of further development. Thus, Vietnam, Sabah and Indonesia are only the countries which do not have any species classification. For the comparative study of catch by species among countries there are two important conditions which have to be satisfied; (1) commercially important species are properly selected as statistical categories throughout all national species classifications and (2) catch data by species so selected are adequately comparable among countries. However, so far no such careful study has been made in these respects.

For the study of how far these conditions are satisfied the most important point to be kept in mind is that for the collection of catch data by species one has to refer to commodity categories which have been traditionally established by both fishermen and fish dealers. Hence, national species classification has to be established primarily in terms of such commodity categories. Such a commodity category often includes more than one species. Therefore, unless taxonomic components of such commodities categories are carefully studied from country to country, nothing can be evaluated with regard to the above two conditions.

In view of the fact that this study involves tremendous patinet work by both fishery biologist and fishery statistician IPFC has so far recommended that at least one year's services of internationally recruited expert be required to accomplish this troublesome task.

3.3 Fishing Gear Classification

Comparing with species classification fishing gear classification has been far less developed in countries under review. At present, only Thailand, West Malaysia, Sarawak and Singapore have established their own national fishing gear classifications. However, of these four countries a cross tabulation of marine catch by species and by types of gear is done only in Thailand, West Malaysia and Sarawak. In Hong Kong, Philippines and Khmer fishing gear classification is applied to part of marine catch mostly limiting to major fisheries.

For establishing a new national fishing gear classification or for revising an existing national fishing gear classification an international fishing gear classification proposed by IPFC/IOFC JWP should be followed as far as possible. Unlike species classification this task does not involve much difficulty, since types of fishing gears dominantly in use throughout a country are fairly well known by many people. However, to facilitate this kind of work without any misunderstanding the definitions of fishing gears which were partly discussed in the 2nd session of IPFC/IOFC JWP should be finalized as early as possible.

4. ESTABLISHMENT OF FISHING AREA CLASSIFIC FOR SOUTH CHINA SEA

Establishment of fishing area classification is a prerequisite to compile catch and fishing effort data by fishing areas, which are indispensable for stock assessment as well as fisheries management. At present, Hong Kong, Philippines, Khmer, Thailand and Sabah have established their own fishing area classifications. However, since these area classifications have been established purely for national use, water areas covered are limited to part of South China Sea and further thy size of unit fishing area differs from country to country. Therefore, there is a need of establishing a new fishing area classification which will cover the entire area of South China Sea and Malacca Strait.

Establishment of subareas within FAO major fishing area 71, i.e. "Western Central Pacific", is now under study by IPFC/IOFC JWP. However, since it has been decided that closed sea areas such as Red Sea and South China Sea will be a unit sub-area, a matter of establishing fishing area classification within South China Sea may not be taken up by the JWP. It is, therefore, considered that this is a matter entirely to be taken up by the South China Sea Programme if catch and fishing effort data have to be compiled by fishing areas. Considering a recent massive expansion of trawl fishery in South China Sea it would be wise that a new fishing area classification is established primarily for the study of demersal resources.

5. TYPES OF STATISTICAL TABLES REQUIRED FOR INTERNATIONAL COMPARISON

It may not be too much to say that at present there is no comparable fisheries data available throughout 10 countries with an exception of the total number of fishing boats and the magnitude of total marine catch. Thus, even the number of trawlers which has markedly increased in recent years and which is the most indispensable figure to initiate the study of stock assessment for demersal resources is not clearly known in many countries. This is due largely to absence of statistical tables to be commonly compiled by every country.

It may now be clear that the first thing to be taken up by the South China Sea Programme is to set up clearly the minimum requirement of national fishery statistics **in the form of statistical table**, examples of which are given in Appendix 1, and to let the participating countries understand the significance. As a matter of fact, this is the first and the most essential task to be achieved before considering the improvement of survey methodology.

Types of statistical table given in Appendix 1 are rather ideally worked out. Therefore, there will be several points which may have to be disregarded during the initial stage of data collection. For example, at the initial stage the number of powered fishing boats may be collected only by tonnage classes ignoring the type of fishing gear employed, and fishing effort data for trawl fishery may be limited to the number of fishing units and the number of trips. All these matters should be determined taking into account the current progress of national fishery statistical system

In Appendix 1 it has been suggested that fishing effort data be collected for selected important fisheries. Although nothing can be concluded at this stage, the author got an impression, during the course of his country visit for the South China Sea Programme, that at least trawl, purse seine, Spanish mackerel drift net and partly Rastrelliger drift net should be considered as selected important fisheries throughout the entire area of South China Sea (See TAble 2 of "Current Status of Fishery Development in South China Sea area, SEAFDEC/SCS.73: S-1).

Appendix 1

Statistical Tables Required for Stock Assessment

Statistical tables given below were prepared merely for the evaluation of existing national fishery statistical system and hence are still provisional. These tables would be carefully studied in the course of Phase II of South China Sea Programme as well as in the third meeting of the IPFC/IOFC JWP to be held in early 1974.

Contents

(Note) A: Essential, B: Desirable

1.1 Number of Fishing Boats by Tonnage Classes and by Tapes of Fishing Gears

Size of Boat[2] / Type of Fishing Gears[1]	Total	Non-Powered boat[3]	Out-board Powered boat[3]	Inboard Powerd Boat[4]					
				Sub Total	0–5 G.T.	5–10 G.T.	10–20 G.T.	20–50 G.T.	50–100 G.T.
Total									
Otter Trawl									
Pair Trawl									
Beam Trawl									
Danish Seine									
Beach seine									
Fish Carrier[5]									

1) Type of fishing gears is listed in the order of those given in Proposed International Statistical Classification of Fishing Gear (See Appendix IX of FAO Fisheries Reports No. 120)
2) Size classification of fishing boat will be that proposed by JWP. (See 3.1 of FAO Fisheries Reports No. 85)
3) Further classification for these categories is optional with the requirement of a national government.
4) In each tonnage class, the lower limit is included and the upper limit excluded.
5) A boat which is exclusively used as a fish carrier.

(General Note) It would be ideal that all fishing boats are classified in accordance with Proposed International Statistical Classification of Fishing Gear. However, if this is not possible, classification of fishing boat by type of fishing gear is to be made at least to fishing gears, for which both catch and fishing effort data are sought.

1.2 Total Tonnage of Fishing Boats by Tonnage Classes and by Type of Fishing Gears

Size of Boat / Type of Fishing Gears	Total	Non-Powered boat	Out-board Powered boat	In-board Powered Craft
Total				
Otter trawl				

The type of statistical table is exactly identical to that of 1.1. However, the total tonnage of "Non-powered boat" and "Out-board powered boat" is not always meaningful, and hence these are optional with the requirement of a government.

(General Note) The same as given in 1.1.

1.3 Total Horse Power of Trawlers by Sizes of Trawler

Size of Boat / Type of Trawl	Total	Outboard Powered boat[1]	Inboard Powered Boat[3]					
			0–5 G.T.	5–10 G.T.	10–20 G.T.	20–50 G.T.	50–100 G.T.	100–200 G.T.
Total								
Otter trawl								
Pair trawl								
Beam trawl[2]								

1) Optional 2) Optional

3) Tonnage classes should be the same as those proposed by IPFC/IOFC JWP. However, the further classification of some tonnage classes would be required depending on the requirement of a national government.

2.1 Total Catch by Species and by Types of Fishing Gears

Unit: Metric ton

By Type of Fishing Gears[1]	Total	By Species[2]
Total		

1) Type of fishing gears will be in the order of those in Proposed International Statistical Classification of Fishing Gear (See Appendix IX of FAO Fisheries Report No. 120)

2) Species will be arranged in accordance with International Standard Classification of Aquatic Animals and Plants (ISSCAAP)

(General Note) This statistical table will be compiled for all marine catches.

2.2 (A) Summary Account of Selected Important Fisheries[1]

Size of Boat	No. of Fishing Units[2]	No. of Trips [2]	No. of Days Absent[2]	No. of Days Fished	No. of Hauls[3]	No. of Trawling Hours[3]	Total Catch in Quantity[2]	Total Catch in Value[4]
Total								
10–20 G.T.								
20–50 G.T.								
50–100 G.T.								
100–200 G.T.								

1) This statistical table is compiled for each of selected important fisheries separately, for which both fishing effort and catch data are sought. The above table is an example for trawl fishery.

2) "No. of fishing units", "No. of trips", "No. of days absent" and "catch in quantity" would be the minimum requirement for every selected important fisheries.

3) These two items should be changed in accordance with the type of fisheries to be covered.

4) To study relative economic importance between different sizes of fishing boat the total catch in value for every size of boat is assessed using average weighted price per unit weight for every species and catch in quantity by species which is obtainable from Table 3.2.2.

2.2 (B) Fishing Effort and Catch by Fishing Areas[1] for Selected Important Fisheries

Type of Fishery_____ Tonnage Class of Boat_____

Items		By Fishing Areas[2]						
		Total	I	II	III	IV	V	.....
Fishing Effort	No. of Trips							
	No. of Days Absent							
	No. of Days fished							
	No. of Hauls							
	No. of Trawling HOurs							
Catch by Species	Total							
	a							
	b							
	c							

1) This statistical table is compiled separately for each tonnage class of boat even within a same fishery.
2) Fishing areas are those which were established to meet the national requirement. It is, however, assumed that such national fishing areas will be established within the area of "sub-area" which will be proposed by IPFC/IOFC JWP in the near future.

SEAFDEC/SCS.73: S-18

Current Status of Research Activities of the Marine Fisheries Research Department, Southeast Asian Fisheries Development Center (1970 – 1972)

by
Chen Foo Yan and Satoshi Mito

1. INTRODUCTION

The Southeast Asian Fisheries Development Center (SEAFDEC), established in 1968, is one of the first concrete regional projects born out of a series of Ministerial Conferences for the Economic Development of Southeast Asia. The Center is governed by a Council, a policy making body, consisting of six Directors, representing six countries, viz. Japan, Malaysia, Philippines, Singapore, Thailand and Vietnam.

The Marine Fisheries Research Department (MFRD) hosted by Singapore is one of the departments of SEAFDEC, the other being the Training Department in Bangkok, Thailand. The functions of the Research Department are:

(i) to develop the fishing grounds in Southeast Asia by experimental fishing
(ii) to carry out research into fishing gears, equipment, fishing methods and general handling of fish at sea, in close cooperation with the Training Department
(iii) to conduct investigation of fisheries resources and research in fisheries oceanography for Southeast Asian countries
(iv) to train research personnel and technicians, and
(v) to undertake such other activities as may be determined by the Council.

The Department consists of three sections, the Fisheries Resources Section, Fishing Ground Development Section and the Ocean Research Section, and owns a 387-ton stern trawler research vessel CHANGI. It has a staff of 47, including 10 scientists and a crew of 25.

Although the Department has been in operation since April 1969 its regular research activities commenced in January 1970. Research was mainly centred around trawl fisheries and oceanographic survey in the South China Sea. However, in 1972, a programme was set up to include exploratory survey of the Straits of Malacca and the Andaman Sea, and the use of other gear, such as tuna longline, bottom longline and vertical handline for studies of demersal fisheries resources in the Southeast Asian waters. Research scientists from member Countries also participated actively in the research programme of the Department.

Up to April 1973 CHANGI carried out 32 survey cruises in 370 navigational days. Raw data obtained from every cruise are compiled and circulated immediately to Member Countries as Quick Reports, while the Department's Quarterly Newsletter and Annual Report summarising the progress of its activities are published for wider circulation.

This paper summarises research findings of the Department while detailed results may be found in 15 papers presented at the Technical Seminar on the South China Sea of SEAFDEC.