Report of Japanese Survey Mission

on

Post-Harvest Technology Research

1976

JAPAN INTERNATIONAL COOPERATION AGENCY

Introduction

This report deals with the problems to be solved in the field of post-harvest technology for fisheries development in the SEAFDEC area, which have been disclosed by the survey conducted twice by the mission in March and August 1976 in compliance with the request of the Council of SEAFDEC.

General Trend of Fisheries in the SEAFDEC Area

The total catch in the four countries covered by the survey, i.e., Malaysia, the Philippines, Singapore and Thailand, is approximately 3 million tons, and this level has been maintained in the last few years.
By adding the catch in Vietnamm, the total catch of the SEAFDEC member countries will be approximately 3.6 million tons (Fig. 1).

By further adding the catch in Indonesia, Burma and Cambodia which are not member countries of SEAFDEC, the total catch will increase to more than 5 million tons, clearly indicating the importance of fisheries in Southeast Asia.

As seen in Fig. 1 prepared from FAO data, Thailand stands atop in the total fish catch, followed by Indonesia and the Philippines. The annual total fish catch in these countries exceeds 1 million tons and shows the tendency of further increase. In Malaysia and Singapore, however, the growth of catch is rather stagnant. Expansion of fishing industry appears difficult particularly in Singapore due to for limitted fishing ground.

Role of Trawl Fishing

It is well known that the increase in fish catch in South-

east Asian waters is attributed mainly to the development of trawl fishing. In Thailand, for instance, the total catch of 186,500 tons in 1960 increased by about 9 times to 1,679,540 tons in 1972, of which 70% was accounted for by the trawl fishing. In 1974, this percentage further rose to 73%.
In Singapore, too, the trawl fishing accounted for 31% of the total catch in 1974. In the Philippines where the fish catch increase is planned at an annual rate of 6.6%, the trawl fishing recorded 187,141 tons in 1974 or 39.7% of the total catch by sea fishery which registered 470,675 tons.
In Malaysia, the trawl fishing recorded 192,000 tons or 43.5% of the total catch in 1974.

By trawl fishing method, it is unavoidable to catch a bulk of bottom fish by each operation. Handling of trash fish is therefore one of the major problems calling for the application of post-harvest technology.

On the other hand, a considerable amount in the total catch is attributed to fishing methods other than the trawling.

Table 1 shows, by way of example, the catch by fishing method in Thailand in 1974.

Table 1 - Catch by Fishing Method (1974)

Fishing Method	Weight		Value	
	Ton	%	US$1000	%
Total	1,351,590	100.0	204,675	100.0
Trawl fishing	998,193	73.9	126,553	61.8
Purse seine fishing	81,795	6.1	14,315	7.0
Lift net fishing	69,217	5.1	7,696	3.8
Gillnet fishing	49,790	3.7	20,695	10.1
Fixed net fishing	50,168	3.7	17,008	8.3
Long lining and angling	8,268	0.6	3,079	1.5
Shellfish collection	51,649	3.8	3,659	1.8
Shrimp culture	2,926	0.2	3,110	1.5
Others	39,584	2.9	8,556	4.1

Problem of Trash Fish

As stated already, the expansion of trawl fishery inevitably results in the increased catch of trach fish that constitutes a large portion of the total catch. The positive and efficient utilization of trash fish is this highly important for the development of trawl fishery.

In Thailand, for instance, 690,270 tons of trash fish were landed in 1974, accounting for as high as 51% of the total catch in that year. The fisheries data of Malaysia indicate that 60% of the total catch (192,000 tons) by trawling in Malay Peninsula (mainly in the west coast al waters) was trash fish in 1974. In both Malaysia and Thailand, the trash fish is mostly processed into fish meal. If it is used for food,

the catch of edible fish would be doubled.

In this connection, it is worthy of notice that a considerably large portion of trash fish is used for fish sauce in the Philippines, though it is also processed into fish meal.

If there is little prospect for further expansion of the fish catch by trawling in the Southeast Asian waters, the use of trash fish for food must be given more attention as an important factor for the fisheries development in Southeast Asia.

Consumption of Fresh Fish in the SEAFDEC member Countries

The fish caught in the SEAFDEC member countries are consumed mostly as fresh fish. The landed fish are supplied to the retail market by auction and eventually to conumers at large. In all the four SEAFDEC member countries, fish is one of the major foodstuffs in the people's dietary life.
In Thailand, the Philippines and Malaysia, the greater part of landed fresh fish is used for domestic consumption. These countries are self-sufficient in the supply of fish.

A noteworthy fact about the fish consumption in Singapore is that it consists mainly of fresh fish and shellfish, although the country is largely dependent on their import. The consumption of fresh fish in Singapore including frozen fish amounted to 46,000 tons in 1974 or 72% of the total fish consumption. Fresh fish is supplied to this country mostly from Malaysia by land and Indonesia by sea.

The ratio of fresh fish consumption is also high in the other three countries. It recorded 680 thousand tons or nearly 40% of the total catch of 1,680 thousand tons in Thailand (1973), 60% of the total catch in the Philippines

(1970), and 66.6% of the total catch in Malaysia (1974).

Since the great majority of landed fish is transported to the consumer areas without processing, attention should be given to the maintenance of its freshness. But, in fact, fresh fish is not properly handled due to the poor use of ice or poor maintenance of the loe temperature.

The mission felt the urgent need for taking suitable countermeasures against the decline of freshness including sufficient use of ice.

Processed Marine Products

There is observed an active consumption of a diversity of processed marine products in all the four countries, of which the most prominent are the traditional products such as unsalted and dried fishes, cured fishes, smoked fishes, and fermented products (fish sauce and salted fish paste).

In 1974, the fish used for processed products accounted for 20% of the total catch (1,300 thousand tons) in the Philippines and 19.3% of the total catch in Malaysia. In the same year, the percentage stood at 66.3% in Thailand and 62.4% in Singapore, although these figures include the production of fish meal which is not edible. In the case of Singapore, the fish catch processed for food registered 16.7% and the remaining 45.7% covered fish meal and other unedible products.

Table 2 shows the component ratios of processed marine products traditionally consumed in Thailand.

Table 2 - Usage Distribution of Fish Catch in Thailand (1974)

	Ton
Total	1,351,590
Fresh fish	455,866
Frozen fish	11,231
Cured fish	78,015
Boiled fish and smoked products	15,573
Salted shrimp	12,006
Dried shrimp	23,815
Fish meal	563,475
Fish manure	955
Fish sauce	64,295
Others	126,359

Each item of these traditional products is sold at different prices according to the quality, permitting consumers to select the product of desired quality. It could be suggested, that fair transactions of these products will be ensured if objective quality standards are established.

Need for such standards was felt particularly for fish sauce because many spurious liquid products are witnessed in the market. For the purpose of consumer protection, the governments of SEAFDEC member countries are contemplating establishing relevant quality standards.

As a result of the inspection of processing plants, the mission found it necessary to effect improvements in the freshness maintenance and cold storage of fish before processing, handling of factory wastes, and technical training of workers. In this connection, it was also felt that the quality improve-

ment should be attained according to the type of each individual traditional product.

Modern processed goods such as frozen fish and canned fish are also produced. In particular the production of frozen fish has been rapidly expanding in recent years. Their production in 1974 recorded 11,231 tons in Thailand, 14,000 tons in the Philippines (estimate) and 13,000 tons in Malaysia (estimate). Most of them are frozen shrimps and cuttlefishes exported overseas. In Singapore, shrimps and cuttlefishes frozen in Indonesia are reprocessed for transit export.

Production of frozen products is conducted in an adequate manner by efficient freezing equipment using fairly good quality material fish. It was noted that careful hygienic consideration is given throughout the production process.

The high technical level of frozen fish production is attributable to the large operational scale and also to the strict quality requirements demanded by importing countries.

As for the production of canned fish, no accurate figures are available due to the absence of relevant statistical data. However, judging from the size of canning factories in Thailand Thailand, Malaysia and the Philippines, it is likely that the production of canned tuna and bonito is beeing carried out on a large scale. Most of these factories are run by American or Australian enterprises in Malaysia where of them are run by Malaysian nationals.

All these factories are clean and employing advanced canning methods, not at all different from those applied in Japan on the U.S. In Singapore, however, the canned fish production is not found significant.

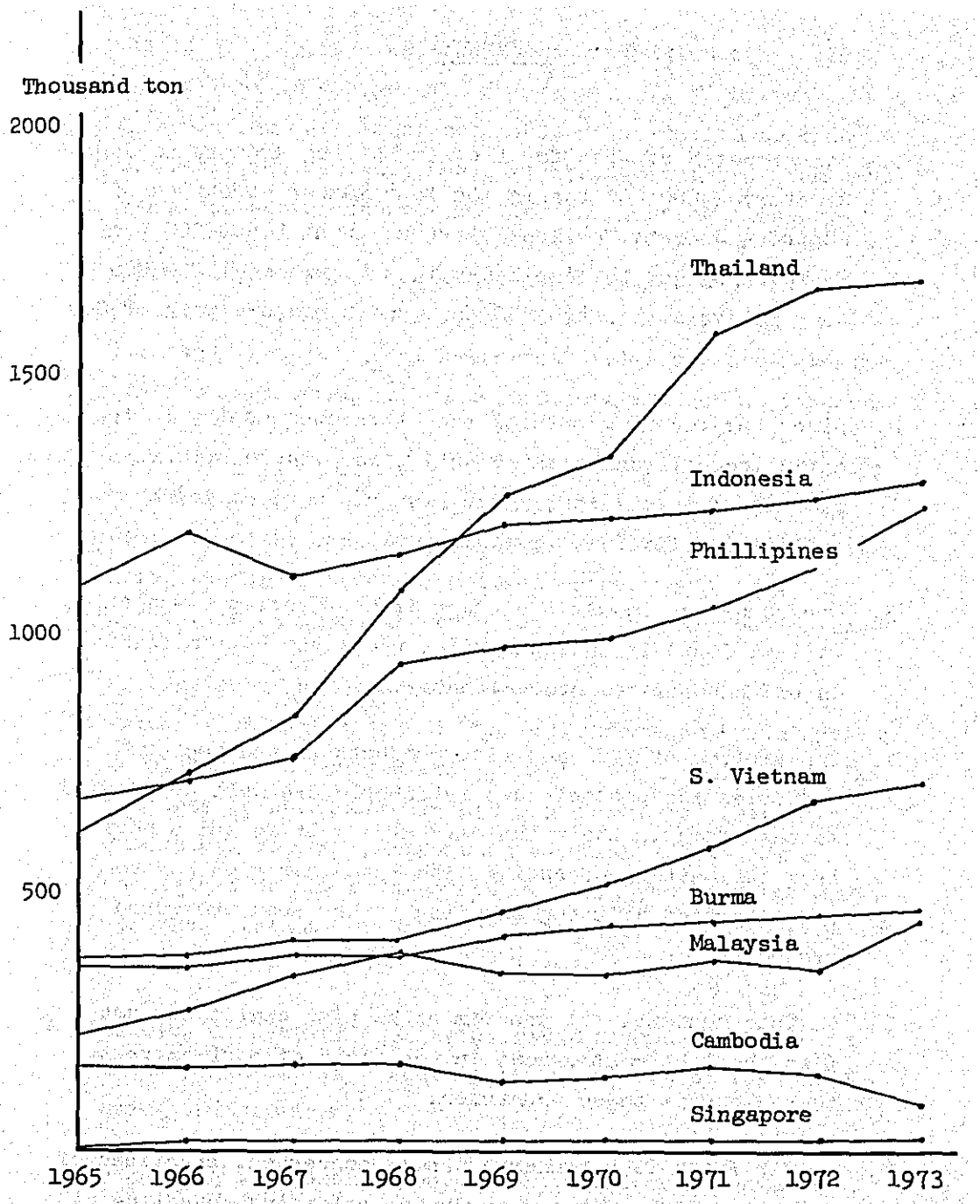
The main problem in the production of frozen or canned fish is how to secure stable and sufficient supply of material

fish rather than to effect technical improvement.

Fish in Dietary Life

In all the four countries, fish plays a significant sole in people's dietary life as the main source of protein supply. The per capita consumption of fish is 28.4 kg in Singapore (1974), 20.1 kg in Thailand (1973), 26.6 kg in Malaysia (1973) and 30.7 kg in the Philippines (1974). These figures are close to the level in Japan (34.3 kg in 1973) which is known to be the heaviest fish consuming country in the world.

In this context, the introduction of the post-harvest technology which is intended for highly efficient utilization of the precious protein resources is of great importance in the SEAFDEC area.


Thousand ton
2000
1500
1000
500
Thailand
Indonesia
Phillipines
S. Vietnam
Burma
Malaysia
Cambodia
Singapore
1965
1966
1967
1968
1969
1970
1971
1972
1973

SUMMARY

1. Annual catch of fish for the time b eing amounts to approximately 3,000,000 ton in the four member countries of SEAFDEC, whereby Thailand harvests about 1,500,000 ton, followed by the Philippines with a figure of 1,200,000 ton, Malaysia with 400,000 ton, and Singapore with 18,000 ton.

2. Since the recent growth of the catch owes mostly to the expansion of trawl fishing activities, there appears a problem of trash fish, which requires more efficient utilization for human consumption.

3. Opportunities to use the trash fish or shrimp by-catch will be found in the countries, where the bottom fishing is being conducted predominantly.

4. Consumption of fish and fish products in the member countries looks stable and the people are well accustomed to take fish in their ordinary diet. It is quite obvious that the pattern of cating fish in this region has been characterized by using raw fish rather than processed products.

5. In this context, the problem of keeping quality of wet fish shall be most urgent in the field of post-harvest technology in these countries.

6. So far fresh fish preservation is concerned, practices of using ice either aboard or during unloading, handling at market, and distribution shall be encouraged. Effort

should also be made on the training of extension workers who will be in charge of bringing up both fishermen and fish handlers of proper use of ice in order to upgrade the wet fish. In addition, appropriate measure should be sought to secure cheaper ice for the fishing industry.

7. A consistent demand for traditional fish products, such as dried, salted, smoked, and fermented fish, can be observed throughout the member countries and the need for quality improvement of these products may not be ignored.

8. An important subject in the improvement of the traditional products will be adequate quality control based on the well organized quality standards. Establishment of workable standards shall be hastened, since administrative activities on this line have been lacking in the region.

9. Production of non-traditional products like canned or frozen fish can be seen in the countries and their quality level has been managed fairly well. Major portion of the products is being directed to export and the quality requirements forced by importing countries should have influenced on the maintenance of quality. Only the problem these industries have, at the present, is shortage of raw materials with good condition of freshness.

10. Problem of keeping quality of raw fish and shellfish is again primarily important in these sectors of fish processing industries.

11. Regarding the research on new product development, it may better be left to the activities of individual industry, since the work of this type often needs quantity of funds

in spite of scarce opportunity to achieve commercial reality. Major efforts should be devoted to the quality improvement of the existing fisheries products in the member countries.

12. Since the fish in the diet of the people in this region has been playing a vital role, in particular, from the viewpoint of protein supply, works on the post-harvest technology, starting with immediately after catching, shall not be ignored in the programmes of SEAFDEC activities.

13. In conclusion, emphasis of post-harvest technology around SEAFDEC countries should be placed on the two significant subjects; one is fresh fish presservation and the other is the quality upgrading of traditional fish products.

Formation of the First Phase Survey Mission
(February 29 ~ March 14, 1976)

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Keishi AMANO	Leader, Overall control	Professor at Tokyo University of Fisheries
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Formation of the Second Phase Survey Mission
(August 2 ~ 16, 1976)

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