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Issue Paper

# MEASURES TO INCREASE THE PRODUCTION AND MARKETING OF VALUE-ADDED FISH PRODUCTS IN ASIA AND THE PACIFIC ISLAND COUNTRIES*

Prepared by
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* This document has not been edited.

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INTRODUCTION

During the 80's the Asian region confirmed itself as the most dynamic and rapidly growing region of the developing world. Not surprisingly, there are wide differences of experience in so varied a region, which ranges from huge sub-continental countries such as the People's Republic of China and India, to newly industrialized countries which, in terms of GDP per capita, are beginning to overtake some of the developed countries.

The region as a whole is well placed to meet the challenges of the 1990's. Efficiency is being enhanced as market forces are increasingly relied upon. Investment rates remain high thereby helping to facilitate the rapid introduction of new technologies and the structural transformation of the economies.

A. Marine fisheries

In the area of fisheries, Asian countries increased their share of the world's total fish catch from 12 percent in the 60's, to more than 40 percent in the 80's.1/

Fish is the major source of animal protein in the diets of Asian peoples, and rapid expansion of supply has been necessary to meet domestic demand. Marine fisheries account for 80 percent of total production, with inland fisheries and aquaculture accounting for the remainder. Expanded marine production has contributed strongly to GDP growth, employment and foreign exchange earnings in the majority of Asian countries. Export of fish products to OECD markets has grown sharply.

One of the main characteristics of Asian marine fisheries is its dual structure which is composed of small scale fishing and industrial fishery.

Small-scale fishery is defined as fishing undertaken mainly by family members to maintain the livelihood of the family. Industrial fishery is for profit-making and is undertaken mainly with hired fishermen.

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1/ Challenge of Asian Developing Countries, Asian Productivity Organization, 1988.

The foregoing distinction is of importance in examining the issue of value-added fish processing because although the issue would seem related only to industrial profit-seeking fisheries, it also indirectly reflects upon the socio-economic development of small scale fisheries.

There are over 7 million artisanal fishermen and over 5 million traditional fish farmers in Asia and the Pacific. This sector of fisheries

(a) provides about half of the region's total production of over 32 million metric tons;

(b) forms the economic basis and justification for thousands of coastal, island and riverine villages;

(c) provides the bulk of lower cost fish protein food for the domestic markets;

(d) provides employment for over 6 million traditional processors and over 3 million retailers, both mostly womenfolk.

There are two types of programme for the small scale sector:

1. Integrated community development usually coupled with some kind of property (users' rights) ownership of the village coastal area, to encourage and facilitate conservation, fish farming and mangrove planting.

2. Co-operation arrangements with the large scale sector where traditional fishermen engage in capture or culture activities and the large company supplies inputs and undertakes processing and marketing. In Indonesia the co-operation strategy is well developed in the "nucleus/plasma estate" system where the private company is the nucleus and the traditional operators are the plasma.

## B. Aquaculture

Each year, consumer demand for fish products grows as resulting in higher consumption rates for a widening variety of species. Heightened demand has brought the commercial fishing industry to a virtual supply production ceiling in some species. In the search for new, safe sources, aquaculture is providing some of the answers for the future of fish production.

At least 89 per cent of global aquaculture production comes from the

Asian region. The species diversity is also the highest in the world. Commonly, Asia's dominance in world aquaculture has been attributed to the fact that fish culture has been a tradition in the region.

Table 1 illustrates the predominance of Asia in the production of all types of aquatic organisms.

TABLE 1

Summary of Aquaculture Production by FAO Regions* (mt)
1986

| FAO Regions | Finfish | Molluscs | Crustacea | Seaweeds | Others |
|---|---|---|---|---|---|
| Africa** | 11,616 | 204 | 74 | - | - |
| North America | 262,149 | 186,664 | 80,863 | 210 | - |
| Latin America | 61,744 | 2,834 | 5,893 | 5,332 | - |
| Asia/Oceania | 4,358,981 | 2,644,196*** | 311,833 | 2,736,463 | 30,260 |
| Europe | 399,153 | 643,636 | 98 | - | - |
| Near East | 56,061 | 214 | - | - | - |
| USSR | 305,000 | - | - | - | - |
| **Total** | **5,454,704** | **3,477,748** | **398,761** | **2,742,005** | **30,260** |

* Data from FAO Fisheries Circular No. 815 (1989)
** Excludes North African countries in Near East grouping
*** Includes additional 1,135,000 tonnes not reported by China in 1986.

There is good potential for development of aquaculture and brackishwater ponds in coastal areas in large parts of Asia. Rapid growth in fisheries production contributes to improved nutrition as well as income, employment and foreign exchange. Besides, it may be said that aquaculture fills a growing gap between demand and supply for some fish and fish products.

FAO has estimated that aquaculture production will reach 22.2 million tons by the year 2000, thus more than doubling its present level. This increase will be necessary if the projected increase in overall demand is to be met at present price levels, taking into account the limited potential for increases in capture fishery landings. In the meantime, the FAO projection for aquaculture production implies an average annual growth rate of 5.5 per cent compared to an average growth rate of 0.3 per cent for capture fisheries.

C. Prospects to the end of the century

The demand for fish products depends on three factors, namely, population, income and price, the latter incorporating a number of other factors such as consumer preferences. Of these, the population factor is the most important since, with stable prices, it normally accounts for about two-thirds of change in total demand.

In Asia, where there are a number of countries in which fish represents half or more of animal protein supplies, an extra five million tons per year would be required by the end of the century to maintain present levels of consumption. On the other hand, almost all important stocks of demersal species are either fully exploited or overfished. Many of the stocks of more highly-valued species are depleted. There is little prospect, therefore, of increasing the catch of demersal species.

There seems to be a better possibility of increasing the harvest of small pelagic species. Additional harvesting may be feasible by more intensive exploitation in some areas and improved fishery management in others. Crustacean species are generally heavily exploited and many, if not most, stocks are depleted. Very few untapped resources of conventional species remain anywhere.

Among unconventional marine resources, those that might support fisheries in the future include mesopelagic species and krill.

For the foreseeable future, because of the nature and size of these fish, they would have to be used for fishmeal production and, at present, incentives for commercial investment for this purpose are lacking.

The most direct and immediate contribution to increased food supplies could be made by reducing post-harvest losses, which are particularly heavy in developing countries. They occur at various stages but are greatest in discards at sea in trawl fisheries and in losses during processing and distribution.

As to discards at sea, it should be stressed that a significant portion of these occur in the shrimp fisheries. The problem in shrimp fishing is that vessel owners and crews have no incentive to keep, preserve and land the relatively low value by-catch.

Ensuring that the present discards from trawl fisheries are landed for human consumption, investing in facilities to reduce post-harvest losses and fully utilizing the small pelagic species as food could all have an impact. However, the contribution from all the above sources to the increased food

fish demand in the year 2000 will only be possible if governments address the needs now. The failure to meet these challenges will result in lower income groups, now dependent to a greater or lesser extent, on fish in their diets, no longer being able to secure and equate protein supplies from this source.

D. Objectives of the Consultation

Scarce resources should be better utilized through:

(a) processing high value-added products for export markets;

(b) processing unutilized resources or by-catch for local or international markets, therefore adding value to the present zero value.

As can be seen from the following statistics in Table 2, Asian fisheries add much less value to their catches than do OECD fisheries. Therefore the objective of the Consultation is to find, discuss and agree on:

- how to add more value to the existing catches;
- how to add value to unutilized by-catches or species.

TABLE 2

Exports of Fish and Fish Products
(Average value in US$/metric ton)
(1988)

| PRODUCT | OECD* | ASIA** | RATIO OECD/ASIA |
|---|---|---|---|
| Fresh, chilled or frozen fish | 2671 | 2202 | 1,21 |
| Dried, salted or smoked fish | 3540 | 2012 | 1,76 |
| Frozen, dried or salted crustacean and mollusc | 6330 | 5558 | 1,14 |
| Fish products and preparations whether or not in airtight containers | 2857 | 2473 | 1,16 |
| Crustacean and mollusc preparations whether or not in airtight containers | 7326 | 4465 | 1,64 |

* Average of the first three OECD exporters.

** Average of the first five Asian exporters. Japan is included in OECD countries.

RAW MATERIAL

Good-quality raw material supplies are an essential prerequisite for any value-added processing activity. This implies good management of the entire fisheries chain and should include:

- adequate resources,

- harbour and other infrastructure facilities,

- catches preservation, storage and handling facilities,

- auction or selling arrangements and procedures,

- transport,

- marketing facilities.

The entire chain could be managed by a sole actor, such as an enterprise with its own fleet and facilities, or different actors such as government, fishermen, commercial buyers, etc., each one managing a segment of the chain with the overall objective of efficient resource utilization.

Due to their diversity, the experience of Asian countries is not uniform, but there is general consensus that management of the resources should be in government hands.

According to the World Conference on Fisheries Management and Development, "management should be conceived and understood not as a constraint upon rational exploitation but as an essential tool for the sound, sustained development of fisheries. Hence management of fisheries is an integral part of the development process.2/

However, management of the resources should be directed towards efficiency through input controls (such as vessel license restrictions, gear controls, etc.) which are easier to implement than output controls consisting of catch limits or quotas.

As far as the other main links are concerned, fisheries co-operatives are considered in both developed and developing countries as an efficient tool to manage most of the fisheries activities and at the same time ameliorating the socio-economic conditions of the fishermen. It is important to stress that co-operatives must be voluntarily organized and not run by a government entity. In the past, co-operatives organized by governments have generally failed.

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2/ Report of the FAO World Conference on Fisheries Management and Development, Rome, 24 June - 6 July 1984.

In some Asian countries, processing enterprises act as a central focal point for the management of the entire fisheries chain. Like in other agroindustrial sectors, enterprises and fishermen can negotiate mutual profitable arrangements and the enterprise can provide inputs, storage facilities, etc. in exchange for fixed deliveries of fish on the basis of a negotiated price.

Questions

Freshness is a must for any value-added product. It calls for good management, at national or enterprise level, of the entire fisheries chain as well as the availability of infrastructure facilities.

Assuming that infrastructure exists, how is management to be improved?

- By giving the responsibility for organizing the fisheries system to the private sector through contracted arrangements with fishermen? Would this system promote social welfare of fishermen?

- By helping to promote fishermen co-operatives and training co-operative managers or persons in charge? Or state-owned non-profit companies? Would such schemes work efficiently? What is the experience of Asian countries?

- By promoting the creation of private sector fleets?

- By creating independently-managed storage and auction centres?

- As good fisheries management is essential for freshness of raw material and therefore for value-added products, should industrial projects be completely integrated projects such as those being implemented by UNIDO in some Asian countries, or should factories be set up simply where fish is abundant?

GOVERNMENT POLICIES

Governments can formulate policies to regulate the fisheries and fish industry. They can also formulate policies to support the subsector and act as a promoter in matters of common interest. The key question is the partition of regulative, supportive, and promotional measures among governments, industry and consumers.

In spite of the diversity of economic regimes prevailing in the region, it seems to be a general consensus that government must play a unique

role in matters concerning public interest. Public health and, therefore, the enforcement of high quality fish and fish products, as well as environment protection, must be regulated by government policies.

Infrastructure and the management of resources within the economic zone, are other areas that should be under exclusive government control. Governments must regulate access to the resources in order to avoid depletion and to assure a sustainable supply.

However, the role of government in supportive measures like R&D centres, export promotion, development of human resources, sectoral master plans, fiscal incentives, and trade regulations, should be discussed in depth, particularly the co-participation of industry in its preparation and implementation.

In the area of fish processing for value-added, several factors play an important role in its development. As far as raw material is concerned, it should be stressed that tropical seas contain multispecies fishery. The sizes range from tiny clupeids to giant sharks. Nearly 65% of the catches are graded as low value items and do not provide sufficient remuneration. Until the fish processing scientists find a better way of utilising these low value fish and raising their real unit value through appropriate processing, the commercial firms will not be attracted to large scale production. At present, the seafood processing industry is processing high value items which give adequate returns. Thus, the industry is developing as a 100% export-oriented unit, since the domestic market cannot afford to pay attractive prices. Under these circumstances, governments should take the lead to establish R&D policies for utilising low value fish. It is encouraging to see that a few Asian countries utilise some varieties of low value fish such as threadfin, breams, conger eel, ribbon fish, croakers, lizard fish, etc., for surimi production, minced meat, fish balls, cutlet, fish fingers, etc. The government at this juncture should evolve a suitable policy to attract the fishery industries to diversify processing of low value products which will bring immediate benefits.

Questions

- In this context, what kind of supportive measures should governments take and how could industry and consumers be involved in the elaboration of these policies? What kind of measures, like industry self-certification for quality, should governments promote?

- What kind of N-S and S-S co-operation, like workshops in export promotion incentives, in industry self-certification, in standards and certificates of quality, should be promoted?

- What kind of policies should be established to promote R&D and commercial use of unutilized species?

## TECHNOLOGIES

### Technology for international markets

Asia already exports fish products such as crustaceans, molluscs, cephalopods, etc., but the value-added is still low. This is due mainly to the fact that the quality of raw material is not high enough and that the simplest technology is being used: freezing in block.

Block freezing is the first technological step to gain access to international markets but the value-added is relatively low. A further step such as individual quick freezing (IQF) can add much more value. Shrimp processed by IQF is traded at prices 20-25% higher.

Individual quick frozen fish fillets are also widely traded. However, the great variety of tropical species makes the efficient application of machines difficult as it implies a large amount of hand-based operations.

Laminated blocks and other fish analogous products are also relatively easy to produce but the value-added is relatively low compared with the IQF of gadoid species well known in the temperate zones of the OECD markets.

On the other hand, consumer demand for fresh, convenience packaged food has led to increased interest in packaging systems such as modified atmosphere packaging (MAP) and film vacuum packs.

Originally developed for the packaging of meats, these systems have since been utilized by the fish processing industry in its search for new and wider marketing opportunities. This, allied to renewed consumer interest in fresh fish has established MAP as a commercial and economic reality, particularly in markets which have a well established and controlled cold chain and, additionally, can sustain a high priced, quality product.

Although expensive, technologies for IQF and even packaging are not so sophisticated and "technological packages" (equipment and technology) are readily available.

Technology for domestic markets

Fish preservation has been practiced in Asia for a long time, the simplest methods employed being drying, salting, smoking and fermentation.

Generally speaking, techniques can be largely improved by introducing new technology to reduce wastage and to protect the product against spoilage and insect infestation.

Indirect solar fish dryers have a number of advantages over more traditional methods. They prevent rain, insects, animal and dirt contact and can produce temperatures high enough to reduce bacterial and mould growth in the early stages of drying. Several solar driers have been constructed in Bangladesh, Philippines, Indonesia, Papua and New Guinea.

The use of pepsin and other peptolitic enzymes increases yields and the quality of fermented fish sauce or paste.

Smoking could also be improved by using better designed smoking chambers allowing the use of standardized practices.

Most of these improvements have been developed by local and regional R&D centres but have to be disseminated among fish producers.

The area of technologies to process unconventional species into new low-cost fish products adapted to Asian markets deserves great attention. Products like fish sausages, fish balls and fish analogues using unconventional species could increase the effectiveness of the Asian fisheries industry by adding value to by-catches presently unutilized or wasted.

Regional and local R&D centres are currently developing such low-cost products, but more research, specially in the area of sensory evaluation, is needed to adapt these products to the Asian consumers' taste.

Questions

Technologies for international markets

Experts have suggested that Asian producers should proceed step-by-step in upgrading the process of species exported in bulk by, for instance, introducing IQF and packaging. This step-by-step approach seems to have the advantage of giving more time to improve the entire fisheries management and to introduce technological complexity at low speed.

- Should Asian fisheries evolve in this slow way or would it be better to concentrate efforts on a few, well-managed factories? In other words, should Asian fisheries try to obtain the maximum of value-added using more sophisticated technologies or keep a reasonable portion proceeding step-by-step?

Technologies for domestic markets

Local or regional fisheries centres have been working on improvement of traditional technologies. These improved technologies are available but have not so far been successfully dispersed.

- What is the best method to disseminate improved traditional technologies? Should international organizations promote regional workshops to facilitate dissemination or would it be preferable to establish pilot demonstration projects?

Some regional and local research centres are developing new low-cost technologies based on unconventional species. However, there seems to be some resistance on the part of consumers to accept low-cost fish products such as fish sausages, extruded products or fish analogues.

However, it must be remembered that fish fingers or laminated fillets were unknown in developed countries 20 years ago and have now gained consumer acceptance.

- Should international organizations set pilot projects to test, in a commercial environment, consumer acceptance of new low-cost products from unconventional species or alternatively reach agreements with private industry for the same purpose?

FINANCE

According to the findings of the FAO/SEAFDEC/INFOFISH Regional Seminar on Fisheries Investment and Project Identification[3/], a decline in the financing of fisheries development projects by international financing institutions has been apparent since the early 1990's. This was thought to be the result of the growing economic maturity of the borrowing countries as well as an increasing disillusionment with the so-called "classical" project approach.

In the Asia and Pacific region no multilateral financing institutions exist except the Asian Development Bank (ADB) and the World Bank, through the International Finance Corporation (IFC).

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3/ FAO/SEAFDEC/INFOFISH Regional Seminar on Fisheries Investment and Project Identification, Bangkok, 10-14 October 1988, page 3, paragraph 22.

By 1987, the membership of the ADB had increased to 47 members, consisting of 29 Asian and Pacific countries and 18 industrialized countries, the latter constituting the main source of funds for banking operations. The ADB's principal mode of operation is the provision of capital assistance to development projects in the form of loans on either ordinary or concessional terms. Fishery loans have traditionally been used for the purchase or mechanization of boats and the construction of shore-based support facilities for marine fisheries. Recently they have also been extended to include inland fisheries and aquaculture.

Examined in terms of the sector's policy objectives, ADB projects have continued to be production-oriented, with appraisal reports justifying projects on grounds of economic returns, based on increased production or output.

Financing from bilateral resources is available from, among others, the Overseas Economic Co-operation Fund (OECF), the Japan International Co-operation Agency (JAICA) and the Australian International Development Assistance Bureau (AIDAB). In addition, the Asian and Pacific Regional Agricultural Credit Association (APRACA), which comprises about 40 agricultural and rural banks from 18 countries of the region is another source of funding for fisheries on a selective basis. There is no record, however, of financing the post-harvest industry including fish processing from the above financing institutions.

Experts have pointed out that a good investment climate, financial deregulations, as well as the availability of venture capital could help promote investment and alleviate the common problem of collateral requirements, by introducing more competition among financial institutions.

Questions

- Some international financial organizations participate in the equity of the new venture thus alleviating the problem of financing the working capital. Should this system be extended to national development banks?

- Should international financing operations be involved to a much greater extent in financing the private sector?

- National development banks that borrow from international organizations at international or subsidized rates apply in many cases excessive on-lending rates to cover their running costs and in most cases require excessive collateral guarantees. Should governments absorb the running cost of those banks in order to keep interest rates at international levels?

- Should governments provide free exchange rate insurance for loans in foreign currency as a tool to stimulate new investment?

- Should governments subsidize lending rates to promote investment or would this policy create a distortion in the economic activity?

## TRAINING AND RESEARCH

The diversity of fisheries education and training systems in various Asian communities is clearly shown in the following table.

Table 1. Summary data on fisheries education together with demographic and fisheries data, in selected Asian countries.

| | Australia | China | India | Indonesia | Japan | Malaysia | Philippines | Singapore | Sri Lanka | Taiwan | Thailand |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No. tertiary institutions offering fisheries degrees | - | 5 | 11 | 16 | 18 | 3 | 34 | - | - | 6 | - |
| No. institutions offering fisheries Ph.D. | - | - | 10 | 1 | 9 | 1 | - | - | - | 2 | - |
| No. institutions offering diploma or certificates as highest level | - | 4 | 51 | | | 8 | 32 | - | - | 11 | |
| No. training vessels | 1 | | 20 | 3 | 12 | 10 | 1 | - | - | 1 | 1 |
| University teaching staff | | | 250 | 330 | | 43 | | 19 | 8 | | 105 |
| No. tertiary students | | 5,000 | | 3,500 | 2,000 | 370 | | | 30 | | 400 |
| No. vocational students | | 7,000 | | | | 300 | | | | | 200 |
| Annual graduate manpower needs in industry (No.) | | | 1,300 | | | 24 | | | 10 | | |
| Population (x $10^6$, 1983) | 16 | 1,035 | 750 | 162 | 120 | 15 | 55 | 2.5 | 16 | 19 | 52 |
| Fish consumption per capita (kg/year) | 7.7 | 4.5 | 3.2 | 13.1 | 83 | 43 | 25 | 32 | 14 | 36 | 19 |
| GNP ($, 1983) | 10,800 | 300 | 260 | 560 | 10,000 | 1,860 | 760 | 6,620 | 330 | 6,000 | 820 |
| Fisheries production (x $10^6$ t) | 0.2 | 6.8 | 2.8 | 2.1 | 12.6 | 0.7 | 2.1 | 0.03 | 0.2 | 1.0 | 2.1 |
| No. fishermen, fishfarmers (x $10^3$) | c. 20 | | 600 | 1,100 | 440 | 108 | 710 | 1.5 | | | 83 |

Source: Asian Fisheries Society - Fisheries, Education and Training in Asia Workshop Proceedings, 1988.

In some countries, lack of demand inhibits further development of fisheries education while in others a "Training Plan" would be needed to streamline the whole fisheries education sector and revise curricula.

One feature which is common to several countries in the region is the poorly developed relationship between training institutions and industry in jointly tackling main problems related to the sector, such as knowledge of updated technology, formulation of investment programmes, information on market opportunities, and improvement of packaging methods.

Asia/Pacific probably has more fish industry-related institutes and centres than any other part of the world. Yet, in 1988 the Asian Fisheries Society, following a regional seminar in Manila, concluded that the education and training was weak and irrelevant to the needs of industry.

Fisheries colleges and universities are the traditional sources for supplying graduates to the government and to industry. However, it is a common observation in the Asian region that fisheries graduates have not met the expectations of the industries. It is therefore time to review the issue of matching training programmes to the actual needs of the public and private sectors.

The processing industry, in particular, requires qualified fish processors, plant managers and post-harvest technologists. Several countries are having difficulty gaining access to lucrative shrimp and tuna markets in Japan and the U.S.A. but do not have the skilled processors and quality control personnel to meet the high import standards.

In order to promote the development of value-added fish processing, training institutions should develop appropriate curricula, and research institutes formulate programmes, relevant to the country's requirements, taking into consideration type and quantity of raw material available, level of technology required and manpower availability. Both training and research institutes should be sensitive to the demands of industry and conduct fundamental and applied research to solve current problems in the processing of value-added products.

In many Asian countries, industry has been reluctant to finance R&D programmes due to the lack of solvency of these public institutions. Innovative approaches that would permit better utilization of the staff and facilities of these centres should be found.

Questions

Training at all stages of production of value-added fish products is needed, from fishermen to quality control inspectors. This is a never-ending exercise for developing as well as for developed countries.

Most of fisheries training is being carried out by government agencies with little or no co-operation from industry.

- Should governments and industry associations together promote more innovative training programmes?

- Should international organizations concentrate on training of trainees or

should more appealing techniques, such as audio-visual courses, be made available to governments, industry associations and NGO's?

At the industrial level, industry associations, with the co-operation of equipment suppliers, are conducting practical training courses in some Asian countries. Should this system be expanded by, for example, formulating policies on this matter?

Existing R&D Centres in Asia are important in research and development of high value-added products well adapted to local conditions and in training high level professionals.

- Should seminars among researchers be convened more often to avoid duplication and to increase efficiency of those centres, or would it be more effective to create on-line information networks?

- It has been pointed out that industry is reluctant to use R&D centres to fund research programmes due to the lack of secrecy. Should industry be allowed to utilize staff and facilities of those centres for product development or would it be preferable to create fiscal incentives for well-defined industrial R&D programmes?

- How should industry associations be associated in the selection of R&D programmes?

MARKETING

To date, some countries, i.e. Thailand, export 40% of fish products (as estimated by processors) either processed and packed into consumer packs or made into prepared fish/seafood products for direct institutional/retailer sale in the major world markets.

However, these are exceptions. Most Asian and Pacific fishery exports are confined to supplying raw material for further processing in developed countries. This is largely due to various constraints which make market penetration difficult, particularly by value-added products. Tariff barriers for value-added products are generally kept at relatively high levels but they do not seem to act as a main impediment to developing export market.

Non-tariff barriers imposed by governments also affect imports of fish and fishery products. Labelling and marketing regulations, internal taxes, minimum price system and sanitary regulations are often used as a means of both restricting imports and promoting exports.

In order to overcome non-tariff barriers, negotiations with importer associations backed by strong government support have proved to be useful.

In spite of the above constraints there seems to be further scope for exports of value-added products by Asian countries, particularly because of supply shortages in developed countries. Improvements in the quality of exported products and their marketing techniques would reduce to a decisive degree, the impact of a number of existing barriers.

More difficult to overcome are the commercial constraints, relating to market characteristics, quality and distribution channels. Each country has, in fact, its own market characteristics.

Although there is an increasing demand for value-added fish products in developed countries, it is very difficult for exporters in developing countries to enter these markets with a new product marketed under their own company's brand name. Most failures have been due to overestimation of their own processing capacities as well as of the consumers' and importers' non-acceptance of unknown processed fish products.

In order to ease the penetration of foreign markets, it has been suggested that business be initiated by setting up commercial/industrial agreements such as joint ventures, co-packing, licensing, etc., with well-known importers. It has also been suggested that certificates of quality, or quality labels, granted under strict regulations, could be helpful in giving importers confidence.

Questions

Information on prices and market trends conveyed by specialized international organizations seems adequate but more product-specific research in selected markets is probably needed.

- Should international organizations expand monographic market research such as the "Study of the World Market for Cephalopods" by ITC?[4/]

Assistance to fairs and international exhibitions could promote commercial-industrial agreements such as joint-ventures, co-packing, licensing, etc.

- Should these programmes be expanded?

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4/ International Trade Centre UNCTAD/GATT, Squid, cuttlefish and octopus: a study of the world market for cephalopods, Geneva, 1989. xiii, 199 p.

Globalization of food trade can often present special challenges in foreign governments' acceptance of imported products. While most of these difficulties are often identified as non-tariff barriers, they are more frequently the result of ignorance of foreign trade laws, standards and specifications.

In the United States, government agencies are creating food export service centres run on a commercial basis. These centres offer up-dated information on standards and specifications of foreign markets and can conduct analytical tests that, in some cases, are homologated by importers associations or governments. This is also very useful in resolving trade disputes.

- Should international organizations promote the creation of such regional centres based on existing facilities? A list of fish marketing institutions in the Asia and Pacific region is enclosed as Annex I.

TECHNOLOGY TRANSFER

The traditional channels of industrial technology transfer have expanded in the past few years and evolved to the concept of "technological package" that includes product, equipment and factory management. In today's world the main transfer agents are: local or overseas R&D centres, joint ventures, equipment suppliers, study tours, trade fairs, courses and workshops, professional journals, local or international consulting and engineering firms. Only two of the above agents, namely, R&D centres and equipment suppliers, are true generators of the technologies to be transferred.

Many countries of the Asian region have created technological institutions which are responsible for the formulation, co-ordination and implementation of technology policies (Annex II). It is worth noting that there is great uniformity among countries, not only in the general technology policy objectives pursued, but also in the specific policy instruments and mechanisms adopted by the acquisition of foreign technology, notwithstanding their different sizes, political and economic philosophies and development levels.

However, technology transferred by equipment suppliers is focused on their own equipment, usually from developed countries, and R&D centres tend to underestimate problems in serial production.

In industrialized countries, engineering and consulting firms are becoming the key actors in keeping in touch with R&D centres, equipment suppliers and end-users. Thanks to their global view of the sub-sector they can act as catalysts inducing new product research and equipment and

spreading new technological packages. However, as most of them are from developed countries, they tend to ignore producers and markets from developing countries.

On the other hand, the lack of experience as well as the limited number of new projects can jeopardize any effort to create local engineering/consulting firms.

Questions

- Should international organizations promote the creation of joint ventures in consulting and engineering from developed and developing countries?

- Should these international organizations be more active in spreading more knowledge on relatively simple techniques like IQF?

INTERNATIONAL CO-OPERATION

Many international organizations are involved in promoting research and development and training of technical personnel in the fisheries industry sector.

Infofish, through FAO, started a project in 1987 (TCP/RAS/6653) to improve the participation of developing countries in international trade of value-added seafood products. Three companies from India, Indonesia and Thailand displayed their value-added products at the ANUGA Fair in Cologne and the response was good. The prime objective is to produce a number of high-quality, value-added seafood products at private plants in several developing countries. In the next project, companies from Bangladesh, Sri Lanka and Malaysia will be involved.

The International Development Research Centre (IDRC) of Canada, the Australian International Development Assistance Bureau (AIDAB) and FAO, also support research in value-added fish products in developing countries in Asia, e.g., production of dried fish in the Philippines and Malaysia; fish noodles and shrimp processing. In addition, FAO has organized four training courses in fish canning in Thailand, Indonesia, Malaysia and the Philippines. The Australian Government, through the ASEAN-Australian Economic Co-operation Programme (AAECP) also supports research in fish processing.

A regional organization, the Southeast Asian Fisheries Development Centre (SEAFDEC) has a Marine Fisheries Research Department in Singapore which runs short courses in post-harvest technology, e.g., low-price fish for conversion for human consumption.

All the aforementioned organizations have contributed a great deal to the training of personnel and research and development of value-added products in Asia, but much more should be done.

Project Ideas

1. Raw material supply

One of the main objectives of the Consultation is to find concrete ways to foster co-operation, at the sectoral level, among all counterparts involved in the development of the specific sector under consideration.

Supply of raw material is one of the most important prerequisites for the development of every industrial sector. In this area, therefore, co-operation between resource-rich countries and processors should be fostered.

In the case of the fisheries industry in Asia and the Pacific, there is room for possible South-South co-operation, particularly in the distant-water fisheries industries.

The main distant water fishery in Asia and the Pacific is for tuna. The region produces well over a million tons a year with a landed value of over a billion U.S. dollars. Developing countries with processing facilities for canning tuna include Thailand (the world's largest outside the U.S.A.), the Philippines, South Korea, Indonesia and Fiji. There is potential for South-South co-operation in harvesting and processing with joint ventures between small countries which have resources but no vessels or plants and companies from the region which can supply these facilities.

Papua New Guinea, for example, has large tuna stocks but no deep sea fleets or processing plants. Vessels from the Philippines sometimes fish there under license. Western Samoa is currently negotiating with American Samoa to undertake some of its tuna processing as its labour costs are much lower. Indonesia charters some deep sea vessels to help harvest offshore tuna stocks. Thailand is canning tuna from many parts of the region. Fiji is canning and re-exporting mackerel imported from Chile and California. Much more of this interregional trade and co-operation could be encouraged, specially at discussions during the Consultation.

2. Technology

The dissemination of available technologies could be one of the best ways to foster the development of a given sector provided that the infrastructure and the conditions exist in the recipient country for technology absorption.

Once the two factors mentioned, availability of technology and prerequisites for its absorption, have been ascertained, the link has to be established with all actors concerned. Institutionalized fora in the form of workshops for the dissemination of specific technologies aimed at an industrial sector in particular, could be the basis for first contacts between the purchaser and the supplier, opening the way for business as well as for elaboration of improved guidelines for transfer of technology. The participation of licensors, equipment suppliers and consulting engineering companies is important. Subjects such as process control, quality control and maintenance, trouble shooting and operation should be the main themes discussed at the workshops.

Regular contacts, under UNIDO technical guidance, among the parties concerned would favour the circulation of information as well as the process and evaluation of complaints and new requirements, competitors' products and new patents.

3. Research

In developing countries, awareness of advances in research and development work carried out in other countries, including industrialized countries, is often lacking. As a matter of fact, attendance at international fora is limited, pertinent literature is not regularly received and exchange of visits is not common as it is in developed countries. Even publication of research results in scientific journals is costly for many R&D institutes in developing countries, and therefore, the outcome of research programmes often remains unknown to potential users, namely, industries.

Regional organizations, such as the Asian Fisheries Society, which hold regular conferences to present and disseminate research results, play an important role in this area.

Conferences and seminars, however, should have among their objectives, close involvement of potential users of research results, in particular, industry representatives who would be in a position to provide feedback and impetus for new research, as well as constructive suggestions based on the experience derived from commercial application of research work.

4. Export services

Commercial constraints in exporting, relating to market characteristics, quality and distribution channels, make market penetration, especially by value-added products, difficult.

While most of these difficulties are often described as non-tariff

barriers, they are more frequently the result of ignorance of trade regulations, standards and specifications. In many cases, foreign governments request on-site inspections to ascertain that factories comply with recognized and sound manufacturing practices.

National or regional export service centres linked to existing institutions, could be established with the purpose of collecting and transferring all information concerning standards, specifications, labelling, etc., required by importing countries.

In some cases export service centres could also pre-certify products so that testing upon arrival in the foreign country is not necessary. A number of practical problems relating to additives permitted, product acceptance, and analytical tests could be simplified so that manufacturers and exporters do not run the risk of their products being found unacceptable upon arrival and inspection in the foreign country.

Research and development institutions could be ideal for offering export advice as they usually have laboratories and could easily be equipped for product evaluation and certification.

In some developed countries, including the U.S.A., the centres operate on a fee-for-service basis and have special agreements with a limited number of major importing countries.

The establishment of such centres should be funded by the processing industry itself and supported by international organizations.

ANNEX I

FISH MARKETING INSTITUTIONS IN ASIA AND THE PACIFIC
(Information provided by INFOFISH, June 1991)

INFOFISH (Intergovernmental Organization for Marketing Information and Technical Advisory Services for Fishery Products in the Asia and Pacific Region)
P.O. Box 10899
50728 Kuala Lumpur
Malaysia
Tel: 2914466, 2914614, 2914794 Telex: INFISH MA 31560 Fax: (603) 2916804

SEAFDEC (Southeast Asian Fisheries Development Centre)
Training Department
P.O. Box 13-4, Phrapradaeng, Samutprakarn 10130
Thailand
Tel: (425) 8040

SEAFDEC Liaison Office
Olympia Bldg. 4th Floor, 956 Rama IV Road
Bangkok 10500, Thailand
Tel: 235-2071 Fax: 235-2070 Telex: 82156 COMSERV TH

FFA (South Pacific Forum Fisheries Agency)
P.O. Box 629, Honiara, Solomon Islands
Tel: (677) 21124 Telex: 66336 FORFISH Fax: (677) 23995 Cable: FORFISH

SPC (South Pacific Commission)
B.P. D5
Noumea Cedex, New Caledonia
Tel: 262000 Telex: SOPACOM 3139 NM Fax: (687) 263818 Cable: SOUTHPACOM NOUMEA

FAO/UNDP Regional Fishery Support Programme
UNDP Private Mail Bag
Suva, Fiji
Tel: 300802 Telex: 2512 FJ Fax: (679) 300029 Cable: UNDEVPRO SUVA

Indo-Pacific Fishery Commission
c/o FAO Office for Asia and the Pacific
Maliwan Mansion, Phra Athit Road, Bangkok 10200
Thailand
Tel: 231-7344 Telex: 82815 FOODAG TH Fax: (662) 2800445

ICLARM (International Center for Living Aquatic Resources Management)
MC P.O. Box 1501
Makati, Metro Manila
Philippines
Tel: 818-04-66 Telx: (ETPI) 64794 ICLARM PN Fax: (632) 816 3183
Cable: ICLARM Manila

BOBP (Bay of Bengal Programme)
91, St. Mary's Road
Abniramapuram, Madrass 600 018
India
Tel: 836294 Fax: 044-836102 Telex: 41-8311 BOBP

ANNEX II

FISH TECHNOLOGY RESEARCH INSTITUTIONS IN ASIA AND THE PACIFIC
(Information provided by FAO, June 1991)

Australia

Royal Melbourne Institute of Technology
(RMIT)
GPO Box 2476V
Melbourne, Vic 3001
Australia

Telephone: 345 2822
Cable: MELTECH Melbourne
Telex: AA 36406

Department of Food Science and Technology
The University of New South Wales
P.O. Box 1, Kensington, NSW 2033
Australia

Telephone: (02) 697 4378
Telex: AA 26054
Telefax: (02) 662 1923

International Food Institutes of Queensland
19, Hercules St.
Hamilton, QLD 4007
Australia

Telefax: 617 8681853

Bangladesh

Institute of Food Science and Technology
New Elephant Road
Dhanmondi, Dhaka 5
Bangladesh

Cable: CONSEARCH

India

Central Institute of Fisheries Technology
(CIFT)
Willingdon Island
Matsyapuri PO.
Cochin 682-029
India

Telex: 0885 440
Cable: FISHTECH, Matsyaoudyogiki, Cochin

Central Institute of Fisheries Education
(CIFE)
Varsova
Bombay- 400 61
India

College of Fisheries
University of Agricultural Sciences
P.O. Box 527
Mangalore 575002
Karnataka
India

Cable: Fishcol, Magalore
Telephone: 27823-36

Indonesia

Research Institute of Fish Technology
(RAFT)
Jalan KS. Tubun
P.O. Box 30, Palmerah
Jakarta Pusat
Indonesia

Telephone: 5482634, 5483635
Cable: LITIKAN JAKARTA
Telefax: 548 3635

Centre for Quality Control
JL. Rm Harsono 3
Pasar Minggu
Jakarta 12550
Indonesia

Telephone: 669 5516, 669 5586

Japan

TOKAI Regional Fisheries Research Laboratory
Fisheries Agency
Ministry of Agriculture, Forestry and Fisheries
5-5-1 Kachidoki
Chuo-Ku
Tokyo 104
Japan

Telephone: 531 1221

Malaysia

MARDI
Food Technology Division
P.O. Box 2301
Kuala Lumpur
Malaysia

University Pertanian Malaysia
(University of Agriculture, Malaysia)
43400 Serdang, Selangor
Malaysia

Telex: MA 37454
Cable: UNIPERITAMA, Sungaibesi
Telephone: 355425, 356101

Philippines

Bureau of Fisheries and Aquatic Resources
(BFAR)
P.O. Box 623
Manila
Philippines

Telex: 2566 BFAR

College of Fisheries
University of the Philippines in the Visayas
(UPV)
Iloilo City 5901
Philippines

Telefax: 0063-33-79248

Institute of Fisheries Development and Research
(IFDR)
College of Fisheries
University of the Philippines
Miag-ao, Iloilo 5023
Philippines

Singapore

Southeast Asian Fisheries Development Centre
(SEAFDEC)
Marine Fisheries Research Department
Changi Fisheries Complex
Changi Point
Singapore 1749
Rep. of Singapore

Telex: PPD RS 28851 (SINGAPORE)
Telephone: 545-1592, 1625, 2124
Telefax: 5427606, 5451483

Sri Lanka

Institute of Post Harvest Technology
NARA (National Aquatic Resources Agency)
Crow Island
Mattakkuliya, Colombo 15
Sri Lanka

Telex: 22792 IOMAC CE

Thailand

Fishery Technological Development Division
(FTDD)
Department of Fisheries
Charoenkrung Road, Yannawa
Bangkok 10120
Thailand

Telephone: 211 9645, 211 1261

Institute of Food Research and Product
Development
Kasetsart University
P.O. Box 4-170
Bangkok 10400
Thailand

Telephone: 5790572, 5790592

Prince of Songkhla University
Haad Yai
Songkhla
Thailand

ANNEX III

EXPORTS OF SELECTED FISH AND FISH PRODUCTS FROM OECD AND ASIAN COUNTRIES
(1988)

FISH: FRESH, CHILLED OR FROZEN (SITC 034)

| First three OECD exporters | Tons | Millions US$ |
|---|---|---|
| USA | 692,713 | 2,004 |
| Norway | 445,320 | 938 |
| Canada | 385,051 | 1,127 |
| TOTAL | 1,523,084 | 4,069 |
| **First five Asian exporters*** | | |
| Korea | 324,989 | 844 |
| Thailand | 139,555 | 127 |
| China | 93,176 | 258 |
| Hong Kong | 86,175 | 186 |
| Singapore | 84,575 | 189 |
| TOTAL | 728,470 | 1,604 |

FISH: DRIED, SALTED OR SMOKED (SITC 035)

| First three OECD exporters | | |
|---|---|---|
| Iceland | 94,334 | 264 |
| Canada | 84,958 | 328 |
| Norway | 84,290 | 341 |
| TOTAL | 263,582 | 933 |
| **First five Asian exporters*** | | |
| Pakistan | 17,887 | 17 |
| Thailand | 13,938 | 17 |
| Indonesia | 3,932 | 7 |
| Hong Kong | 3,728 | 19 |
| Singapore | 2,259 | 24 |
| TOTAL | 41,744 | 84 |

* Excluding Japan which is an OECD member state

CRUSTACEANS AND MOLLUSCS: FRESH, FROZEN, DRIED, SALTED (SITC 036)

| First three OECD exporters | Tons | Millions US$ |
|---|---|---|
| USA | 70,847 | 458 |
| Canada | 64,568 | 490 |
| Denmark | 60,474 | 292 |
| TOTAL | 195,889 | 1,240 |
| **First five Asian exporters*** | | |
| China | 195,486 | 983 |
| Thailand | 122,572 | 630 |
| India | 84,290 | 402 |
| Hong Kong | 82,996 | 462 |
| Indonesia | 73,695 | 630 |
| TOTAL | 559,039 | 3,107 |

FISH PRODUCTS AND PREPARATIONS WHETHER OR NOT IN AIRTIGHT CONTAINERS (SITC 037.1)

| First three OECD exporters | | |
|---|---|---|
| USA | 194,515 | 510 |
| Japan | 88,366 | 255 |
| Denmark | 47,508 | 179 |
| TOTAL | 330,389 | 944 |
| **First five Asian exporters*** | | |
| Thailand | 256,506 | 593 |
| Korea | 55,068 | 175 |
| Philippines | 37,879 | 93 |
| Indonesia | 8,617 | 21 |
| Malaysia | 5,864 | 18 |
| TOTAL | 363,934 | 900 |

* Excluding Japan which is an OECD member state

CRUSTACEANS AND MOLLUSC PREPARATIONS WHETHER OR NOT IN AIRTIGHT CONTAINERS (SITC 037.2)

| First three OECD exporters | Tons | Millions US$ |
|---|---|---|
| Denmark | 24,846 | 186 |
| Netherlands | 19,629 | 102 |
| Canada | 9,849 | 110 |
| TOTAL | 54,324 | 398 |
| **First five Asian exporters*** | | |
| Thailand | 57,462 | 233 |
| Korea | 30,847 | 190 |
| China | 14,512 | 50 |
| Malaysia | 13,235 | 54 |
| Indonesia | 3,308 | 6 |
| TOTAL | 119,364 | 533 |

* Excluding Japan which is an OECD member state

Source: FAO Fisheries Yearbook Statistics