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Promotion of Distant-Water Fishing Industry in Taiwan

Dah-Wen Shieh
University of Rhode Island

PROMOTION OF DISTANT-WATER FISHING INDUSTRY IN TAIWAN

BY

DAH-WEN SHIEH

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I. Introduction

In 1980, the total fisheries production of the Republic of China (Taiwan) was 936,183 MT of which about 40 percent came from distant-water fishing. Trawling and tuna longlining are the two major fishing industries in Taiwan, although squid fishing is becoming important in recent years.

The growth of distant-water fishing industry in Taiwan has been steady during the period from 1965 to 1973. However, since 1973, the slow expansion of distant-water fisheries has been reflected in both the production side and the decreasing catch per unit effort. The increasing operation costs and the shrinking fishing grounds are mainly attributable to the limitation of distant-water fishing industry. The small scale of fishing companies with small-sized vessels also resulted in the inefficient operation in this highly competitive business.

Since both the trawling and tuna fisheries are affected by the adoption of 200-mile limits, cooperative arrangement with other nations is the only way to ensure Taiwan's continuous utilization of foreign fishery resources. The government has been actively seeking licensing of joint venture agreements with other coastal states for the past few years. Taiwan fishermen are continuing to fish within the 200-mile economic zone of more than ten coastal states under various arrangements. The restrictions of 200-mile limits have also led Taiwan's fishing industry to step up

operations in previously unfished areas and to intensify their reach for new species.

For Taiwan, distant-water fishing is not only a means of meeting general protein requirements for its population but also an important source of foreign exchange. As such, the government has planned to double its annual distnat-water fish catch to 700,000 MT in six years through an aggressive promotion program.

II. Fisheries in Taiwan

Taiwan is an island located between $21^{o}45'$-$25^{o}38'$N and 120^{o}-122^{o}E, with the Tropic of Cancer crossing the middle of the island. The area of Taiwan is 36,000 sq km, with a population about 17,000,000 in 1980.

In order to feed this large island population, the most effective means of utilizing the given natural conditions is by cultivation of a high yielding rice crops and the exploitation of marine resources. The land-based agricultural production will be limited by the competitions of other usus on the island. The development of fisheries is a potential bio-industry to ensure the stable and ample supply of food in the future. Moreover, the fishery will play a useful dual role in Taiwan's economy, not only providing a fairly high degree of self-sufficiency in fish supplies, but also making an increasing valuable contribution to the country's export trade. For example, Taiwan exports about 220,000 MT

of fish products with a value of US$680,000,000 in 1979.

Taiwan's total fisheries production in 1980 was 936,183 MT, roughly doubled the production of 1967 (Fig. 1). Taiwan fishery is characterized by the diversified fish species as well as the fishing operations due to the coastal environments and the domestic demand.

For statistical purposes, Taiwan fisheries are classified by the type of fishing craft, gear used and the relative distance of fishing areas, into four categories, namely, distant-water fisheries, offshore fisheries, coastal fisheries and aquaculture. The production of distant-water and offshore fisheries is the major fish landing both in volume and value. However, aquaculture is becoming important due to its high-priced production (Table 1). It is also evident from Fig. 1, that over the past two decades coastal fisheries production has been minor and has shown no change at all, whereas big gains have been scored by offshore and distant-water fisheries.

Taiwan's most spectacular fishery development has been in the distant-water fisheries, which accounts for about 40 percent of its total annual catch in 1980. The expansion of the industry has already made Taiwan the owners of the third largest Asian fishery fleet behind Japan and South Korea. At the end of 1979, Taiwan's fishing industry had 1614 fishing boats of more than 50 tons, with a total tonnage of 287,262 tons (Table 2).

III. The Development of Distant-Water Fisheries in Taiwan

A. Tuna Fisheries

The operation of tuna long-line fishing in Taiwan can be traced back early as 1913 when it was introduced from Japan. The steady growth of the fishery was evidenced by a fleet of 227 tuna boats with a production of 7,000 MT in 1953. The fishing areas were expanded to the South China Sea and waters of North Kalimantan, Sulu Sea and Sulawesi Sea during that period. In 1940, the tuna fleets expanded to 400 boats with a peak production of 14,500 MT representing 13.3 percent of the total fish production of Taiwan. The development of tuna fishery was then totally ruined due to the World War II. However, the recovery was rapid and in 1953, the production already exceeded that of pre-war level.

The operation of four 350-ton government-owned tuna vessels in the India Ocean in 1954 set forward the new direction for further development of distant-water tuna fishing industry in Taiwan.

A rpaid growth of the tuna fishing industry during the 1960s was made possible by the encouragement and support of the government, together with heavy investment by private concerns under the loan provided through US aids, International Bank for Reconstruction and Development (IBRD) and the Asian Development Bank (ASDB). In 1973, there were 649 distant-water tuna longliners operating on the oceans of the world.

Initially, the fishing grounds for Taiwan's tuna long-liners were restricted to the South China Sea and Sulu Sea due to the limitation of craft size. As tuna fishing vessels became larger and more modernized, the fishing grounds were gradually extended to the India Ocean, Atlantic Ocean and the South Pacific Ocean. In order to lower the costs and facilitate the operation of distant-water tuna fishing, the government under the cooperation of coastal states, has designated 51 foreign fishing bases around the world for the supply and repair of fishing vessels as well as landing of the catch (Fig. 2).

About 60 percent of Taiwan's distant-fishing fleets is engaged in tuna fishing. Taiwan is currently the fourth largest tuna exporting country in the world behind Japan, the US and Spain, with 90 percent of the catch going to markets in the US, Japan and recently, European countries. The total value of Taiwan's tuna exports stood at US$120,000,000 in 1979.

B. Trawl Fisheries

The development of trawl fishery in Taiwan begen in 1925. However, the early stage of trawling was mainly operated with 50-80 ton class vessels, and the fishing areas were only restricted to East China Sea, Yellow Sea and South China Sea. In 1940, the number of trawlers reached 140 vessels with a catch of 42,219 MT which represented 39

percent of the total catch of Taiwan.

Being affected by the second World War and the government-operation policy, the development of trawl fishery has been slowed down. Until 1947, the policy that the operation of distant-water fishing opened to the private sector gave a strong impetus to the industry. In addition, the success of experimental fishing in the fishing grounds off Viet-nam and Kalimantan conducted by the research vessel of the Taiwan Fisheries Research Institute has opened up new frontiers for the industry. A 1900 ton class stern trawler "Golden Dragon" which made her first trial cruise to the waters off West Africa in 1968 was a milestone in the development of distant-water trawling. Begining in 1970, a foreign fishing base in Dakar of Senegal in West Africa was used by Taiwan distant-water fishing fleets to facilitate fishing operation in the Atlantic Ocean.

The expansion of Taiwan trawl fisheries was enhanced by the success of exploratory fishing made at waters off north Australia in 1971. These waters, including the Northwest Shelf, Timor Sea, Arafura Sea and Gulf of Carpentalia, became the most important fishing grounds for Taiwan Trawlers. However, the further expansion of distant-water trawling to the Bering Sea and Gulf of Alaska was restricted by the establishment of 200-mile zones by the US and USSR. Because trawl fisheries are mostly operated within the 200-mile limits of coastal states, their development is dependent

upon close international cooperation with coastal states. At present, most of Taiwan trawlers are fishing at waters off north Australia, Indonesia, India, West Africa and US under the arrangements of fishery agreements or joint ventures (Fig. 3).

C. Squid Fisheries

Squid is a sea food which is in widespread demand in Taiwan. The source has been imported mainly from South Korea, and the domestic catch is rather small.

There are many countries in the world where squid is not consumed, and the off-shore waters of these countries represent a considerable resource which has not been exploited.

The fishing grounds for Taiwan distant-water squid fishing fleets can be divided into two major areas according to the seasons. They fish in the Northwest Pacific from July to November and move to waters off New Zealand from December to April of the next year (Fig. 4).

The history of distant-water squid fishing in Taiwan is less than ten years. The fishery was undertaken in Taiwan for the first time in 1973 when a squid fishing boat made a trial cruise to the waters off New Zealand. Taiwan squid fishing boats began to fish in Northwest Pacific area from 1977 when they lost the north fishing ground of the Sea of Japan due to the 200-mile claims made by Soviet Union

and Japan.

During the 1979-1980 period, there were 24 squid fishing boats fishing off New Zealand with a total catch of 3,479 MT, while in the Northwest Pacific, there were 23 boats with a total catch of 3,384 MT. The latest record of squid catch indicated that in the New Zealand waters the 31 Taiwanese vessels increased their catch to 8,000 MT for the 1980-1981 period; this being more than doubled the total catch of the previous year in that area.

IV. Impacts of 200-mile Limits on Taiwan's Distant-Water Fisheries

A. Present Status

The high sea is shrinking due to the establishment of economic zone to 200 miles by most coastal states. Moreover, due to the uneven distribution of fishery resources in the ocean, all of the demersal species of the world and about 60 percent of the world catch of highly migratory species are affected by this new situation.[1]

It has been estimated that about 94 percent of the current world catch is taken from within 200 miles of the land.[2] There can be little doubt that the adoption of a 200-mile Exclusive Economic Zone (EEZ) on a global basis will have a tremendous impact on the distant-water fishing countries.

The major fishing grounds for Taiwan trawlers are

located in the waters of South China Sea, India Ocean, North Pacific Ocean and off North Australia and Weat Africa (Fig. 3). Since almost all of the demersal species catch comes from within the 200 miles of the land, the Taiwanese distant-water trawlers have been faced with ever-increasing restrictions on the fishing grounds open to them. In order to get access to the fishing grounds which are now under the national jurisdiction of coastal states, Taiwan has been actively seeking cooperation with other coastal states through the arrangements of bilateral agreements or joint ventures.

The tuna fisheries of the world can be divided into two major groups: the longline fisheries, primarily of Japan, Republic of China (Taiwan) and Republic of Korea, and the surface fisheries, in which the US and Japan are major participants.[3] The surface fisheries use live bait and purse seines. The longline tuna fishing is usually operated in rather offshore waters or on the high seas. On the other hand, the surface fisheries are mostly operated in the coastal waters.

Since Taiwan tuna fleets are all longline fisheries, their operations are less affected by the establishment of 200-mile EEZ of coastal states than that of trawl fisheries. However, with the expansion of fishing grounds to the areas of the South Pacific and South Africa, and the proposed establishment of tuna purse seining, further development of

Taiwan tuna fisheries will still heavily rely on the cooperative arrangements with the coastal states.

For the past few years, the fishing grounds for Taiwan distant-water squid fishing were in the Sea of Japan, Northwest Pacific area and waters of New Zwaland. Since 1977, Taiwanese squid fishing boats lost the north fishing ground of the Sea of Japan due to the 200-mile claims made by the Soviet Union and Japan.

The total production of squid from distant-water fishing was 9,707 MT in 1980. The growth of the squid fishing industry is most prominent among all sectors of diatant-water fisheries, being 67.3 percent more than that of 1979. It is estimated that the catch of squid in 1981 may reach 15,000 MT and the projected production of 1982 is expected to be 20,000 MT which will meet the maximum local demand in Taiwan.

The summer fishing grounds of squid are located in the high seas of the Northwest Pacific Ocean and are not affected by the 200-mile new regime. However, the winter fishing grounds are mainly in the 200-mile waters of New Zealand and being regulated in accordance with the agreements between Taiwan and New Zealand. In order to compansate for the possible loss of catch from the New Zwaland waters, the exploitation of squid resources from winter fishing grounds on the high seas of South Pacific and India Ocean is considered necessary to futher promote squid production.

B. International Cooperations

The development of the Law of the Sea reveals a strong shift in favor of an extension of coastal state fishing rights by establishment of a 200-mile EEZ or fishing zone. The rights of a coastal state in the EEZ are to increase their control over the harvesting of living resources within their respective EEZ.[4] However, the coastal states also have the obligations to promote resources utilization from these areas. If the coastal states do not have the capacity to harvest or will not harvest the entire allowable catch, they shall give other states access to the surplus of the allowable catch.[5]

Some developed countries, such as the United States, Canada, Australia and New Zealand are temporarily unable to utilize an important part of their fishery resources due to inefficiency of harvesting and processing related to the species of low market value. In this group of fishery resources, we can mention Pacific hake, Alaska pollock, Atka mackerel, dogfish, silver hake, capeline, squids and others.[6]

In the case of New Zealand, an annual catch of 405,000 MT of finfish and squid is currently estimated to be the safe biological yield in New Zealand territorial sea and EEZ waters.[7] The New Zealand domestic industry is estimated to have the capacity to harvest 100,000 MT of this with the remainder being apportioned amongest joint fishing ventures and any balance to foreign nations.

The Fishery Conservation and Management Act of 1976 (FCMA) extends United States authority to regulate fishing in a fishery conservation zone (FCZ), from the outer boundary of US territorial waters to a distance of 200 nautical miles from the US coast.

Taiwan has been fishing in the eastern Bering Sea since late 1974, but involving only few trawlers. However, the further development of the North Pacific trawl fisheries is restricted by the imposition of 200-mile zone by the US. A governing international fishery agreement (GIFA) between the government of ROC and US was concluded for Taiwanese trawlers to fish in the FCZ of US for a period of five years begining from 1977. The catch quota for Taiwan trawlers was 6,621 MT in 1980 and increased to 16,629 MT in 1981.

Another fishery agreement with the Republic of South Africa (RSA) for a period of ten years (from 1978 to 1988) was also concluded for Taiwan tuna fleets to fish in the 200-mile EEZ of RSA.

Fisheries operations were also conducted under private-sector fisheries agreements with Australia, New Zealand, Indonesia, Sri Lanka, Monace, Territories of Micronesia, Palau and Tonga.

Seperate agreements covering the operation of Taiwanese trawlers and gill-netters in waters off north and northwest Australia were signed with the Kalis Kaohsiung Fishing Company Pty Ltd as agent for the Kaohsiung Fishing Boat Commercial

Guild in 1980. These agreements permit a maximum of 60 pairs of trawlers to take a quota of 27,500 MT of demersal fin fish and sharks for an access fee of A$ 825,000 and 30 gill-netters to take a quota of 7,000 MT of pelagic fin fish and sharks for an access fee of A$ 159,000. Both agreements are valid for one year and may be renegotiated after this time. These allocations represent a reduction of about a half of the total catch taken by Taiwanese fishermen off north and northwest Australia in recent years. Before the Kalis-Kaohsiung Company was formed, most seasons saw more than 200 Taiwanese boats operating off Australia's northern coasts taking up to 120,000 MT of fish back to Taiwan annually. However, the joint venture has meant that the Taiwanese fleet is able to continue fishing for species which are generally unacceptable on Australian markets although regarded as valuable in Taiwan.

A private enterprise in Venezuela has also proposed a joint venture with Taiwan based on tuna in the Venezuelan 200-mile zone. All details have not been finalized but the project will probably include six Taiwanese ships working in the area and paying about 125 US dollars for each ton of tuna caught. The agreement will be from three to five years. The Taiwanese vessels will use Venezuelan ports and they will be allowed to buy their fuel at Venezuela price.

The fisheries resources of the South Pacific are dominated by highly migratory species, particularly tunas.

The establishment of 200-mile EEZs in the central and western tropical Pacific will bring more than 20 million sq km of this area under the control of the island states.[8]

With special concern of the highly migratory species, the Article 64 of the UNCLOS Informal Composite Negotiating Text (RICNT, 1980) stated clearly that "the coastal states and other states whose nationals fish in the region for the highly migratory species, shall co-operate directly or through appropriate international organizations with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone." However, at the 1976 meeting of the South Pacific Forum in Suva, Fiji (South Pacific Forum, 1976), the member states decided in priciple to establish a South Pacific fisheries agency to promote the conservation and rational utilization of the fish stocks of the region.[9] It is reasonable to assume that the resources adjacent to coastal states will be caught by those states themselves or by making arrangements for foreign flag vessels to do so. At the present time the developing countries of the central and western tropical Pacific have neither the scientific information necessary to manage these resources nor the vessels and expertise necessary to exploit them.

In order to maintain the current catch level of distant-water fisheries, ROC government has decided to re-deploy her

fishing fleets to the South Pacific waters. In addition to the fishery agreements entered with Trust Territories of Micronesia, Palau and Tonga, the Taiwanese fishing interests have actively negotiated with the other South Pacific island states such as Cook Islands, American Samoa, Kiribati, Marshall Islands, Tuvaru, Western Samoa, Nauru and Vanutu for making access arrangement to the fishery resources in that area. The progress of these negotiations is most promising and seperate agreements are expected to be concluded in the near future.

C. Exploration of High Sea Fishery Resources

Facing the impact of the new ocean regime on traditional fisheries, countries that rely heavily on distant-water fishing will need to look elsewhere. One direction for future development of distant-water fisheries is to explore the fishery resources which occurred beyond coastal states' 200-mile zone and have not been utilized traditionally. For example, the oceanic pelagic fishing resources are distributed widely over the high seas and, apart from the larger tunas, only a small part of them are being fully utilized. Under-utilized stocks in this group include flying fishes, sauries, rainbow runners, dolphin fishes, and the small tunas.

Prospects for greater utilization of sauries in the future are good. The Pacific saury has long been utilized in the Northwest Pacific. The biomass of Atlantic saury

seems to be much larger than that of any of the other species and the average size of the fish is large enough for commercial utilization. Tentative estimates of the possible catch in the southeastern Atlantic Ocean are several hundred thousand tons, and it is likely that several times this amount could be caught if the entire stock of this species were effectively exploited.[10]

Taiwan has been much interested in the development of saury fishery for the past few years. The experimental fishing for this resource has been undertaken by Taiwan Fisheries Research Institute on the open waters off Japan.

There also has been some potential mentioned for developing fisheries on mesopelagic fish - for example, lantern fish and light fish. Lantern fish include many genera and perhaps 200 species of mesopelagic forms occurring at depths of 200-1000 m.[11] The deep swimming habits and small size of lantern fish are discouraging factors for commercial utilization. If harvesting were feasible, several hundred thousand tons of lantern fish could probably be caught from each of the northwestern, southwestern and southeastern parts of the North Atlantic Ocean, the northeastern, eastern central, and south eastern parts of the Pacific Ocean.[12] It is also estimated that 750,000 MT of light fish could be harvested yearly.[13]

Squid fisheries may be the most promising resources to be developed. Squid occur in all oceans, and are generally

believed to form a major unexploited resources. Present exploitation is limited to a few of the coastal and offshore stocks, particularly off Japan. There are very great regional differences in the degree of exploitation. World demand of squids is very uneven, being concentrated in Japan and southern Europe, though the demand in Southeast Asia is steadily growing.[14] The total magnitude of potential catch of squid resources is roughly estimated at 10 - 100 million tons.[15]

Antartic krill resources is another example where larger annual yield could be harvested in the future (Fig. 5). The Soviets and the Japanese started experimental krill fishing in 1961 - 1962. In recent years, several other countries have been pursuing this type of fishing, notably Poland, West Germany, South Korea and the Republic of China.

Taiwan has shown great interests in the exploitation of Antarctic krill for the past few years. The first exploratory expendition of the Taiwan Fisheries Research Institute operated out of South Africa in 1977. The research vessel Hai Kung brought back 136 MT of krill. In 1978, the Hai Kung returned from another 45-day experimental trip with 700 MT of krill.

Because of the long distances from home port and the short harvesting season, the cost of Antarctic krill exploitation is comparatively high. Although adequate fishing methods leading to higher catch rates were identified and

work on product development has progressed recently, the promotion of local consumption and better utilization of the krill are still the two major factors to determine the feasibility of commercial operation in the future.

V. Prospects of Distant-Water Fishing Industry in Taiwan

The development of distant-water fishing industry involves the complexity of social-economical considerations, such as the capital investment, technological advancement and effective management. The implementation of 200-mile EEZ of coastal states coupled with the political compromise futher complicated the situation. Today, the coastal states see the development of distant-water fisheries not only a means to obtain food from the sea but also an expansion of maritime power in the world arena.

In the face of the changing world fisheries due to the shrinking high seas and raising fuel cost, the further promotion of distant-water fisheries in Taiwan, therefore, relies on the government's strong support and timely responses in policy making.

In order to ensure the stable growth of distant-water fisheries, ROC government has set up a long-term plan for promotion of the industry. An aggressive modernization program financed and spurred by the government had included modernization of both fishing boats and equipment, construction of new kinds of fishing vessels designed to increase the

efficiency of fishing operations. The government will provide loans to build around 160 distant-water fishing fleets of more than 300 tons each over the next six years. The government money will cover about 80 percent of the construction cost. If final results meet expectations, the vessels will not only double the annual capacity of Taiwan's distant-water fishing catch to over 700,000 MT but will also help to develop Taiwan's ship building, machinery manufacturing and food processing.

In addition to the strong support from the government, the Taiwan fishing industry is also adjusting to the new ocean regime in various way:

(1) By searching for new fishing grounds in slightly fished coastal areas and on the high seas beyond national jurisdiction. Coastal areas marked for increased fishing for Taiwan trawlers are the waters off Australia, West Africa, and eastern Bering Sea. Although the fishing agreements with South Africa and the US have been concluded, the allocated quota for Taiwan trawlers are still far from demand. It is also generally concluded that the skipjack tuna resources within the area of central and western Pacific Ocean hold the greatest potential for increased yield in Taiwan tuna industry.

(2) By considering new species. Antarctic krill is looked upon as the most promising. The squid resources beyond the 200-mile limits of Japan and New Zealand and the

worldwide saury resources have held great potential for further utilization. The exploitation of deep-sea demersal species and seamount fishery resources will also become commercially feasible if the fishing technology is developed.

(3) By improving harvesting, processing and storage technology. Particular interests for Taiwan fishing industry will be concentrated in the development of more efficient harvesting in the deeper waters outside natural resources zone. Researches and improvements in vessel design, electronic gear, and net design and handling are ongoing. A large part of the catch is simply lost between harvest and use through inefficiency. The improvements in processing and storage will greatly reduce the loss.

(4) By upgrading the distant-water fishing to an effective and modern industry. The distant-water fishing industry is a capital-intensive and technology-oriented industry. The establishment of a modern distant-water fishing industry will rely on the well-trained personnel at all levels, adequate infrastructure and marketing and distribution systems as well as the effective management. The structural change of fishing company to a large scaled industry is an important step to promote the distant-water fishing industry in Taiwan.

These adjustments in fishing patterns and practices should lessen the impact of the world wide extended fisheries

jurisdiction on the further development of Taiwan's distant-water fishing industry to certain extent.

VI. Conclusions

For the past ten years, all parts of the world distant-water fisheries accounted for a significant part of the catch totalling some 12 percent by weight.[16] To some countries, such as USSR and Ploand, the distant-water fisheries are even of greater importance as they provide half or more of the total catch.[17] The Republic of China, as a growing distant-water fishing country, has about 40 percent of its total annual catch coming from the distant waters. Clearly, without distant-water fisheries, Taiwan would suffer a serious reduction in the supply of fish.

In comparison with the local fleets, the distant-water fleets incur higher costs involved in maintaining ships and crews at sea a long way from the home base. Except for stocks found only on the high seas, the distant fishing would gradually decline for economic reasons, being more expensive than shore-based operations. However, the great permanent advantage of distant-water fleets is their flexibility. Distant-water fleets can easily switch from stock to stock of the same or different species to concentrate where conditions are particularly favorable. With proper management, distant-water fishing is at present the most effective way of harvesting many of the world's fish stocks,

and without it there would be a big drop in the total world catch.

An important effect of 200-mile EEZ is that many of the most important areas of fishery production, once subject to the regimes of the high seas, will now to a considerable degree come under coastal state control. To Taiwan, the continuing access to the fishery resources in the EEZ of other coastal states has become a crucial issue to maintain its fishing industry. Joint exploitation of the fisheries recources in the EEZ is today considered as at least a partial solution to neutralization of harvesting limitations imposed on fishing states in traditionally exploited fishing grounds. Cooperative arrangements are expected to provide an open access to the fishery resources within the 200-mile EEZ with the opportunity for further utilization of their established large and usually over-capitalized distant-water fishing potential. However, any cooperative arrangements with coastal states are considered to be only temporary solutiond, since coastal stated eventually will develop their own fishing capacity. The distant-water fishing states must, at the same time, look for alternative open ocean areas where new fisheries can be developed.

The general trend of the development of fisheries in the future, no matter whether their operations are under national jurisdiction of the coastal states or on the high seas, will be under the considerations of rational and better

utilization of the resources. The international negotiations on fisheries cooperation will be based on the scientific research of fish stocks. It is generally agreed that the improvements on the data collection of catch statistics and the study of fishery biology could be of great help in promoting Taiwan's distant-water fishing industry.

Moreover, Suda (1973) estimated that the possible increases in world catch from nonconventional species will be more than 40 million tons.[18] How to effectively exploit these nonconventional resources will be the major efforts to be made by the leading distant-water fishing countries. The new international ocean regimes will certainly give an impetus to the further promotion of Taiwan's fishing industry.

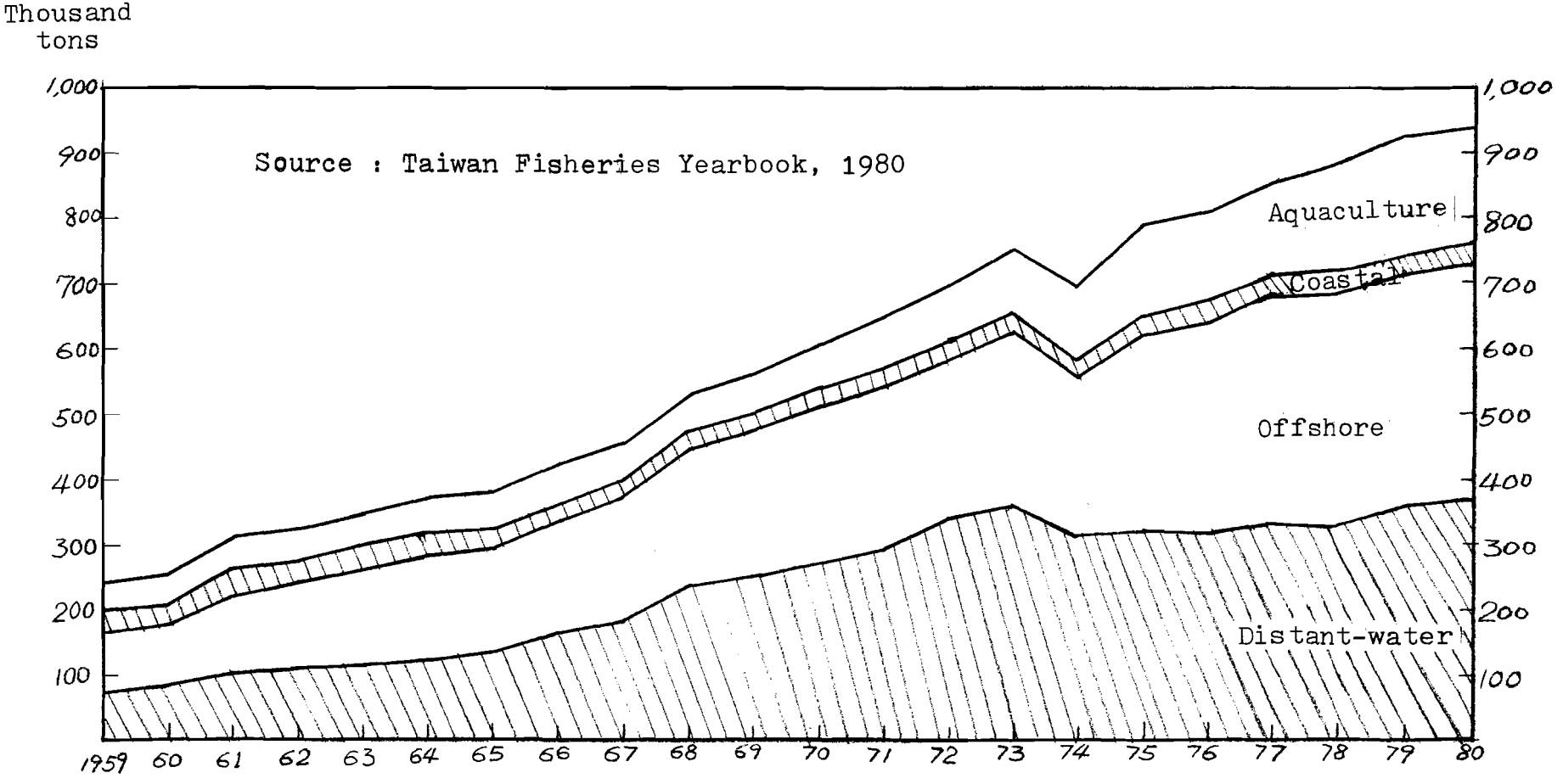
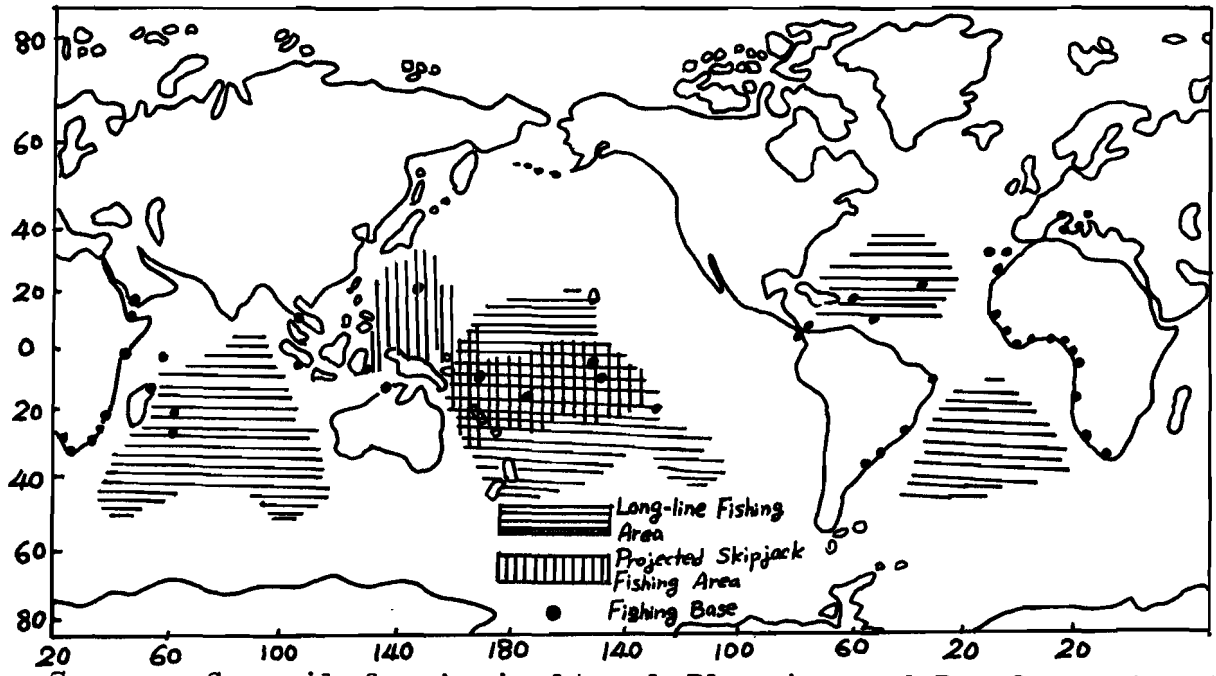
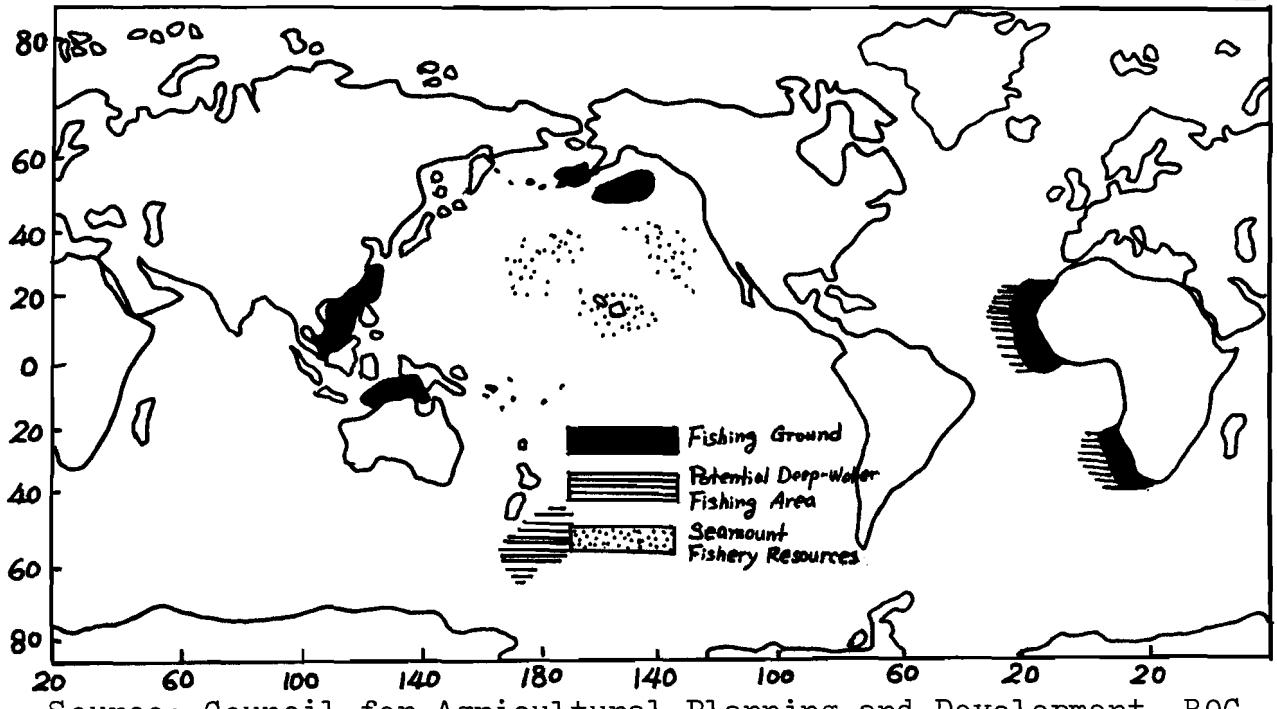


Fig. 1 Taiwan Fishery Production Classified by Category of Fisheries



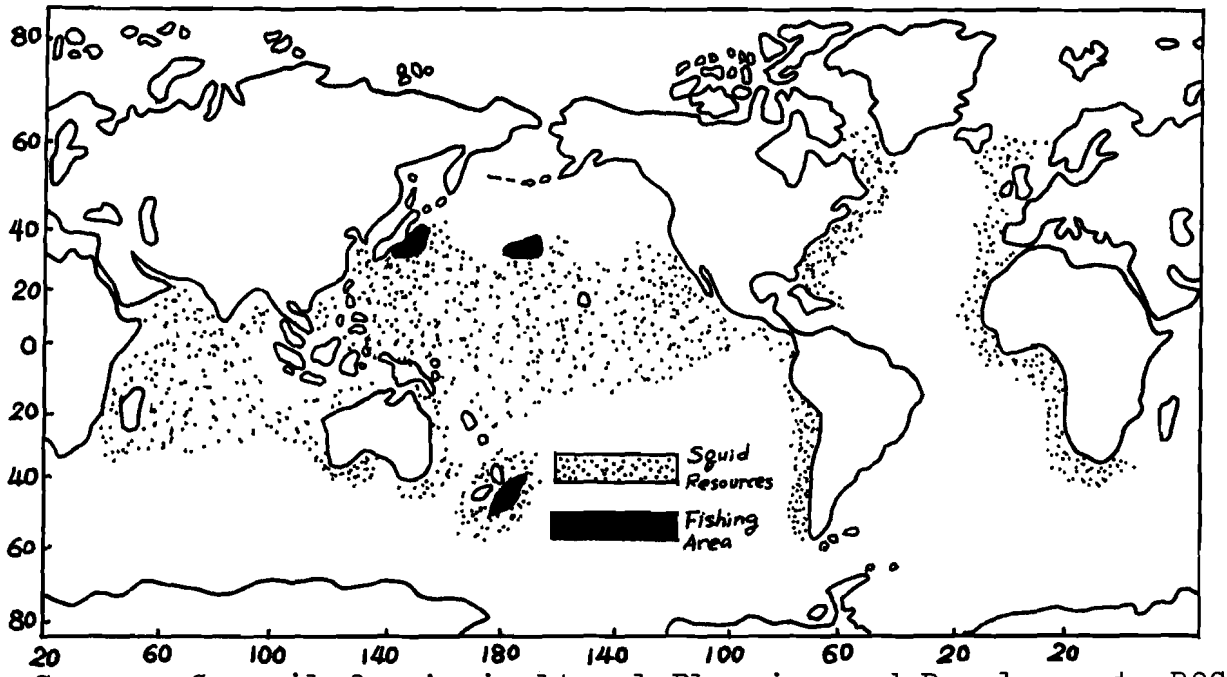
Source: Council for Agricultural Planning and Development, ROC

Fig. 2 Fishing Grounds and Foreign Bases for Tuna Fisheries



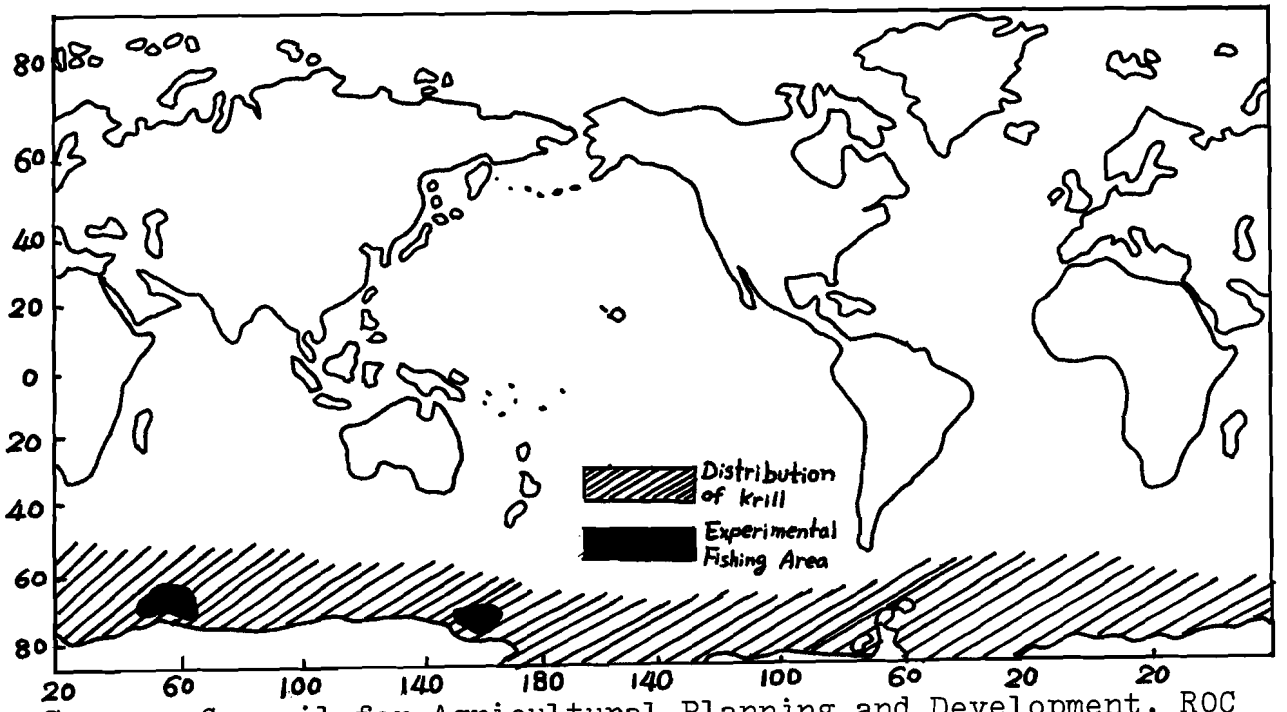
Source: Council for Agricultural Planning and Development, ROC

Fig. 3 Fishing Grounds for Trawl Fisheries



Source: Council for Agricultural Planning and Development, ROC

Fig. 4 Distribution of Squid Resources and Fishing Areas



Source: Council for Agricultural Planning and Development, ROC

Fig.5 Distribution of Antarctic Krill and Experimental Fishing Areas

	MT	%	US$1,000	%
Distant -Water	362,268	39.0	303,951	28.1
Offshore	350,801	37.8	336,870	31.1
Coastal	32,433	3.3	32,600	3.0
Aquaculture	183,674	19.7	409,129	37.8
Total	929,176	100	1,082,500	100

Table 1 Fisheries Production and Value in Taiwan, 1979

Source : Taiwan Fisheries Yearbook, 1980

Year	Number of Vessels	Vessel Tonnage	Average Tonnage Per Vessel	Catch	Average Catch Per Vessel-ton
1970	926	152,450	165	277,955 MT	1.82 MT
1971	947	161,840	171	293,780 MT	1.82 MT
1972	1068	189,135	177	345,036 MT	1.82 MT
1973	1293	234,843	182	362,385 MT	1.54 MT
1974	1673	307,114	184	316,748 MT	1.03 MT
1975	1622	303,754	187	326,707 MT	1.08 MT
1976	1467	278,753	190	325,327 MT	1.17 MT
1977	n.a.	n.a.		339,411 MT	
1978	1524	273,377	179	335,142 MT	1.23 MT
1979	1614	287,262	178	362,268 MT	1.26 MT

Table 2 Distant-Water Fishing Fleet and Catch

Source : Taiwan Fisheries Yearbook, 1980

Notes

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4. UNCLOS, Revised Informal Composite Negotiating Text (RICNT,1980) Article 56

5. Ibid. Article 57

6. Kaczynski, Wlodzimierz 1979. "Joint Ventures in Fisheries between Distant-Water and Developed Coastal Nations : An Economic View" Ocean Management Vol.5 pp.43

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8. Kearney, R.E. 1978. "The Law of the Sea and Regional Fisheries Policy" Ocean Development and International Law J. Vol.5, No.2&3 pp.249

9. Ibid. pp.251

10. Suda, A. 1973. "Development of Fisheries for Nonconventional Species" J. Fish. Res. Board Can. Vol.30 pp.2134

11. Ibid. pp.2142

12. Ibid. pp.2143

13. Ibid. pp.2147

14. See World Fishing January 1978. pp. 57-58

15. Gulland, J.A. 1971. "The Fish Resources of the Ocean" Fishing News (Books) Ltd. pp. 177

16. Gulland, J.A. 1973. "Distant-Water Fisheries and their Relation to Development and Management" J. Fish. Res. Board Can. Vol.30 pp. 2458

17. The distant-water fish catch of USSR represented 48 percent of total catch in 1970, while the distant-water fish catch of Poland represented 55 percent of total catch in 1979.

18. Suda. Supra note 10. pp. 2121

The data and statistics used in this paper which are not specifically cited are taken from the following publications :

1. Taiwan Fisheries Yearbook, May 1980

2. China Fisheries Monthly

3. China Fisheries News