5-1988

Problems and Opportunities for the Republic of China in Regard to Distant Water Tuna Fisheries

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PROBLEMS AND OPPORTUNITIES FOR THE REPUBLIC OF CHINA IN REGARD TO DISTANT WATER TUNA FISHERIES

BY

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A PAPER SUBMITTED IN PARTIAL

FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF MARINE AFFAIRS

DEPARTMENT OF MARINE AFFAIRS

UNIVERSITY OF RHODE ISLAND

KINGSTON, RHODE ISLAND

MAY 1988

MASTER OF MARINE AFFAIRS

MAJOR PAPER OF

CHIH-I SHA

APPROVER: _____

MAJOR PROFESSOR: DR. LAWRENCE JUDA

UNIVERSITY OF RHODE ISLAND

1988

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I. INTRODUCTION

The extension of fishery jurisdiction out to 200 miles from the baselines used to measure the territorial sea by most of the coastal states was the dominant event in global fisheries during the decade of the 1970s. The extensions changed the open-access regime and provided the coastal states with the opportunity to control fishing and actually manage the stocks of fish in their newly claimed fishery zones. In principle, under extended jurisdiction, the coastal states have the authority to eliminate economic waste and to reduce excessive fishing pressure; on the other hand, the distant water fishing states will have to curtail their fishing activities from the traditional fishing grounds off the coastal states.[1] The Republic of China (ROC) is a typical distant water fishing state, and is seriously impacted by the new regime of fisheries jurisdiction.

Comparing her two major distant water fisheries, trawling and tuna longlining fisheries, the ROC recognized that her trawling fisheries would be affected much more seriously than her tuna longlining fisheries, because almost all of demersal fish were caught within 200 mile coastal zones. Large quantities of tuna, however, could be taken on high seas beyond the limits of coastal state jurisdiction. In order to maintain her fish production and lessen the impact on her marine fisheries from fishing grounds increasingly closed to her fishing vessels, the ROC government changed her fisheries policies to encourage aquaculture, and to continually forbid any increase in the tonnages of tuna longlining boats. This program was enacted in 1975

when the worldwide energy crisis caused the ROC tuna longlining fishery to become extremely expensive to operate.

On the other hand, the ROC also made many efforts to arrive at fisheries agreements with coastal states for her trawling fisheries. The ROC, though, found that it was in a more difficult situation than other distant water fishing states because of her poor political position in the international community. Although efforts to gain access to fishery zones of other states have reduced the impact on her distant water trawling fisheries, the annual production of ROC distant water trawling fisheries has still decreased from 204,784 tons to 179,530 tons between 1977 and 1986. In spite of less attention to her tuna fisheries, the ROC tuna production has remained stable at a level of catch of some 100,000 tons per year in the period between 1975 and 1985. In this same time period, however, the world annual tuna production has increased dramatically from 1,530,000 to 2,099,000 tons and, consequently, the ROC dropped from the position of the fourth largest tuna fishing nation to the ninth in world rank. But her neighboring country, Japan, still kept the top of world tuna production and increased its annual tuna production from 542,000 tons to 788,000 tons in the same period.<2>

The ROC has had a very successful performance record for tuna fisheries. That continued performance is threatened, however, because additional fishing boat construction has been suspended.<3> Since 1980 the tuna wholesale price in the international market is increasing and the oil price is decreasing; this potential for profit in the tuna longlining

fishery naturally stimulates the fishermen's willingness to reenter such fishing activities.

A strong request to construct additional fishing vessels, therefore, comes from the ROC tuna fishermen. They argued that an abundant skipjack resource whose maximum sustainable yield (MSY) is conservatively estimated at 1.2 million tons in the western central Pacific ocean has not been exploited by the ROC fishermen.[4] This resource is utilized mainly by the Japanese fishermen at present although the fishing ground is a shorter distance from Taiwan than from Japan; ROC fishermen simply do not have enough fishing vessels to exploit the skipjack.

Among traditional marine living resources, it is true that tuna is worthy of more attention by the ROC, not only because it can be fished on the high seas, but because of its abundance and its international market value. The purpose of this paper is to examine the problems and opportunities of the ROC to expand her distant water tuna fisheries, taking into consideration not only the changes in the international legal regime, but also trends in the world tuna fisheries.

II. WORLD TUNA RESOURCES AND ITS FISHERIES

The tuna and tuna-like fish include many diverse species which frequently are taken in the same fishing operation. They are most often grouped into three categories.(8) The first category, the major fishing targets of tuna fishing fleet, includes six major tuna species, which are called the principal market species :albacore (Thunnus alalunga), yellowfin (T. albacares), bigeye (T. obesus), northern bluefin (T. thynnus), southern bluefin (T. maccoyii), and skipjack (Katsuwonus pelamis). The second and third categories, being incidentally caught by tuna fishing fleet, includes among others bonito (Sarda spp.), black skipjack (Euthynnus spp.), frigate mackerel (Auxis spp.), and the billfish (including all members of the families Xiphiidae and Istiophoridae). Although the tuna and tuna-like fish are generally considered together for management purposes, this paper consider only the principal market species because their productivity and economic significance are much more important for the tuna fisheries industries in the world.

1. The Characteristics of Tuna

Tuna is characterized by rapid growth and attains a large size. They spawn large numbers of eggs over vast areas of the ocean. The eggs hatch quickly and the small fish grow rapidly, maintaining the populations of these species at high levels of abundance. The bluefin tuna is among the world's largest fishes. Other species, such as yellowfin and bigeye, reach sizes in excess of 200 pounds only within 4 or 5 years. Tuna swim very

fast, with a minimum swimming speed of one body length a second, and cannot stop swimming because due to their high density they would sink if they did. Their unique characteristics have resulted in tuna being distributed worldwide.[6] For example, North Pacific bluefin spawn in a very restricted region in the western Pacific east of Taiwan, but the adult fish can be caught off Mexico, Canada, the United States, Japan, and Republic of China. In the Atlantic Ocean northern bluefin also travel between the Gulf Stream waters off North America and European waters from Spain to Norway, and albacore probably migrate just as extensively. Skipjack also migrate widely, traveling at least between the central Pacific and the coastal waters of both the eastern Pacific and Japan. Southern bluefin, found only in the southern hemisphere, migrate from spawning areas around Australia to the Atlantic, Pacific, and Indian oceans. Yellowfin and bigeye do not appear to make such extensive migrations as the other species, but also undertake migrations of several thousand miles. Because of these characteristics, tuna is defined as highly migratory species in the 1982 Convention of Law of the Sea.[7]

Because of their high fecundity, rapid growth, and worldwide distribution, it would be virtually impossible to overfish the tunas to a point that would threaten biological extinction. However it is possible to fish them to such a low population level that production is reduced substantially, resulting in economic chaos in the world fisheries for tuna.[8]

2. Status of World Tuna Fisheries

There are three basic catch techniques used in regard to tuna: bait fishing, purse seining, and longlining. Purse seining and bait fishing are also referred to as surface fisheries. Other methods of fishing for tuna include traps, gillnetting, handlining, and harpooning, but they account for only a small share of the catch.

Bait fishing involves the use of barbless feathered jigs, which is used with a pole to catch tuna by fishermen. Bait fishing is generally carried out near shore because of the problem of maintaining the live bait used to attract and concentrate the tuna, so that it is primarily used by coastal states. However, bait fishing has long accounted for the major share of the world catch of tuna.

Purse seining involves the use of large net, which is used to surround the tuna schools, then the net is drawn shut at the bottom to prevent the tuna from escaping. It has primarily used by fishermen from the United States, Spain, Mexico and France. Although purse seining is quite capital intensive compared with the other two techniques, it is much more effective than them in terms of catch per unit of effort. Purse seining, which was in last place among the major methods of tuna fishing until 1970, has now replaced longlining in second place,[3] and has already threatened the position of bait fishing.

Longlining, which involves setting main lines, each containing branch lines with a total of up to 4,000 hooks, is used for taking tuna at great depths. It is primarily used by fishermen from Far East nations, particularly Japan, the Republic of China and the Republic of Korea.

Prior to 1940 the world catch of tuna never exceeded 250,000 metric tons per year.[10] After World War II annual production began to increase rapidly, and reached over 1 million metric tons by 1970. From 1970 to 1985, this steady increase in production continued. In 1985 the world catch of tuna was 2.1 million metric tons. Among tuna species, skipjack accounts for much of this recent increase because of the rapid development of that fishery in the western Pacific. However the annual production of albacore has decreased since 1970. (Table 1)

In 1985, skipjack was the most important species in terms of tonnage harvested, making up 42 percent of the world production (Figure 1). It is followed by yellowfin (35 percent), bigeye (11 percent), albacore (8 percent), bluefin (2 percent), and southern bluefin (2 percent). The largest catches were made in the Pacific Ocean (64 percent), with the Atlantic Ocean (22 percent) and the Indian Ocean (14 percent) following. Among the world major fishing areas (Figure 2), the western central Pacific is the best one and produces 572,000 tons (27 percent of the world tuna production). It is followed by eastern central Pacific (524,000 tons, 25 percent), west Indian (236,000 tons, 11 percent), eastern central Atlantic (217,000 tons, 10 percent) and northwest Pacific (208,000 tons, 10 percent). These five major fishing areas (FAO code 71, 77, 51, 34 and 61) produce almost 1,757,000 tons, making up 84 percent of the world production. The species caught in different major fishing areas are shown in table 2.

The number of nations fishing tuna on a commercial basis has increased since 1970 from about 40[11] to about 65 in 1985.[12]

Table 1. WORLD TUNA CATCH BY SPECIES, 1972-85

thousand metric ton

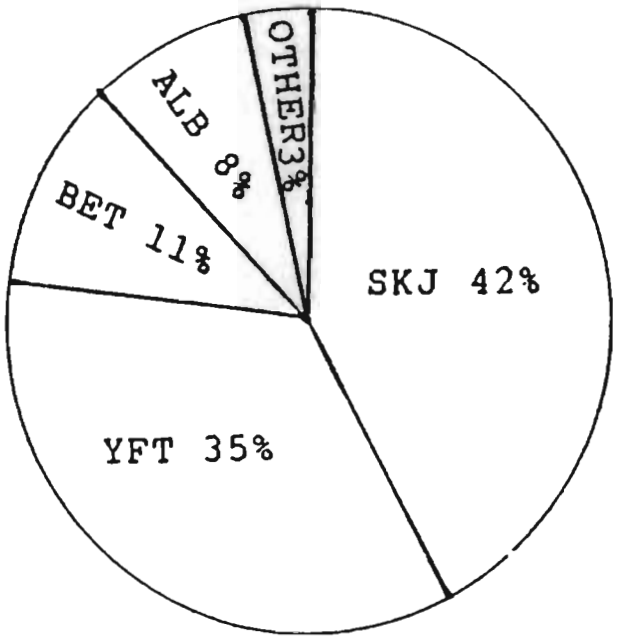
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
SKJ	460	530	670	547	666	633	795	717	785	739	782	906	1054	893
YFT	450	429	488	511	558	550	521	544	536	585	565	588	603	740
ALB	237	247	246	183	232	197	223	192	193	183	199	168	166	171
BET	144	148	165	189	185	214	210	206	219	202	222	218	205	231
BFT	35	31	35	38	40	39	36	38	33	43	47	38	33	33
SBF	55	48	46	34	43	37	32	39	47	45	42	46	38	35
SUBTOTAL	1382	1434	1651	1502	1724	1670	1818	1736	1812	1796	1857	1963	2099	2103
OTHERS	481	566	602	593	571	665	644	727	824	854	933	976	1013	1050
TOTAL	1863	1999	2253	2095	2294	2334	2462	2463	2635	2650	2790	2940	3111	3154

SOURCE: FAO YEARBOOK OF FISHERY STATISTICS

Note: (1). ^ refers to those species of bonito, black skipjack, frigate mackerel, and the billfish.

(2). SKJ(skipjack), YFT(yellowfin), ALB(albacore), BET(bigeye), BFT(bluefin), SBF(southern bluefin).

by Species



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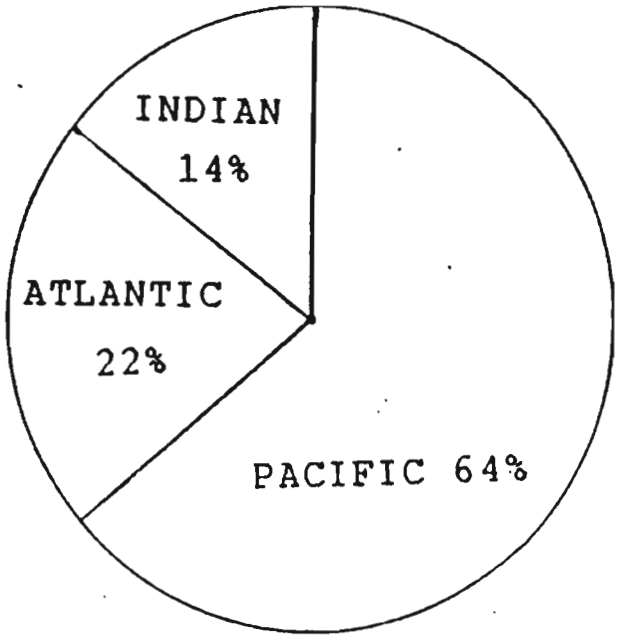

Figure 1. Distribution of World Tuna Production, 1985

Source: 1985 FAO Yearbook of Fishery Statistics

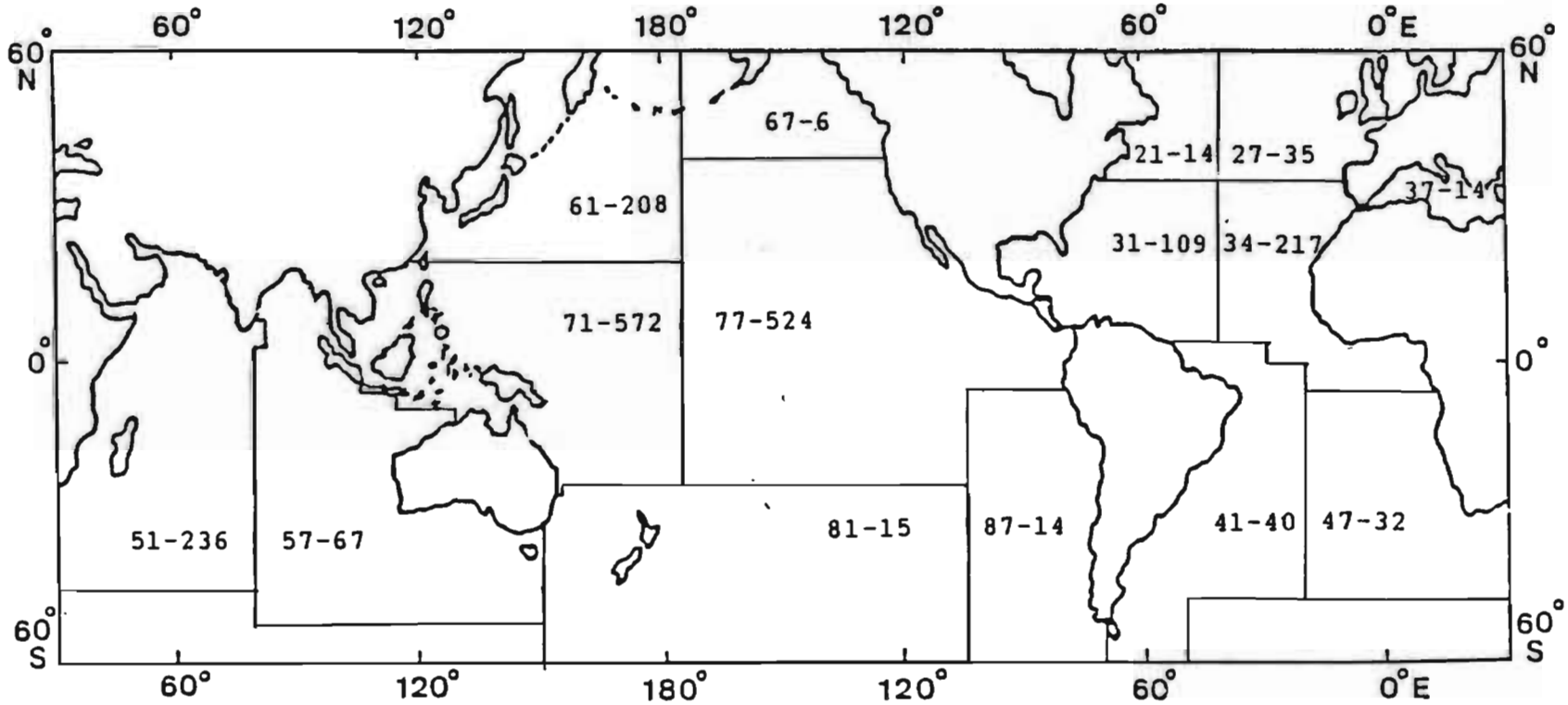

Figure 2. Distribution of World Tuna Production, by Major Fishing Ground

Source: 1985 FAO Yearbook of Fishery Statistics

Table 2. World Tuna Catch by Species and by Major Fishing Areas, 1985

thousand metric ton

	SKJ	YFT	ALB	BET	BFT	SBF	TOTAL
ATLANTIC							
NW (21)	0	6	3	2	2	0	14
NE (27)	2	0	24	5	4	0	35
WC (31)	34	58	12	4	0	0	109
EC (34)	73	100	5	38	1	0	217
MB (37)	0	0	1	0	13	0	14
SW (41)	25	5	5	5	0	0	40
SE (47)	0	2	11	14	0	3	32
SUB-TOTAL							461
INDIAN							
W (51)	107	90	9	27	0	3	236
E (57)	13	9	7	12	0	26	67
SUB-TOTAL							303
PACIFIC							
NW (61)	116	44	31	9	7	0	208
NE (67)	1	0	5	0	0	0	6
WC (71)	363	174	13	22	0	0	572
EC (77)	156	248	36	79	4	0	524
SW (81)	1	1	9	1	0	3	15
SE (87)	0	3	0	11	0	0	14
SUB-TOTAL							1340
TOTAL	892	740	171	231	33	35	2103

SOURCE: 1985 FAO YEARBOOK OF FISHERY STATISTICS

Note: (1). The numbers within parentheses refer to FAO code of major fishing areas.

(2). SKJ(skipjack), YFT(yellowfin), ALB(albacore), BET(bigeye), BFT(bluefin), SBF(southern bluefin).

Japan and the United States are still the dominant tuna catching countries (Table 3), but their percentage of catch has declined from 64 to 44 percent between 1970 and 1985. The Republic of China and the Republic of Korea, which before 1980 were the number three and four on the list of leading tuna producing nations respectively, have been replaced by Spain, the Philippines, Indonesia, France, and Mexico. In 1985 Japan is the biggest tuna producer, accounting for 33 percent of the world catch, and catch 690,000 tons. It is followed by United States (234,000 tons, 11 percent), Spain (187,000 tons, 9 percent), the Philippines (125,000 tons, 6 percent), Indonesia (116,000 tons, 6 percent). In 1970 the top five countries accounted for over 81 percent of the world catch, but only 64 percent of the world tuna production in 1985. Among tuna fishing states, Japan is the biggest producer of every species (Table 4). The USA, Spain, the Philippines, and Indonesia are the dominant fishing states of skipjack and yellowfin. On the other hand, the ROC and Korea are the dominant fishing states for albacore and bigeye.

During 1980, about 80 percent of the total world tuna catch went into canning, 12 percent into dried fish production (mainly Katsuobushi in Japan), and the remaining 8 percent was consumed fresh (Sashimi in Japan).[13] In 1985, Japan is the biggest tuna consuming country (Table 5), and consumed 608,000 tons (29 percent of world tuna consumption). It is followed by United States (390,000 tons, 18 percent), Spain (119,000 tons, 6 percent), Italy (90,000 tons, 4 percent) and France (78,000 tons, 4 percent) etc. These five countries consume 1,285,000 tons tuna, representing 61 percent of world tuna production. Although Japan

Table 3. World Tuna Catch by Major Fishing Countries, Selected Year

thousand metric ton

	1970	1975	1979	1980	1981	1982	1983	1984	1985
JAPAN	502	542	672	723	642	674	696	788	690
USA	214	259	218	226	222	199	266	263	234
SPAIN	47	77	100	101	122	131	126	132	187
PHILIPPINES	52	84	94	79	95	103	119	104	125
INDONESIA	21	39	61	73	84	90	103	115	116
FRANCE	50	58	64	72	69	69	84	100	101
MEXICO	11	23	31	34	68	45	38	78	93
KOREA, REP.	NA	119	125	110	105	108	89	71	92
ROC	89	90	109	106	90	104	104	99	86
VENEZUELA	2	1	3	4	6	4	39	53	79
ECUADOR	16	36	34	19	19	21	15	29	39
SOLOMON IS.	0	7	24	23	26	20	34	36	31
MALDIVES	29	20	22	28	26	20	26	32	30
BRAZIL	1	2	5	10	24	17	17	22	29
GHANA	0	8	6	9	15	29	33	22	28
SRI LANKA	18	22	14	20	21	22	23	18	19
AUSTRALIA	8	11	11	14	18	21	22	16	16
OTHERS	58	96	122	124	119	109	98	101	87
TOTAL	1118	1530	1733	1796	1787	1811	1946	2099	2103

SOURCE: FAO YEARBOOK OF FISHERY STATISTICS
Note: The figure of ROC refers to the catch of "other nei A" in FAO yearbook fishery statistics.

Table 4. World Tuna Catch by Countries and by Species, 1985

thousand metric ton

	SKJ	YFT	ALB	BET	BFT	SBF	TOTAL
JAPAN	315	134	57	155	10	19	690
USA	96	125	8	0	4	0	234
SPAIN	66	88	21	6	5	0	187
PHILIPPINES	61	64	0	0	0	0	64
INDONESIA	82	34	0	0	0	0	116
FRANCE	45	44	2	6	3	0	101
MEXICO	7	85	0	0	1	0	93
KOREA, REP.	14	26	18	34	0	0	77
ROC	2	22	49	13	1	0	87
VENEZUELA	29	48	1	0	0	0	79
ECUADOR	25	11	0	2	0	0	39
SOLOMON IS.	27	4	0	0	0	0	4
MALDIVES	24	6	0	0	0	0	30
BRAZIL	25	3	0	0	0	0	29
GHANA	21	6	0	1	0	0	28
PANAMA	7	11	3	2	0	0	22
SRI LANKA	12	7	0	0	0	0	19
AUSTRALIA	0	0	0	0	0	16	16
OTHERS	135	23	11	10	8	1	189
TOTAL	892	740	171	231	33	35	2103

SOURCE: 1985 FAO YEARBOOK OF FISHERY STATISTICS
Note: (1). The figure of ROC refers to the catch of "other nei A" in FAO yaarbook of fishery statistics.
(2). SKJ(skipjack), YFT(yellowfin), ALB(albacore), BET(bigeye), BFT(bluefin), SBF(southern bluefin).

Table 5. Total Frozen Tuna Consumption by Selected Countries

thousand metric ton

	1981	1982	1983	1984	1985
JAPAN					
landings	470	378	498	542	500
imports	101	127	142	111	148
exports	36	40	44	74	40
local consumption	535	465	596	579	608
UNITED STATES					
landings	222	199	266	263	217
imports	274	222	199	183	173
exports	0	0	0	0	0
local consumption	496	421	465	446	390
SPAIN					
landings	122	131	126	132	140
imports	28	43	22	15	11
exports	45	53	45	26	32
local consumption	105	121	103	121	119
ITALY					
landings	1	2	2	2	2
imports	71	77	74	83	90
exports	2	1	2	1	2
local consumption	70	78	74	84	90
FRANCE					
landings	69	69	84	100	110
imports	12	20	19	19	20
exports	23	37	46	37	52
local consumption	58	52	57	82	78
TOTAL					
landings	884	779	976	1039	969
imports	486	489	456	411	442
exports	106	131	137	138	126
local consumption	1264	1137	1295	1312	1285

SOURCE: GLOBEFISH

and United States are the two biggest producing countries, they are also the biggest importers in the world. The United States and Japan were net tuna importer of 173,000 tons and 108,000 tons, respectively in 1985.

Because it is such a high-priced commodity, tuna is mostly consumed in the more affluent nations. This consumption patterns will be expected to continue due to the fact that: (1) Tuna are high on the marine trophic web and the average sustainable yield is not as high as for certain other species such as herring. (2) Tuna are widely dispersed in the oceans of the world. Harvesting operators therefore require large investments in high sea vessels and gear. (3). Most of tuna are near or at the levels of full exploitation. Increased fishing effort therefore will tend to bring about declining catch rates, increasing costs per pound of tuna landed, and higher market prices necessary to cover these increasing costs.[14]

3. Existing International Arrangements for Tuna Management

Because of the way highly migratory species move over vast distances in the ocean and span several zones of national jurisdiction as well as entering or crossing great expanses of the high seas, tuna are usually considered to be best conserved and managed on a global basis.[15] There are five major international organizations concerned with the scientific study and management of tuna: Inter-American Tropical Tuna Commission (IATTC), International Commission for the Conservation of Atlantic Tunas (ICCAT), Indian Ocean Fishery Commission (IOFC), Indo-Pacific Fisheries Commission (IPFC), South Pacific Forum Fishery

Agency (SPFFA).

(1). Inter-American Tropical Tuna Commission (IATTC)

The IATTC was formed in 1950 by a convention between the governments of the USA and Costa Rica.[16] The convention, however, is open to adherence by other governments whose nationals fish for tropical tunas in the eastern Pacific Ocean (EPO). As of 1987 there were five member nations: France, Japan, Nicaragua, Panama, and the United States.[17]

The IATTC is the only regional tuna fisheries management body which has its own internationally recruited scientific staff, and their duties are to study tuna and other fish caught by tuna fishing vessels within its geographical area of responsibility and to recommend management measures designed to maintain stocks at levels that will produce maximum yields on a sustained basis. With the exception of yellowfin, it has not been demonstrated to date that there is a need for conservation measures for other species of tunas harvested in the EPO.[18]

The IATTC has established an global annual catch quota for yellowfin to be taken by vessels of all nations within a specified area of the eastern Pacific known as the Commission's Yellowfin Regulatory Area (CYRA, figure 3) since 1966. Within the CYRA the quota is taken on a first-come-first-served basis, implying that the resources belong to whoever can first catch them. Once the quota was about to be exhausted, the Director of Investigation of IATTC would close the season and allow only a last trip, during which each vessel would be allowed to catch its carrying capacity. It was the first and only existing inter-

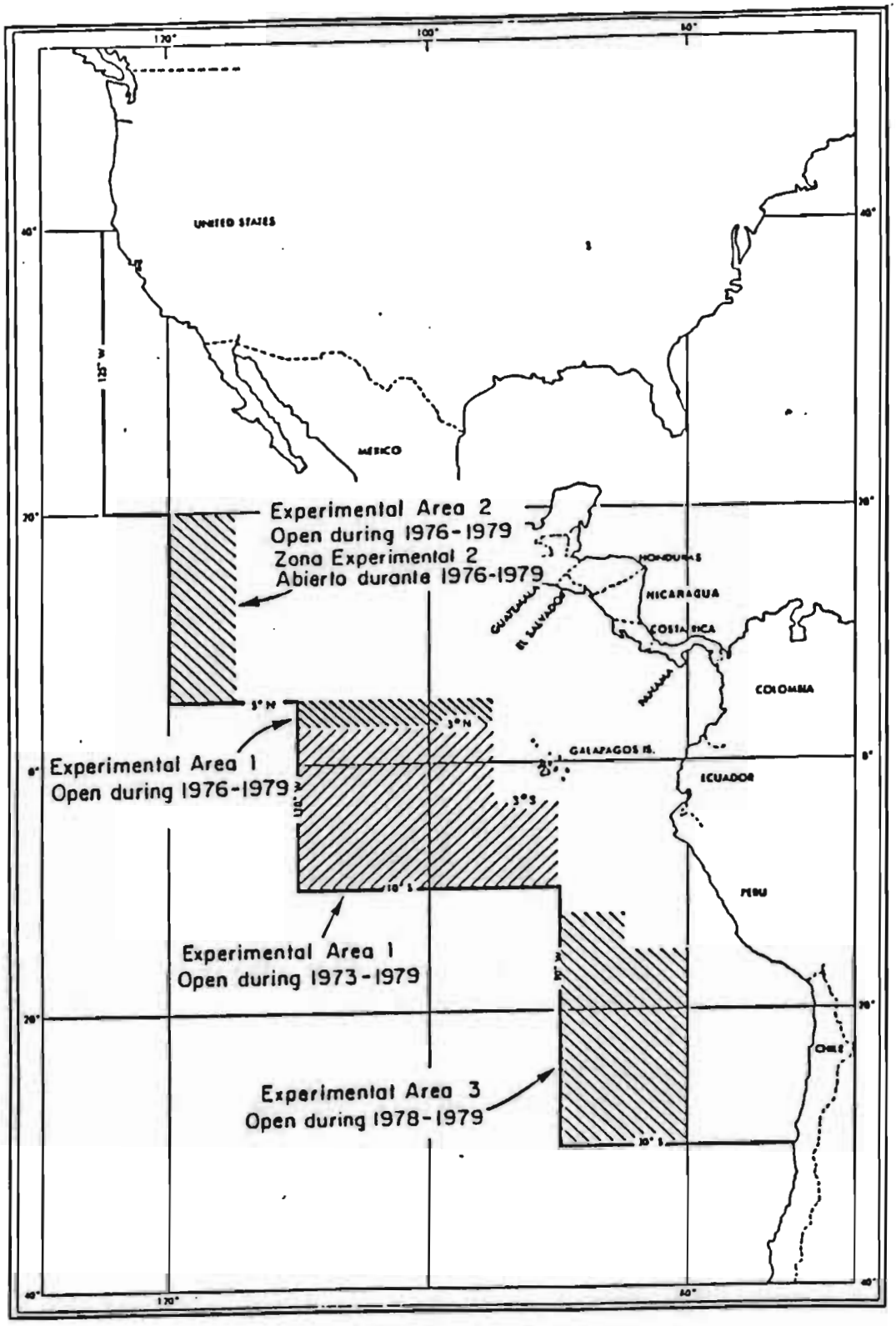

Figure 3. The Commission's Yellowfin Regulatory Area of IATTC.

Source: 1986 IATTC Annual Report.

national organization using a quota system for tuna management. However, the reason for its success was that the United States was the dominant fishing state and contributed almost all the funds to run this organization on a area of the high seas.[19]

Since the 1970's the trend of coastal states' extended fisheries jurisdiction to 200 miles, which a good part of CYRA became intergraded within the coastal state's EEZ, has seriously eroded the operation of IATTC, especially after Costa Rica, Ecuador, and Mexico withdrew in succession from the IATTC. For example, catch quotas for yellowfin for the CYRA have been recommended by IATTC staff and variously adopted in Commission resolutions and implemented by the countries participating in the fishery through 1966-1979. Since 1980, however, the quotas were adopted, but not implemented.[20] This meant that the resource could not continue under the regime of freedom of fishing on which the IATTC system was built. Since a significant part of tuna is found within 200 miles,[21] it would have been useless to maintain the system only in the High Sea part of the CYRA, and the resource could not continue under the regime of freedom of fishing on which the IATTC system was built.

Several alternative international arrangements have been proposed to manage the EPO tuna fishery. The most important alternatives are the partially allocated quota (PAQ) system or the quota certificate (QC) system, which are suggested to replace the first-come-first-serve approach and to keep the IATTC operation continually.[22] Both PAQ and QC systems recognize that (1) an international agency should be established to execute researches, to set an overall quota, to enforce its regulations within EPO,

including EEZs and high seas, (2) the allocation of tuna resource or economic benefits should take into account historical fishing right of fishing states and special rights of coastal states, (3) each coastal nation that receives a quota allocation is given two options it can either harvest the national allocation, or it can allow some other nation to harvest the allocation. However, it is important to note that the major difference between these two systems is the mechanism by which national allocations are made available to foreign harvesters. Under the PAQ system the international organization fixes the transfer price for the national quotas by setting the participant fee. On the other hand, under QC system the international organization do not involve the whole process of quota certificate trading, which is operated by competitive market.[23]

A series negotiations were held among Mexico, Costa Rica, and the U.S.A. between 1975-1980. The Mexican and Costa Rican have taken the position that coastal states should have national quotas equal to the entire amount of tuna caught in their 200-mile national zones, leaving to the distant water fishing nations only the tuna beyond the 200-mile limit or that which the coastal states cannot harvest. On the other hand, the U.S.A. requested the historical fishing rights should be respected.[24] In 1980, due to the failure of the IATTC renegotiations, Mexico extended its fisheries jurisdiction to include tuna.[25] Furthermore, Costa Rica began seizing foreign flag vessels in February 1979 and Mexico began seizing vessels in July of 1980. In response to these seizures, the United States embargoed all tuna products from both Costa Rica and Mexico, as required by law under the

U.S. Fisheries Conservation and Management Act.[26] The function of IATTC, therefore, has collapsed, although the body is still supported by the U.S.A. and Japan.

(2). International Commission for the Conservation of Atlantic Tunas (ICCAT)

The ICCAT was created and given responsibility for the scientific study and management of the tuna and billfish in the Atlantic Ocean in 1969.[27] As of 1987 the ICCAT had 22 member nations which were Angola, Benin, Brazil, Canada, Cape Verde, Cuba, France, Gabon, Ghana, Ivory Coast, Japan, Republic of Korea, Morocco, Portugal, Sao Tome and Principe, Senegal, South Africa, Spain, Uruguay, the United States, and the USSR, Venezuela.[28] Members contribute funds on the basis of catch and utilization. The ICCAT has its own secretariat but no scientific staff. The collection of basic catch and effort data and the implementation of biological studies remain the responsibilities of individual governments, and attempts to meet convention objectives are being made by appointing panels for different species.

A result of this system of data collection is that ICCAT members frequently accuse each other's scientists of presenting 'biases' data, and they are consequently unable to make much progress in the management of the species during the meeting.[29] However ICCAT has established a Standing Committee on Research and Statistics (SCRS) to review all research papers from scientists and to make recommendations to the commission each year. The ICCAT has adopted some conservation regulations

since 1973.[30] Those regulations include: (1) Minimum size limits of 3.2 Kg on yellowfin (1973), of 6.4 Kg on bluefin (1975), and 3.2 Kg on bigeye (1980). (2) Forbidding to fish northern bluefin tuna in the western atlantic ocean(1983).

(3). Indian Ocean Fishery Commission (IOFC) & Indo-Pacific Fisheries Commission (IPFC)

The IOFC was established in 1967 by the Council of the Food and Agricultural Organization (FAO) of the United Nations under Article VI-1 of the FAO constitution.[31] The Commission has broad responsibility over the entire field of fishery development and conservation in the Indian Ocean. As of 1985 The IOFC had 33 member nations.[32]

The IPFC was created in 1948, also within the framework of FAO, under Article XIV of the FAO constitution. The Commission has broad responsibility over the research and investigation of the living marine and freshwater resources of the Indo-Pacific region. As of 1985 the IPFC had 18 member nations.[33]

These two Commissions have no provision for an operating budget in their founding documents, and must rely on the FAO for support. Because they do not employ a permanent secretariat and a research staff, they depend on working groups of scientists affiliated with other organizations. However, a special tuna management committee was established by both commissions, and the IPFC has an Indo-Pacific Tuna Program (IPTP) to meet all scientists from nations concerned and to exchange all information concerned about tuna each year.[34]

(4). South Pacific Forum Fishery Agency (SPFFA)

The SPFFA was formed in 1979. Because many members of South Pacific Forum (SPF) feared the SPFFA will be dominated by the large metropolitan powers,[35] the SPFFA Convention restricts its membership to SPF countries plus other nations or territories in the region that are recommended by Committee and approved by the SPF.[36] It is the first international organization for the purpose of tuna management excluding distant water fishing states (such as the United States, Japan, and the Republic of Korea), and the dependent islands (such as the United States' territories, the French Overseas Territories, and Chile's Easter Island), and limiting its convention areas only within coastal states' EEZs. In 1985, the membership consists of 16 nations which are Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, New Zealand, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, Western Samoa.[37]

The duties of SPFFA are to ''facilitate the collection, analysis, evaluation and dissemination of relevant statistical scientific and economic information'' and to maintain the ''common interest in the conservation and optimum utilization of the living marine resources of the South Pacific region and in particular of the highly migratory species.''[38] The SPFFA consists of a Forum Fisheries Committee(FFC)-composed or representatives from all the SPF members-and a Secretariat.[39] Both the FFC and the Secretariat, however, are designed to be consultative and advisory. Neither body has the power to determine the allowable catch or allocate the surplus catch to foreign

countries. Therefore, the individual government negotiates access and fee agreements with distant water fishing nations directly.

An important step was taken in May 1983 with establishment of the Regional Register by the SPFFA. The Register has made a significant contribution to the control of the fishing operations of distant water fishing nations. All foreign fishing vessels fishing in waters of any SPF member state, including vessels registered with another member of SPF, are required to register. Licenses to fish in a particular EEZ are given only to vessels in good standing on the Register. Good standing can be withdrawn, i.e. a vessel may be blacklisted if persons responsible for the operation of the vessel have committed a serious offense against the laws or regulations of any of the participating countries. Elaborate due process procedures must be followed before a vessel is blacklisted.[40]

Concerning the tuna research and conservation, the position of SPFFA is quite ambiguous. The SPFFA Convention grants the SPFFA only limited duties, for example, to collect data and provide advice and assistance to member nations upon their request. The SPFFA Convention reserves ultimate management and conservation responsibilities over living marine resources within the 200-mile zones, including the highly migratory species, to the individual coastal nations. In addition, since 1976 the South Pacific Commission (SPC)[41] has established a Skipjack Survey and Assessment Programme, which was succeeded in 1981 by the Tuna and Billfish Assessment Programme (TBAP).

In order to avoid duplication so far as possible, the SPF

has decided that the SPC will continue work on resource survey and assessment, and SPFFA will focus on the development, exploitation and management interests of SPF members.[42] Therefore, the SPF members needed to clearly establish their own research and development objectives with the help of expert consultants.

Standard forms for information on vessel catches and fishing activities are now used by SPF members. The data will submit to the SPC for scientific research and the SPFFA for monitoring and negotiation purposes, respectively.

4. Status of World Tuna Resources and Management

Tuna resources have not been discussed on a global basis, although it is a highly migratory in nature. However the status of tuna resources can be assessed by individual ocean and species. (Table 6)

(1). Atlantic Ocean[43]

(a). Skipjack tuna

Although the maximum sustainable yield (MSY) of skipjack is not estimated, the resource is believed to be under exploited. The skipjack catch in Atlantic ocean ranged from 116-133,000 tons between 1983 and 1986.

(b). Yellowfin tuna

The MSY of yellowfin in Atlantic ocean was estimated at 117-127,000 tons and the production ranged from 134-380,000 tons between 1983-1986. The resource is considered over exploited and the ICCAT has adopted regulation to restrict all fishing states

Table 6. Status of Tuna Resources

thousand metric ton

	Estimated MSY	Catch
ATLANTIC(1)*		
SKJ	-	116-133
YFT	117-127	134-380
BET	74-175	58-74
N. ALB	48-52	40-60
S. ALB	24-25	27-28
BFT	-	14-19
INDIAN(2)**		
SKJ	-	32-64
YFT	40-60	34-100
BET	36-53	33-44
ALB	15-20	11-21
SBF	-	35-45
PACIFIC(2)***		
SKJ(3)****	-	563-820
W. YFT	80-90******	181-214
E. YFT(4)*****	152-175	105-295
BET	127	97-144
N. ALB	84-133	62-98
S. ALB	33-35	33-42
BFT	-	17-29

SOURCE: (1). 1986 ICCAT Annual Report.
(2). Japanese Distant Water Fisheries Research Institution(1985), ``Report on World Tuna Resources.''
(3). 1985 FAO Yearbook of Fishery Statistics.
(4). 1985 IATTC Annual Report.

Note: * catch between 1983-86.
** catch between 1980-85.
*** catch between 1978-85.
**** catch between 1983-85.
***** catch between 1981-86.
****** only estimated by longlining fisheries.

to catch small fish under 3.2 Kg.

(c). Bigeye tuna

The MSY of bigeye in Atlantic ocean was estimated at 74-175,000 tons and the production ranged from 58-74,000 tons between 1983-1986. The resource is considered fully exploited and the ICCAT has adopted regulation to restrict all fishing states to catch small fish under 3.2 Kg.

(d). Albacore tuna

The albacore is believed having two stocks in northern and southern Atlantic ocean respectively. The MSY of albacore in northern Atlantic ocean was estimated at 48-52,000 tons and the production ranged from 40-60,000 tons between 1983-1986. The resources is considered near fully exploited. The MSY of albacore in southern Atlantic ocean was estimated at 24-25,000 tons and the production ranged from 27-28,000 tons between 1983-1986. Because the albacore production in Atlantic ocean is considered near the MSY, it should be monitored very carefully on the catch of little albacore.

(e). Bluefin tuna

The MSY of bluefin in Atlantic ocean was not estimated and the production ranged from 14-19,000 tons between 1983-1986. However , the resources is considered fully exploited, and the ICCAT has adopted some limitation as follows: (1). In western Atlantic ocean, it has forbidden all fishing states to fish bluefin tuna since 1983, except a special quota of 2,660 tons for USA, Japan and Canada but the incidental catch of small fish under 6.4 Kg is limited under 15 percent of total catch, by weight or by fish number. (2). In eastern Atlantic ocean, the

status of resource is better and the fishing activities does not expand in the recent years. However the ICCAT has adopted regulation to restrict all fishing states to catch small fish under 6.4 Kg in Atlantic ocean.

(2). Indian Ocean[44]

(a). Skipjack tuna

The MSY of skipjack is not estimated, and the skipjack catch in Indian ocean ranged from 32-64,000 tons between 1980 and 1985. The resource assessment needs to collect more detail fishing data from coastal fisheries of every state.

(b). Yellowfin tuna

The MSY of yellowfin in Indian ocean was estimated at 40-60,000 tons and the production ranged from 34-100,000 tons between 1980-1985. The resource for longlining is considered fully exploited. However the production is increasing, because the French purse seiners have operated in eastern Indian ocean since 1983.

(c). Bigeye tuna

The MSY of bigeye in Indian ocean was estimated at 36-53,000 tons and the production ranged from 33-44,000 tons between 1980-1985. The resource is considered near fully exploited. However the deeper longlining has been popularized since 1983 and the French, Spanish, and Mauritus' purse seiners have operated in Indian ocean and the yellowfin production is increasing.

(d). Albacore tuna

The MSY of albacore in Indian ocean was estimated at 15-20,000 tons and the production ranged from 11-21,000 tons between

1980-1985. However, the production is considered near the MSY because the French, Spanish purse seiners and the ROC gill netters have joined to operate in this area since 1984.

(e). Southern bluefin tuna

The MSY of southern bluefin was difficult to be estimated and the production in global basis ranged from 35-45,000 tons between 1980-1985. However, the Japan, New Zealand and Australia, the major fishing and coastal countries involved in Pacific ocean, have made some understanding to restrict their own fishing activities since 1983. Japan has restricted its fishermen to catch small fish on the high seas, and Australia has set a total allowable catch quota of 14,500 tons and closed the southern fishing area of 34°S in its EEZ.

(3). Pacific ocean[45]

(a). Skipjack tuna

Although the MSY of skipjack is not estimated, the resource is believed near fully exploited. The skipjack catch in Pacific ocean ranged from 563-820,000 tons between 1983 and 1985.[46]

(b). Yellowfin tuna

In the western Pacific Ocean, the MSY of yellowfin for longlining was estimated between 80-90,000 tons. However, in this area, the MSY of yellowfin for surface fisheries could not be estimated because the Philippines had increased its production in recent years but its statistics are so poor. Between 1978-1985, the production of yellowfin ranged from 181-214,000 tons in this area. It may be concluded that the yellowfin resources in this area for longlining are fully exploited. The variance of

stock should be monitored very carefully because the catch of yellowfin by purse seining is increasing in the area of equator. In the eastern Pacific ocean, the MSY of yellowfin was estimated between 152-175,000 tons, and the production ranged from 105-295,000 tons between 1981-1986.[47] The yellowfin was fully exploited before. However many U.S. purse seiners have moved to the western Pacific in the past ten years, and the yellowfin in this area is now exploited at a level below MSY.

(c). Bigeye tuna

The MSY of bigeye was estimated at 127,000 tons in Pacific ocean and the production ranged from 97-144,000 tons between 1978-1985. However the deeper longlining has been popularized and its production is increasing since 1983. The resource is used near the MSY.

(d). Albacore tuna

The albacore is believed having two stocks in northern and southern Pacific ocean respectively. The MSY of albacore in northern Pacific was estimated at 84-133,000 tons and the production ranged from 62-98,000 tons between 1978-1985. Because the production is considered near the MSY, it should be monitored very carefully on the catch of little albacore. The MSY of albacore in southern Pacific was estimated at 33-35,000 tons and the production ranged from 33-42,000 tons between 1978-1982. The resource is totally used by longlining, and is considered fully exploited already.

(e). Bluefin tuna

The MSY of bluefin in Pacific is not estimated yet because the annual production varied sharply, compared other tuna

production. The production ranged from 17-29,000 tons between 1978-1985.

III. THE LEGAL REGIME FOR TUNA UNDER THE 1982 LOS CONVENTION

The 1982 United Nations Convention on the Law of the Sea makes provision for extended coastal state jurisdiction beyond the baseline for the territorial sea over all living resources within 200 nautical miles.(48) Within that area the coastal state is recognized as having sovereign rights over the entire range of living resources.(49) Among the living resources of the ocean, tuna are one of the most complicated and difficult species to be managed and conserved.

The majority view is that tuna is subject to coastal authority in the EEZ exactly as are all other species.(50) However, given the nature of highly migratory species which move considerable distances in the ocean and span several zones of national jurisdiction as well as entering or crossing vast expanses of the high seas, such species are often accessible for harvesting within one or more EEZs and in the high seas. Amounts taken within or beyond the EEZ may affect other catches. So the coastal states are obliged to cooperate with states fishing in the region ''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.''(51) On the other hand, the tuna fishing states ''have the right for their nationals to engage in fishing on the high seas,'' except '' subject to the rights and duties as well as the interests of coastal states provided for, inter alia, in Article 64.''(52)

Under those provisions, few distant water fishing states,[53] e.g. the United States, do not recognize that the coastal state has the right to manage tuna in its own EEZ, and insist that the tuna, both within and beyond EEZ, shall be managed under international organizations.[54] Many conflicts, therefore, are between the coastal states and distant water fishing states.[55]

The position of the ROC on this issue is contradictory. From the nature of tuna, the ROC believes that tuna is better managed throughout its migratory range, in both the EEZ and high seas, under international organization. On the other hand, if tuna is managed through international organizations, the ROC believes that the management measures will not provide for allocation on a first-come, first-served basis, and the allocation of national quotas, within and beyond EEZ, among its member nations will be the only type of tuna management in international organizations.[56] It does not correspond the ROC's interests due to her poor political position in the international community. It should be noted that the ROC is not a member of many international organizations.

In a situation in which individual states control access to tuna, the ROC would negotiate with each coastal state to take fish in that state's EEZ by emphasizing **economic** considerations such as economic assistance. International organizations would accentuate **political** considerations. If the ROC plans to expand her tuna fisheries, it should carefully examine the future development of the international legal regime for tuna management, focusing especially on the provisions of 1982 LOS

Convention and state practice.

1. Nature of the Coastal States' Rights to conserve and Manage Living Resources in the EEZ

The 1982 LOS Convention makes provision for establishing an exclusive economic zone (EEZ) beyond the baseline for the territorial sea within 200 nautical miles.[57] Within the EEZ the coastal state is recognized as having sovereign rights for the purpose of exploring and exploiting, conserving and managing all living resources.[58] In prescribing the rules and regulations applicable to fisheries in the EEZ, the coastal state will be placed under certain obligations regarding the conservation and management of fishery resources as follows.[59]

(1). Determining the allowable catch

The 1982 LOS Convention provides that ''the coastal state shall determine the allowable catch of the living resources in its exclusive economic zone.''[60] The allowable catch would normally include both those stocks harvested intentionally either for commercial or recreational or other purposes (such as scientific) and those incidentally taken in the course of taking a target species.[61]

While, the coastal state is required to determine an allowable catch for ''living resources'' in its EEZ, but may set the allowable catch as it wishes because the article does not describe any specific criterion to determine the amount or species of allowable catch.[62]

(2). Avoiding over-exploitation

The 1982 LOS Convention provides that ''the coastal state,

taking into account the best scientific evidence available to it, shall ensure through proper conservation and management measures that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation. As appropriate, the coastal state and competent international organizations, whether subregional, regional or global, shall co-operate to this end.''(63)

Although this article does not specify the level of the conserved species to be maintained, nor precisely what species should be maintained, it can be thought that maintaining a level of the target species for economically viable commercial fishing is required.(64) However those measures are required only to be based on ''the best available scientific evidence.'' It appears to mean that the coastal state may proceed to adopt measures even though its basic evidence is not complete or as fully verified as might be possible. Furthermore, the coastal state is not obligated to cooperate with international organizations to improve the available scientific evidence unless it feels these actions are ''appropriate.''

(3). Producing the optimum yield of harvested species

The 1982 LOS Convention provides that ''Such measures shall also be designed to maintain or restore population of harvested species at levels which can produce the maximum sustainable yield, as qualified by relevant environmental and economic factors, including the economic needs of coastal fishing communities and the special requirements of developing states, and taking into account fishing patterns, the interdependence of stocks and any generally recommended international minimum

standards, whether subregional, regional or global.''[65]

The meaning of this article is quite imprecise, because it involves concepts from biology, economics and sociology together and does not describe any criterion. Actually it comes from a new concept of fisheries management, i.e., optimum yield.[66] However, it is obvious that a coastal state is not required to manage fisheries on the basis of producing the maximum sustainable yield if this is not in the coastal state's interest.[67]

(4). Avoiding seriously threats to the ecosystem[68]

The 1982 LOS Convention provides that ''In taking such measures the coastal state shall take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels at which their reproduction may become seriously threatened.''[69]

The terms ''associated or dependent'' species includes predator-prey or more distant food or other biological relationships.[70] However, at present the totality of interactions is not sufficiently understood in any ecosystem to allow for comprehensive ecosystem management.[71]

(5). Contributing and exchanging data and information

The 1982 LOS Convention provides that ''Available scientific information, catch and fishing effort statistics, and other data relevant to the conservation of fish stocks shall be contributed and exchanged on a regular basis through competent international organizations, whether subregional, regional or global, where appropriate and with participation by all states concerned, in-

cluding states whose nationals are allowed to fish in the exclusive economic zone.''[72] It can be unique executed immediately by the coastal state, because the criterion of the data or information required is that which is ''available.''

(6). Optimum Utilization of Fishery Resources

The coastal state is not only given the right and responsibility to determine the allowable catch of living resources in its EEZ, but also given the obligation to ''promote the objective of the optimum utilization of the living resources in the exclusive economic zone without prejudice to article 61.''[73]

The 1982 LOS Convention provides that the coastal state ''shall'' determine how much of the living resources can be harvested by the coastal state. Where the coastal state does not have the capacity to harvest the entire allowable catch, it ''shall'', through agreements and other arrangements and pursuant to a wide variety of factors, give other states access to the surplus of the allowable catch.[74]

However, the treaty does not require ''full utilization '' of resources in the EEZ and only requires the coastal state to ''promote'' the objective of ''optimum utilization''[75] of the living resource in its EEZ. The coastal state's decision in setting the allowable catch is not constrained by any obligation regarding level of utilization, and the coastal states can set an allowable catch at whatever level the coastal state determines to be in the interest of its harvesting industry or its other relevant interests. Burke concluded that it is certain under the 1982 LOS Convention that the specific meaning of optimum utilization in any specific context is a matter exclusively for

coastal state decision.(76)

In addition, it is important to note that the coastal state's capacity to harvest living resources may not always be meant to depend solely on the capital and technology of its national economy. Each coastal state is free to introduce foreign capital and to obtain technical assistance from foreign nations, and it is also free to allow any foreign nations or foreign enterprises it chooses to engage in fishing activity through concessionary agreements and to secure the maximum of the total allowable catch for itself, even though it might not wish to use this catch for the consumption of its own nationals.(77)

Regarding those articles some argue that deciding conservation measures is an obligation of the coastal state because of the use of the mandatory ''shall'' in article 61, but it is obvious that those requirements are difficult to execute immediately, even among the developed states. So Oda points out that ''it can be argued that it is not appropriate for the coastal state always to be required to determine the allowable catch of the living resources in the EEZ and that it is extremely difficult to perform this obligation properly.''(78) And Burke concluded that despite the literal language of Article 61 the coastal state is not required to determine an allowable catch for all living resources of its EEZ.(79)

On the other hand, disputes relating to fisheries are to be settled in accordance with section 2 of part XV of UNCLOS III, i.e., by compulsory procedure with binding results, except that this does not apply to dispute over ''any of the sovereign rights relating to the living resources of the EEZ,'' which sovereign

rights include ''its discretionary powers for determining the allowable catch,...and the terms and conditions established in its conservation and management laws and regulations.''(80) However, such disputes may be settled, if not by negotiation, then by recourse to any procedure mutually agreed upon by the parties concerned or by their submission to the conciliation procedure.(81) It should be noted that the Conciliation Commission cannot substitute its discretion for that of the coastal state(82) and, at any rate, the report drawn up by the Commission cannot be binding.(83) Thus, there seems to be no effective legal mechanism under the terms of the 1982 Convention with which to challenge major actions taken by the coastal state as it manages its fishery resources in the EEZ.(84) Under those provisions, the scope of coastal authority established in Articles 56 and 61 of part V on the EEZ is clarified. So Burke notes that ''...the coastal state is given substantially complete discretion to manage the fisheries for its own exclusive interests, however narrowly and selfishly conceived they might be.''(85) In other words, the coastal state is given virtually full property rights to the fishery resources within its EEZ.(86)

It may be concluded that the coastal state has been granted full power to conserve and manage the living resources in its EEZ under UNCLOS. Even though some of the wording of UNCLOS implies that the coastal state has the obligation to cooperate with competent international organizations, such wording is quite weak. It can be said that those sections present obligations which are very ambiguous.

2. The Rights of the Coastal State to Conserve and Manage Tuna Resources

Because tuna moves in and out of any single national jurisdiction, it is generally believed that proper conservation and management cannot be promulgated for nor applied to only one part of the total area within which stocks migrate.[87] Tuna cannot be managed successfully if management measures are applicable only within 200 nautical miles while the stocks are fished to a significant degree outside any EEZ in the region. Cooperation in this context should aim at a coherent, unified management regime applicable to the stock within and beyond the EEZ.[88]

Some arguments for the coastal state's sovereign right over highly migratory species in its EEZ, therefore, come from article 64, which requires that the coastal and fishing states shall cooperate to ensure conservation and promote the objective of optimum utilization of the highly migratory species throughout the region. This cooperation is to extend both within and beyond the EEZ. Because of the additional treatment in a separate article, some countries indicate that authority over tuna conservation and management is different for highly migratory species than for others in the EEZ.[89] They insist that the coastal states are required to cooperate through an international organization for the management of tuna, and that the tuna are exempt from coastal-state jurisdiction beyond territorial seas prior to the existence of an international management scheme.[90]

During the past two centuries, however, high-seas fisheries have grown under the internationally recognized principle of

''freedom of the seas.'' Under this principle, most coastal states maintained relatively narrow territorial or jurisdictional zones beyond which fishermen have had largely unfettered rights to exploit fisheries resources. A great deal of biological and economic waste has been associated with the exploitation of fisheries resources, and the international community has not adequately resolved a number of issues governing management of living resources on the high seas. While the preambles of international management agreement may include statements concerning the promotion of full utilization of resources, different opinions concerning optimal management guidelines or acceptable fishing methods may be difficult to reconcile due to the differences among the nations.<91>

So Alverson points out that a global agency may be desirable '' in a rational world,'' and in a world where national entities are willing to vest some of their autonomy in a large, more comprehensive international organizations. Its jurisdictional authority, however, seems unrealistic in today's political climate, and therefore is unlikely to be accepted-at least not as it would apply to the extended coastal state jurisdictional zones.<92> As Miles notes: ''Recommendations on future organizational arrangements at the global level must always take into account the fact that the structure of political process of international fisheries management, as currently practiced, inherently greatly restricts regional as well as global organizations.''<93>

It is noteworthy that with the emergence of EEZs all coastal living resources become private property.<94> This system

reflects the theory that the private owner (the coastal state), at least in principle, has a stronger incentive to properly care for the resources it owns and to conserve them for the future.[95] It is impossible to view the other states as still having a right to share the property, especially in the EEZ.[96]

The 1982 LOS Convention has a separate article which refers to establishing international organizations for Highly Migratory Species (HMS), but does not provide that such agencies shall have any final decision making authority. In addition, article 64(2) declares that article 64(1) is ''in addition to'' the other provisions of Part V, which declares that the coastal states have sovereign rights over all living resources in their EEZs; tuna , of course, is a living resource. Indeed, the prevailing view is that despite article 64 of the 1982 LOS convention, tuna is treated no differently than other living resources within EEZ.[97] It is obvious that article 64 does not displace the other provisions, but requires the coastal state to consider the additional elements for tuna conservation and management in its EEZ. It is reasonable to conclude that the coastal states have an obligation to cooperate with distant water fishing states to conserve the HMS in their EEZs and beyond, but this obligation can be discharged with distant water fishing states directly or through international organizations. However, if cooperative efforts fail, the coastal states still have the exclusive authority to make final decisions on the conservation and optimum utilization of HMS in their EEZs.

On the other hand, while freedom of fishing has undoubtedly been considered as one of the basic freedoms of the high seas for

many countries, fishing tuna on the high seas today is placed under some restrictions in accordance with articles 116-120 of LOS Convention.[99] Article 116 declares that ''all States have the right for their nationals to engage in fishing on the high seas subject to (a) their treaty obligations; (b) the rights and duties as well as the interests of coastal States provided for, inter alia, in article 63, paragraph 2, and articles 64 to 67; and (c) the provisions of this section.'' Furthermore, the Treaty declares all the states concerned (coastal state and distant water fishing states) are to corporate to establish conservation measures and to promote utilization involving high seas fishing.[99] The rights of coastal states would come into play in the negotiating process, just as would the rights of distant water states.[100] These provisions introduce an entirely new condition affecting fishing on the high seas. This means that high seas fishing for tuna is subject to the sovereign rights of the coastal state over the same stock when the latter is within the EEZ, and distant water fishing states are not free to adopt conservation and allocation measures applicable only on the high seas without efforts to cooperate for this purpose with coastal states.[101] If any distant water fishing state denies the rights of coastal states to conserve tuna resources on high seas, the issue can be settled by compulsory procedure with binding results.[102]

Article 64 deals with tuna both within the EEZ and beyond, joining Articles 56, 61, and 62 for application within the EEZ and Article 87 and 116-119 for application beyond the EEZ. This set of provisions appears substantially to alter the traditional

law regarding freedom to fish tuna on the high seas. It may be argued that the coastal states concerned may be authorized by these provisions to establish an allowable catch for tuna in the entire region, including their EEZs and high seas. Accordingly, the distant water fishing nations are obliged to conduct themselves in accordance with coastal states' determination of management for the region. Refusal to cooperate to observe the allowable catch for the region could make a distant water fishing nation subject to sanctions adopted by coastal states of the region. The sanctions, for example, phasing out those foreign vessels which do not follow the regulations established by coastal states for their EEZs, would be very powerful. For example, purse seining, the most efficient fishing method, takes over 70 percent of its catch from the coastal waters within 200 miles.⁽¹⁰⁸⁾ Once a state is phased out from the coastal waters of the world, it means this state loses its competitive position in the international tuna market even though the state's fishing vessels can operate on the high seas. Therefore, it may be said that the coastal states have not only sovereign rights over tuna in their EEZs, but also have power to influence events on the high seas in respect of tuna fishing.

3. Practices Regarding Fishing Access to Tuna Resources in EEZs

While there was clearly an attempt to balance coastal state/distant water fishing state interests on tuna management at UNCLOS III there are some questions as to how this balance will evolve in actual practice. It is especially important, therefore, to monitor state practice. Since the geographical ex-

pansion of coastal state jurisdiction will tend to reduce fishing opportunities for distant water fishing fleets, their pressure on tuna stocks in the remaining high seas will probably increase. Therefore, the first set of practices to consider are those of international organizations.

(A). Practice of international organizations

It is a basic principle of international law that all states are free to fish on the high seas unless otherwise bound by specific international agreements. The ideal of equal access to high seas fisheries under the same roles is fundamental to the conservation program provided for in each convention.[104] With regard to those areas of the high sea and to those species that do not remain within the EEZ, there may be several interested countries, and agreement become more difficult. Problems with initial catch quotas and future adjustments to quotas may prove to be insurmountable, and a single international fishery objective is difficult to formulate because all nations are economically, technologically, biologically, socially, and politically diverse.[105]

For decades some of the most intensely fished areas of the world were subject to the jurisdiction of multilaternal fishery commissions, established or adhered to by all interested states in addition to the coastal state beyond modest exclusive fishing zones. A prime difficulty, perhaps the most important, was that prescribed measures could not be made effective and some nations plainly did not comply with measures they agreed to employ. Elsewhere around the globe no comparable international agencies were established despite excessive fishing.[106] Moreover, many

institutions, however, do not have the authority to deal with socioeconomic problems. Differing objectives, coupled with the common-property aspect of the oceans, have contributed to the inevitable crisis state of many fisheries: that is, development of more fishing capacity than is required to harvest the surplus provided by nature. Excessive fishing capacity (overcapitalization) frequently generates political pressures on the management institutions to soften regulations in terms of seasons or quotas or, in some cases, encourages development of regulations that eliminate or restrict more efficient units in favor of more numerous, less efficient, harvesting systems.[107]

Even if countries can surmount the initial stages of a particular fishery negotiation, the agreement could founder under pressures from outside countries not party to the agreement. These countries may make unacceptable quota demands or simply ignore the regulations. Countries which were originally adherents to the fisheries regime may then feel entitled or compelled to increase their catch to make up for the fish taken by outsiders.[108] If anything is apparent from the previous years of management history, it is that international agencies have not been able to manage well.[109]

Concerning tuna management, none of the existing international organizations have the responsibilities to oversee global tuna management. Even the ICCAT (International Commission for the Conservation of Atlantic Tunas) and the IATTC (Inter-American Tropical Tuna Commission), the two major international organizations for conserving tuna resources, have largely been concerned with the design of strategies to prevent biological

overfishing or biological waste rather than with promoting fisheries development to secure MSY. They do not try to address the problem of global management at all.[110]

(B). State practice

A second consideration is the practices of individual states. Juda indicates that not a single coastal state claiming an EEZ explicitly denies under all circumstances foreign access to that zone for fishery purposes. However, an analysis of EEZ proclamations and legislation reveals that a significant number of states make no mention of any right of access to fisheries in the EEZ by foreign fishermen. Furthermore, of those states which indicate that foreign fishery access in their EEZ is possible, not all refer to any right of foreign access to surplus fish. Instead they stipulate only the need to obtain permits from the coastal states for fishing in the EEZ.[111] However, Carroz and Savini found that fishing in foreign EEZs has come to be governed under the terms of a growing number of diverse bilateral agreements, and such bilateral agreements do not make any specific reference to a requirement to allow foreign vessels access to any fishery surplus in the coastal state's EEZ. They do, however, often contain implied references to that principle or direct mention of factors which the coastal state would take into account when providing access to a foreign fishing vessel. Indeed, coastal states granting access to living resources in their EEZs seem to be careful to avoid quoting or referring specifically to LOS Convention which limit or restrict national sovereignty.[112]

On the matter of coastal state control over tuna and their

management, the position of the United States government to the effect that tuna should be excluded from the exclusive management and jurisdiction of the coastal state in the EEZ appears to be very distinctly out of step with the claims of other states.[113] Most states simply assert that this exclusive management authority in the EEZ extends to the living and non-living resources of that zone without any qualification to the effect that highly migratory species are excepted.[114] Unlike the United States, most coastal states believe that international management must be derived from coastal state authority over tuna within a 200 mile EEZ. Indeed, the argument can be made that for purpose of conservation, coastal state authority provides more incentive to rational governments to manage well a resource for the biological, socioeconomic and political benefits are more predictable and reliable over the long time.[115]

On the other hand, many distant water tuna fishing states have made a series of agreements with coastal states to gain access to fish tuna in the EEZs of other states. Those fishing states have recognized the coastal states have the right to manage tuna in their EEZs.[116] For example, Japan, the largest tuna fishing state in the world, has made agreements with sixteen coastal states to be allowed to fish tuna in the EEZs, and ten among those agreements are signed by governments.[117] The Republic of China and South Korea are in similar situations. Those three states are responsible for almost half of world tuna production.

In 1987, the United States signed a five-year regional fisheries treaty with twelve Pacific island states that sets

forth conditions on U.S. fishing in the Southern Pacific region.[118] It means that almost all of the tuna fishing states have recognized the coastal states' right to control over tuna in their EEZs. It may be concluded that the existing international organizations are only responsible for conserving tuna resources on the high seas, while the coastal states are responsible for managing the tuna resources in their EEZs.

However, more attention should be paid to the development of regional organizations which are organized by coastal states alone, such as the South Pacific Forum Fisheries Agency. The trend is quite clearly that the coastal states are going to organize regional organizations, and the next may be in the pacific ocean side of South American nations' EEZs where the area of CYRA was managed by IATTC before.[119] Those regional organizations will have the potential to form cartels and to use joint licensing arrangements to negotiate with the distant tuna fishing states to get the results which are in best interest for their regions.[120]

Although the joint licensing arrangement has a number of disadvantages for the coastal states, the major problem for the coastal states resulting from such arrangements is how to determine the benefit level and how to share those benefits.[121] However, extra benefits such as economic assistance, if necessary, can be requested from distant water fishing states, because the distant water tuna fishing fleets can not economically fish on the high seas alone.

When regional organizations are established around the world and cooperate closely, world tuna resources will be controlled by

coastal states, not only in their EEZs but on the high seas. Those regional organizations, taken together, will provide a global tuna management regime. May be this is exactly meaning of those tuna provisions of 1982 LOS Covention.

IV. STATUS OF THE TUNA FISHERIES OF THE REPUBLIC OF CHINA

The ROC fisheries production has increased from 425,277 M.T. to 1,094,587 M.T., and the value has increased from 3,865 million N.T. dollars[122] to 75,280 million N.T. dollars between 1966 and 1986 (Figure 4).

For statistical purpose, the ROC fisheries are classified by marine fisheries and aquaculture. The marine fisheries are also classified by the ship's tonnage or engine power, into three categories, namely, deep sea fisheries, inshore fisheries, and coastal fisheries. However, both deep sea and inshore fisheries are referred to distant water fisheries.[123] Between 1966 and 1986, the production of aquaculture has increased from 58,511 M.T. to 266,112 M.T., and the production of marine fisheries has increased from 367,766 M.T. to 828,475 M.T. In marine fisheries, the deep sea fisheries has increased from 169,260 M.T. to 497,403 M.T., the inshore fisheries has increased from 172,267 M.T. to 276,479 M.T., and the coastal fisheries has increased from 25,239 M.T. to 54,593 M.T. in the same period (Figure 5).

In 1986, the production of deep sea fisheries represented 45.4% in quantity (32.7% in value) of total fisheries production. It was followed by inshore fisheries (25.3% in quantity and 22.0% in value), and aquaculture (24.3% and 41.2%), and coastal fisheries (5.0% and 4.1%). Among the species of ROC fisheries production, tuna is the most important.(Table 7) It represented 13.5% in quantity (13.4% in value) of total fisheries production, and 17.9% in quantity (22.7% in value) of marine fisheries production in 1986. It can be concluded that tuna is a higher

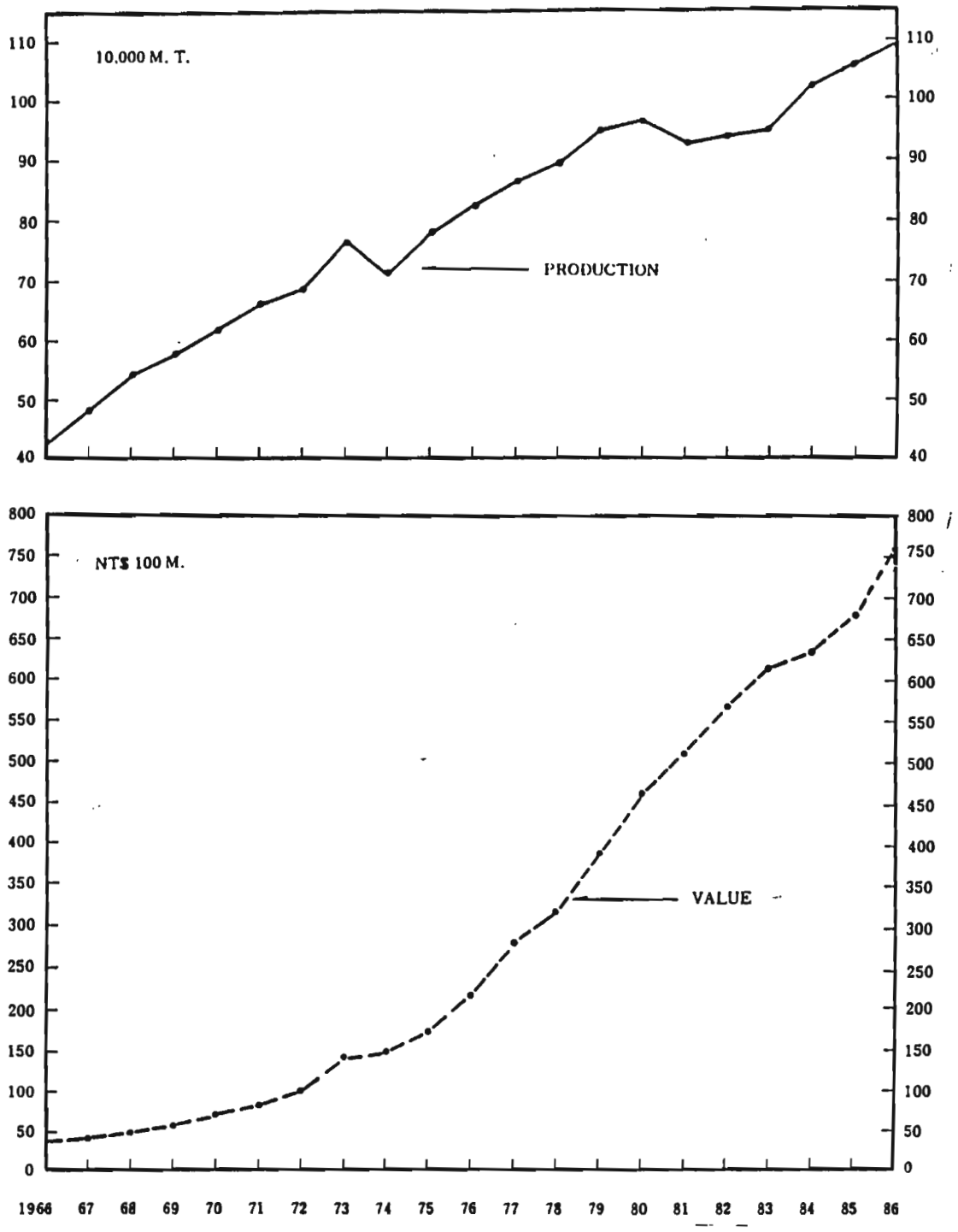

Figure 4. ROC Fisheries Production, 1966-1986

Source: ROC Fisheries Yearbook, 1986.

Note: M.T. refers to metric ton; N.T. refers to new Taiwan dollar.

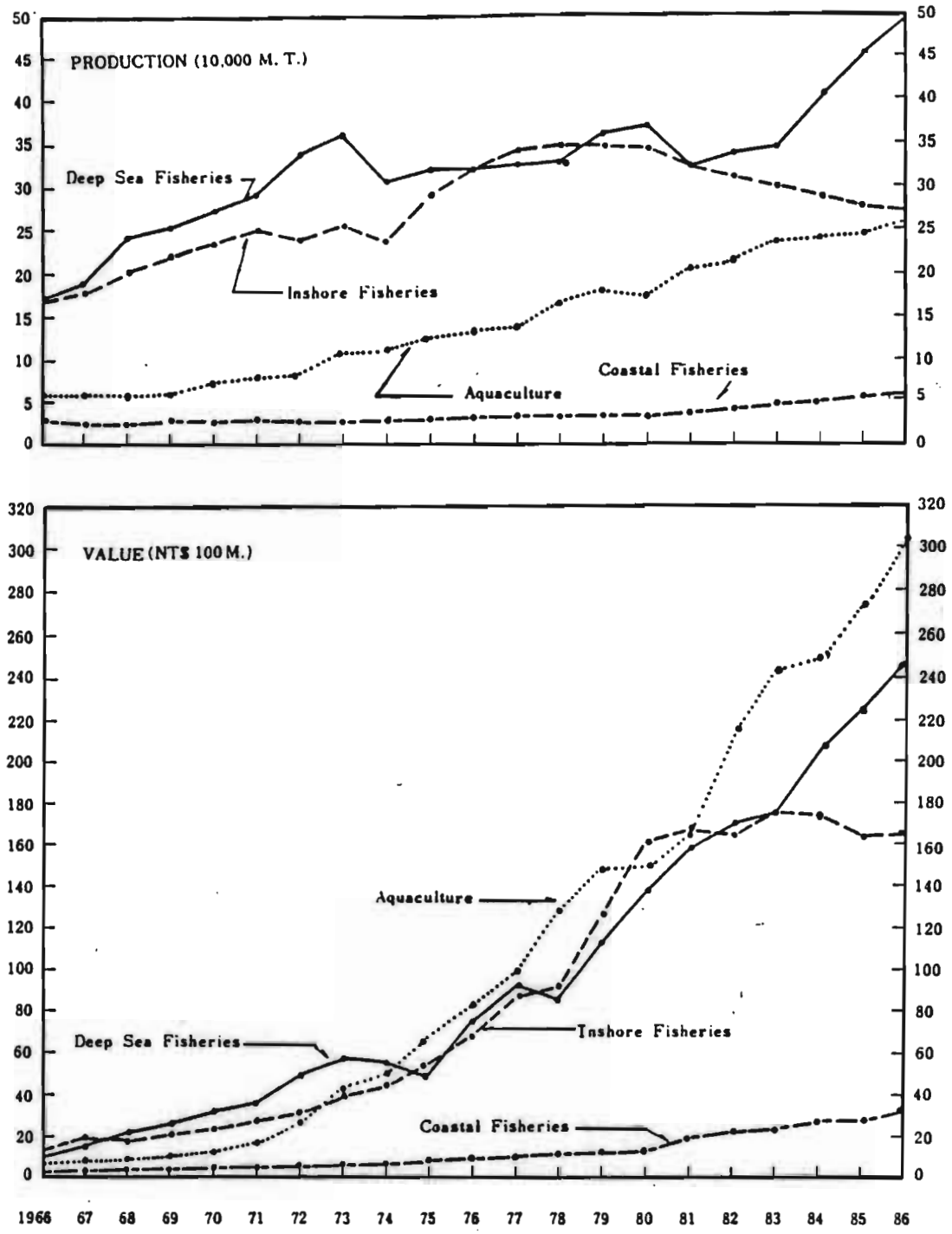

Figure 5. ROC Fisheries Production, by Categories 1966-1986

Source: ROC Fisheries Yearbook, 1986.

Note: M.T. refers to metric ton; N.T. refers to new Taiwan dollar.

Table 7. 1986 ROC Marine Fish Catch, by Species

	Production thousand M.T.	%(1)	%(2)	Value million N.T.	%(1)	%(2)
Tuna	148	18	14	10,052	23	14
Squid	113	14	10	6,954	16	9
Shrimp	88	11	8	6,983	16	9
Shark	44	5	4	1,101	3	2
Bonito	34	4	3	721	2	1
H mackere	32	4	3	961	2	1
Croaker	21	3	2	1,053	2	1
Other	349	42	32	16,464	37	22
Total	828	100	76	44,289	100	59

SOURCE: ROC Fisheries yearbook, 1986

Note: (1). divided by total production of marine fisheries.
(2). divided by total fishery production.
(3). M.T. refers to metric ton; N.T. refers to new Taiwan dollar.

value species in marine fisheries, although it is not the most valuable species in the ROC fisheries due to the higher value of aquaculture products. If the ROC wants to expand her marine fisheries, tuna fisheries should be her first consideration.

1. History of ROC Tuna Fisheries

The tuna fisheries in the ROC can be traced back to 1913 when Taiwan was occupied by Japan. In the beginning, it was fishing tuna by pole jigging, and the fishing ground was only the sea area around Taiwan, and the target fish was shark. The majority of fishing vessels were small wooden ships whose gross tonnage was between 20 and 40 tons.

After World War II, Taiwan was restored to the ROC and became one province of ROC. Although the ROC government encouraged her people to develop the tuna fisheries, results were limited because the tuna fisheries is a highly capitalized business. By 1953 the total number of tuna fishing vessels increased to 353, but only 14 vessels were above 50 tons and average tonnage of tuna fishing vessels was only 19.2 tons. During this period, the fishing grounds were expanded to the South China Sea and waters of North Kalimantan, the Sulu Sea and the Celebes Sea, but most tuna fishing vessels were still fishing in the waters surrounding Taiwan. Those areas are referred to traditional fishing grounds by the ROC.(Figure 6)

In 1953, after four 350-tonnage grade government-owned tuna fishing vessels had successfully fished in the India Ocean, the ROC government made an entire development plan of tuna fisheries to encourage her people to build distant water tuna fishing

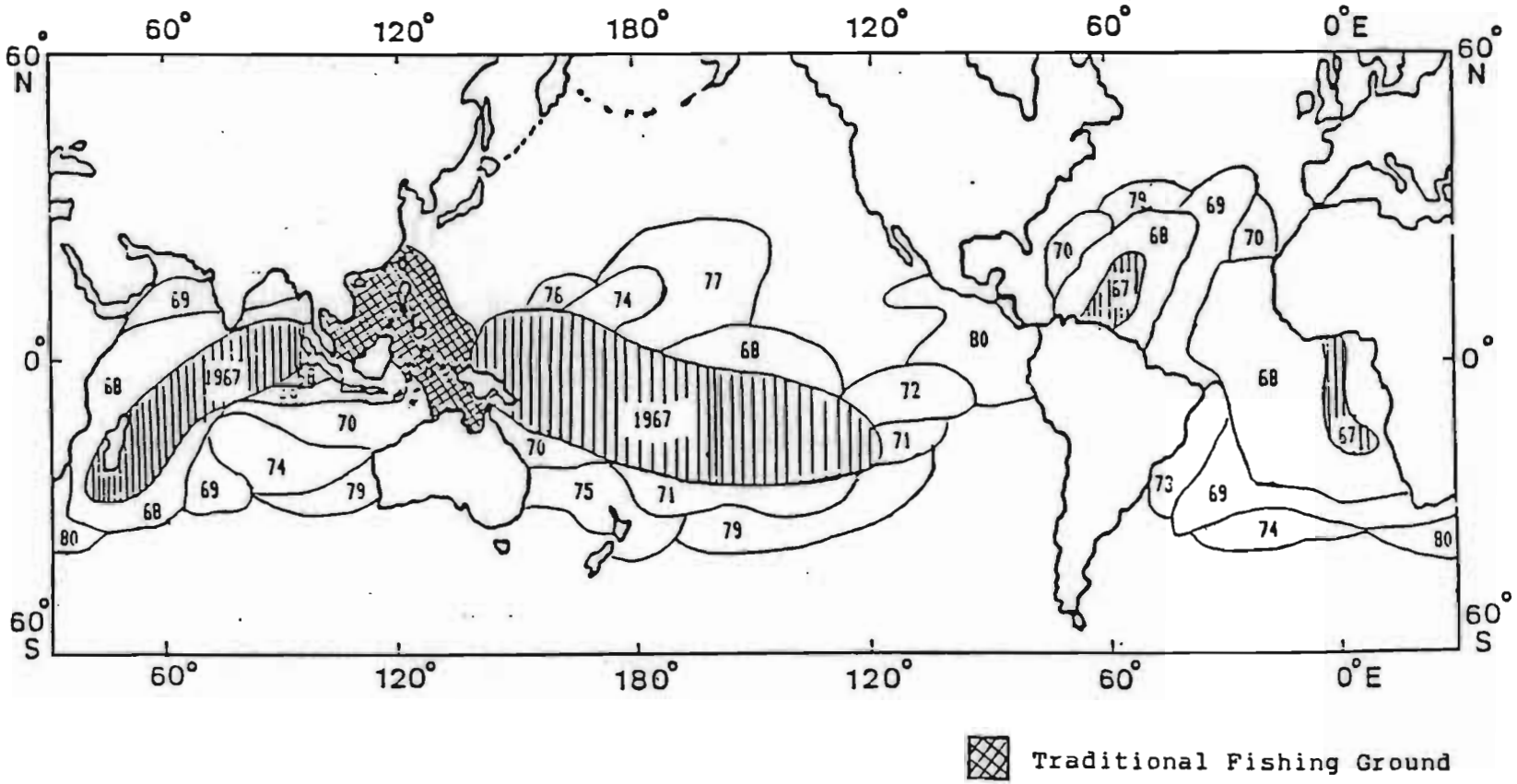

Figure 6. Expansion of the ROC Tuna Fishing Ground

Source: Annual Report of ROC Tuna Distant Water Longlining Fisheries.

Note: Numbers on map refer to year, e.g. 70 refers to 1970.

vessels.[124] The ROC government used US financial aid and applied the loans from International Bank for Reconstruction and Development (IBRD) and Asian Development Bank (ASDB) to make loans to private companies to build about one hundred 350-ton steel tuna long line fishing vessels. In addition, the ROC government also sent many people to Japan to learn the fishing technology of tuna long lining. In this period, some events which had significant impacts on for the development of ROC tuna fisheries are as follows:

(a). On 13 March 1958, the government-owned tuna fishing vessel first used Singapore as an overseas fishing base for the supply and repair of fishing vessels as well as exchanging the crew and landing of the catch. It has expanded to 57 overseas fishing bases around the world in 1987.

(b). In 1958, the ROC had begun to export frozen tuna to the USA, although the quantity was only 5 tons and the value was only 3 thousand US dollars. Now, the ROC supplies more white meat tuna (albacore) to the USA than any other state.

(c). In 1960, the government-owned tuna fishing vessel had first operated in the Atlantic Ocean. In 1987 ROC has about 500 tuna fishing vessels operated in three oceans of the world. The expansion of the ROC tuna fishing ground are shown in figure 6.

The ROC tuna fisheries was seriously impacted when the price of oil price increased dramatically in 1973. Most of ROC distant water tuna fishing vessels returned to Taiwan and stayed in port. Although the ROC government took many steps to help her tuna fisheries, e.g., subsidizing fuel prices and providing low-rate loans, it could not solve the other problem caused by the

decline in world tuna consumption due to the economic depression associated with the oil crisis. The international market price of albacore declined from US 1,200 dollar to 500 dollar per metric ton. However, the international tuna fisheries is very competitive, and the Japanese tuna fisheries faced a much more difficult situation, such like its crew's cost increased sharply, than did the ROC. In 1972 some ROC tuna fishing vessels began to change their freezing equipment which can freeze tuna to -65°C and to alter the fishing target from albacore to bigeye and yellowfin tuna in order to export to Japan for Sashimi, which were only captured before by Japan.

Since 1977, most coastal states have claimed a 200-mile Exclusive Economic/Fishery Zone, and this development has seriously impacted all distant water fishing states. Of course, the ROC was one such state. However, tuna is a highly migratory species and can be caught in substantial amounts by longlining on the high seas. (Table 8) In addition, it was not very difficult to make arrangements to access fishing in coastal states' EEZs through commercial channels, although the ROC had diplomatic relations with few coastal states. The production of the ROC tuna fisheries did not decrease at all, nor did it expand due to the restriction on the number of fishing vessels. Accordingly, the tuna production of ROC in the world ranks dropped from the fourth largest producing country to the ninth in 1985.

In 1982, there were significant changes in ROC tuna fishing industry. Some vessels successfully used gill net to fish tuna on the high seas of the Indian Ocean, although the fishing season is only half year. The other important change was that the govern-

Table 8. Percentage of ROC Tuna Catch Caught Within and Beyond Foreign EEZs.

	Within 200 mile			Beyond 200 mile		
	1979	1980	1981	1979	1980	1981
ATLANTIC						
ALB	27	23	18	73	77	82
BET	30	23	16	70	77	84
YFT	58	37	29	42	63	71
OTHER	30	27	25	70	73	75
SUB TOTAL	28	23	18	72	77	82
INDIAN						
ALB	17	19	16	83	81	84
BET	11	30	30	89	71	70
YFT	28	41	45	72	59	55
OTHER	13	39	47	87	61	53
SUB TOTAL	17	24	23	83	76	77
PACIFIC						
ALB	57	52	44	43	48	56
BET	74	68	55	26	32	45
YFT	90	85	79	10	15	21
OTHER	95	53	57	5	47	43
SUB TOTAL	65	56	47	35	44	53
TOTAL AREAS						
ALB	33	36	24	67	64	76
BET	23	41	32	77	59	68
YFT	58	72	57	42	28	43
OTHER	47	42	44	53	58	56
GRAND TOTAL	35	39	27	65	61	73

SOURCE: Estimated from National Taiwan University, Annual Report of ROC Deep Sea Tuna Longlining Fisheries, 1979-81.

ment encouraged the private companies to develop purse seining fisheries.

2. Current Status of ROC Tuna Fisheries

The ROC tuna fisheries are now using longlining, gillnetting, and purse seining to catch tuna. The operation of ROC tuna fisheries can be divided into two categories, the overseas operation and domestic operation. The overseas operation involves fishing vessels using foreign ports as a fishing base to discharge their production and to transship that production to export destinations. On the other hand, the fishing vessels also get supplies, repairs and exchanges of crew members in those ports. The fishing vessels usually stay at overseas fishing bases many years and get their annual survey in local ports. They usually do not sail back to their home country unless the ships need major repairs. Domestic operations, involve fishing vessels which are usually smaller, and use domestic ports as a fishing base, returning home after every voyage.

(1). Tuna Production in the Republic of China

Before 1985, the ROC annual tuna production was in the range of 90-110,000 metric tons for many years (Table 9). Among the species taken, albacore was the dominant product since 1967, and its annual production was between 50-70,000 metric tons. It was followed by yellowfin (20-40,000 M.T.), bigeye tuna (10-20,000 M.T.), and skipjack and bluefin tuna (1-5,000 M.T.). However, it has dramatically increased to 148,000 M.T. due to the increment of albacore in 1986.

Table 9. ROC Tuna Catch by Species, 1964-1986

thousand metric ton

	TOTAL	ALB	YFT	BET	SKJ	BFT
1964	13	1	6	4	2	0
1965	13	2	7	3	1	0
1966	27	10	12	4	1	0
1967	39	17	14	8	1	0
1968	78	28	35	15	1	0
1969	89	32	40	17	1	0
1970	89	36	36	16	1	0
1971	91	42	32	16	1	0
1972	100	52	31	15	1	0
1973	107	64	28	14	2	0
1974	95	57	23	13	2	0
1975	90	43	29	16	2	0
1976	85	53	22	8	2	0
1977	112	70	27	12	3	0
1978	112	65	31	11	5	0
1979	109	59	34	12	4	0
1980	106	57	32	14	3	0
1981	89	50	26	10	3	0
1982	103	66	23	9	4	0
1983	102	58	26	15	3	0
1984	98	55	26	14	2	1
1985	113	67	24	15	4	2
1986	148	94	27	17	9	1

Source: ROC Fisheries Yearbook

Analyzing the 1986 tuna production (Table 10), the deep sea fisheries lands 134,100 M.T. and represents about 90 percent of the ROC total tuna production. It is followed by the inshore fisheries (13,300 M.T., 9 percent) and coastal fisheries (5,000 M.T., 0.4 percent). However the production value of inshore tuna fisheries represented a greater percentage of the total value than that of its weight, 9 percent by weight in comparison with 17.7 percent by value, because those product caught by inshore fishing vessels can be exported to Japan by air for sashimi at higher prices. By fishing methods, the tuna long lining, which was known the only fishing method used by ROC, catches 128,800 M.T. and represents about 87.1 percent of the total production. However, 18,000 M.T., 12.1 percent of total production, were caught by purse seining and gillnetting in 1986.

In 1986, the production from the overseas operation was 111,700 M.T., and represented about 76 percent of total tuna production, but its value was only about 67 percent of total production value. It is a fact that the dominant production of overseas operation is albacore, whose price is higher than other tuna species of canning material but much cheaper than those tuna used for sashimi. On the other hand, the domestic operations produced 36,200 M.T. and represented about 25 percent of total tuna production, but the value of the production from domestic operation share was about 33 percent of the value of the total production. This indicates that its production is more valuable than those product of overseas operations, because those product caught by domestic operation fishing vessels can be also exported to Japan by air for sashimi at higher prices. It can be

Table 10. Characteristics of ROC Tuna Catch, 1981-86

thousand metric ton

	1981	1982	1983	1984	1985	1986
by Categories						
Deep Sea	67	82	83	79	93	134
Inshore	22	21	20	20	19	13
Coastal	1	1	1	1	1	1
by Fishing Methods						
Longlining	86	99	99	95	100	129
Purse Seining	0	1	2	2	7	12
Gill Netting	1	2	2	1	4	6
Others	2	2	1	1	2	1
by Landing Areas						
Overseas	63	76	75	72	81	112
Domestic	26	28	29	27	32	36
Total	89	104	104	99	113	148

SOURCE: ROC Fisheries Yearbook, 1981-86.

concluded that the deep sea tuna longlining fisheries involving overseas operations is the dominant tuna fisheries of ROC. However, tuna production has significantly increased in recent years through gillnetting and purse seining.

Because Chinese do not like to eat tuna whose muscle fiber is much thicker than that of other fish, almost all ROC tuna production is exported to USA, Japan, Europe (Table 11). About 20-30,000 M.T. is exported to Japan, and the rest is exported through frozen material or canning products. However, more and more Chinese people in Taiwan like to eat sashimi in recent year, and thus they consume more tuna than before.

(2). Current Operation of ROC Tuna Fishing Vessels

There were 2849 fishing vessels engaging in tuna fishing in 1986. Among those fishing vessels, there are 2,084 defined in-shore fishing vessels which are under 50 gross tons, and the other 765 fishing vessels are defined as deep sea fishing vessels which are above 50 gross tons. The distribution and operation patterns of those fishing vessels are described as follows.

A. Longlining fisheries

(A). Deep sea fisheries:

(a). Albacore fisheries

Currently there are 300-400 large tuna fishing vessels fishing in three oceans of the world (Figure 7). In the Pacific Ocean, there are 70-90 vessels using America Samoa, and Fiji as overseas fishing bases, and the average ship's tonnage is 150-250 tons. The major fishing grounds are in deep ocean areas between 5-40°S and 165°W to 160°E.

Table 11. ROC Tuna Utilization, 1984-85

thousand metric ton

	1984	1985
TOTAL LANDING	107.8	121.4
OVERSEAS LANDING	71.4	78.3
EXPORTING JAPAN	19.3	23.3
FOR SASHIMI	15.6	16.0
FOR CANNING MATERIAL	3.7	6.3
EXPORTING OTHER AREAS FOR CANNING MATERIAL*	52.1	55.0
DOMASTIC LANDING	36.4	43.1
EXPORTING JAPAN FOR SASHIMI	12.7	12.7
DOMESTIC UTILIZATION**	23.6	30.4

Source:(1). ROC Fisheries Yearbook, 1984-85..
(2). Japanese Customs Statistics, 1984-85.

Note: * export to USA and western Europe
** most be canned to export.

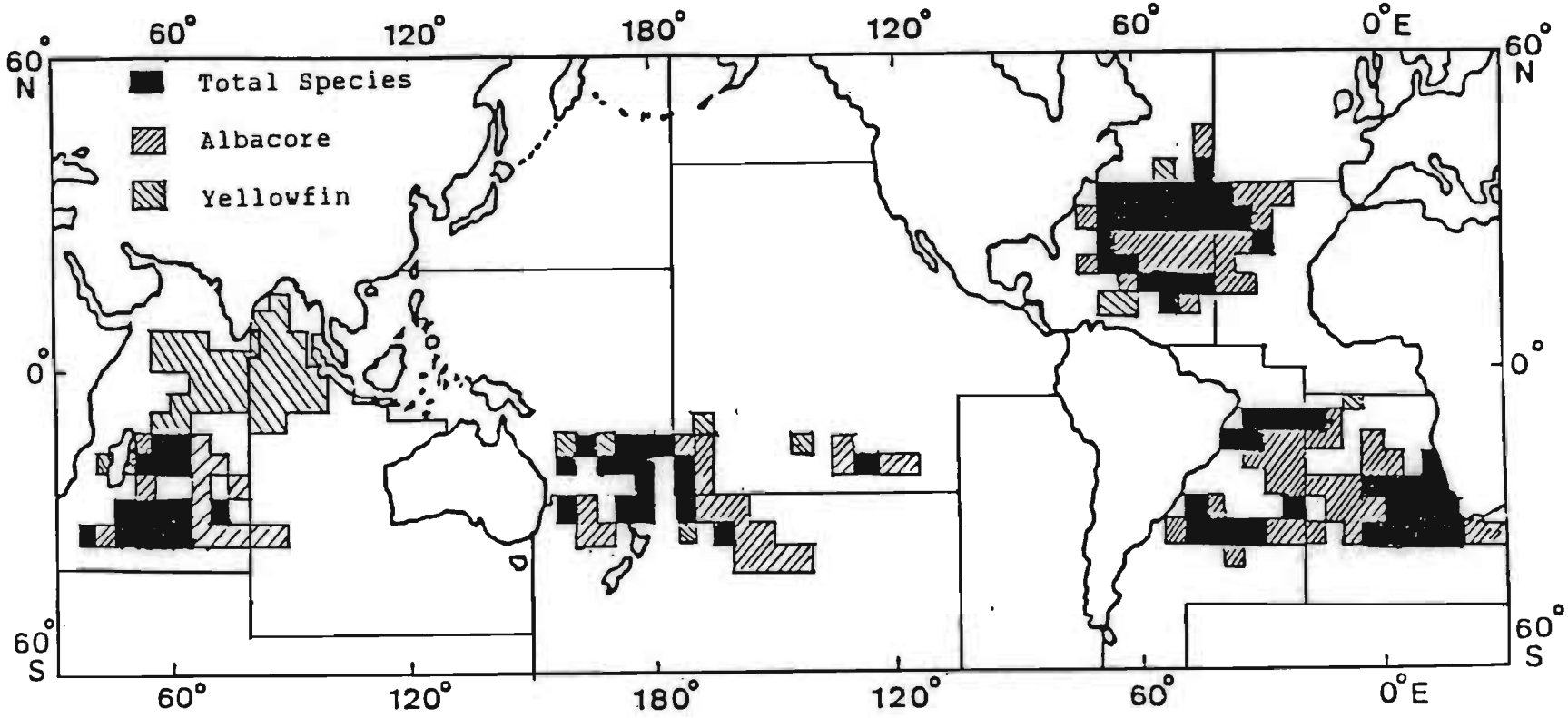

Figure 7. The Major Fishing Grounds of ROC Tuna Longlining Fisheries

Source: Annual Report of ROC Tuna Distant Water Longlining Fisheries, 1986.

In Indian Ocean, there are another 50-80 vessels using Singapore, Port of Louis and Reunion as overseas fishing bases, and the average ship's tonnage is 180-250 tons. The fishing grounds are in deep ocean areas between 15-40°S and 40-100°E.

There are 180-230 the newest fishing vessels separated into two groups fishing in Atlantic Ocean, and the average ship's tonnage is 250-400 tons. One group, fishing in the north Atlantic Ocean, have 80-100 vessels using Las Palmas, Saint Martin, Port of Spain and Saint Lucia as overseas fishing bases. The fishing grounds are in deep ocean areas between 30-45°N and 20-70°W from October to February, and 15-25°N and 20-60°W from April to August. The other group, fishing in the south Atlantic Ocean, have 100-130 vessels using Cape Town and Montevideo as overseas fishing bases. The major fishing grounds are in deep ocean areas 20-40°S and 30°E to 10°W from February to August, 30-45°S and 40-60°W from April to August, 10-30°S and 10-35°W, 10-30°S and 20-35°W from October to February.

(b). Sashimi tuna fisheries

Currently there are 80-100 tuna fishing vessels equipped with freezer capability so that tuna can be frozen to -65°C and which catch bigeye and yellowfin tuna for export to Japan for Sashimi. Those vessels use Singapore as an overseas fishing base and their average tonnage is 300-700 tons. The major fishing area is all of the Indian Ocean.

(B). Inshore tuna fisheries:

There are about 2,000 tuna fishing vessels which are under 50 tons using domestic ports as operating bases to fish yellowfin tuna. The major fishing ground are China South Sea and eastern

waters of Luzon Islands. Annually production is about 20,000 M.T. Half of this production goes to domestic canneries, and the other half is exported to Japan for Sashimi by air.

B. Deep sea gillnetting tuna fisheries:

There are 80-100 tuna fishing vessel using Singapore as overseas operating base to fish albacore by gillnetting, and the average ship's tonnage is 300-700 tons. The major fishing area is the Indian Ocean and the fishing season is between November to May.

C. Deep sea purse seining tuna fisheries

There are 13 purse seiners, whose gross tonnage is between 500 and 1000 tons, to fish skipjack in western South Pacific Ocean and to use Guam as overseas fishing base. The production is supplied to the domestic tuna cannery or exported to the cannery of Tailand or United States.

The purse seiner is the most expensive fishing vessel among tuna fisheries, because the average price of construction in ROC is 5 million US dollars per vessels. However new purse seiners are being built at the rate of one vessel every two months, and new orders for construction have been scheduled to the beginning of 1989. It is estimated that in 1990 there will be 20- 30 purse seiners in the ROC, and the total tuna production will increase over 200 thousand M.T.

3. Arrangements with Coastal States to Access Fishing Tuna in their EEZs

After the United States claimed a 200 miles fishery conservation zone (FCZ) in 1977, almost all coastal states have

claimed either an FCZ or an EEZ. Although tuna can be caught on the high seas, the distant water tuna fishing vessels still need access to fish in the FCZs/EEZs. Since 1977, ROC tuna fishing vessels have been permitted to access fishing in the FCZs/EEZs by 13 coastal states through inter-governmental agreements or commercial channels. These arrangements are described as follows.

A. Pacific Ocean

(A). USA (American Samoa)

Since 1977 the USA has claimed its 200 miles fishery conservation zone, the ROC government has signed a Governing International Fisheries Agreement (GIFA) with the United States.[125] Although the United States has not claimed jurisdiction over highly migratory species in its EEZ, the United States definition of highly migratory species includes only tuna.[126] The American view is different from that expressed in 1982 LOS Convention which included many other highly migratory species, e.g., all species of marlin. The fishery agreement terminated in 1986 and has not been renewed due to the problem of ROC squid fishing vessels incidentally catching salmon on the high seas of the northern Pacific. However there were about 30-60 ROC tuna long lining vessels to apply for licenses every year that the agreement was in force.[127]

(B). Cook Islands

There are 55 inshore tuna long liners (below 50 tons) fishing in the EEZ of Cook Island under governmental fisheries agreement between ROC and Cook Island.[128] The fish catch is not

limited, and the access fee is 1,505 U.S. dollars per vessel per year.

(C). Papua New Guinea (PNG)

There are 11 tuna purse seiners to be allowed fishing in the PNG's EEZ as a result of agreement achieved through commercial channels.[129] The access fee charged is 5 percent of free on board (FOB) value of total production. There are no limitations on quantity of catch.

(D). Federated States of Micronesia

There are 54 tuna long liner and 11 tuna purse seiners operating in the EEZ of the Federated States of Micronesia, and there is no limitation on the fishing catch. The access fee are divided into four categories: 1,200 US dollars per long liner (ship tonnage under 50 tons); 3,000 US dollars per long liner (ship tonnage between 50-100 tons); 3,500 US dollars per long liner (ship tonnage above 100 tons; and 17,000 US dollars per purse seiner.

B. India Ocean

(A). Indonesia

There are 8 tuna long liner to be permitted to fish in the Indonesia's EEZ through commercial channels. The access fee is related to the ship's tonnage, and the fishing catch is not limited.

(B). The Philippines

There are 19 tuna long liner allowed to fish in the EEZ of the Philippines through commercial agreements. The access fee is tied to the gross profit (after subtracting the cost) of total

production, and the rate is 12 percent. Again there is no limit on fish catch.

(C). India

There are 4 tuna long liners allowed to fish in the EEZ of India through commercial agreement, and the fishing catch is unlimited. The access fee is tied to ship tonnage or the value of total production.

(D). The Maldives

There are 8 tuna long liners allowed to fish in the EEZ of the Maldives through commercial channels. The total allowable catch for ROC is 7,000 metric tons in 1987, and the access fee varies by fish weight, 68 US dollars per metric ton. In addition, every vessel is to deposit an amount of money, 21.5 US dollars per ship ton, before access fishing.

C. Atlantic Ocean

(A). The Republic of South Africa (RSA)

The RSA and the ROC have very good relations, and Cape Town is the one of most important ROC overseas fishing bases although the RSA's FCZ is not the major tuna fishing ground for the ROC tuna fisheries. When the RSA claimed a 200 mile Fishery Conservation Zone in 1 November 1977, both countries immediately signed an agreement on mutual fishery relations which entered into force it on January 26, 1978. Concerning the ROC tuna long liner access to fishing in the RSA's FCZ, an additional memorandum of understanding was signed simultaneously.[130] It has been agreed as follows:

(a). Prior to 1 January 1978 ROC tuna long liners will be

exempted from the requirement of the fishing permits issued by RSA.

(b). As from 1 January 1978 ROC tuna long liners must be in possession and have on board a valid permit issued by the RSA. However the number of fishing permits to ROC tuna long liners ''will for 1978 not be restricted to below the equivalent of the catching effort deployed during 1977.''

Under this agreement and memorandum the ROC has been granted 60-120 permits on tuna long liner by RSA per year since 1978, and there is no further fishing quota on tuna or limitation on the numbers of fishing vessels.

Although there are also some differences between the two countries, it is easy to solve because both countries respect each other and realize the nature of fisheries. For example, the RSA asked the tonnage fee for those tuna caught by the ROC in its EEZ according to the fishing data supplied by the ROC. Due to the nature of highly migratory of tuna, the ROC fishermen can easily make up their operating position on the high seas to avoid to pay the tonnage fee, which will also destroy the accuracy of ROC tuna statistics system. After the RSA realized that fact, the RSA gave up the proposal although the proposal had been published officially.

(B). Uruguay

Although Uruguay does not agree all foreign fishing vessels to access fishing in its EEZ by payment, six ROC tuna long liners are permitted access to fish in Uruguay's EEZ through fishery investment since 1984. Because the investment regulation of Uruguay changes frequently, there is only one tuna vessel fishing

in Uruguay's EEZ in 1987. The other five tuna long liner withdrew in 1986.

(c). Argentina

Although Argentina has granted access to7 ROC tuna long liners to fish in its EEZ through commercial channels since 1984, there were no fishing vessels to operate in its EEZ because Argentina's regulations change very frequently.

(d). Bermuda (UK)

There are more than 50 tuna long liners allowed permission to fish in the 50-200 miles of Bermuda as the result of commercial agreement. The license fee is 500 US dollars per vessel per year.

(e). Trinidad and Tobago

There are about 40-60 tuna long liners involved in joint venture operations with Trinidad and Tobago through commercial agreements. The condition is that the ROC fishing vessels shall export their production through the government owned company of Trinidad and Tobago, and that company is to get 7 percent of the value of total production, but the joint venture vessels can get cheap local fuel.

4. Relationships with International Tuna Conservation and Management Organizations

Although the ROC is not a member nation of any of the existing international tuna conservation and management organizations, none of them can neglect the fact that ROC is one of the most important tuna fishing nations in the world, catching over one forth of world production of albacore and over 4 percent

of the world tuna total production. If any existing international organizations attempts to develop conservation and management measures based on scientific information, it will need the cooperation and support of the ROC, both in collection of fishing statistics and acceptance of regulation. That is why Joseph thinks that the fact that the ROC cannot be a member of international bodies is a problem of international tuna management. As he notes ''Management of tuna cannot succeed unless all significant participants in the fisheries are full partners in any agreement.''(131)

The ROC has not only established a research group for tuna fisheries resources at the National Taiwan University and spends over 200 thousand US dollars per year to process the fishing data which be collected from her 57 overseas fishing bases around the world directly, but also has established a strict regulations to punish those captains who do not supply their fishing records in the required time. The ROC has been focusing at the assessment of albacore resources of the world, because the ROC is the only nation to catch large quantity of albacore as target fish. This explains why an ROC scientist was invited to be a rapporteur of assessing albacore resource in the Species Rapporteurs Meeting of Standing Committee on Research and Statistics (SCRS) of ICCAT in 1986, although the ROC is not a member of ICCAT.

In fact, since the 1970's, the ROC has had very good relationships with ICCAT and IATTC, the two main international organizations on tuna management, and has been invited to send observers to their annual meetings every year. The ROC not only supplies them with scientific information every year, but also

supports and carries out their regulations. Although the ROC is not a member of FAO, it was invited by IPFC to send observers to its meetings of the Indo-Pacific Tuna Program (IPTP) since 1986. SPFFA also has contacted with the ROC.

V. PROSPECTS OF THE ROC TUNA FISHERIES

In 1984, the ROC government re-organized her fisheries department, by established a Council of Agriculture, and re-assessed her fisheries policies in detail. Aquaculture was closely examined in this context. It was found that the annual production of aquaculture had increased to 245,000 tons in 1984 and represented about 24 percent of total fish production in weight (37 percent in value). It is impossible, however, to continuously use the limited land to develop aquaculture because Taiwan is a small island about 14,000 square miles in size and with a population of about 20 million. The other disadvantage of development of aquaculture is that aquaculture uses underground fresh water resources, and its use has led to the subsidence of some land area below the sea-level. The conclusion of the Government assessment was that further development of aquaculture be stopped and to stress again the development of distant water fisheries.

Fishing for squid has developed very quickly in recent years and has allowed the ROC to become the second largest fishing country of the world in 1985. On 6 January 1988, the ROC government announced that the regulation to forbid her fishermen to build additional conventional distant water fishing vessels would be phased out in the next two or three years.[132] Furthermore, the ROC government announced continuously that it will invest 600 million US dollar on public fisheries facilities to develop her distant water fisheries on 15 February 1988.[133]

The establishment of an 200 mile exclusive economic or a

fishery zone is sanctioned by customary international law. Almost all coastal states have declared their own exclusive zone for fishery management purposes. In their exclusive zones, evidence shows increasingly that the coastal states are starting to phase out foreign distant water fishing fleet from their exclusive zones. The United States, for example, has decided that there will be no foreign vessels fishing inside the 200-mile limits of the United States North Pacific in 1988. The US North Pacific Management Council, which control catch allocations, has also directed the major share of the quotas to domestic use.[134] Following these trends, the ROC should be careful to choose in which kind of conventional distant water fisheries it encourages expansion.

Among all conventional fisheries, the trawling fisheries, which must operate in the coastal water for demersal fish, provide the least opportunity for the ROC to expand. All coastal states will maintain the fisheries resources at a high level for conservation purposes, or develop their own fisheries for economic or recreational purposes. The existing distant water fishing states will face more and more difficult conditions, including higher and higher economic compensation and more and more restrictive regulation of joint ventures to access fishing in coastal states' EEZs, until they can no longer afford the costs.

Tuna, though, is a highly migratory species, so it can not be managed well by individual coastal states in their EEZs; a coastal state can not by itself adopt effective management measures to conserve the tuna resources because exploitation may

and does occur in the region beyond its EEZ. On the high seas, none of the existing international organizations have the position to oversee global tuna management. Even the ICCAT and IATTC, the two major international organizations for conservation of tuna resources, have largely been concerned with the design of strategies to prevent biological overfishing or biological waste rather than with promoting fisheries development to secure MSY. It can be concluded that this management system implies that partial property rights over tuna resources can be exercised by the coastal state while these species are migrating through areas of the coastal state's EEZ, but they are common property resources while migrating outside the 200 mile boundaries.

Although many tuna resources are estimated to be fully exploited, it is an important fact that tuna would be virtually impossible to overfish to a point that would threaten biological extinction because of their high fecundity, rapid growth, and worldwide distribution.[135] A large quantity of tuna can there be taken by distant water fishing fleets on the high seas. In addition, a potential skipjack tuna catch in the western Pacific of 10 million metric tons is estimated by South Pacific Commission.[136]

Concerning the policies of coastal states, a survey of legislative objectives for fishery management in a 200 mile zone shows the following facts: (1) a surprisingly large number of enactments contain no statement of objective at all; (2) where objectives can be identified the preponderant emphasis is upon general economic and social goals rather than biological.[137] Given the partial property rights of coastal state over tuna

resources in its EEZ and no effective international tuna management system of allocation on the high seas, it can be postulated that each coastal state will seek to ''sell'' all the tuna it can, knowing that another country will do so if it does not. No coastal state will attempt to conserve tuna stock because what it can preserve, another will ''sell.''

If the coastal state refuses to enter into cooperative tuna fisheries arrangement then the contribution of the relevant fisheries to that coastal state's national income will be reduced at least for two reasons. First, the tuna resource rent to be enjoyed from any given level of harvest will be diminished. Second, because tuna are highly predatory in the marine food chains, conserving tuna resource which will migrate to other state's EEZ and high seas means the coastal state will lose other valuable living resources in its EEZ, which originally belong to the coastal state. It should be recognized that an individual coastal state does not own the tuna resources themselves, and only has sovereign rights over those resources while in the migratory pathways of those resources in its EEZs. In addition, if the coastal state is to set total allowable catch deemed by the international community to be unconscionably low, it would invite poaching by distant water nations which the coastal state would be able to counter only through the implementation of prohibitively ''expensive'' surveillance and enforcement procedures.[138] That is why Papua New Guinea, whose EEZ is one of the most important fishing areas, does not deny fishing access to any tuna vessel owner who is prepared to pay the fee.[139] From the existing experiences of the Republic of

China, it can be also certified that many coastal states do not take any actions on tuna conservation in their EEZs, including restriction on fishing vessels and catch quantity.

As mentioned above too, tuna is highly migratory species and its fisheries follow the migration of fish stocks. Tuna fisheries are more capital intensive, requiring more advanced technology than does trawling. In regard to world consumption of tuna, the top five consuming states consume about 61 percent of world tuna production. Again it should be noted that tuna fisheries are among the most competitive international fisheries in the world, competing for limited resources. That is why the top ten fishing states still accounted for 86 percent of the world catch in 1985, although more and more tuna resources, especially skipjack tuna, have been exploited. Accordingly, developing coastal states may will choose to develop their trawling fisheries rather than tuna fisheries.

Even though an individual coastal state develops its own tuna fisheries, such like Mexico, that state will become a new distant water fishing state because its own tuna resources in EEZ can not support a competitive tuna fisheries.[140] The coastal state, a new distant water fishing state, then also needs to face all the problems of the traditional tuna distant water fishing state: a competition for access to fishing grounds, for international markets, and in regard to new technology and on investment. In other words, a coastal state through whose EEZ tuna will migrate through its EEZ, may not have much better opportunities to develop its own tuna fisheries than traditional tuna distant water fishing states. In a case study evaluating

the alternative institutional arrangements for tuna fisheries development within Indonesia's EEZ, the results showed that unless the social weight of the value added by indigenous enterprises (including the domestic and joint venture operation) is at least one-and-a-half to two times, a licensing arrangement for foreign vessels, even at a relatively low license fee, is preferable to an indigenous arrangement.[141] All of these facts imply that the ROC still has opportunity to expand her tuna fisheries. It can be concluded that before an international tuna management institutions can take the responsibility of tuna management both within and beyond the EEZs and manages well, none of coastal states will refuse the distant water fishing fleet access fishing in its EEZ by payment or joint venture.

As mentioned before, the development of regional organizations, such like SPFFA, is the most significant event for the future of international tuna management. Although the SPFFA was established in 1979 and has not been authorized to manage tuna directly,[142] more and more evidence shows that the second regional organization will be developed in the Pacific side of South America.[143] Those states in South America know much better how to manage tuna resources and how to negotiate with distant water fishing states than those states in the South Pacific, because many of them were the members of IATTC, the best international organization of tuna management in the world.[144] When that regional organization is established and joins with the SPFFA to manage tuna resources in the Pacific Ocean, it will result in over 52 percent of world tuna production under their influences.[145] Any distant water fishing state which is a new

entrant for those area controlled by those regional organizations will face stricter conditions, or no chance at all, to get access fishing in those areas.

In other words, before those efficient regional organizations developed, the ROC should expand her distant water tuna fisheries as soon as possible. After those regional tuna management institutions are established, the ROC will find it more difficult to get access to fishing in the Pacific Ocean controlled by regional organizations due to lack of historical involvement.

However, if the ROC has decided to expand her tuna fisheries, it should be recognized that the tuna fisheries is the most competitively international fisheries in the world, not only in terms of access to the fishing grounds, but in the international tuna market. In order to increase the competitive power of her tuna fisheries, the ROC government should take the following actions:

(A). **Strengthening tuna resource research:** Although the ROC has invested US 200 thousand dollars per year on tuna resource research, funding is equivalent to only 0.06 percent of total value of tuna production. Many studies, including those on tuna biology and population dynamics, have not been done systematically.[146] Due to her poor political position in the international community, it should be recognized that the only chips for the ROC to gain access to fish in coastal state EEZs are economic power and scientific research. On the other hand, the existing international organizations of tuna management have

invited the ROC, a non-member, to attend their meetings, because the ROC is not only an important a large distant fishing state, but the ROC can supply information which they need. A strong research effort is the only way to protect the benefits of ROC tuna fisheries in those organizations.

The expenditure of an amount of at least 1 percent of the value of tuna production should be considered to reinforce her tuna research capacities.

(B). **Adopting flexible policies on the administration of tuna fishing industries:** As discussed above, tuna fisheries is the most competitive international fisheries. Improving the economic efficiency of tuna fisheries is the most important factor determining the success of expansion of ROC tuna fisheries. The ROC government has adopted many flexible measures in past five years which include:(1). allowing the captain to hire local crews in overseas fishing bases, but not exceeding one third of total crews. (2). allowing the vessels to operate under foreign flags with conditions. (3). revising the customs law to allow those vessels which operates under foreign flags to ship back a part of their catches to Taiwan on a basis of duty free. However, more flexible policies shall be further considered to use on tuna fisheries by the ROC government.

(C). **Avoiding to the use of subsidies:** Any subsidy on tuna fisheries will distort the real economic profits. Although Japan and USA may have provided some subsidies to pay access fees,[147] the benefits will be shared by their domestic con-

sumer because almost all their tuna production is consumed by them. Contrariwise, as almost all ROC tuna production is exported, a subsidy can only benefit the foreign consumer.

However, the ROC government should support her tuna boatowners association to build a foundation to expand her domestic tuna consumption market, to establish overseas fishing bases, to collect the information of world tuna fisheries, to negotiate fishing access agreements with coastal states, etc. In addition, as mentioned above, although tuna are thought of as a highly migratory species, the fishing areas are concentrated in five major fishing areas, the western central, eastern central and north- western Pacific (FAO code 71, 77 and 61), and eastern central Atlantic (FAO code 34) and western Indian (FAO code 51). Those areas account for some 85 percent of world tuna production, and most coastal states surrounding those areas are less-developed or developing countries. The ROC government should help her tuna fisheries to get access fishing in those EEZs through trade negotiations or economic assistance with those coastal countries.

(D). **Balancing the development of tuna fisheries:** As mentioned before, skipjack and yellowfin caught by purse seining are the most important source of tuna in terms of tonnage harvested, but the ROC was not much engaged in these tuna fisheries before 1983. The ROC should encourage her fishermen to invest in purse seining tuna fisheries to increase her tuna production, but it should be recognized that the purse seining tuna fisheries relies much more on operation in coastal waters

than does longlining. If the purse seiner can not get access to fish in coastal waters, the fishing vessels can not easily fish for other species. On the other hand, tuna longlining and gillnetting can operate on the high seas alone because the vessels can fish tuna and other species as well on the high seas in the different fishing seasons.

A model of such an operation, combined to use gill net to fish tuna in the Indian ocean and squid in the Pacific Ocean or to use long line and jig for tuna and squid in the Atlantic Ocean, has been developed recently in the ROC. However, more attention should be paid to such operational models because it is the only way that the distant water fishing fleet can escape from the restriction of coastal states, even after regional organizations are developed.

The ROC should expand the albacore and sashimi tuna longlining fisheries in a different way. The expansion of albacore fisheries should cease because albacore has shrunk in importance on the international tuna market and albacore longlining fisheries require too much input of man power in comparison with its production value. Those existing fishing vessels should be gradually transferred to catch a variety of species on the high seas, and to get the maximum profit from every species and every fishing season. On the other hand, the sashimi fisheries should be expanded, not only for their higher production value, but as there is increasing demand in domestic consumption market.

VI. Conclusion

Since UNCLOS aimed only to establish a framework for a new fisheries regime, details of fisheries management were left incomplete. The eventual evolution of workable fisheries arrangements will require the addition of other principles. Due to the process of development of international law, the evolution of rules depends on actions taken by interested states. If a development reflects the needs of a substantial majority of interested states, the evolution of legal rules may follow quickly and easily, regardless of the lack of precedents.

After the United States signed a five-year fisheries treaty with twelve Pacific island states to access fishing tuna in their EEZs in 1987, the article 64 of 1982 LOS Convention have been clarified that the coastal state has sovereign rights over tuna in its EEZ. This is a good development for the ROC which plans to expand her distant water tuna fisheries, because the ROC can negotiate the access to fishing in EEZs in negotiations focusing on economic considerations rather than, political considerations, as would be the case in international organizations.

Because tuna fisheries are more capital intensive, requiring more advanced technology than does trawling, developing coastal states may still choose to develop their trawling fisheries rather than tuna fisheries. However, tuna is a highly migratory species, so it can not be managed well by individual coastal states in their EEZ; on the high seas, none of the existing international organizations have the enough authorities to enforce their regulations to conserve tuna stocks. Consequently, each

coastal state may will seek to ''sell'' all the tuna it can, knowing that another country will do so if it does not. It can be concluded that before an international tuna management institutions can take the responsibility of tuna management both within and beyond the EEZs and manages well, none of coastal states will refuse the distant water fishing fleet access fishing in its EEZ by payment or joint venture.

Even though an individual coastal state develops its own tuna fisheries, that state will become a new distant water fishing state and also need to face all the problems of the traditional tuna distant water fishing state: a competition for access to fishing grounds, for international markets, and in regard to new technology and on investment. In other words, the coastal state may not have much better opportunities to develop its own tuna fisheries than traditional tuna distant water fishing states.

All of these facts imply that the ROC still has opportunity to expand her tuna fisheries. However, the development of regional organizations, such like SPFFA, is the most significant event for the future of international tuna management. More and more evidence shows that the second regional organization will be developed in the Pacific side of South America. Before those regional organizations developed, the ROC should expand her distant water tuna fisheries as soon as possible.

Finally, if the ROC is to expand her distant water tuna fisheries, it must increase her competitive ability in tuna fisheries. As suggested above, the strengthening of tuna resource research, the adopting of a flexible tuna fisheries policy, the

avoiding of subsides, and the balancing of the development among purse seining, longlining, and gillnetting fisheries are the important factors for success of the expansion of ROC tuna fisheries.

Notes

1. B.J Rothschild, ''Introduction,'' in B. J. Rothschild (ed.), Global Fisheries : Perspectives for 1980s, New York:Springer-Verlag, 1983, pp.1-6.

2. 1985 FAO Yearbook of Fishery Statistics, Rome.

3. J. W. Dellapenna and A. Wang, ''A Proposed Fishery Conservation and Management Act for the Republic of China,'' Fordham International Law Journal, 5:35-89(1981), and ''The Republic of China's Relating to the Territorial Sea, Continental Shelf, and Exclusive Economic Zone: Legal and Economic Aspects,'' Boston College International & Comparative Law Review, 3(2):353-376(1980).

4. A. Wang and H. Liu, Studies on Problems and Policies of Deep Sea Fisheries for the Republic of China, published in Chinese by the Executive Yuan of ROC, (1978)

5. J. Joseph and J. W. Greenough, International Management of Tuna, Propoise, and Billfish: Biological, Legal and Political Aspects, Seattle:University of Washington Press, 1979. See also J. Joseph, ''International Tuna Management Revisited,'' in B. J. Rothschild supra note 1, p.123-150; J. Joseph, ''The Management of Highly Migratory Species: Some important concepts,'' Marine Policy, 1:275-288(1977).

6. J. E. Bardach and P. J. Ridings, ''Pacific Tuna: Biology, Economics and Politics,'' Ocean Yearbook, 5:29-57(1985); W. H. Baylift, Synopses of Biological Data on Eight Species of Scombrids, IATTC Special Report No 2, La Jolla, 1980; H. Kakamura, Tuna Distribution and Migration, London:Fishing News (Books) Ltd., 1969.

7. See Annex I of the 1982 LOS Convention, A/Conf. 62/122 (October 7, 1982). The text of this convention appears in International Legal Materials 21:1261-1354 (November 1982). Hereafter cited as 1982 LOS Convention.

8. Supra note 5.

9. Id.

10. Id.

11. Id.

12. Calculated from 1985 FAO Yearbook of Fishery Statistics, Rome.

13. ADB/FAO, TUNA, INFOFISH Market Report Vol. 2, 1983.

14. S. B. Saila and V. J. Norton, ''Tuna: Status, Trends and Alternative Management Arrangements,'' Resources for the Future

/Program of International Studies of Fishery Arrangements, Paper No 6, June 1974.

15. Supra note 5.

16. IATTC Convention, 1 UST 230, TIAS 2044.

17. IATTC, '' Annual Report of IATTC, 1986,'' La Jolla, USA, 1987.

18. Id.

19. J. Sha, ''Attendant Report of 1984 IATTC Meeting,'' Tuna Fisheries Monthly, 174:2-4(1985).

20. Supra note 17.

21. The EEZs of Costa Rica, Ecuador, and Mexico produced the average 45 percent of the combined yellowfin and skipjack catch of the EPO in 1970-74.See supra note 5.

22. The PAQ system involves that tuna management would be based on open access to all resources and would be administrated by an international agency that (1) sets overall catch quotas, (2) issues international licenses for fishing vessels, (3) partially allocates the catch to coastal nations, (4) collects participant fees based on catches, (5) redistributes resulting proceeds among nations, (6) and provides for enforcement and control of fleet size. For details see supra note 5.

The QC system involves that tuna management would be based on open access to all resources and would be administrated by an international agency that (1) sets overall catch quotas, (2) issues quota certificates which are allocated among nations on the basis of any agree-on set of weighted criteria (historical fishing, length of coastal, distribution of historical catches, distribution of fishery, fleet size, etc), (3) establishes an international tuna exchange forum to allow each nation to buy, rent, or lease fishing effort and trade quota certificates with any member of the international community, (4) and imposed a small tax on tuna landings to fund research and enforcement. For details see D.M. King, ''International Management of Highly Migratory Species: Centralized versus Decentralized Economic Decision Making,'' Marine Policy, 3:264-277(1979).

23. Id.

24. Supra note 5.

25. A. Szekely, ''Implementing the New Law of Sea: The Mexican Experience,'' in B. J. Rothschild supra note 1, pp.51-72.

26. Supra note 5.

27. ICCAT Convention, 20 UST 2887, TIAS 6767.

28. ICCAT, ''Report for biennial period, 1986-1987, Part I

(1986),'' Madrid, Spain, 1987.

29. H. Liu and J. Sha, ''Attendant Report of 1986 ICCAT Meeting,'' China Fisheries Monthly, 413:15-19(1987).

30. Supra note 28.

31. Constitution of the United Nations Food and Agriculture Organization, TIAS 4803, UST 12.1.980.

32. Biennial Report of Japanese Tuna Fisheries, p.287-288(1985)

33. Id.

34. Id.

35. The South Pacific Forum was formed in 1971 and is composed of the political leaders of Australia, New Zealand, and eleven island states: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, and Western Samoa. Palau and Marshall Islands have observer status. The Forum meets annually and the site of the meeting is rotated among the Member States. The Secretariat of the Forum, the South Pacific Bureau for Economic Co-orperation, is located in Suva, Fiji. See J.V. Dyke, and S. Heftel, ''Tuna Management in the Pacific: An Analysis of the South Pacific Forum Fisheries Agency,'' University of Hawaii Law Review, Vol. 3, p1-65, 1981.

36. For the text of the convention establishing SPFFA see ''South Pacific Forum Fisheries Agency: Relevant Agreements in FFA Countries,'' in FAO, Report of the Expert Consultation on the Conditions of Access to the Fish Resources of the Exclusive Economic Zone, Annex 18, FAO Fisheries Report No. 293, (Rome: FAO, April 1983), p201-204. Hereafter cited as SPFFA Convention.

37. Supra note 32.

38. See SPFFA Convention, preamble.

39. SPFFA Convention art. I(2).

40. C.C. Aikman, ''Island Nations of the South Pacific and Jurisdiction over Highly Migratory Species,'' Victoria University of Wellington Law Review, Vol. 17, p101-124, 1987.

41. The South Pacific Commission was formed in 1947 by the six western countries with dependences in the South Pacific-Australia, New Zealand, France, the Netherlands, the Unite Kingdom, and the United States. The Netherlands withdrew from the Commission in 1962 when it relinquished control of its territory in the region, and as the remaining dependencies became independent they became Members of the Commission in their own right.

42. Supra note 40.

43. Supra note 29.

44. Supra note 32, p100-176.

45. Id.

46. Supra note 2.

47. Supra note 17.

48. 1982 LOS Convention article 57.

49. 1982 LOS Convention article 56(1)a.

50. W. T. Burke,''Highly Migratory Species in the New Law of the Sea,'' Ocean Development and International Law, 14:273-314(1984).

51. 1982 LOS Convention article 64.

52. 1982 LOS Convention article 116(b)

53. Only the United States and the Bahamas do not claim jurisdiction over tuna (but do claim jurisdiction over other highly migratory species). Japan claims jurisdiction over all fish within 200 miles but does not prohibit the catch of highly migratory species by foreigners. see W. T. Burke, ''Extended Fisheries Jurisdiction and the New Law of the Sea,'' in B. J. Rothschild supra note 1, pp. 7-48.

54. ''The exclusive fishery management authority of the United States shall not include, nor shall it be constructed to extend to, highly migratory species of fish,'' and ''highly migratory species'' are defined as ''species of tuna which, in the course of their life cycle, spawn, and migrate over great distances in waters of the ocean.'' See Fishery Conservation and Management Act of 1976 (FCMA), Pub. L. No 94-265, section 2(b)1(A), 2(b)1(B)2, 2(c)2, 3(13), 3(14), and 103.

55. Since 1940' Chile, Ecuador, and Peru claimed 200 mile territorial sea against the United States whose flag was flown by the high-seas tuna-seining fleet in the eastern tropical Pacific, the United States oppose that through special protective legislation attempted to maintain this opposition while shielding its flag fishing vessels from the financial burdens and losses that arose from coastal state enforcement of these claims. These controversies peaked in 1979, when Canada, Mexico, Costa Rica, and Peru seized United States tuna boats fishing within their 200 mile zones. The United States retaliated by placing embargoes on Costa Rican, Peruvian, and Canadian, Mexican tuna and related tuna products. In detail, see N. P. Rasmussen, ''The Tuna War: Fishery Jurisdiction in International Law,'' University of Illinois Law review, 16:755-774(1981).

56. Normally, any satisfactory regime will require the

establishment of a total allowable catch and its division into national quotas where the high seas are involved. See P. Copes, ''The Law of the Sea and Management of Anadromous Fish Stocks,'' Ocean Development and International Law Journal, 4:233-259(1977).

57. 1982 LOS Convention article 57.

58. 1982 LOS Convention article 56.

59. 1982 LOS Convention article 61, 62.

60. 1982 LOS Convention article 61(1).

61. Supra note 50.

62. W. T. Burke, ''1982 Convention on the Law of the Sea Provisions on Conditions of Access to Fisheries Subject to National Jurisdiction,'' in FAO, supra note 36, p23-42.

63. 1982 new LOS Convention article 61(2).

64. As Burke noted ''So far as is known no marine finfish species has been reduced to extinction through overexploitation in the past several thousand years, despite intense exploitation of some for hundreds of years.'' see supra note 53.

65. 1982 LOS Convention article 61(3).

66. On the new concept see P. M. Roedel (ed.) Optimum Sustainable Yield as a Concept in Fisheries Management, Washington, D. C. :American Fisheries Society special publication No 9, 1975. See also P. Fricke, ''Use of Sociological Data in the Allocation of'' Marine Policy, 39-52(1985)

67. Supra note 62.

68. On this concept see U. Lie, ''Marine Ecosystems: Research and Management,'' Impact of Science on Society, p277-291, 1983.

69. 1982 LOS Convention article 61(4)

70. Supra note 50.

71. As Burke notes ''Only the United States legislation, which is the most detailed and comprehensive, makes provision for non target species. Ecosystem management seems to be virtually unheard of at the national legislative level.'' see supra note 53. See also FAO, Interim Report of the ACMRR Working Party on the Scientific Basis of Determining Management Measures, FAO Fish. Circ. No 718, Rome, 1978.

72. 1982 LOS Convention article 61(5).

73. 1982 LOS Convention article 62(1).

74. 1982 LOS Convention article 62(2), 62(3), 62(4), 69, 70,

and 71.

75. It should be recognized that ''optimum utilization'' is not the same as ''maximum utilization'' of fishery resources, that is, the objective of management may not be conceived of in terms of the largest possible fish catch. See supra note 62.

76. Id.

77. S. Oda, ''Fisheries under the United Nations Conventions on the Law of Sea,'' American Journal of International Law, 77:739-755(1983).

78. Id.

79. supra note 62.

80. 1982 LOS Convention article 297(3)a.

81. 1982 LOS Convention article 297(3)b.

82. 1982 LOS Convention article 297(3)c.

83. 1982 LOS Convention Annex V Article 7(2).

84. For analysis of its provisions, see S. Rosenne, ''Settlement of Fisheries Disputes in the Exclusive Economic Zone,'' American Journal of International Law, 13:89-194(1979)

85. Supra note 53.

86. G. R. Munro, ''Coastal States, Distant Water Fleets and EFJ: Some Long Run Consideration,'' Marine Policy, 2-15(1985).

87. Supra note 6.

88. Supra note 50.

89. Supra notes 54.

90. W. T. Burke, ''U.S. Fishery Management and the New Law of Sea,'' American Journal of International Law, 76:24-55(1982).

91. D. L. Alverso, ''Management of the Ocean's Living resources: An Essay Review,'' Ocean Development and International Law, 99-125(1975).

92. Id.

93. E. Miles, ''Organizational Arrangements to Facilitate Global Management of Fisheries,'' Resources for the Future /Program of International Studies of Fishery Arrangements, Paper No 4, June 1974.

94. The roots of the EEZ stem most directly from the failure of the 1958 Law of the Sea Conventions to develop a widely accepted

regime for fisheries which could protect the world's coastal states against the increasing operation of foreign fishing fleets off theirs.

95. J. D. Gwartney and R. L. Stroup (ed.), Microeconomic:Private and public choise, New York:HBJ Academic Press, p34-35, 1987.

96. S. D. Wade, ''A Proposal to Include Tunas in US Fishery Jurisdiction,'' Ocean Development and International Law, 16:255-304(1986).

97. Supra note 90.

98. 1982 LOS Convention article 87.

99. 1982 LOS Convention article 117-119.

100. Supra note 53.

101. Id.

102. 1982 LOS Convention article 297(3)a.

103. Supra note 6.

104. J. W. Kindt, ''The Law of the Sea: Anadromous and Catadromous Fish Stocks, Sedentary Species, and Highly Migratory Species,'' Syracuse Journal of International Law and Commerce, 11:9-46(1984).

105. Supra note 56.

106. Supra note 14.

107. Supra note 91.

108. Supra note 104.

109. Supra note 53.

110. Supra note 91.

111. L. Juda, ''The Exclusive Economic Zone:Compatibility of National Claims and the UN Convention on the Law of Sea,''Ocean Development and International Law, 16:1-58(1986).

112. J. E. Carroz and M. J. Savini'' The New International Law of Fisheries Emerging From Bilateral Agreements,'' Marine Policy, 3:29-98(1978), and ''The Practice of Coastal States Regarding Foreign Access to Fishery Resources (An Analysis of Bilateral Agreements),''in FAO, supra note 36, p23-42.

113. Supra note 111.

114. Id.

115. Supra note 96.

116. R. Teiwaki, ''Access Agreements in the South Pacific: Kiribati and the Distant Water Fishing Nations 1979-1986,'' Marine Policy, 273-284(1987).

117. N. Fujinami, ''Japanese Experience in Access Condition of 200 mile Regime,''in FAO, supra note 36, p175-182. See also supra note 32, p273-291.

118. The Unite States and twelve Pacific island states signed a five-year regional fisheries treaty, which declared that ''in accordance with international law, coastal states have sovereign rights for the purposes of exploring and exploiting, and conserving and managing the fisheries resources of their exclusive economic zones or fisheries zones.'' Under the treaty, the U.S. fishing industry will guarantee to purchase at least $1.75 million worth of fishing licenses annually (Vessels will be licensed at the rate of $50,000 per year for the first 40 vessels, and $60,000 for additional vessels.), and will provide $250,000 in annual technical assistance to help the island states develop their own fishing industries. In addition, the U.S. government will pay $9 million in cash, plus 1 million in aid each year. The treaty will enter into force after ratification by the United States and ten of the Pacific signatory states. Parties taking part in the negotiations but which have not yet signed the treaty include Niue, Palau, Tonga and Vanuatu. The text of the treaty sees International Legal Materials, XXVI:1051-1090(1987).

However, the treaty has not yet, and can not enter into force until U.S. law, in particular the FCMA, is changed. Fishing News International, November 1987, p10.

119. After more than a decade of negotiations, often marked by discord, Latin American countries have finally reached agreement in principle over regulations covering fishing and conservation of Pacific tuna stock. According to Mexico's Ministry of Fisheries, the main point concerns the 200 mile economic zones. See Fishing News International, December 1987, p9.

120. As suggested ''A group of states with share stocks might consider establishing an agency with the competence to make and enforce management measures. It may be difficult to envisage such a supra-national agency, but states sharing a stock which they have no interest in using directly could find that the advantages of creating such an authority to control foreign fishing outweigh the disadvantages of of the derogation of their sovereignty.'' See FAO, ''Principles and Techniques of Fishery Management,'' Committee on Fisheries, Rome (1983), p7.

121. The joint licensing arrangement has advantages and disadvantages. The potential benefits include economic gains because of the strengthening of bargaining positions; reduction of competition among coastal states for foreign fishing access; minimization of the likelihood of fee evasion; greater

flexibility of movement for fishermen allowing economic fishing; improvement in enforcement and surveillance and thus compliance by the flag states; reduction in the administrative costs from requiring the individual coastal states to set up separate management systems, the development of new or under-utilized fishing grounds because of the freer movements of vessels over a wide zone; and, reduced incentives to false reporting because of the need to pay a single fee for a specified fishing area.

There are several drawbacks in the use of a joint access agreement. The parties can find it difficult to agree on the level of fees and structure. The difference in practice and opinion on the relative merits of different types of systems is a major obstacle. The problem of revenue sharing is acute if some countries receive less than others from a regional arrangement. See supra note 116.

122. New Taiwan Dollar. In 1988, 1 US dollar exchanges 28 N.T. dollars.

123. The ROC inshore fishing vessels usually stay on the high seas 20-30 days every voyage, and their fishing ground are as far as in southern Pacific.

124. C. Wang, ''The History and Prospects of the Development of Distant Water Tuna Longlining Fisheries,'' China Fisheries Monthly, 375:10-24(1984).

125. Sino-U.S.A. Fishery Agreement, TIAS 8529.

126. Supra note 54.

127. Although the United States does not claim jurisdiction over tuna in its FCZ, the foreign vessels fishing tuna in U.S. FCZ are required to apply licenses by US government. The fee is lower than $100 dollars per vessel, per year.

128. Sino-Cook Islands Fishery Agreement(copies available from the author).

129. D. J. Doulman, ''Licensing Distant-Water Tuna Fleets in Papua New Guinea,'' Marine Policy, 16-28(1987).

130. See ''Agreement between the Republic of China and the Republic of South Africa on Mutual Fishery Relations''(1978) (copies available from the author)

131. Supra note 5.

132. World Daily News, 6 January 1988, p4.

133. Central Daily News, 15 February 1988, p2.

134. Fishing News International, January 1988, p1.

135. Supra note 5.

136. P. Ottesen and C. Grant ''Prospects for Australians in the Western Pacific Skipjack Fishery,'' Australian Fisheries, 41(4):3-7, 1982.

137. Supra note 53.

138. Supre note 86.

139. Supra note 129.

140. Economists tends to give considerable emphasis to relative factor proportions in attempting to explain patterns of comparative advantage. Relative factor proportions certainly are relevant in fisheries.

For example, in the capital intensive offshore tuna fisheries in the south Pacific, the comparative advantage of distant water nations lies in the peculiarity of the fishery that are highly seasonal and which require the use of expensive, specialized vessel capital. If the fisheries are exploited by coastal fleets that are confined to costal water, the vessels may be unutilized, or at least underutilized, offseason. Distant water fleets, on the other hand, may, by the nature of their operation, be capable of being allocated to other fisheries offseason. However the less-developed countries generally have low labor costs enabling them to use intensive labor fishing techniques such as the live-bait, pole and line fishing method. See supra note 86.

141. S. Comitini and S. Hardjolukito, ''Economic Benefits and Costs of Alternative Arrangements for Tuna Fisheries Development in the Exclusive Economic Zone: The Case of Indonesia,'' Ocean Management, 10:37-55(1986).

142. It should be noted that notwithstanding the SPFFA's significance in being the first regional fisheries organization in the South Pacific, the SPF member nations intended it to be merely advisory. The SPFFA Convention reserves ultimate management and conservation responsibilities over living marine resources including tuna, within the 200-mile zones to the individual coastal nations. See supra note 40.

143. Supra note 119.

144. J. C. Castilla and F. O. Vicuna, ''Highly Migratory Species and the Coordination of Fishery Policies with Certain Exclusive Economic Zones: the South Pacific,'' Ocean Management, 9:21-33(1984).

145. In 1985, the eastern-central Pacific (FAO code 77) and western-central Pacific (FAO code 71) represented about 52 percent of world tun production. See table 2.

146. Supra note 29.

147. See supra note 117, 118.

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