

## Japan's Herring and Herring Roe Supplies and Trade

### Introduction

Herring and herring roe have traditionally been seafood favorites of the Japanese. Japan is virtually the world's only market for herring roe—which is considered a great delicacy by Japanese consumers. It is also an expanding market for food herring. Japan currently relies almost exclusively on imported herring roe and roe herring (herring that will be processed in Japan to extract the roe) to supply consumer demand. A small Pacific herring fishery exists in Japan, but the harvest is processed mostly for food and not for the roe.

The United States and Canada are the principal suppliers of both herring and herring roe to the Japanese market (Tables 1-4). While almost all U.S. exports are shipped as roe herring for extraction and further processing in Japan, Canadian shipments are predominantly processed herring roe, as Canadian regulations limit the export of Pacific roe herring so that added value can be obtained by extracting the herring roe in Canada. Improving North Atlantic herring catches have enabled several European countries to increase herring and herring roe exports to Japan in recent years, thus intensifying competition in the Japanese herring market.

### Japan's Herring Harvest

Japanese fishermen harvest Pacific herring in both a spring and a fall fishery; the spring fishery occurs in coastal waters around Hokkaido and northern Honshu, while the fall fishery is in the East China Sea off Kyushu. The harvest from the domestic fishery is utilized for

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food in Japan, either as a fresh product, or as dried herring. Japanese fishermen formerly harvested much larger amounts of herring than they do currently; a record-high post-World War II herring catch was reported in 1952, when herring harvests amounted to nearly 321,000 metric tons (t). Since 1970, however, the largest annual catch was made in 1971, when 162,000 t were harvested by Japanese fishermen. The emergence of 200-mile fishing zones has restricted Japanese access to North Pacific herring

fishing grounds and Japan's herring harvest was only 6,800 tons in 1984 (Table 5).

Japan must rely on supplies from foreign harvesters and processors for roe herring and herring roe, as local herring stocks are not large enough to support a roe herring fishery. Japan was formerly able to supply the domestic demand for herring, but the gradual loss of access to distant-water herring stocks in the North Pacific—mostly in what is now the Soviet Union's 200-mile zone—left the Japanese with little choice but to depend upon foreign suppliers. Japanese importers first turned to Canadian and U.S. herring roe and roe herring suppliers in the early 1970's, after a 1971 Japanese-Soviet fishery agreement banned the harvest of roe herring north of lat. 52°N in the Sea of Okhotsk. The ban was enacted because herring stocks

Table 1.—Japanese herring imports (excluding roe) by commodity and country, 1979-85, in metric tons.

Commodity and country	Herring imports (t)						
	1979	1980	1981	1982	1983	1984	1985
<b>Fresh</b>							
United States	1.7				1.1		
Norway							197.3
Total	1.7				1.1		197.3
<b>Frozen<sup>1</sup></b>							
United States	6,429.5	21,547.9	22,342.8	30,972.6	38,083.5	31,760.3	34,072.0
Canada	6,194.9	7,563.7	23,451.6	23,141.4	9,081.7	5,755.5	5,054.6
China		7.8	229.6	52.1			107.1
N. Korea (DPRK)		120.4	223.9	503.1	635.9	233.2	52.4
U.S.S.R.		36.5	269.2	1,769.0		316.6	
S. Korea (ROK)	479.4	450.0	187.8		59.9		
<b>Europe</b>							
Norway				8.2	470.1	10,444.9	18,301.7
Netherlands			2,913.8	2,632.3	3,880.5	4,775.7	11,168.2
Sweden		418.1	499.1	36.6	371.3	691.3	1,215.2
United Kingdom	10.8			409.8		448.4	914.3
Ireland				19.5	32.9	281.0	194.8
Italy							138.5
Denmark				18.7	49.2	13.8	73.4
Iceland	188.5			300.5	461.5	339.5	65.2
Finland	413.6						
West Germany			negl.	53.8			
France					5.6		
Subtotal	612.9	418.1	3,412.9	3,479.4	5,271.1	16,994.6	32,071.3
Other	23.3			1.0	35.1		210.0
Total	13,740.0	30,144.5	50,117.8	59,918.5	53,167.1	55,060.2	71,567.6
<b>Salted</b>							
United States	726.8	1,873.7	8.6	339.8	1,442.6		
Canada		76.5		0.9			
U.S.S.R.		15.6	30.6	80.6			
S. Korea (ROK)			100.9	46.1			
Other			60.3				0.9
Total	726.8	1,965.8	200.4	467.5	1,442.6		0.9
<b>Grand total<sup>2</sup></b>	<b>14,468.5</b>	<b>32,110.3</b>	<b>50,318.2</b>	<b>60,386.0</b>	<b>54,610.8</b>	<b>55,060.2</b>	<b>71,765.8</b>

<sup>1</sup>Includes the imports of round roe herring.

<sup>2</sup>Totals may not agree because of rounding.

in the Sea of Okhotsk were being seriously depleted by overfishing. In 1977, when the Soviet Union adopted a 200-mile fisheries zone, Japanese fishermen were prohibited altogether from harvesting herring in Soviet waters. Between 1976 and 1978, the Japanese harvest of Pacific herring decreased from 65,200 t to only 6,760 t. This necessitated the liberalization of Japanese herring import quotas by the Government, because the strict quotas were no longer protecting a domestic herring fishery of any consequence. The resulting liberalization opened the Japanese market to U.S. and Canadian exporters.

In an attempt to revive Japan's coastal herring fishery, Japanese fishery biologists successfully hatched 180,000 fertilized herring eggs in 1982, from which 84,000 fry were raised and released in coastal waters. In 1983, this experiment was repeated when 250,000 herring eggs were hatched and 200,000 herring fry released in Japanese waters near Akeshi in Hokkaido. It is not known what consequence, if any, the viability of herring enhancement by Japan will have vis-a-vis an increased domestic herring harvest. The 1983 experiments were conducted by the Japan Sea Farming Association and more recent information regarding herring enhancement efforts is unavailable.

### The Domestic Market

There are two markets for herring (nishin) in Japan: The market for food herring and the market for herring roe. The market for food herring is supplied by both the domestic fishery and imports, while the herring roe market is entirely dependent upon imports. The herring roe market is by far the more lucrative of the two markets because of its status as a highly desired delicacy.

### Food Herring

Herring is consumed either fresh or dried in Japan. The fresh herring market is supplied by the Japanese domestic fishery, as well as by imports. The imports consist of both Atlantic and Pacific herring and are generally shipped frozen to Japan and then thawed for sale to consumers. A major portion of the dried herring (migaki nishin)

Table 2.—Japanese herring imports (excluding roe) by commodity and country, 1979-85, in thousands of dollars.

Commodity and country	Herring imports (US\$1,000 <sup>1</sup> )						
	1979	1980	1981	1982	1983	1984	1985
<b>Fresh</b>							
United States	2.8				1.6		
Norway							202.8
Total	2.8				1.6		202.8
<b>Frozen<sup>2</sup></b>							
United States	17,108.5	37,549.0	37,994.0	47,820.8	69,192.7	50,242.3	76,988.7
Canada	4,758.0	8,555.1	24,136.9	21,773.3	7,960.5	5,276.2	4,474.6
N. Korea (DPRK)		92.5	341.4	430.0	670.4	474.5	59.0
China		4.7	188.0	47.9			54.8
S. Korea (ROK)	214.2	145.9	255.8		60.0	196.5	
U.S.S.R.		32.1	506.7	2,036.7			
Europe							
Norway				9.1	457.8	9,007.0	18,482.5
Netherlands			2,699.0	2,118.2	2,530.9	2,380.9	6,512.6
Sweden		463.2	539.6	40.9	333.9	665.2	1,215.2
United Kingdom	42.8			406.3		371.0	600.3
Ireland				20.2	32.1	180.0	146.2
Italy							133.0
Denmark				17.2	47.4	14.1	86.0
Iceland	206.6			301.8	393.8	250.2	53.7
West Germany			0.5	50.0			
Finland	451.3						
France					5.4		
Subtotal	700.7	463.2	3,239.1	2,963.9	3,801.3	12,868.4	27,229.5
Other	22.5		0.5	1.0	28.7		130.0
Total	22,803.9	46,842.5	66,662.1	75,073.6	81,713.5	69,058.0	108,936.7
<b>Salted</b>							
United States	1,392.2	2,206.3	29.4	440.7	1,280.6		
U.S.S.R.		49.9	68.2	99.4			
Canada		43.8		1.1			
S. Korea (ROK)			509.1	61.3			
Other			84.7				2.8
Total	1,392.2	2,300.0	691.4	602.5	1,280.6		2.8
<b>Grand total<sup>3</sup></b>	24,198.9	49,142.5	67,353.5	75,676.1	82,995.7	69,058.0	109,142.3

<sup>1</sup>Values are approximate and based upon annual International Monetary Fund (IMF) average exchange rates.

<sup>2</sup>Includes the import of round roe herring.

<sup>3</sup>Totals may not agree because of rounding.

market is reportedly supplied from the Japanese coastal herring catch, although the declining catch has also forced migaki nishin processors to also import Pacific herring. No data are available on the amount of fresh or dried herring consumed annually in Japan.

### Herring Roe

Herring roe is a traditional seafood delicacy in Japan and has been described as "indispensable" for ceremonial occasions such as the New Year holiday (shogatsu) and weddings. Known as "kazunoko," much of the herring roe that is consumed in Japan is dried, salted, and packed in little boxes which are given as gifts during shogatsu. Kazunoko is such a highly desired (and expensive) delicacy that it is often referred to as "yellow diamonds" by the

Japanese. The consumption of kazunoko during shogatsu signifies family prosperity and numerous progeny. Observers estimate that 60 percent of the kazunoko is consumed during shogatsu; the other 40 percent is consumed year round in restaurants and drinking establishments which serve it as an appetizer or as a side-dish. While the kazunoko used during shogatsu is usually high-quality roe that is contained within the natural skein (ovisac) of the herring, the restaurant and drinking establishment roe is generally of lower quality and is served "broken", i.e., without the skein.

Another popular and expensive herring roe delicacy in Japan is "komuchi konbun," or herring roe on kelp. Komuchi konbun is processed in brine and the United States and Canada are currently Japan's only source. Shipments to

Table 3.—Japanese herring roe imports, by commodity and country, 1979-85, in metric tons.

Commodity and country	Roe imports (t)						
	1979	1980	1981	1982	1983	1984	1985
<b>Frozen</b>							
Canada	492.0	380.4	438.1	940.0	1,492.9	2,918.6	4,651.7
Trinidad/Tobago							62.9
United States		1.3	0.3	0.6	2.4	3.5	19.3
Other							3.6
<b>Europe</b>							
Ireland				73.9	169.5	245.1	227.7
West Germany							88.5
Denmark				8.5	5.0	14.6	47.3
Netherlands				4.8	6.1	24.0	25.2
Finland	4.2	12.0	27.8	30.0	39.9	12.5	25.1
Iceland	0.1	0.4					18.3
France							9.7
Norway		0.4				8.0	6.5
United Kingdom				1.4			0.9
Sweden					0.4	2.4	
Subtotal	4.3	12.8	27.8	118.6	220.9	306.6	449.2
Total frozen	496.2	394.1	466.2	1,059.2	1,716.2	3,228.6	5,186.5
<b>Cured<sup>1</sup></b>							
Canada	5,107.1	2,292.7	4,185.3	4,722.1	5,638.8	4,683.9	4,001.1
United States	1,090.3	1,439.2	1,767.8	1,501.5	1,246.8	878.3	1,626.5
China	857.8	855.1	469.3	399.4	915.9	556.4	617.1
S. Korea (ROK)	569.1	655.6	1,006.6	731.5	335.6	375.2	829.8
U.S.S.R.	85.2	151.9	180.3	26.6	75.6	415.4	69.8
N. Korea (DPRK)	5.1	20.6	24.9	66.0	189.5	101.3	50.8
<b>Europe</b>							
Denmark				9.4	143.9	227.1	227.5
Finland	9.1		10.5	39.4	68.2	57.4	143.0
Netherlands	0.8	0.5	0.4	0.4		0.1	67.0
West Germany					11.1	8.2	25.5
Norway			0.2	0.3		2.4	15.9
Sweden				0.1	2.9		7.7
France							1.6
Ireland						3.8	
Subtotal	9.9	0.5	11.1	49.6	226.1	299.0	488.2
Total cured	7,724.4	5,415.7	7,645.3	7,496.8	8,628.1	7,309.4	7,683.3
<b>On kelp</b>							
Canada	214.2	239.9	172.9	180.0	213.1	156.6	209.1
United States	292.6	304.3	211.7	282.0	293.5	198.9	41.2
Total on kelp	506.8	544.2	384.6	462.0	506.6	355.5	250.3
<b>Grand total<sup>2</sup></b>	8,727.4	6,354.0	8,505.1	9,018.0	10,850.9	10,893.5	13,120.1

<sup>1</sup>Dried, salted, or smoked.

<sup>2</sup>Totals may not agree because of rounding.

Japan include both natural and induced herring spawn-on-kelp. Canadian companies developed the practice of inducing herring to spawn on artificially prepared kelp beds, at an earlier date than U.S. producers. However, induced spawning on cut kelp is now being conducted by U.S. fishermen in Alaska's Prince William Sound.

Japanese herring roe importers purchase both Atlantic and Pacific herring roe from foreign suppliers in order to supply the domestic market. Because Japanese consumers prefer the taste and texture of the higher-priced Pacific herring roe over Atlantic herring roe, much of the higher-quality Pacific herring roe imports are destined for the shogatsu

gift market, while both Atlantic and lower-quality Pacific herring roes are consumed in the year round market, either in restaurants, drinking establishments, or in private households.

The Japanese herring roe market has often been subject to speculation and controversy. The greatest controversy occurred during 1979-80, when a Japanese herring roe trading firm, Hokusho Co., collapsed, causing the largest bankruptcy in the history of the Japanese fishing industry. Over \$100 million worth of debts was the outcome of the collapse, which was the result of price speculation that pushed prices higher than the market would bear. Japanese herring roe traders believed that con-

sumers would pay any price to buy their holiday kazunoko. They pushed prices so high that consumers revolted and refused to buy the high-priced roe. As a result, only half of the seasonal kazunoko was sold and wholesale prices for the delicacy fell from \$26 to \$9 per pound. Hokusho, which stockpiled large amounts of herring roe purchased at high prices, was ruined by the collapse of the kazunoko market. Since 1979-80, observers note that kazunoko speculation by Japanese herring roe traders has been greatly curtailed.

### Japan's Herring Imports

Between 1979 and 1984, herring and herring roe shipments to Japan accounted for an increasing percentage of total fishery imports. For example, Japanese importers purchased 23,200 t of herring commodities in 1979 (Fig. 1), or about 1.8 percent of Japan's total fishery imports that year (1.15 million tons). In 1984, herring commodity imports were nearly 66,000 tons—about 4.7 percent of Japan's total fishery imports (1.39 million tons). Japan's herring commodity import increase is related to both a liberalization of the Government-imposed round herring import quota, a gradual decrease in tariffs, and the increased availability of herring and herring roe from the North Atlantic. In 1985, Japan's imports of 84,900 t of herring commodities outpaced the record-high import of 69,400 t set in 1982 (Fig. 1 and Tables 1 and 3).

### Import Restrictions

The Japanese Government regulates herring commodity imports through the use of tariff and nontariff barriers. Imports of herring face both import quota restrictions and ad valorem duties. Unlike round herring, shipments of herring roe to Japan are not restricted by an import quota because the Japanese no longer have a roe herring fishery. Nevertheless, herring roe imports are also assessed duties by the Japanese Government.

### Import Quota

Japan controls imports of herring but not herring roe through a quantitative restriction known as an import quota.

**Table 4.—Japanese herring roe imports, by commodity and country, 1979-85, in thousands of dollars.**

Commodity and country	Roe imports (US\$1,000 <sup>1</sup> )						
	1979	1980	1981	1982	1983	1984	1985
<b>Frozen</b>							
Canada	4,027.6	2,028.5	2,669.8	7,262.7	8,350.9	17,949.4	27,668.8
United States		6.7	1.8	3.0	16.9	18.5	106.3
Other							29.2
<b>Europe</b>							
Ireland				330.6	870.8	1,277.7	1,552.2
West Germany							490.3
Finland	10.5	107.9	244.5	261.4	323.3	107.1	240.9
Netherlands				18.4	15.6	88.8	135.5
Denmark				19.6	9.1	29.1	103.0
France							49.1
Norway		0.8				15.6	25.9
United Kingdom				2.5			6.3
Sweden					4.6	20.3	
Iceland	0.7						
Subtotal	11.2	108.7	244.5	632.5	1,218.8	1,538.6	2,603.2
Total frozen	4,038.9	2,144.0	2,916.1	7,898.2	9,591.2	19,506.5	30,407.5
<b>Cured<sup>2</sup></b>							
Canada	171,758.4	35,184.0	62,681.6	70,242.4	87,623.8	69,496.5	90,216.4
United States	31,472.4	20,205.1	24,381.1	21,402.2	20,854.9	12,568.3	31,999.0
S. Korea (ROK)	19,870.4	10,889.6	13,948.7	12,716.2	5,693.1	6,209.9	15,981.2
China	19,767.4	8,731.4	5,203.0	5,902.1	15,067.8	7,415.8	10,575.0
U.S.S.R.	2,253.1	1,708.2	2,314.1	395.0	846.0	4,878.8	1,181.9
N. Korea (DPRK)	55.5	77.2	90.5	264.6	737.0	496.3	368.2
<b>Europe</b>							
Finland	28.4		58.6	245.2	449.8	258.8	1,210.1
Denmark				15.6	313.5	567.3	580.0
Netherlands	3.2	2.7	1.9	2.3		0.9	348.1
Norway			0.7	1.1		7.6	85.6
West Germany					97.0	26.1	144.5
Sweden				2.4	26.4		31.5
France							12.1
Ireland						30.8	
Subtotal	31.6	2.7	61.2	266.6	886.7	891.5	2,411.9
Total cured	245,208.8	76,798.5	108,680.2	111,189.1	131,709.5	101,957.1	152,733.5
<b>On kelp</b>							
Canada	4,155.2	2,778.0	2,809.9	3,435.3	4,925.7	3,449.0	6,019.4
United States	2,643.5	1,760.8	1,104.9	1,718.9	1,855.4	994.6	565.4
Total on kelp	6,798.7	4,538.8	3,914.8	5,154.2	6,781.1	4,443.6	6,584.8
Grand total <sup>3</sup>	256,046.4	83,481.3	115,511.1	124,241.5	148,081.8	125,907.2	189,725.8

<sup>1</sup>Values are approximate and are based upon International Monetary Fund (IMF) exchange rate averages.

<sup>2</sup>Dried, salted, or smoked.

<sup>3</sup>Totals may not agree because of rounding.

The herring import quota was originally devised to protect the domestic herring fishing industry, while allowing domestic demand to be fully supplied. Because of the loss of access to herring fishing grounds, the Japanese Government found it necessary to remove the import quota system for herring roe in May 1972 to keep the traditional kazunoko market adequately supplied. The herring import quota was retained to provide some compensation to Japanese fishermen for the loss of income and jobs caused by the Japanese-Soviet agreement (and, later, by the extension of 200-mile zones in the North Pacific). Because of the high demand for herring in Japan, and the encouragement of her-

ring producer countries interested in exporting herring to the Japanese market, the Japanese Government has gradually "liberalized" the annual herring import quota from 10,000 t in 1971, to 68,000 t in 1985 (Table 6). A further liberalization of the import quota would depend primarily on the pressures exerted both externally (by herring producer countries) and internally (by increased domestic demand) upon the Japanese Government.

Japan's herring import quota applies to live, fresh, chilled, frozen, or salted herring and covers imports from all herring trading countries. The quotas are set biannually, according to Japan's fiscal year (which runs from April to

**Table 5.—Japanese herring harvests by quantity and species, 1970-84.**

Year	Catch (1,000 t)		
	Atlantic	Pacific	Total
1970		97.4	97.4
1971	3.2	158.8	162.0
1972	2.7	59.5	62.2
1973	2.9	79.8	82.7
1974	3.4	72.8	76.2
1975	2.1	64.5	66.6
1976	0.9	65.2	66.6
1977	negl.	19.7	19.7
1978	negl.	6.7	6.7
1979		6.8	6.8
1980		11.1	11.1
1981		8.9	8.9
1982		24.2	24.2
1983		8.4	8.4
1984		6.8	6.8

**Table 6.—Japan's herring import quotas, 1971-85.**

Fiscal year <sup>1</sup>	Quota (1,000 t)	Fiscal year <sup>1</sup>	Quota (1,000 t)
1971	10.0	1979	40.0
1972	13.0	1980	42.5
1973	16.9	1981	45.0
1974	13.0	1982	54.0
1975	13.0	1983	54.0
1976	17.0	1984	54.0
1977	33.0	1985	68.0
1978	40.0		

<sup>1</sup>Japan's fiscal year is April through March.

March). The Japanese Government announces half-year quotas at the beginning and middle of the fiscal year. Herring traders interested in exporting to Japan complain about the restrictive import quota system, but also point out that a "second dimension" to the import quota, which requires that all herring imports be licensed, is probably a more serious trade obstacle than the quota itself. For example, the Japanese Government granted import quota licenses to only the Hokkaido Federation of Fishery Cooperative Associations (Dogyoren) from 1977 to 1980. This group had little interest in importing processed herring, as its membership includes herring fishing vessel owners as well as processors. In 1980, U.S. fishery trade representatives asked the Japanese to distribute herring import quota licenses to other associations and companies besides Dogyoren. The Japanese Government agreed to assign a percent of the total 1980 licensed import quota to a processor's cooperative (Do Kakoren - the Federation of Hokkaido Fish Pro-

**Table 7.—Japan's herring tariffs, by commodity, 1985.**

Commodity	Tariff <sup>1</sup>	
	GATT	Non-GATT
Herring		
Fresh	10.0	10.0
Frozen	6.5	10.0
Fillets	10.0	10.0
Salted	15.0	15.0
Smoked	15.0	15.0
Canned	9.0	20.0
Herring roe		
Fresh	8.3	10.0
Frozen	6.0 <sup>2</sup>	10.0
Cured	12.0 <sup>2</sup>	15.0
On tangles	5.0	15.0
Canned	16.0 <sup>2</sup>	20.0

<sup>1</sup>Percentage (ad valorem).

<sup>2</sup>Temporary tariff. The tariffs for these commodities had not yet been reduced officially to these levels.

cessors Association). In 1981, the Japanese Government further relaxed the criteria of eligibility to import herring and about 26 Japanese processing associations and trading firms currently receive licenses to import herring. Dogyoren still dominates the herring quota system as it receives about 50 percent of the import licenses. The remainder is divided among the other 25 processing associations and trading companies.

### Tariffs

The Japanese Government imposes tariffs on herring commodities in addition to the quantitative restraints on herring imports. Japan has no need for such tariffs as revenue measures, their purpose is to protect the domestic market. Some trade observers note that if Japan desires to protect its herring market, the import quotas already in place provide more than adequate protection. Japan was urged by other nations to reduce various fishery tariffs during the "Tokyo Round" of the General Agreement on Tariffs and Trade (GATT) Multilateral Trade Negotiations in 1979. The Japanese made concessions to gradually reduce ad valorem duties for frozen herring roe and round herring and herring fillets from 10 to 6 percent during 1979-87<sup>1</sup>. By 1985, tariffs were reduced for frozen herring roe and round herring to 6 and 6.5 percent, respectively, but the Japanese have failed to reduce herring

<sup>1</sup>These tariff reductions were only for GATT signatory nations; other nations may face higher tariffs.

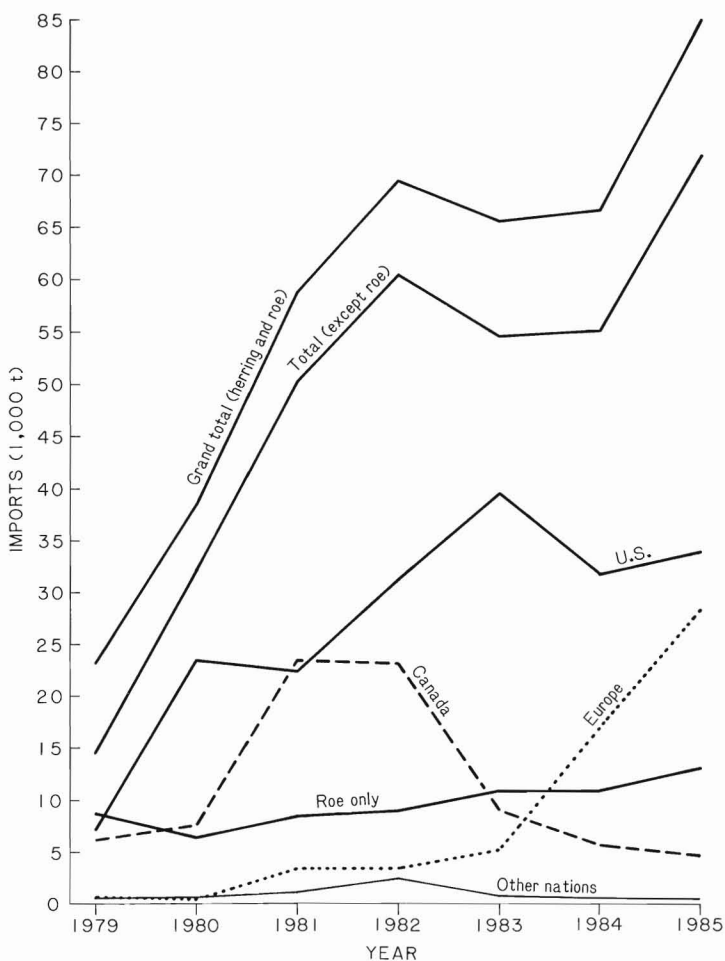


Figure 1.—Japan's herring imports by source and quantity and roe imports by quantity, 1979-84.

fillet duties whatsoever. Other tariffs for herring commodities range from 8.3 to 20 percent (Table 7). Japan may be urged to reduce further fishery tariffs—including those for herring commodities—when the next round of GATT negotiations begin to take place in late 1986 or 1987.

### Commodities

The Japanese import almost a dozen different herring commodities; Table 7 illustrates the varying tariffs that are placed on those commodities by the Japanese Government. A precise picture of Japan's herring imports cannot be determined as shipments of processed commodities, such as smoked, canned, and filleted herring, are included in

"basket" categories with other fish species in Japanese statistics. Nevertheless, a fairly good overview of Japan's herring imports can be made, as restrictive tariffs limit shipments of smoked, canned, and filleted herring. Because there is a difference between the marketing of round herring (a common foodstuff) and herring roe (a traditional delicacy), these two commodity groupings are usually analyzed separately from each other. While the quantity of Japan's round herring imports accounted for over five times those of herring roe during 1980-85, the value of Japan's lucrative herring roe imports during the same period have consistently exceeded round herring import values by about 40-45 percent (Table 8).

**Table 8.—Japan's round herring and herring roe imports, by value, 1979-85, in millions of U.S. dollars.**

Year	Herring		Total
	Round <sup>1</sup>	Roe	
1979	24.2	256.0	280.2
1980	49.1	83.5	132.6
1981	67.4	115.5	182.9
1982	75.7	124.3	200.0
1983	83.0	148.1	231.1
1984	69.1	125.9	195.0
1985	109.1	189.7	298.9

<sup>1</sup>Includes roe bearing herring.

### Round herring

The Japanese primarily import frozen round herring; small quantities of fresh and salted herring are also imported, but they face higher duties than the frozen herring. An undetermined amount of Japan's frozen herring (mostly Pacific) imports consist of roe herring that is destined for roe removal by Japanese processors. Because the Japanese Government has lowered the frozen herring tariff while increasing the herring import quota during 1979-85, the Japanese market has absorbed greater quantities of herring shipments from the United States, Canada, and Europe. Japanese importers, for example, increased purchases from only about 14,500 t of herring worth \$24 million in 1979, to nearly 71,800 t worth \$109 million during 1985 (Tables 1 and 2).

### Herring roe

Japan's imports of Pacific and Atlantic herring roe consist of both frozen and cured roe. Some of the imported frozen roe is destined for curing or flavoring by Japanese processors before reaching consumers, while imported cured roe has already undergone a drying, salting, smoking, or bleaching process. Frozen roe imports have accounted for a larger share of Japan's total roe imports in recent years. For example, imported frozen roe accounted for only 6 percent of the total quantity of roe imports in 1979, while almost 30 percent of Japan's total roe imports consisted of frozen roe in 1984. This increase is mostly due to an increased shipment of frozen Atlantic herring roe by Canadian and European exporters to Japanese processors.

The most valuable of the Japanese herring roe commodity imports is cured Pacific herring roe on sea kelp, which

is known as "komuchi konbun". The United States and Canada are Japan's only suppliers of herring roe on kelp. Some imported shipments of komuchi konbun have been valued at over \$20,000/t in recent years.

### Sources

The Japanese import herring and herring roe from various countries, and the United States and Canada are the leading herring commodity suppliers to the Japanese market. In recent years, Japanese importers have purchased greater quantities of herring from European sources—most notably Norway—because European herring stocks have been recovering from overfishing that occurred during the 1960's and 1970's (Fig. 1). Because the demand for herring has been satisfied in Europe by the increased Atlantic herring harvests, European exporters have capitalized upon Japan's increased herring import quotas and decreased tariffs. For example, frozen European herring shipments to Japan increased from only 600 t (worth \$0.7 million) in 1979, to nearly 32,100 t (worth \$27.2 million) during 1985 (Tables 1 and 2). Similarly, European herring roe shipments to Japan increased from only 14 t (worth \$42,800) to 940 t (worth nearly \$5.0 million) from 1979 to 1985 (Tables 3 and 4).

### Round Herring

The United States is the leading supplier of herring to the Japanese market and U.S. herring shipments have accounted for nearly 60 percent of Japan's total supply of imported herring (fresh, frozen, and salted) during 1979-85. The U.S. shipments consist entirely of Pacific herring, *Clupea harengus pallasii*, which is mostly harvested in Alaskan waters. Almost all of the herring shipped by U.S. exporters consists of roe herring destined for roe removal and further processing in Japan. The Japanese also purchase U.S.-harvested roe herring through a joint venture in Bristol Bay, Alaska. The 1981-85 purchases were: 1981, 953 t; 1982, 2,453 t; 1983, 2,632 t; 1984, 3,230 t; 1985, 2,371 t. This joint venture was begun in 1981, but observers are not sure that it would continue beyond 1986. The United States exported a record-high quantity

of herring to Japan in 1983, when over 38,000 t worth \$70.5 million were purchased by Japanese companies. During 1985, the Japanese purchased nearly 34,100 t of frozen U.S. herring worth \$77.0 million.

Canada is also a major supplier to the Japanese herring market, and Canadian exporters ship both Atlantic and Pacific herring to Japan. Unlike the United States, about 95 percent of Canada's frozen herring shipments to Japan consist of Atlantic herring rather than Pacific because regulations enacted by the Canadian Government limit the amount of Pacific roe herring shipments to only 5 percent of the total annual harvest, because the added value of extracting herring roe benefits Canadian processing companies. This regulation is not applicable on Canada's east coast because there has never been a roe fishery for Atlantic herring. Besides, Atlantic herring roe is not as highly valued as Pacific herring roe.

Canadian herring shipments to Japan have decreased in recent years, despite the Japanese liberalization of herring import restrictions, for several reasons. Competition from European herring exporting countries has cut into Canadian exports to Japan. The Canadians accounted for 23,450 t (worth \$24 million) or 47 percent, of the quantity of Japan's herring imports in 1981, but during 1985, Japanese purchases of Canadian herring amounted to 5,100 t (worth almost \$4.5 million) or only 7 percent of the total quantity of Japanese herring imports.

The most dramatic increase in Japan's herring imports has been the increasing amount of frozen herring shipments from European sources; most notably Norway, the Netherlands, and Sweden. These countries have not only benefited from the increase in the Japanese herring import quota and decrease in frozen herring tariff, but favorable exchange rates and the fact that formerly depressed northeast Atlantic herring stocks (and catches) have increased, enabling the Europeans to capitalize upon the strong demand for herring in Japan. The increased European herring shipments to Japan have intensified competition for Canadian (east coast) exporters more than for U.S. exporters, because of the

higher demand for Pacific roe herring in Japan, rather than for Atlantic roe herring.

Among Japan's European herring suppliers, Norway has made the greatest inroads in shipping herring to the Japanese market. Norwegian herring shipments amounted to only 8 t (worth \$9,000) in 1982, but have increased to 18,500 t (worth \$18.7 million) during 1985. Much of the increase results from an active marketing campaign in the Japanese market by the Norwegians. In March 1985, Norway's Minister of Fisheries led a 19-member delegation to Japan, consisting of representatives from the Norwegian Export Council and the Herring Export Council, seeking to increase Norwegian fishery exports—especially herring exports—to Japan. Since then, scientists at Norway's Institute of Fishery Technology Research have developed equipment capable of sorting female (with roe) from male herring. Observers believe that this new technique will have a considerable effect on the price that Norway gets for its herring on the Japanese market where buyers are willing to pay up to 100 percent more for females (roe) herring than for an unsorted consignment. Because the herring quotas agreed upon by the European countries for the northeastern Atlantic were enlarged for 1986, observers believed that European herring shipments to Japan—especially those from Norway—would increase.

#### *Herring Roe*

Japan obtains most of its imported herring roe from Canada (Tables 3 and 4). Except for 1980 (the year after the collapse of the Japanese herring roe market), Canada's herring roe shipments have amounted to well over half of Japan's supply of imported herring roe and an average of over 60 percent of Japan's herring roe imports during 1979-85. Most of Canada's shipments consist of the more valuable Pacific herring roe, although Japanese importers have recently begun to purchase increasing amounts of Atlantic herring roe. While the Pacific herring roe is mostly imported to supply the annual shogatsu demand, the Atlantic herring roe is consumed during a year-round market and

is served as an appetizer. The most highly priced Canadian herring roe commodity exported to Japan is the herring roe on kelp. Shipments during 1985 amounted to 209 t, valued at \$6.0 million.

The United States is Japan's second largest supplier of herring roe. U.S. shipments consist almost entirely of cured Pacific herring roe; less than 1 percent of U.S. herring roe shipments to Japan consists of frozen product. The United States, like Canada, also ships herring roe on kelp to the Japanese market. Total Japanese purchases of all U.S. herring roe commodities during 1985 amounted to nearly 1,690 t worth \$32.7 million.

European herring roe exports to Japan are only a small fraction of Canadian and U.S. shipments, but they have steadily increased in recent years and the Europeans are making inroads into the Japanese market. The European Atlantic herring roe does not currently have a major effect upon the shogatsu herring roe market, which is traditionally supplied by U.S. and Canadian Pacific producers, although it may in years to come. The European herring roe presently competes heavily with Canadian Atlantic herring roe in the year-round appetizer market in Japan. The primary European supplier of frozen Atlantic herring roe to the Japanese market is Ireland, while Denmark accounts for most of Japan's cured herring roe coming from Europe. Total European shipments of herring roe commodities to Japan during 1985 amounted to 940 t worth \$5 million.

A distinct possibility exists that Atlantic herring roe may directly compete with Pacific herring roe in the highly valued shogatsu market in the future. Biologists have observed that the ovaries and the eggs of the two species are almost identical physiologically and that the taste, texture, size, and oil content of Atlantic roe has the potential of equaling Pacific roe, provided that North Atlantic fishermen can harvest the Atlantic herring during the same critical spawning time that coincides with the Pacific herring roe fishery. The only factor which currently prevents this is that most Atlantic herring spawn well below the surface of the ocean, while

Pacific herring tends to spawn near the ocean surface in coastal waters, thus making it difficult for fishery biologists to predict a precise optimal harvesting period to obtain marketable roe. This obstacle may possibly be overcome in the future as biologists and fishery technologists are able to develop precise predictions when marketable Atlantic roe herring stocks are spawning.

Japan also obtains small quantities of Pacific herring roe from countries such as China, the Republic of Korea (ROK), the Soviet Union, and North Korea. Japanese herring roe imports from these countries have accounted for about 13-14 percent of Japan's total herring roe imports since 1982. Almost all of the processed Pacific herring roe that Japan obtains from China and the ROK is from North American-origin roe herring (mostly from the United States) that was imported by those countries for roe removal and curing and reexported to Japan. Observers report that some Japanese companies have transshipped roe herring from the United States to China for processing into cured herring roe. The Japanese were reportedly able to utilize inexpensive Chinese labor while using the herring carcasses as partial payment for the roe removal and curing services rendered by the Chinese.

The Soviet Union, China, and North Korea have the potential to increase herring and herring roe sales to Japan, but their exports are currently hindered by higher tariffs than those faced by the United States, Canada, and European countries because these Communist countries are not GATT member-nations and, therefore, often face a separate tariff schedule which assesses higher duties than for GATT member-nations for certain herring commodities. In addition, because China and North Korea are at the extreme end of the range of Pacific herring, harvestable quantities of spawning herring occur only sporadically. Herring and herring roe shipments from the Soviet Union may increase in the future, despite the fact that shipments may face high tariffs, because stocks are reportedly increasing in the Sea of Okhotsk and the Soviets may be willing to undercut Canadian and U.S. prices for herring commodities in Japan to earn hard currency.

## Development of the Moroccan Fisheries

The 200-vessel Moroccan high-seas fishing fleet lands its catch almost entirely in Las Palmas, a port in the Spanish Canary Islands. The Moroccan Government and private companies are both investing large sums in port infrastructure and fish freezing and processing facilities to entice the fleet back from Las Palmas to Moroccan ports. This new investment in the ports of Tan Tan and Agadir, however, will not automatically remove the economic incentives favoring Las Palmas. Moroccan officials talk of voluntary gradual repatriation of the fleet, but the Government may find itself compelled to offer incentives and bring financial and/or legal pressure to bear on vessel owners to induce the high-seas fleet to land its catch in Moroccan ports. The ensuing realignment of markets could provide opportunities for U.S. seafood firms interested in joint ventures.

### “Moroccanization”

Over the past decade, Morocco has been engaged in a determined campaign to “Moroccanize” the utilization of the rich fishing grounds off southern Morocco and the Western Sahara. In 1981, the Government extended its economic zone to 200-nautical miles. A 4-year Spanish-Moroccan fisheries agreement, signed in August 1983 and to be renegotiated in August 1987, provides for a progressive decrease of Spanish catch quotas and a concomitant increase in Spanish assistance to Morocco and in the Moroccan share of the catch. The Spanish Government agreed to provide, over the 4 years of the agreement, more than \$550 million in assorted credits (25 percent of which at concessional rates of interest) for the development of Moroccan fisheries. The Moroccan Government has provided generous financial incentives to Moroccan vessel owners, largely funded by these Spanish loans. The net result of

Morocco's policies has been the growth of a Moroccan-owned (or partnered) high-seas fleet of some 200 trawlers to compete with the Spanish, Japanese, and Portuguese fleets still fishing legally in Moroccan waters<sup>1</sup>.

### Las Palmas Landings

In 1984, the Moroccan high-seas fleet landed 77,000 metric tons (t) of whitefish and cephalopods. The vast majority of the catch was landed in Las Palmas. Of that amount, 34,000 t was exported to Europe, 31,700 t to Japan, and 11,700 t to African countries. The total value of the high-seas landings was estimated at 934 million dirhams (US\$88.1 million)<sup>2</sup>. Large cephalopods (octopus, cuttlefish, and squid), exported to Japan, were the most valuable product.

Until 1985, Morocco did not possess a port with the necessary maintenance facilities to act as homeport for large freezer trawlers. Morocco's high-seas fleet, based primarily in Las Palmas, sells frozen fish to European and Japanese middlemen. Much of the hard currency earned stays in Las Palmas to pay for diesel oil and spare parts, and for maintenance and shore services. Not only is the Moroccan Government concerned about the foreign exchange loss, but Moroccans are deprived of the opportunity to add value through processing and packaging.

Over the past 3 years the Government and private enterprise have mobilized considerable investment to remedy the lack of homeport infrastructure. The Ministry of Equipment budgets funds for port construction and expansion, but

<sup>1</sup>The U.S.S.R. has a treaty of technical cooperation with the Government, but no fishing rights; extensive illegal Soviet fishing has been assumed but most of the vessels intercepted and fined are Spanish-owned.

<sup>2</sup>Based on the January 1986 exchange rate of 10.6 dirhams to the U.S. dollar.

fish handling, cold storage, and ship repair facilities depend on private investment.

### Tan Tan and OMP

In 1978, a Casablanca businessman, Mohamed Laraki, established the Omnium Marocain de Peche (OMP)<sup>3</sup> company in partnership with an Arab expatriate residing in France. OMP has used about US\$80 million in government-guaranteed<sup>4</sup> French and Spanish credits to buy 27 freezer trawlers of 328 t each (US\$30 million) and to construct a fishing complex at Tan Tan (US\$50 million). Located about 400 km south of Agadir, Tan Tan is a prosperous population center on the Moroccan side of the former boundary with the Spanish Sahara. Finished in the spring of 1985, the Tan Tan port was designed to take advantage of the rich nearby coastal resources to supply a gleaming high-technology fish processing plant (100 t a day processing capacity), a freezing plant (100 t a day), a cold store (5,000 t holding capacity), and a fishmeal plant (150 t of fish a day reduction capacity). In addition, OMP has shore facilities to support the company's 27 freezer trawlers as well as vessels owned by other companies. This enormous investment has been nearly idle—OMP buys sardines from the coastal fleet for freezing or reducing into fishmeal, but the whitefish and cephalopod landings are insufficient for the operation of the fish-processing plant so long as the Moroccan high-seas fleet remains in Las Palmas. Local fishermen currently truck frozen sardines up to the packing plants of Agadir and Safi (a day's ride in open truck through the desert).

### Agadir

In 1984, the Agadir fishing fleet of 205 coastal vessels landed 176,324 t of fish, a small decline from 1983. The area of the existing port is small and cannot be expanded. The Ministry of Equipment is using Spanish Government credits (from the bilateral fishing

<sup>3</sup>Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

<sup>4</sup>The loans are guaranteed by Morocco's Caisse Centrale de Garantie.



agreement) to build a new cargo port half as large as the old, to be finished in 1989.

### Las Palmas Advantages

Even the OMP fleet of 27 freezer trawlers has been in no hurry to leave Las Palmas. In part, this hesitation reflects the Government's sluggishness in obtaining the vital spare parts inventory needed to support the fleet. More important though are Las Palmas' formidable economic advantages. A large, completely equipped port, Las Palmas is actually located nearer the richest fishing grounds than either Tan Tan or Agadir. Even when the Moroccan Government makes a long-promised move to offer diesel fuel in Tan Tan and Agadir at the prevailing international prices, Las Palmas will retain the equally decisive advantage of direct access to established international markets. Intangibles favoring Las Palmas include not only social amenities for still largely non-Moroccan crews (Tan Tan is a desert outpost), but also freedom from close Government of Morocco enforcement of catch restrictions and currency repatriation regulations.

### Fleet Transfer

Though both the OMP and the Fisheries Ministry deny that the Government will act unilaterally to compel the fleet to return, a convincing program of economic incentives for the fleet to transfer voluntarily has not been worked out. Moroccan officials foresee repatriation as a gradual process, beginning in 1986. The entire fleet cannot be accommodated until after the completion of Agadir's new port. OMP maintains that lower costs in Tan Tan for allegedly equal or superior service, combined with the benefits of reduced hard currency outflow, will suffice. The Ministry talks vaguely of "encouragement" for vessel owners.

Even though its operation in Tan Tan was not fully underway, the OMP seemed confident and was planning to double cold storage capacity to 10,000 t. Meanwhile, the Government was planning a US\$12 million project to improve poorly designed port access, as well as the installation of a large new

water-desalination plant for the port. In light of this confidence, it may be that a program of incentives and pressures is in the works. A change in foreign exchange controls or customs regime may make Tan Tan more attractive.

To be successful, the transfer of the fleet will require a major shift in marketing. To compete in international markets with Las Palmas, Morocco will have to become much more aggressive in marketing its own products. OMP officials talk, for example, of "coming up with a large U.S. seafood distributor to take advantage of the growing American market." The company's Tan Tan plant could be adapted to the packing of specialty frozen seafood dinners. OMP officials also contemplate a much more active role in selling fish to Africa.

A complicating factor for any investor is that the richest fishing grounds lie off the Western Sahara, in waters recognized de facto but not de jure as being under Moroccan administrative control. Pending an internationally accepted solution to the Sahara conflict, the security of investments and operations south of the old international border (just south of Tan Tan) cannot be unconditionally assumed. (Source: IFR-86/08.)

## Recent Developments in Iceland Fisheries

Iceland's fish catch rose from 1.5 million metric tons (t) in 1984 to over 1.7 million t in 1985, breaking the record of 1.6 million t caught in 1979. Capelin accounted for 993,000 t worth \$44 million, followed by Atlantic cod, 323,000 t valued at \$134 million. The rapid growth of fresh fish exports to Western Europe have produced both profits and problems for Iceland; the amount of raw material available to Iceland's seafood processing industry, the backbone of Iceland's economy, had been reduced, thereby threatening jobs and the maintenance of steady shipments of processed fishery products to established markets.

While freezing will continue to be the major export earner in Iceland, there is concern about the loss of foreign mar-

kets, especially in the United States. The United States remained Iceland's most important customer in 1985, purchasing \$202 million worth of Icelandic seafoods, mostly frozen fish. There is some concern about the decline in the value of the U.S. dollar and its possible effect on the profitability of Icelandic exports in the future.

The Icelandic capelin (*Mallotus villosus*) is a small fish that inhabits the Arctic waters off Iceland and eastern Greenland. Because of its abundance and pelagic schooling nature, the capelin is a major food resource for larger marine species. During the past two decades capelin has replaced herring as the main raw material for Iceland's fishmeal and oil producers. About 50 Icelandic purse seiners currently fish for capelin.

As noted, in 1985, Icelandic fishermen caught a record 993,000 t of capelin. Iceland shares the capelin resource with Norway and Greenland under a quota system: Iceland takes 85 percent of the total quota, Norway takes 15 percent, and the remaining 5 percent is issued to Greenland. Greenland's fishing community is demanding that their share be increased from 5 to 40 percent, a claim which is being disputed by Iceland and Norway.

Iceland's capelin meal and oil is produced in old reduction plants built to process herring. The chief markets for capelin meal include the United Kingdom (UK), Finland, and West Germany. Capelin oil is mostly sold in the U.K. The U.S. Embassy in Reykjavik has prepared a 19-page report reviewing Iceland's capelin resource, catch, quota system, production of capelin meal and oil, and marketing efforts. The report includes statistical tables on both catch and production. U.S. companies can obtain a copy of "Iceland's Capelin Fishery, 1985" for \$9.95 and a \$3.00 handling fee (total \$12.95, personal checks or money orders only) by ordering report PB86-246014/6BA from NTIS, Springfield, VA 22161. Also available from NTIS is an 11-page report titled "Icelandic Fisheries, 1985-86" for \$9.95 and a \$3.00 handling fee (total \$12.95, personal checks or money orders only) by ordering report PB86-235041/GBA.

## The Fisheries of Latin America

Latin American fishermen reported significant catch increases in 1985, and all major fishing countries reported improved results. Preliminary reports suggest that Latin American fishermen caught about 13.9 million metric tons (t) in 1985, a 16 percent increase over the 12.0 million t taken in 1984 (Fig. 1). Many countries in the region have implemented significant fishery development programs. Officials in those countries have assigned a high priority to fisheries because they see it as an industry which can both provide high-protein food to domestic consumers and also produce important foreign exchange earnings. Fishery products are one of the most important nonpetroleum export earners for nearly half of the Latin American countries.

### Grounds

Latin American countries conduct fisheries on grounds as diverse as the frigid waters off Patagonia and the tropical waters of the Caribbean. Upwelling and the northerly flowing Peruvian Current produce one of the world's most productive fishing grounds off the coasts of Chile and Peru, primarily for various

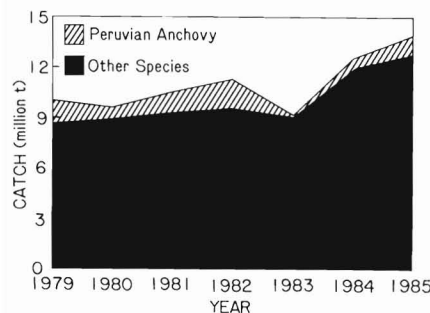


Figure 1.—The Latin American fisheries catch, 1979-85.

pelagic species. An extensive shelf area and the Falklands/Malvinas Current produce another important fishing ground off the coast of Argentina, primarily for squid and various demersal fish.

On the more northerly grounds off Brazil, Ecuador, and Mexico important fisheries are conducted for shrimp, lobster, tuna, and other tropical species. Local observers believe that many Latin American countries could significantly expand their current fishery catch. One FAO study suggests that the Latin American catch could be increased by 7-8 million t with existing technology. For example, fishermen have only recently initiated extensive fisheries to utilize the rich resources of the Patagonian shelf. Most of the catch there is being taken by distant-water fishermen, particularly Polish, Soviet, Spanish, and Japanese fishermen.

The countries in the region reported continued recovery from the 1982-83 El Niño event in the Eastern Pacific, one

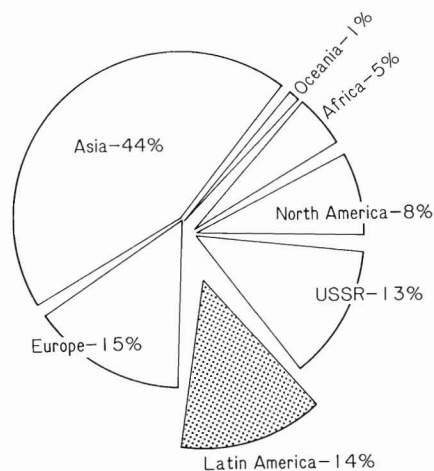


Figure 2.—Percentages of the world fisheries catch by region, 1984 (total = 83.2 million t).

of the most devastating such events ever recorded. The 1985 catch was the largest Latin American catch reported since the collapse of the Peruvian anchovy fishery in 1972. Disregarding anchovy, catches in the region set new record levels in 1985 (Table 1, Fig. 1). Latin America has experienced more severe fluctuations in its fisheries than any other world region. Most of these fluctuations have resulted from sharp changes in one fishery—Peru's anchovy fishery. If the Peruvian anchovy catch is deleted from the regional totals, the Latin American fisheries catch has been generally stable at 8.6-9.6 million t between 1979 and 1983. Following the 1982-83 El Niño, however, several countries have reported major catch increases, especially Chile, Ecuador, and Peru. As a result, the total regional catch increased to over 12.0 million t during 1984 and 1985.

Latin American fishery officials believed that the 1986 catch would be as large or even larger than the 1985 catch, but actual results may be strongly affected by two factors: Developments in Chile and Peru, the region's two major fishing countries, will have a major impact on year-end results for the region as a whole. Chilean officials closed the huge northern pelagic fishery in December 1985 and January 1986. Chilean catches, however, have continued to expand and may set another new record in 1986.

And, Peruvian officials were reporting catches slightly above 1985 levels. Anchovy stocks in particular had apparently continued to recover from the effects of the 1982-83 El Niño.

The Latin American 1985 fisheries catch of 13.9 million t amounted to 17 percent of the 84.0 million t caught world wide by all countries (Table 2). The latest available comparative data for all world regions is 1984 (Table 2 and Fig. 2). The Latin American catch exceeded the Soviet catch in 1984 and, the NMFS Branch of Foreign Fisheries Analysis believes, probably exceeded the European catch in 1985, making Latin America the world's second most important fishing region. Only the massive Asian catch is believed to have exceeded the Latin American catch. While

Table 1.—Latin America's fisheries catch, 1980-85.

Country or Dependency	Catch (1,000 t)						Major species
	1980	1981	1982	1983	1984	1985 <sup>1</sup>	
<b>Caribbean</b>							
Antigua	1.6	1.8	2.0	2.2	2.2F	2.2F <sup>2</sup>	Lobster
Bahamas <sup>3</sup>	5.0	4.4	4.7	5.2	5.3	8.2	
Barbados	3.7	3.4	3.5	6.5	6.5F	6.5F	
Bermuda <sup>3</sup>	4.1	2.0	2.2	0.5	0.5F	0.5F	
British Virgin Isl.	0.3F	0.3F	0.3F	0.3F	0.3F	0.3F	
Cayman Islands	0.5F	0.7	0.8	0.7	0.6F	0.6F	
Cuba	186.5	164.8	195.2	198.5	199.6	219.9	
Dominica	1.4	1.5	1.5	1.0F	0.4F	0.4F	
Dominican Republic	10.7	12.0	13.2	13.2F	13.2F	13.2F	
Grenada	1.8	1.7	1.8	0.6	0.6	0.6	
Guadeloupe	8.0F	8.3F	8.2F	8.8F	8.9F	8.9F	Flying fish Mackerel
Haiti	4.1F	4.1F	4.2F	4.3F	4.4F	4.4F	
Jamaica	9.1	7.8	7.9	8.7	9.6	9.6F	Mackerel Lobster/conch
Martinique	5.0F	4.7F	5.5F	5.1F	5.2F	5.2F	
Montserrat	0.1F	0.1F	0.1F	0.1F	0.1F	0.1F	
Netherlands Antilles	1.9F	1.8F	1.8F	1.8F	1.8F	1.8F	
Puerto Rico	2.6	2.7F	2.2	2.5	2.3	2.3F	
St. Kitts	1.9	1.9	1.9	1.1	1.1F	1.1F	
St. Lucia	2.4	2.4	2.4	2.6	2.6F	2.6F	
St. Vincent	0.5F	0.5F	0.5F	0.5F	0.5F	0.5F	
Trinidad-Tobago	4.5	3.8	4.6	4.2	3.6	3.6F	
Turks and Caicos	1.1F	1.1F	1.1F	1.1F	1.1F	1.1F	
U.S. Virgin Islands	0.7	0.6	0.9	0.6	0.7	0.7	
<b>Total</b>	<b>257.5</b>	<b>232.4</b>	<b>266.5</b>	<b>270.1</b>	<b>271.1</b>	<b>294.3</b>	
<b>Central America</b>							
Belize	1.3	1.3F	1.4F	1.5F	1.6F	1.6F	Lobster/conch Shrimp Shrimp Shrimp Lobster Shrimp/tuna Shrimp/lobster Shrimp/anchovy
Costa Rica	18.3	15.0	10.9	9.2	12.0	12.0F	
El Salvador	14.0	20.3	13.5	7.6	12.2	12.2F	
Guatemala	3.5	4.3	4.3	2.4	3.0	2.7	
Honduras	6.4	6.3	5.0	8.4	8.4	8.4F	
Mexico	1,222.5	1,536.2	1,321.0	1,064.3	1,103.7	1,300.0	
Nicaragua	7.0	5.9	5.0	4.5	4.3	4.3F	
Panama	216.4F	149.5F	116.6F	169.4F	138.2F	251.1F	
<b>Total</b>	<b>1,489.4</b>	<b>1,738.8</b>	<b>1,477.7</b>	<b>1,267.3</b>	<b>1,283.4</b>	<b>1,592.3</b>	
<b>South America</b>							
Argentina	385.3	361.5	475.0	416.4	314.2	386.6 <sup>4</sup>	Hake/shrimp Shrimp/lobster Sardine/mackerel Shrimp Shrimp/tuna Shrimp Shrimp Sardine Shrimp Hake/croaker Shrimp/tuna
Bolivia	4.4	5.6	5.6F	5.6F	5.6F	5.6F	
Brazil	819.8	828.7	828.9	875.4	954.4	1,020.0	
Chile	2,816.7	3,385.4	3,673.0	3,981.8	4,499.3	4,804.4	
Colombia	76.2	94.7	71.4	57.5	78.5	69.0	
Ecuador	643.5	731.0	654.1	307.3	867.5	1,647.9	
French Guiana	1.2	1.4	2.0	2.5	2.5	2.5F	
Guyana	23.6	23.4	25.8	27.6	32.4	32.4F	
Paraguay	3.3F	3.4F	3.4F	3.5	5.0	5.0F	
Peru	2,738.6	2,741.2	3,528.6	1,568.3	3,317.5E	3,594.2	
Suriname	3.0	3.4	2.9	3.6	4.1	4.1F	
Uruguay	120.4	147.0	119.1	144.1	134.0	140.0	
Venezuela	186.6	191.9	213.7	217.0	254.4	282.8	
<b>Total</b>	<b>7,822.6</b>	<b>8,518.6</b>	<b>9,603.5</b>	<b>7,610.6</b>	<b>10,469.4</b>	<b>11,994.5</b>	
<b>Grand total<sup>5</sup></b>	<b>9,569.5</b>	<b>10,489.8</b>	<b>11,347.7</b>	<b>9,148.0</b>	<b>12,023.9</b>	<b>13,881.1</b>	

<sup>1</sup>1985 data are available only for major countries. For other countries, 1984 data were used to obtain the totals and an indication of general trends.

<sup>2</sup>F = Estimated by FAO.

<sup>3</sup>These islands are not physically located in the Caribbean, but are included in the Caribbean totals for organizational simplicity.

<sup>4</sup>Different Argentine sources provide sharply different 1985 catch estimates, varying from 330,000-387,000 t. FAO reports a catch of 407,000 t.

<sup>5</sup>NMFS has followed the FAO system of excluding seaweed which in the case of some countries requires that their official statistics be adjusted. Such adjustments can be significant, Chilean seaweed harvests, for example, totaled 182,000 t in 1985.

Latin American fishermen will never approach the massive Asian catch, they are likely to continue their lead over European and Soviet fishermen who are currently fishing extensively off their own coasts and who are having increasing problems with access to distant-

water grounds. Many Latin American countries, on the other hand, have sizeable coastal stocks which they are not fully utilizing.

### Major Countries

Latin American fisheries are domi-

Table 2.—World fisheries catch by region, 1980-85.

Region	Catch (million t)					
	1980	1981	1982	1983	1984	1985
Asia	30.9	32.3	33.1	35.0	37.0	
Europe	12.5	12.5	12.1	12.5	12.8	
Latin America	9.6	10.5	11.3	9.2	12.0	13.9
U.S.S.R.	9.5	9.5	10.0	9.8	10.6	
North America	5.0	5.2	5.4	5.5	6.4	
Africa	4.1	4.3	4.1	4.4	4.0	
Oceania	0.4	0.4	0.4	0.4	0.5	
<b>Total<sup>1</sup></b>	<b>72.0</b>	<b>74.9</b>	<b>76.6</b>	<b>76.8</b>	<b>83.2</b>	<b>84.0</b>

<sup>1</sup>Totals may not agree due to rounding.



Figure 3.—The Latin American fisheries catch, 1985 (total = 13.9 million t).

nated by the large catches of two countries—Chile and Peru. Those two countries reported a combined catch of over 8.4 million t, over 60 percent of the fish and shellfish taken in the region during 1985 (Table 1 and Fig. 3). The most important 1985 developments in the six largest Latin American fishing countries are given below.

### Chile

Chile is Latin America's most important fishing country (Table 1). Chilean fishermen have steadily increased their catch since 1977. Unlike neighboring Peru, the Chilean catch was not reduced by the massive 1982-83 El Niño event, although some specific fisheries were affected. Fishermen reported major catch increases in both 1984 and 1985. The record 4.8 million t taken in 1985 ranks Chile as the world's fifth most im-

**Table 3.—Catch of the major fishing countries of the world, 1980-85.**

Country	Catch (million t)					
	1980	1981	1982	1983	1984	1985
Japan	10.4	10.7	10.8	11.3	12.0	11.5F <sup>1</sup>
U.S.S.R.	9.5	9.5	10.0	9.8	10.6	10.3
China	4.2	4.4	4.9	5.2	5.9	NA <sup>2</sup>
U.S.A.	3.6	3.8	4.0	4.1	4.8	5.0
Chile	2.8	3.4	3.7	4.0	4.5	4.8
Peru	2.7	2.7	3.5	1.6	3.3	3.6
India	2.4	2.4	2.4	2.5	2.9	2.8
Korea (ROK)	2.1	2.4	2.3	2.4	2.5	2.7
Indonesia	1.8	1.9	2.0	2.2	2.2	NA
Norway	2.4	2.6	2.5	2.8	2.5	2.1
Thailand	1.8	2.0	2.1	2.3	2.2	2.1
Philippines	1.6	1.7	1.8	2.0	1.9	2.0
Iceland	1.5	1.4	0.8	0.8	1.5	1.7
Denmark	2.0	1.9	1.9	1.9	1.8	1.7
N. Korea	1.4F	1.5F	1.6F	1.6F	1.7F	1.7F
Ecuador	0.6	0.7	0.7	0.3	0.8	1.6
Canada	1.3	1.4	1.4	1.3	1.3	1.4
Spain	1.3	1.3	1.4	1.3	1.3	1.3
Mexico	1.2	1.5	1.3	1.1	1.1	1.3
Brazil	0.8	0.8	0.8	0.9	1.0	1.0

<sup>1</sup>F = FAO estimate.  
<sup>2</sup>NA = Not available.

portant fishing country (Table 3). Catches of the species which dominate Chilean landings (sardines and mackerels) increased by 11 percent in 1985. The only major species groups which declined were crustaceans.

Chilean scientists are concerned about the long-term impact of the explosive growth of Chilean fisheries, especially on sardine stocks. To protect those stocks, the Chilean Government closed the reduction fishery on 14 December 1985, and did not reopen it until the end of January 1986. Chilean companies have made major investments in recent years adjusting to the decline of anchovy stocks. The companies redirected their fishing effort to sardine and mackerel stocks. These companies have made the necessary changes in vessels, gear, and strategy with little or no assistance from the Chilean Government. Many vessels, added to Chile's growing fleet, have been used vessels bought from the hard-pressed fishermen of neighboring Peru.

The Chilean fishing industry is centered in the north and is primarily concerned with the reduction of small pelagic species into fishmeal and oil. Over 80 percent of the Chilean catch is reduced and Chile is now the world's largest fishmeal exporter. Fish and shellfish taken for human consumption are harvested mostly by artisanal fishermen using traditional gear and methods.

The Government is promoting the modernization and diversification of the industry and several interesting programs are underway, including demersal trawling off the southern coast, surimi production, krill fishing (joint ventures with the Japanese), and various salmon and mollusk culture projects. The two most promising programs are salmon culture and surimi production. A growing number of private companies have begun to culture coho salmon in Chile, air shipping it fresh to the United States during the winter and early spring months when U.S. domestic salmon is not available. In 1985, Chile became the first Latin American country to export surimi. The shipments were small but could eventually become a major fishery export.

### Peru

Peruvian fishermen reported a 1985 catch of 3.6 million t, nearly 10 percent more than the 3.3 million t taken in 1984. The 1985 catch was the largest reported since 1979, ranking Peru as the world's sixth most important fishing country. Small pelagic stocks, especially anchovy, were reportedly recovering from the 1982-83 El Niño event and Peruvian officials were predicting major catch increases in 1986 and 1987. While many fishery stocks are at their highest level in recent years, the country's fishing industry is still recovering from the 1982-83 El Niño and associated climatic and meteorological disturbances which caused widespread destruction in coastal communities. Piers and other shore installations, as well as roads and bridges needed to transport the catch, were severely damaged.

Unlike Chilean fishermen, however, Peruvian fishermen have not made the changes necessary to utilize the much larger mackerel stocks now found in the Eastern Pacific. Peru's Instituto del Mar believes that the mackerel biomass may be as high as 9 million t. Those stocks are now being fished by the Soviet Union and other communist countries outside Peru's and Chile's 200-mile zone. The Peruvian Government is attempting to gain some economic advantage from the foreign activity and

increase the supply of edible fish by pursuing negotiations to revise now-expired joint ventures with the Soviets. In addition, Peru also began in December 1985 a test fishing program with Cuba.

Peru's fishing industry is still dominated by the fishmeal industry which was nationalized in 1973. Since the nationalization, the Ministry of Fisheries has had to finance massive budget deficits (reportedly exceeding \$100 million by 1985) amassed by the state-owned fishmeal company (PESCA PERU). The previous Fisheries Minister, Ismael Benavides, attempted to curtail unprofitable operations and carried out major staff reductions and plant closures. The new APRISTA Government, which assumed power in July 1985, reversed that policy and reopened 10 of the closed fishmeal plants. Catches have increased so that more fish is available for reduction, but it is not yet clear if fish landings are large enough to support the newly opened plants on a profitable basis, or if additional funds will be needed to subsidize their operations.

Recent increases in world fishmeal prices have greatly benefited PESCA PERU's efforts to avoid additional large deficits. Peru's canning industry continues to report serious economic difficulties caused by the weak international market for canned sardines and Government regulations which not only set the prices the fishermen receive, but also restrict fishmeal production by private companies. Some companies are reporting considerable success with a new fishery for scallops and the developing shrimp culture industry in northern Peru, although officials are concerned about both of these two fisheries. Nevertheless, scallops and shrimp have become two of Peru's leading fishery export commodities.

### Ecuador

Ecuador reported the largest catch increase in the region during 1985. Its fishermen caught a record 1.6 million t, a 90 percent increase over the previous record 0.9 million t reported in 1984. Most of the increase was due to sharply higher catches of small pelagic species as the industry continued to recover from the effects of the 1982-83

El Niño which caused catches to plummet to only 0.3 million t. Tuna fishermen are also benefiting from the post-El Niño recovery and reported improved 1985 results. Exporters resumed large-scale tuna exports to the United States in 1985. Local investors purchased the large U.S.-owned INEPACA cannery in 1985.

The country's most important fishery in terms of value is shrimp, most of which is cultured. Shrimp farmers reported a serious shortage of postlarvae to stock their ponds during most of 1985. Postlarvae prices climbed to record levels and were often simply not available. Some farmers imported postlarvae and others attempted to use species not yet fully tested for pond culture. Reports suggest that a substantial number of ponds were taken out of production because of this inability to obtain postlarvae. As a result, Ecuador's 1985 shrimp exports fell below 1984 levels. Shipments to the United States, for example, were only 19,900 t, a decline of 6 percent from the 21,100 t exported in 1984.

While that decline was small in quantitative terms, it represented a loss of nearly \$20 million. The postlarvae problem eased somewhat in October 1985, but the country will continue to experience periodic problems as long as it is dependent on wild sources of postlarvae. The shortage has caused an explosive growth in the number of shrimp hatcheries. More than 10 large hatcheries are currently in operation. Reports from Ecuador suggest that about 60 new hatchery projects are in various stages of planning and construction. It will probably be several years, however, before these hatcheries will supply a sizeable proportion of the approximately 20 billion postlarvae that growers need annually.

### **Mexico**

Mexican fishermen reported a substantial catch increase. The 1985 fisheries catch totaled 1.3 million t, nearly 20 percent more than the 1.1 million t reported in 1984. Much of the increase resulted from improved small pelagic catches along the Pacific coast. Included in the 1984 total was a record tuna catch

of over 85,000 t, mostly yellowfin tuna. The Government reported increased success in its efforts to develop export markets for tuna and claims to have exported over 35,000 t in 1985, an all-time record. Efforts to end the 1980 U.S. tuna embargo continued, but the embargo remained in place throughout the year, preventing shipments to the United States.

Mexico is also proceeding with the second phase of its major effort to develop the fishing industry which was begun in 1977. The current 5-year National Fisheries and Marine Resources Development Plan (1984-88) is much more modest than the original 1977-82 plan because of the country's fiscal crisis which began in 1982. Under the latest plan, the Government hopes to increase the fisheries catch to 2.5 million t by 1988. While a major expansion program is planned for the state-owned fishing company, Productos Pesqueros Mexicanos, most of the important fisheries continue to be reserved for the country's cooperative fishermen. Private investors, however, would like to see the regulations governing the cooperatives changed.

The country's Congress is reportedly close to passing a new comprehensive fisheries law which has been under consideration for over 10 years. One of the provisions of this proposed law retains the cooperatives' exclusive right to fish for eight reserved species, but allows private investors to participate in the processing and marketing of those species. This particular change has been severely criticized by some cooperative leaders. The Government estimated that the development plan should enable Mexico to increase export earnings from \$570 million in 1984 to \$690 million by 1988. Some observers, however, point out that long-term trends in Mexican exports are unclear.

Mexico is experiencing serious difficulties with many of its export-oriented fisheries. Shrimp is Mexico's leading fishery in terms of value. It is not yet known if Mexico could significantly expand its shrimp trawler catch. Many observers believe that shrimp stocks, especially those supporting the more important Pacific Coast fishery, are

already being utilized at or near full capacity. A substantial decline in the shrimp catch occurred in 1985. Press reports suggest a significant deterioration of the country's cooperative-owned shrimp fleet, especially in the Gulf of Mexico. The principal reasons for the catch decline, however, are probably environmental/climatic factors. Statistical data is difficult to evaluate because a large quantity of shrimp is landed and marketed illegally.

Efforts to launch a shrimp culture industry in Mexico have not yet met with the success achieved in other Latin American countries, but Government efforts to promote the industry have been intensified and over 1,000 hectares of ponds have now been constructed. Private industry sources claim that the major factor inhibiting the industry's growth is the law which only permits marine shrimp culture to be conducted by cooperatives and ejidos. Other important export-oriented fisheries also face serious problems. Mexico continues to report difficulty exporting tuna, while catches of the two other major export-oriented fisheries, abalone and lobster, reportedly are declining.

### **Brazil**

Brazilian fishermen significantly increased their catch in 1985, exceeding 1.0 million t for the first time. This amount was about 6 percent more than the 0.95 million t taken in 1984. About half of the catch was taken by artisanal fishermen, the highest proportion reported in any major Latin American fishing country. While the artisanal fishermen generally employ primitive methods, almost all of their catch is for human consumption. This differs from the other major Latin American fishing countries where the bulk of the catch is exported or for reduced to fishmeal and oil.

Several companies reported difficulties in 1985. Brazilian companies have a large, but poorly utilized processing capacity. Many of these companies expanded their plants using the cheap credits made available to the industry through the Government fiscal incentive program. Most of these investments were made in the processing industry

and relatively few investments were made in new vessels. As a result of this imbalanced growth, as much as 60 percent of the country's processing capacity was idle in 1985 because the fishing fleet could not deliver adequate supplies of raw material. The U.S. Embassy in Brasilia reports that the fleet is outmoded and poorly equipped to deliver the quantity and quality of fish needed by the country's modernized processing plants.

The Government announced the First National Plan for Fisheries Development (1986-89) in August 1985, but details are not yet available on the projects to be undertaken during the 4-year term of the plan. The country's two most important export-oriented fisheries are shrimp and lobster. The shrimp industry can probably be expanded. The northern shrimp fishery out of the port of Belem is still not being fully utilized. Shrimp culture could also expand Brazilian shrimp production. The Government is assisting private investors entering the shrimp culture industry. Prospects for the lobster fishery are less promising. Known lobster stocks are currently being fully utilized, and any increased fishing effort could affect them adversely.

A small fishery for skipjack tuna has developed in recent years and Brazil has become a major Latin American tuna supplier to the U.S. market. The Government in 1985 attempted to end a fuel subsidy program for exporters, but the cancellation of the program was so severely criticized that it was soon restored. To diversify the fishing industry from the current dependence on shrimp and lobster fisheries, the Government began a new subsidy program that exempted fresh and frozen fish (but not shellfish) from income tax payments. Results of this program cannot yet be fully evaluated.

### **Argentina**

Argentine fishermen reported a catch of almost 0.4 million t in 1985, a 33 percent increase over the 0.3 million taken in 1984. Argentina has one of the world's largest underutilized fisheries resource. The country's fishing industry, however, continues to have severe prob-

lems. The Government had hoped to achieve a catch of 1.0 million t, or more, by 1980, an amount that could easily be supported by offshore resources.

The economic problems experienced by the major fishing companies and their mounting debts have forced many companies to restrict their fishing effort. These problems have kept the annual catch below 0.5 million t throughout the 1980's. The Government's fisheries development program has also been complicated by continuing difficulties with the United Kingdom over the Falkland Islands. The British maintain a 150-mile Falklands Island Protection Zone, restricting both Argentine fishermen and Argentine efforts to limit foreign fishing in the area. Argentina could theoretically request British permission to fish off the Falklands, but as this would be considered de facto recognition of British jurisdiction, the Government has not done so. The British do not require other countries to request permission to fish off the Falklands. They have, however, contacted some of the countries active in this fishery to convince them of the need to limit their fishing effort.

Foreign fishing, which has expanded significantly since 1982, has been especially harmful to Argentina. Many countries fishing in the South Atlantic, especially Poland, market their catch on the international market, thus placing themselves in direct competition with Argentine companies. This competition has had an especially severe impact on Argentine squid exporters who report that the prices they received declined by about 30 percent during 1985. Other exporters were hurt by changes in the tariff regime of the Latin American Integration Association (ALADI). Most Argentine exporters, however benefited by the declining availability of cod on the U.S. market. This shortage of cod helped sales of Argentina's traditional fishery export—hake, a cod substitute.

Hake sales increased during 1985, despite increased competition from South Africa. Shipments totaled \$147 million, an 8 percent increase over the \$136 million exported in 1984. The increased hake sales have aided many hard-pressed Argentine companies.

Several countries were reportedly close to bankruptcy because of previous debts and an unexpected decline in shrimp catches which began in mid-1985. Many companies had become dependent on the shrimp fishery which they developed along the central coast since 1982. Shrimp was the country's principal fishery export commodity in 1984 thus making the precipitous drop in shrimp catches in mid-1985 that much more devastating.

Some fishermen reported improved shrimp landings in early 1986, but officials remain uncertain about the future of this fishery. The outlook for the country's entire fishing industry also continues to be unclear. Many factors cloud the industry's future: low international prices for many Argentine species, high interest rates, government regulations and economic policy, high domestic costs, and the decline of shrimp stocks. (Source: IFR-86/32.)

### ***Japan, France Sign Fisheries Agreement***

Japanese and French Government representatives met in Tokyo in June and agreed to extend operations by Japanese tuna fishing vessels in the Exclusive Economic Zones (EEZ) of France's territories in the South Pacific. The agreement will be in effect until 19 August 1987 and will permit Japan to fish off New Caledonia, French Polynesia, and Wallis and Futuna Islands. These areas serve as complementary fishing grounds for the Japanese tuna fleet, which passes through them on the way to more important fishing grounds off New Zealand and South America.

The Japanese-French fisheries agreement has traditionally included Japanese fishing operations off French territories in the Indian Ocean and off western Central America, as well as the South Pacific. Japan has fished in these areas intermittently since the 1979-80 agreement (Table 1). The Japanese agreed to end fishing operations off French islands near Madagascar in the 1986 agreement, primarily because very few vessels actually operated there in 1985. However, Japan will resume trial fishing

operations around Clipperton Island off the west coast of Central America.

The Japanese-French agreement has been renewed annually since it was first signed in 1979. France has been steadily increasing Japan's catch quotas since the 1983-84 season (Table 1) in exchange for more Japanese technical and development assistance to its territories. The fishing fees agreed on by the Japanese have also increased accordingly, from \$211,000 in 1983 to \$645,000 in 1986. (Exchange rates used for 1983 and 1986 were approximately 8.3 FF/\$ and 7.3

FF/\$ (30 June 1986), respectively.)

The four main provisions of the current agreement are:

1) Number of vessels: The total number of Japanese vessels permitted to fish in French overseas territorial waters was increased from the 1985 quota of 140 vessels to 153.

2) Catch quota: The 1986-87 catch quota is 9,124 metric tons (t) of fish (primarily tuna), up nearly 20 percent from the 1985-86 quota of 7,650 t.

3) Fishing fees: Total fishing fees for the 1986-87 agreement are \$645,000.

French Polynesia will receive the largest portion of these fees—about \$485,000. New Caledonia and Wallis and Futuna Islands will receive \$129,000 and \$30,000, respectively. Japan will continue to pay the fishing fees in a lump sum to the individual territories. Since the sixth extension of the agreement (1984-85), the Japanese have been trying to change the present system of lump sum payments to a per-vessel basis. Japan has consistently not used its entire quotas for both catch and number of vessels, resulting in a high cost per vessel for those fishermen participating in the fishery. For example, only 28 Japanese fishing vessels operated in the French South Pacific territories out of a total vessel quota of 107 in the 1983-84 season. The catch was only 762 t, 16 percent of the total 4,660 t quota. The 1985-86 catch amounted to 1,150 t, only 15 percent of the total 7,650 t quota. This means that the Japanese paid fees of about \$334 per ton of fish compared to \$50 per ton if they had caught their entire quota.

4) Fisheries cooperation: In addition to fishing fees, the Japanese have agreed to provide fisheries assistance to each of the French South Pacific territories. They will send two fisheries experts and two fishery training vessels to French Polynesia to train local fisheries technicians at a cost of over \$600,000. Of this total, about \$485,000 will be paid in fishery fees and the remainder will be paid in materials and equipment. New Caledonia and Wallis and Futuna will be given fishery equipment worth \$13,000 and \$6,500, respectively. Japan has been providing materials and equipment for development of all three territories' coastal fisheries since the 1983-84 agreement. In the 1984-85 agreement, Japan agreed to conduct some exploratory fishing off New Caledonia and French Polynesia, provide French Polynesia with a small research vessel, and train two technicians. In addition, the Japanese agreed to send experts to study the development potential of French Polynesia's local fishing industry. (Details of Japanese fisheries aid to the French South Pacific territories in the 1985-86 agreement were not available.) (Source: IFR-86/49.)

Table 1.—Japan's fisheries agreements with France; agreement provisions by duration, fishing grounds, fees, number and type of vessel, and catch quota, 1981-87.

Duration	Fishing grounds	Fishing fees <sup>1</sup> (1,000 FF)	No. of Vessels and type <sup>2</sup>			Catch quota (t)
			Longline	Pole-and-line	Total	
20 July 1979- 19 July 1980	New Caledonia	506	N/A	N/A	70	3,375
	French Polynesia	1,013	N/A	N/A	255	3,750
	Wallis and Futuna	330	N/A	N/A	40	1,500
	Tromelin <sup>3</sup>	45	N/A	N/A	15	225
	Clipperton	None	N/A	N/A	35	Unlimited
	Total	1,894	N/A	N/A	415	8,850
July 1980- Aug. 1981	N/A	N/A	N/A	N/A	N/A	N/A
Aug. 1981- Aug. 1982	New Caledonia	N/A	N/A	N/A	105	5,800
	French Polynesia	N/A	N/A	N/A	290	5,600
	Wallis and Futuna	N/A	N/A	N/A	60	1,400
	Tromelin <sup>4</sup>	N/A	N/A	N/A	35	100
	Total	3,248	N/A	N/A	490	12,900
19 Aug. 1982- 18 Aug. 1983	New Caledonia	N/A	N/A	N/A	105	5,550
	French Polynesia <sup>3</sup>	N/A	N/A	N/A	136	3,600
	Wallis and Futuna	N/A	N/A	N/A	60	1,350
	Tromelin <sup>4</sup>	N/A	N/A	N/A	10	200
	Total	2,865	N/A	N/A	311	10,700
19 Aug. 1983- 18 Aug. 1984	New Caledonia	N/A	N/A	N/A	N/A	N/A
	French Polynesia	N/A	N/A	N/A	N/A	N/A
	Total	1,760	78	29	107	4,659
19 Aug. 1984- 18 Aug. 1985	New Caledonia	658	24	5	29	2,350
	French Polynesia	1,305	54	0	54	3,000
	Wallis and Futuna	162	0	7	7	540
	Clipperton	None	Unlimited	Unlimited	Unlimited	Unlimited
	Total	1,855	78	12	90	5,890
20 Aug. 1985- 19 Aug. 1986	New Caledonia	822	25	11	36	2,650
	French Polynesia	2,100	94	10	104	5,000
	Total	2,922	119	21	140	7,650
20 Aug. 1986- 19 Aug. 1987	New Caledonia	943	31	6	34	2,645
	French Polynesia	3,543	113	0	113 <sup>5</sup>	5,900
	Wallis and Futuna	220	0	6	6	579
	Clipperton	None	Unlimited	Unlimited	Unlimited	N/A
	Total	4,706	144	12	153	9,124

<sup>1</sup>Fees are paid in French francs (FF). Approximate annual franc/dollar exchange rates for 1979-1985 are: 1979 = 4.3 FF/\$, 1981 = 5.7 FF/\$, 1982 = 6.7 FF/\$, 1983 = 8.3 FF/\$, 1984 = 9.5 FF/\$, and 1985 = 7.6 FF/\$. The exchange rate at the signing of the 1986 agreement was approximately 7.3 FF/\$ (30 June 1986).

<sup>2</sup>N/A = Not available.

<sup>3</sup>Agreement period was to end on April 19, Extension beyond that date was conditional on satisfactory compliance of the agreement terms by Japan.

<sup>4</sup>Also includes Glorieuses, Juan-de-Nova, and Europa at Bassas-da-India islands.

<sup>5</sup>The number of vessels is not to exceed 30 at any one time.

## Major Japanese Tuna Firms Alter Operations

Japanese fishing companies became major earners of foreign exchange after World War II, exporting mainly to the United States and Europe. Currently, however, because of growing competition from developing countries (particularly Taiwan and the Republic of Korea), as well as the enforcement of 200-mile Exclusive Economic Zones, Japanese companies are now changing the way they do business throughout the fishing industry, especially their tuna operations. Five important Japanese companies<sup>1</sup> (Taiyo, Nippon Suisan, Nichiro, Kyokuyo, and Nichirei) are taking several measures to adjust their tuna and other operations to the changing conditions. They are buying more fish from foreign vessels, moving processing plants overseas, and increasing the share of processed and semiprocessed fish in their overall trade; in the past, they tended to catch their own, or buy whole fish, and process the fish themselves.

### Taiyo Fishing Company

Taiyo is the largest marine products company in Japan, handling all facets of the seafood industry from catching to selling. Taiyo began its operations before World War II, exporting tuna to the United States. After the war, it extended its tuna fishing operations to the Atlantic Ocean, processing it aboard factory ships, and selling it directly to Europe. At the same time, Taiyo started trading in other fisheries products, greatly increasing its exports. Taiyo has been airshipping bluefin tuna from Boston to Japan since 1971, and is currently importing and marketing about 200 individual bluefin tuna annually. Taiyo is heavily involved in overseas operations, and has 21 overseas subsidiaries and affiliates, 3 of which are engaged in tuna. It also hopes to expand its already impressive cooperative fishing operations.

Taiyo's tuna operations are quite diverse. It is involved in cooperative fishing with domestic fishermen, a joint

<sup>1</sup>Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

venture (J/V) in the Solomon Islands, and tuna aquaculture in the Mediterranean Sea. Taiyo is actively engaged in fishing operations with a number of other Japanese companies. Taiyo's tuna longlining cooperative operations consist of six of its own vessels, four from Hakodate Public Fishing Corporation, three from a subsidiary of the Hokkaido Fishing Corporation, three from Daito Deepwater Fishing, and one from Goyo Suisan, for a total of 17 vessels. Its tuna purse seining cooperative operations consist of three Taiyo vessels and one each from Taisei Fisheries and Goyo Suisan, totalling five vessels.

A Taiyo subsidiary has cultured tuna in Ceuta, a Spanish island in the Mediterranean, since 1973. In 1985, it harvested 610 fish. Tuna eggs are obtained from a local fishermen's union, and are hatched and grown to about 20 kg before harvesting. The head, tail, fins, and internal organs are removed and the fish are packed in ice, then shipped to Madrid. From there they are airshipped to Narita airport, outside of Tokyo. Harvesting takes place between July and December. Taiyo stations five to six technicians in Ceuta.

Taiyo has a joint venture (J/V) with the Government of the Solomon Islands to catch, process, and export canned and processed fishery products and engage in bonito longlining. The J/V was set up in 1973 for a 10-year period. The agreement was extended in November 1981 and will be in effect through 31 December 1992. The J/V company, Solomon-Taiyo, previously sold frozen tuna and bonito to U.S. packers in Guam and Puerto Rico, but because market conditions have changed significantly, its primary frozen tuna market is now Thailand, where canners have greatly expanded production. Low prices for the J/V's products have made this operation only marginally profitable to manage. However, as it is critical to the Solomon's economy, accounting for about 40 percent of the Island's total foreign currency earnings, it is unlikely to halt operations. The company also exports tuna and bonito packed in oil to the European Community. The company's fleet consists of 34 pole-and-line vessels, one small purse seining vessel,

and two transport vessels. The operation catches approximately 10,000 metric tons (t) of bonito and tuna per year; its canneries produce approximately 100,000 cases of tuna per year. Solomon-Taiyo's plans for a new cannery, however, have been shelved due to the current low tuna prices.

The company has directed much of its recent efforts in building new vessels and adjusting marketing patterns to new conditions. Taiyo is investing in all-weather fishing vessels which can operate in extreme northern latitudes and produce high-quality products at the same time. Taiyo has recently taken steps to introduce the latest technology on its new vessels to cut costs. (Older vessels are being replaced with new additions to improve production efficiency. The company has replaced 10 of the 17 cooperative vessels so far in 1986.)

Taiyo is slowly strengthening its domestic marketing, buying fresh and frozen fish from Taiwan and the Republic of Korea (ROK) for processing and subsequently reexporting it, reorganizing its sales network for tuna and bonito, and broadening its middleman operations. Because of the breakup of Azuma Suisan, a Taiyo subsidiary established in 1978 to handle domestic and international tuna trade, Taiyo plans to create a centralized marketing and administrative body within the company and thus improve sales. This centralized body will be in charge of all Taiyo's tuna operations. Taiyo's tuna supplies come from three main sources: the catch from its cooperative fishing operations (30 percent), domestic purchases (30 percent), and imports (30 percent),

Note: Unless otherwise credited, material in this section is from either the Foreign Fishery Information Releases (FFIR) compiled by Sunee C. Sonu, Foreign Reporting Branch, Fishery Development Division, Southwest Region, National Marine Fisheries Service, NOAA, Terminal Island, CA 90731, or the International Fishery Releases (IFR), Language Services Bi-weekly (LSB) reports, or Language Services News Briefs (LSNB) produced by the Office of International Fisheries Affairs, National Marine Fisheries Service, NOAA, Washington, DC 20235.



mainly from Taiwan and ROK. The remaining 10 percent comes from trade in processed tuna, an area which Taiyo is hoping to greatly expand. Taiyo now handles about 12,000-13,000 t of processed tuna annually, worth about \$130 million (at ¥154 = US\$1).

#### **Nissui Company (Nippon Suisan)**

Nissui was a small company engaged in tuna trolling prior to World War II. After the war, Nissui began tuna factoryship operations and processed tuna jointly with Hokoku Suisan. Hokoku, however, wanted to emphasize land-based operations, while Nissui wanted to continue its factoryship operations. The two companies formally split up in 1969 when Hokoku decided to restructure its management.

Nissui operations were centered on whaling and salmon fishing after the split. Seven years later, in 1976, Nissui decided to return to tuna marketing. Because of its long absence from this business, Nissui had to rebuild its sales network from the ground up. Its sales have steadily expanded since, and are expected to reach \$143 million in 1986, compared to zero 10 years ago. This growth reflects the considerable influence Nissui has in Japan's tuna industry.

Initial 1986 sales projections were over \$160 million, but because the price of tuna decreased 30 percent in 1985, revenue decreased despite an increase in the quantity sold. At present, Nissui is selling its products mainly to fish retailers and large wholesalers. It also has several processing plants in Shizuoka Prefecture, and one in Tokyo. Nissui's main species is now bigeye tuna. Nissui is planning to develop new distribution channels for all its products, including tuna. It hopes to expand sales through high-volume chain stores and plans to concentrate its operations on low-fat fish, expanding the number of species handled.

#### **Nichiro Fishing Company**

Nichiro was unable to conduct its traditional North Pacific fishing operations during World War II, but rebuilt its bottom-fishing operations following the war. It steadily increased its fleet and began tuna purse seining off the coast

of Africa. After the "tuna mercury" scare and the 1973 oil crisis, Nichiro restructured and eliminated its tuna fishing operations. (In early 1973, there were reports that tuna were found with hazardous levels of mercury in their systems, causing a drastic decrease in consumption of tuna in Japan. This blow was followed in late 1973 by the substantial increase in oil prices.)

While the company eliminated its own fishing operations in 1973, it is still engaged in the tuna business, importing bluefin from North America and purchasing the catch from subsidiaries in Latin America. Since 1972, Nichiro has been airshipping bluefin tuna from Canada and Boston to Japan in cooperation with Marubeni, a large Japanese trading company. Each company handles 400 individual bluefin per year, for a total of 800, representing 40 percent of Japan's bluefin tuna imports from this area. Both companies expect bluefin prices to keep rising, and hope to further expand their business.

Nichiro has a subsidiary in Ghana which operates four pole-and-line fishing vessels and one purse seiner; all five fish for skipjack tuna. It is also fishing for skipjack tuna off Brazil in cooperation with a local fishing company. Nichiro presently does not plan to enter any new markets, but does hope to expand its tuna airshipping operations.

#### **Kyokuyo Company**

Kyokuyo was the first large Japanese fishing company to enter the tuna industry. Following World War II, it began tuna longlining with four vessels. It discontinued this fishery in 1970 after a management shakeup and began to concentrate on tuna sashimi sales. In 1973, Kyokuyo began operations with a refrigeration company to produce primarily high- and medium-grade tuna. This was the beginning of the company's vertical integration. Kyokuyo later purchased a freezing and processing plant jointly with the same refrigeration company. Following the consolidation of Japan's whaling industry, Kyokuyo purchased three purse seiners and resumed tuna fishing operations.

Kyokuyo is currently operating its three vessels jointly with a vessel from

Daido Suisan. It replaced one of its older vessels with a newly constructed one in May 1986. Kyokuyo has yearly sales of \$195-227 million, making it one of Japan's largest fishing companies. It is involved in both wholesale and retail fish sales and its offices in Tokyo and Osaka have special tuna sales sections. Kyokuyo hopes to increase tuna sales through high-volume retail chains by emphasizing the wholesale and retail sectors.

#### **Nichirei Company**

After World War II, Nichirei was a major exporter of frozen tuna to the U.S. with operations in Samoa. In 1963, it moved all of its offshore operations to St. Martin (Netherlands Antilles) in the Caribbean. Nichirei built all of its own roads and piers, and acquired a refrigerated transport vessel. It later built two additional cold-storage facilities and its business began to expand rapidly. Nichirei was one of the first Japanese fishing companies to move its operations overseas.

Nichirei stations 10 employees in St. Martin and services approximately 40-45 Taiwanese longliners (250-300 GRT) which land about 12,000-13,000 t of fish annually. The tuna, which is about 80 percent of the catch, is transhipped to Puerto Rico where it is processed in one of five canneries. (The Nicholson Act (Title 46 U.S.C. 251 A) prohibits foreign fishing vessels from landing fish directly at U.S. ports. To comply with the Nicholson Act, the Taiwanese fishing vessels have to first land the fish in St. Martin (Netherlands) and then Nichirei transships to canneries in Puerto Rico.) About 1,000 t of the remainder of the catch, mainly striped marlin, blue marlin, and bigeye tuna, is exported to Japan. The rest is sold locally. Curacao Pioneering, a locally incorporated company, operates the St. Martin facility. In addition to purchasing the catch from Taiwanese vessels in St. Martin, Nichirei also purchases fish from Las Palmas (Canary Islands, Spain), Montevideo (Uruguay), and Capetown (South Africa). Nichirei plans to expand its current operations, which are already mostly overseas. (Source: IFR-86/43.)