DEVELOPMENT POTENTIAL FOR THE CHILEAN SEAFOOD INDUSTRY

by

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I. INTRODUCTION

Chile is far down on the list of countries in domestic seafood consumption. The per capita marine product consumption is considerably higher in the Far East region, Europe, and some African countries. Because of these traditional consumption patterns, effort is expended in Chile to export seafood rather trying to improve commercialization in the domestic market.

Chile has traditionally had commercial relations with Europe and Japan and in the early 1980's, started exporting seafood to the United States beginning with centolla (Chilean Kingcrab). While exporting seafood may represent a growth opportunity to a particular company, there are many problems in the international seafood trade business that a company will have to deal with. These include non-tariff trade barriers that may affect the Chilean seafood that enters international markets.

Since 1977, most of coastal nations have declared a 200 mile Exclusive Economic Zone (EEZ). This restricts access to most of the world's marine fish stocks, primarily affecting nations with distant water fleets. The principal results of this have been changes in fish production patterns and international seafood trade.

To improve the understanding of the Chilean domestic and international seafood trade, this paper addresses four major questions:

1. What can be done to increase seafood consumption within Chile ? 2. What is the potential for expanding the market for Chilean seafoods in the U.S ?

3. How has Chile been affected by the establishment of EEZ and what strategies can Chile use to take advantage of the new zone ?
4. What non tariff trade barriers do Chilean seafoods face ?

Experiences and examples from the U.S are used to deal with these questions, because of the similarity of U.S. and Chile situations.

Background information is given in world fish production and fisheries development in the world oceans. This is followed by a description of seafood characteristics and ways of merchandising, in order to apply these techniques in Chile. An analysis is made of current market for Chilean species in the U.S, and possible expansion to other Chilean species as a means to increase Chilean seafood exports. Catch and production of important nations before and after the establishment of the EEZ is described, along with the benefit to both Chile and U.S. Management of fishery resources is also discussed. Finally, a description of the principal non-tariff trade barriers is provided, together with the results of interviews conducted in Seattle in October 1986, with people in the seafood industry.

II. WORLD FISH PRODUCTION

The greatest ocean fisheries catches come from the temperate and sub-polar continental shelves of the northern hemisphere, and from the upwelling areas of the great pelagic fisheries such as Peru-Chile. Although there are some thousands of fish and shellfish in the world ocean, only a small proportion is of real commercial significance. In temperate waters the biomass caught is relatively high and the species diversity low; in the tropics, outside of the upwelling areas, the reverse is the case.

The major commercial fishing nations can be grouped . First are the Western European nations with their highly diversified fisheries and long history, concentrated in the north and mid - Atlantic and in the Mediterranean and Black Seas. Developing from this, through emigration and technological transfer, are the commercial fisheries of North America, Australia, New Zealand and South America. The second major grouping are the centrally-planned, state- run fisheries of the Soviet Union and Eastern Europe, built upon distant water and remote base operations. Third are the fisheries of Japan, the world's greatest and most diversified fishing nation, with a long history in the northwest Pacific, and recent wordwide expansion. The fisheries of the developing countries remain primarily aetesesanal , but significant development is occurring in many areas with outside assistance, especially in South America and East Asia.

World seafood production has increased consistently year by

year since the Second World War. The world nominal catches has risen from a level of 19.5 million metric tons (MT) in 1948 to 72.2 million MT in 1980 (Figure 1: World Nominal Catch by Economic Regions 1960-1980). Analyzing the data of total catch by continents in 1983, it can be seen that Asia is ahead with 29 million MT, followed by Europe with 12.1 millions, and USSR with 8.9 million MT. (Figure 2: Total catch by continents). Leading countries include Japan with 11.2 millions MT, followed by the USSR with 9.7 and China with 5.2 million MT. (Figure 3: Principal countries in terms of catch volume). (Fig.4 World Commercial catch by leading countries).

Approximate 70% of the world total catch is destined to human consumption and 30% is reduced to meal and oil. (Figure 5: Disposition of World Catch). The world market has some striking regional variations. In the developed world there has been a marked shift over the past three decades from fresh to frozen products, while the consumption of high value canned products, such as salmon and tuna, has also increased markedly. In the last few years, however, there has again been a shift to fresh products.

The seafood market for fresh or chilled products in 1980 was 29% of world catch; the frozen product market was 31%; cured, marinades, smoked and dried product 20%; and canned 20%. (Figure 6: Disposition of World Catch destined for human consumption by type of marketing).

A remarkably high proportion of fish products entered international trade, about 56 per cent in the early 1980s. The

FIGURE 1

World Nominal Catch by Economic Regions 1960-1980
(Fish, crustaceans, molluscs, other aquatic animals and plants)

	Thousand metric tons			% Share		
	1960	1970	1980	1960	1970	1980
World Total	40,200.0	65,455.7	72,190.8	100	100	100
Developed countries	16,728.5	24,560.2	27,386.8	41.5	37.5	37.9
Developing countries	13,899.3	29,571.9	29,922.7	34.5	45.2	41.4
(Developing countries without Peru)	(10,172.3)	(17,037,0)	(27,191.3)	(25.3)	(26.0)	(37.7)
Centrally planned countries (including China)	9,572.2	11,323.6	14,881.3	23.7	17.3	20.6

Source: FAO, Yearbook of Fishery Statistics, various issues.

FIGURE 2

World Nominal Catches By Continents

Africa	2,636.300	2,924.500
North America	7,087.800	6,976.600
South America	9,242.400	7,189.900
Asia	27,787.200	29,008.100
Europe	11,738.400	12,121.700
Oceania	387,600	430,300
USSR	9,153.200	8,960.300

Source: FAO, Yearbook of fisheries Statistics, 1984.

FIGURE 3

Principals countries in terms of catch volume

Country		1982 TM	1983 TM
Japan	1	10,775.265	11,250.000
USSR	2	9,956.749	9,756.797
China	3	4,926.683	5,213.261
USA	4	3,988.307	4,142.546
Chile	5	3,672.997	3,978.078
Norway	6	2,500.525	2,822.312
India	7	2,335.151	2,520.000
Korea	8	2,280.821	2,400.387
Thailand	9	2,120.133	2,250.000
Indonesia	10	1,999.061	2,112.23

Source: FAO Yearbook of fisheries statistics 1984.

FIGURE 4

WORLD COMMERCIAL CATCH BY LEADING COUNTRIES
(LIVE WEIGHT)

MILLION METRIC TONS

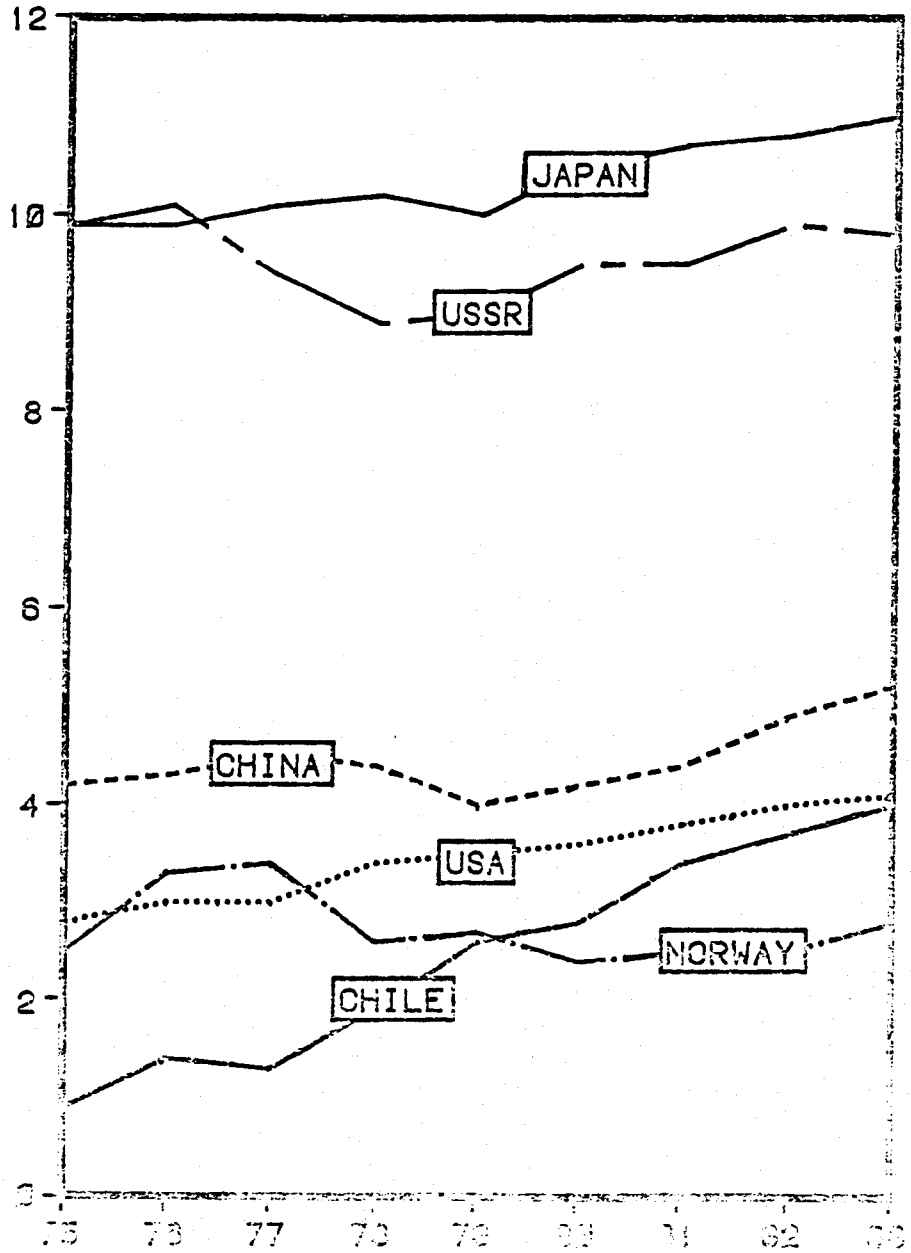


FIGURE 5

Disposition of World Catch

	1960		1970		1980	
	Million metric tons	% share	Million metric tons	% share	Million metric tons	% share
Total catch	40.2	100	65.5	100	72.2	100
For human consumption	32.0	80	40.8	62	50.5	70
Reduction to fishmeal, oils and miscellaneous purposes	8.2	20	24.7	38	21.7	30

Source: FAO, Yearbook of Fishery Statistics, various issues.

FIGURE 6

Disposition of World Catch destined for human consumption by type of marketing and processing

	1960		1970		1980	
	Million metric tons	% share	Million metric tons	% share	Million metric tons	% share
Total catch for human consumption	32.0	100	40.8	100	50.5	100
Intended for marketing fresh or chilled	16.1	50	18.3	45	14.8	29
Freezing	3.7	12	9.1	22	15.7	31
Curing, (in salt or brine, in marinades, by smoking or by drying)	7.7	24	7.6	19	9.9	20
Canning	4.5	14	5.8	14	10,2	20

Source: FAO, Yearbook of Fishery Statistics, various issues.

trade is dominated by the developed nations, who captured approximately 70% of the international trade in terms of volume in 1980, and 74% in terms of value. (Figure 7: International Trade in Fishery Products).

2.1 World Oceans Fisheries

2.1.1 North Pacific

The North Pacific is the second great center of world fisheries development and the first in terms of production. The Pacific Northwest total catch was 21.1 million MT, and Pacific Northeast 2.49 million MT in 1983. (Figure 8: World Nominal Catches by Fishing Areas). Unlike the Atlantic, the continental shelves are narrowed (except in the East China Sea) and the fisheries are shared among a small number of large fishing nations. The pattern is dominated by the long-established fisheries of China and Japan, and by the relatively recent ones of Canada and the United States in the east and the Soviet Union in the west. The salmon, halibut and herring have been significant resources here.

2.1.2 South Pacific

Industrialization in the southern seas is relatively small-scale and isolated. In southeast and southwest Australia there, are important shellfish and finfish sectors, and while Australia has the largest EEZ in the world, fishery potential is relatively limited. The small fishing industry of New Zealand was, however, the fifth largest in the country and the fastest growing in 1978, with further expansion anticipated within the new EEZ. Southeast Pacific is the ranking fishing area in

FIGURE 7

TABLE 4. INTERNATIONAL TRADE IN FISHERY PRODUCTS

(Q = thousand MT; V = million US$)

		IMPORTS			EXPORTS		
		1978	1979	1980	1978	1979	1980
. Total fishery products[1/]							
World	Q	8,422.2	9,319.2	9,199.0	8,977.6	10,075.7	10,044.5
	V	12,146.1	15,052.1	15,293.5	11,532.1	14,050.1	14,390.7
f which:							
Developed countries	Q	6,078.0	6,691.6	6,649.5	5,089.4	5,596.1	5,085.5
	V	10,390.5	13,051.0	13,144.6	6,878.6	8,126.2	8,791.6
Developing countries	Q	1,672.3	1,893.0	1,824.7	3,241.8	3,800.0	3,656.7
	V	1,426.6	1,651.4	1,780.0	4,346.5	5,513.0	5,735.9
. Fish, fresh, chilled or frozen							
World	Q	3,363.0	3,642.4	3,677.1	3,847.3	4,305.4	4,325.3
	V	4,490.9	5,429.3	5,560.8	4,329.5	5,271.7	5,403.0
f which:							
Developed countries	Q	2,516.2	2,687.1	2,680.8	2,033.8	2,434.8	2,414.1
	V	3,993.9	4,827.2	4,915.5	2,807.4	3,441.2	3,577.4
Developing countries	Q	625.0	717.9	697.3	1,117.8	1,165.6	1,169.7
	V	374.6	467.1	480.1	1,026.5	1,293.9	1,265.0
:. Fish, dried, salted or smoked							
World	Q	363.3	394.3	392.3	423.3	468.0	481.0
	V	992.6	1,222.8	1,097.9	896.5	1,097.0	1,216.6
of which:							
Developed countries	Q	223.4	262.7	253.4	343.2	367.0	382.7
	V	759.0	977.2	828.9	755.4	893.4	1,093.3
Developing countries	Q	114.2	115.0	120.9	60.7	72.3	75.8
	V	223.0	232.5	253.5	91.6	122.3	129.2
D. Crustaceans and molluscs, fresh, frozen, dried, salted							
World	Q	1,023.0	1,185.3	1,116.1	998.0	1,143.6	1,075.6
	V	3,343.1	4,657.0	4,400.3	3,145.8	4,113.0	4,016.1
of which:							
Developed countries	Q	913.6	999.3	962.1	420.9	478.6	480.8
	V	3,148.8	4,014.5	4,099.2	1,176.0	1,494.1	1,496.1
Developing countries	Q	101.4	107.1	133.6	553.7	642.6	575.4
	V	170.3	250.3	272.5	1,893.2	2,526.1	2,341.0
E. Fish products and preparations whether or not in airtight containers							
World	Q	791.4	826.9	893.8	815.1	840.6	959.5
	V	1,464.8	1,659.3	1,990.1	1,546.1	1,758.5	2,015.4
of which:							
Developed countries	Q	430.1	460.3	519.4	569.7	580.0	625.5
	V	1,034.3	1,222.2	1,514.2	1,139.8	1,271.3	1,447.1
Developing countries	Q	323.1	333.4	327.8	187.1	202.8	264.2
	V	379.6	385.5	410.3	299.3	344.1	447.1
F. Crustaceans and molluscs products and preparations, whether or not in airtight containers							
World	Q	159.4	162.8	168.3	106.0	110.3	118.2
	V	619.9	721.5	799.6	428.5	520.8	593.4
of which:							
Developed countries	Q	141.4	133.0	152.0	55.3	55.0	62.0
	V	581.2	681.0	744.5	240.8	300.3	362.4
Developing countries	Q	17.4	19.2	15.6	45.3	50.5	52.7
	V	36.3	38.7	47.7	166.7	180.3	196.8

[1/] Including oils and fats, crude or refined, meals and similar animal feeding stuffs, of aquatic animal origin.

Source: FAO, Yearbook of Fishery Statistics, Vol. 51. Data includes various estimates.

FIGURE 8

WORLD NOMINAL CATCHES

Fishing Areas	1982 MT	1983 MT
Atlantic Northwest	2,802.000	2,708.700
Atlantic Northeast	10,762.000	11,130.500
Atlantic Western Central	2,155.200	2,268.000
Atlantic Eastern Central	3,206.300	3,172.600
Mediterranean and Black Sea	1,870.800	1,898.400
Atlantic Southwest	1,516.500	1,657.800
Atlantic Southeast	2,359.200	2,347.900
Atlantic Antartic	466,400	302,400
Indian Ocean, Western	2,030.600	2,186.100
Indian Ocean, Eastern	1,658.700	1,774.300
Indian Ocean, Antartic	179.500	109.700
Pacific Northwest	20,402.500	21,136.900
Pacific Northeast	2,160.200	2,492.000
Pacific Western central	5,841.000	6,150.900
Pacific Eastern central	2,342.200	1,642.200
Pacific Southwest	399.600	431.600
Pacific Southeast	7,873.600	6,190.700
Pacific, Antarctic	6,800	10,600

Source: Fodd and Agriculture Organization of the United Nations.

FAO, 1984.

the world with 6,150.900 metric tons of nominal catches in 1983. (Figure 8: World catches by fishing areas). Along the Chilean and Peruvian coasts, jack mackerel is intensively harvested. After Alaska pollock and Japanese pilchard, this is a third largest single species catch in the world marine fisheries. Likewise, there is considerable potential in central and southern Chile for both the demersal trawl fisheries for hake and other species.

2.1.3 **North Atlantic**

The North Atlantic had the world's first commercial fishing industry, pioneered by the nations of Western Europe. It ranks second in terms of catch, with the Atlantic Northeast representing 11.1 million MT and Atlantic Eastern Central 3.1 million MT. (Figure 8: World Catches by Fishing Areas).

Today's industry has grown out of the thousands of coastal fishing comunities of northwest and Mediterranean Europe, many of which date back to medieval times. However, it has become progressively more concentrated upon large inshore ports acting as centres of processing and marketing, while technological innovation has tended to lead towards specialization and the ability to exploit a wide range of fisheries in both near and distant waters. The great fisheries with long historical roots are cod and herring.

2.1.4 **Central and South Atlantic**

Traditional fisheries are prominent along many coasts of the tropical and South Atlantic but the ocean expanses have been exploited mainly by the industrial nations of the north because

these areas offer great potential for increasing their distant water fisheries.

The total catch in Central Atlantic was 5.4 million tons in 1983, with the Atlantic Eastern Central with relative more important.

The total catch in South Atlantic was 4 million tons (Figure 8), with the Atlantic Southeast having a higher share of the total catch.

The potential of the whole Tropical and Southern Atlantic for both pelagic and demersal stocks has attracted intensive exploitation by the Soviet bloc nations and Japan since 1945, especially off the Saharan coast, Southern Africa, and briefly the Argentine hake grounds where the potential was amply demonstrated by Soviet fleets before the Latin American nations began to assert EEZ rights.

2.1.5 **Indian Ocean**

The total catch in 1983 for Western and Eastern Indian ocean was 3,9 million tons. There is traditional fisheries in several areas including those of eastern Africa, Madagascar, the desert coasts from the Horn of Africa to the mouths of the Indus, including the Red Sea and The Gulf etc., There is considerable potential in some areas,especially in the northern Indian Ocean and the shelf of Western Australia, and possible around the oceanic islands of the Western Indian Ocean. (Gulland, 1971).

III. SEAFOOD DOMESTIC MARKETS

3.1 Care and handling characteristics

Everybody involved in the seafood business needs to understand how care and handling affects the quality and quantity of seafood products that are sold in the marketplace. A brief overview of the seafood industry follows, explaining how seafood arrives at the store, and what determines the quality.

Seafood is a delicate and highly perishable product requiring great care if quality is to be maintained. Everyone involved in the seafood industry from the fishermen himself to the retailer must fight a constant battle against time and temperature to maintain product quality. Time and temperature are both extremely important in handling seafood because bacterial growth, enzymatic and chemical action are major causes of quality decline in seafood. In general, the lower the temperature is maintained, and the faster the product moves from harvesting to consumer, the better the quality will be. (Humphreys, 1985).

Seafood is at the peak of quality as soon as it comes from the water. Under ideal conditions, fresh seafood may have a product life of 21 days from the time of harvest. Unfortunately, however, seafood is rarely maintained under ideal conditions, and by the time many retailers receive their fresh products, the remaining life may be only a few days. (West Coast Seafood Institute, 1986).

The retailer needs to keep in mind the perishability of fresh seafood and the manner in which it spoils. Seafood quality

declines slowly in the initial stages but proceeds rapidly as spoilage nears. (Humphreys, 1985). A product that is acceptable on Tuesday, for example, may no longer be of saleable quality on Wednesday. It is vital that the retailer check seafood stocks daily to ensure that he is providing good quality products to his customers.

3.2 Seafood harvesting and the distribution chain

Several stages are involved in the harvesting and distribution of seafood, and good handling practices are essential at all stages to ensure top quality products for the consumer. Mishandling at any one point can cause a loss of quality that can never be restored.

The fisherman himself is the first link in the harvest and distribution chain. The fishing gear that he uses, the way that he handless the fish on board, the type of cooling that he uses for the fish, and the speed with which he delivers the fish to a tender or processor will all greatly influence the subsequent quality of seafood that the retailer receives.

The most common methods of fishing are: Trawling (known also as dragging), trolling, purse seining, gillnetting, longlining, and traps (pots). In addition to the fishing methods, some seafood is grown in aquaculture operations, which are basically farms to raise fish, shellfish or seaweeds. The major advantage is that the harvest can be controlled, thus permitting a more consistent supply of the product. It is up to each buyer to evaluate the product received for quality level.

Several trends in the seafood industry may influence a

business operation:

* Improvement of freezing technology and increasing emphasis on freezing seafood.

* Development of analog products (surimi imitation crab, scallops, shrimp, etc.) from Pollock in the Bearing Sea and hake in Eastern Pacific.

* Emphasis of some fishermen and processors on providing extremely high quality seafood products by handling each fish carefully and individually. These producers are bleeding the fish immediatelly, using on-board refrigeration systems and the latest in freezer technology.

* Availability of cultured seafood products from around the world, which, in some cases, are replacing products from traditional sources. An example is Chilean pen salmon marketed in U.S., Belgium and Brazil.

The care and attention paid throughout the seafood harvesting and distribution chain from fisherman or harvester to retailer will provide consumers with consistently good quality seafood and will enhance profits at every link in the chain.

3.3 Major Consumers of Seafood

Some countries are particularly reliant upon seafood. Japan has the highest per capita consumption in the world, with 148.6 pounds estimated live weight. Following Japan is Iceland, with 147.3 pounds. Next is Hong Kong with 111.3 pounds, followed by the Republic of Korea with 104.3 pounds. (NOAA, 1984).

Other important countries in seafood consumption are Norway, Singapore, Spain, Portugal and Denmark. (Figure 9: Annual per

capita consumption of seafood by region and country). In terms of regions Far East is ahead, followed by Europe and North America.

The countries with higher per capita consumption are generally those close to major fishing areas or long established or traditional fisheries. There are, however, some exceptions such as Chile.

Chile is far down on the list in seafood consumption, almost five times less than Japan. Chile does have an available fish resource, as well as, the catching and landing capacity. Where I believe the problem originates is in distributing and marketing seafood products. Development just cannot take place on a scale which will make any real impact on consumption.
One of the major reasons why the development of domestic market has been neglected in Chile has been the over emphasis given to the expansion of export markets. The export market is more attractive to producers and processors.
Merchandising, consumer education and promotional activities are necessary to expand domestic consumption.

The question is, who will be responsible for developing these programs. There are no large processing companies to initiate product and market development. The creation of a Fisheries Development Agency should be considered with the purpose of promoting development in seafood consumption.

In Chile where a great part of the population is low income people, a logical step would be to spand the distribuition and sales of low grade fish. These fish can be sold as fillets, ready

FIGURE 9

SEAFOOD PER CAPITA CONSUMPTION

1982-1983 average, by region and country.

Region and country	Estimated live weight equivalent. Pounds per year
North America: **Average**	37.6
Canada	40.1
United States	35.1
Latin America: **Average**	19.2
Chile	34.8
Cuba	46.1
Guyana	46.1
Jamaica	52.9
Peru	37.9
Europe: **Average**	44
Denmark	77.4
Iceland	147.3
Norway	103.6
Portugal	85.1
Spain	77.8
Sweden	71.6
USSR	63.3
Near East: **Average**.....	9.8
Israel	24.5
Lybia	16.1
Yemen	27.3
Far East: **Average**	47.3
Hong Kong	111.3
Japan	148.6
Republic of Korea	104.3
Singapore	93.7
Thailand	50.5
Africa: **Average**	23.9
Ghana	60.8
Senegal	89.3
Sierra Leone	59.1
Oceania: **Average**	35.3
Australia	32.2
New Zealand	37.3
Papua New Guinea	37.4
World	27.1

Source:FAO, Rome. 1984.

to cook product in attractive, but inexpensive packaging.

On the other hand U.S. is also low in seafood consumption, being a little higher than Chile.

The trend is for a rapid increase in seafood consumption in U.S. Compare, for example, the annual per-capita consumption of seafood and beef in 1970 (11.8 and 84.0 lbs., respectively) to that in 1985 (14.5 and 79.1 lbs). The American Demographic Magazine published a study which predicted this trend to continue. By the year 2000 the consumption of fish will increase 44% compared to 35% for vegetables and 30% for beef. A survey of seafood consumers in the U.S., conducted by Better Homes and Gardens Magazine, found that taste and flavor rated equal in importance to health and nutrition as a motivation for including seafood in the diet on a regular basis.

One of the reasons why the increase in seafood consumption is the work done by the Fisheries Development Foundations throughout the country. The West Coast Fisheries Development Foundation places special emphasis on marketing and promoting West Coast seafood, and on educating consumers regarding the benefits of seafood in the diet. Proper handling and preparation of seafood also gets attention.

3.4 **Merchandising Seafood**

For a better understanding of seafood trade we need to learn more of what's make people buy fish. Modern seafood merchandising calls for creativity, attention to detail, and a fresh approach to seafood display.

Merchandisers responsible for profitable seafood programs

agree on one issue: profits from seafood operations depend on an aggressive, coordinated marketing and communications effort. A communication strategy makes such a difference with seafood because of the way consumers feel about seafood, and the newness of seafood as a product line in many outlets.

People generally have a favorable impression of seafood, but lack the confidence in selection and preparation. Consumers also think seafood is expensive. When something is unfamiliar and expensive, it becomes a purchase risk for many people. Communicating information is the only cure for purchase risk.

More informed consumers are more willing to try seafood products. To reduce the purchase risk for seafood, advertising, promotion and personal selling can help.

Product presentation in the fresh case is the heart of a successful seafood program. A well designed, full display case lures customers and promotes employee - customer conversation, so important to creating sales. Standard displays may work well for the meat department, but they are boring in service seafood departments.

Fresh seafood in the market may be is a new concept for many people. It is important to support the seafood new products introductions with an intensive marketing communications effort to get people to try the product.

It's easy to see also why today's shopper is ready to be sold on seafood. Most seafood is highly nutritious, rich in vitamins, minerals and protein, but low in calories and cholesterol. Seafood also cooks quickly and is adaptable to

almost every imaginable method of preparation.

Effective merchandising to stimulate the consumers buying impulses and to activate their expending power is extremely important. According to Dr. Sam Gillespie, a widely known seafood retailing authority, says: " Make consumers a success at the dinner table, and they will make you successful in your seafood endeavors ". (Gillespie, 1980). By communicating seafood preparation alternatives and describing seafood's attributes, you make people comfortable and succesful with it.

Merchandising includes:

Newspaper advertisements, a very cost effective method, but for many customers ads are an aid to shopping list planning.

Window ads at the store front reinforce the value of seafood.

Seafood display has to create a favorable impression and the objective hear is to create a unique display every day.

Collateral material such as recipes can help to sell. No retail seafood market should be without recipe materials. Recipes create impulse sales as well as stimulate increased use of seafood.

3.4.1 **The good side of fish**

Recent research has shown that fish oil contains long chain omega 3 fatty acids which may directly lower the risk of heart attacks. The only dietary source of this omega 3 fatty acids are seafood flesh anf fish oil. They can, at present, best be obtained by increasing consumption of fish in the diet.

Seafood has legitimate claim as a heart food due to this polyunsaturated fat made of omega 3 fatty acid. Fattier fish such as salmon, tuna, mackerel, sardines, and herring contain the most

omega 3. (Better Homes and Gardens, 1986).

Greenland Eskimos provided the first evidence. Because Eskimos diets mainly fish, seal, and whale meat are high in protein and fat, scientists expected these people to be heading straight for heart trouble. Instead, the researchers found particularly healthy hearts and low blood cholesterol levels in the Eskimos.

The scientists decided to look at another group of fish-eating people, Japanese fishermen. Again, they found less heart disease in the fishermen than in Japanese farmers who ate little fish.

In the rush of research that followed, scientists identified the omega 3 fatty acids in fish.

Omega-3 protects against heart disease in three ways.

1. Omega-3 thins blood. Thick blood clogs vessels are caused of heart attack.

2. Omega-3 lowers blood triglyceride levels. High triglyceride levels are implicated in heart disease.

3. Omega-3 causes blood cholesterol to drop. Also, the ratio of low-density lipoprotein (LDL) cholesterol to high-density lipoprotein cholesterol (HDL) improves. LDL cholesterol clogs arteries; HDL cholesterol removes cholesterol. (Better Homes and Gardens, 1986).

Efforts are underway to find an inexpensive way of producing fish oil concentrates for taking in capsule form. Until this happens, the best way to increase the omega-3 fatty acids in the human diet is to increase the consumption of fish.

3.4.2 **The dark side of fish: Parasites in marine fishes**

Fish, like all living organisms, can be infected with various parasites. The most commonly observed parasites in marine food fishes are round-worms called nematodes. (Oregon State University, Extension Service, 1974).

The nematodes seen most commonly in fish are often called herring worms or cod worms. Actually, a number of different species are involved, and it is difficult to distinguish between them. All are in the family Anisakidae and are properly referred to as anisakid nematodes.

Other fish, especially freshwater and anadromous fish, may carry larvae of the tapeworm Diphyllobothrium. These small, whitish, and somewhat flabby worms are specially common in salmon from Alaska.

Because nematodes are relatively uncommon in fish fillets and are easily destroyed by normal processing and cooking procedures, they rarely cause health problems. Public health problems only arise when people eat raw or lightly preserved fish, such as sashimi or ceviche. When fish is to be prepared according to these recipes, it should first be completely frozen for at least 24 hours to kill any parasites that may be present. These nematodes do not find people to be suitable hosts and do not live long in human digestive tracts. Nevertheless, infections have been reported to cause severe abdominal pain and intestinal upset for as long as 10 days. (Consumer Reports, 1986).

Tapeworms that occur in fish can infect people and other fish eating mammals if they swallow living larvae. The tapeworms

may live in the intestinal tract for several years, and eggs and tapeworm sections can be found in human feces. The infection is not fatal. Symptoms in infected individuals may vary from none to abdominal pain, weakness, loss of weight, and anemia.

IV. THE CHILEAN SEAFOOD INDUSTRY

Chile is a country of seafood surprises. You wouldn't think of a South American country as a producer of King crab, chinook and coho salmon, rainbow trout, steelhead, halibut, oysters, scallops etc.

People tends to think of Chile as a "banana republic" even though there aren't any bananas. (Grapes, peaches, plums, apricots and apples, yes. Much of the fruit consumed in the U.S. in the winter is from Chile.) I mention this because misconceptions abound.

Chile, with approximately 2800 miles of coastline has an advantageous situation for developing fishery activities, its waters counting on a large variety of marine resources among which fish, shellfish and seaweed are most important. Such features make the country an essentially maritime nation, with favourable conditions for the efficient development and use of marine resources.

The total capture of sea products was higher than 4.9 million tons, thus placing Chile in the first rank among the Latin American countries and among the largest fish producing nations in the world. (Anuario Estadistico de Pesca, 1985). The main characteristic of Chilean fishery is that it is basically of the coastal type, since most of the extractive activity, both artisinal and industrial is developed at distances not farther than 60 miles from the coast, utilizing its largest efforts on species on the continental shelf, these being pelagic,

demersal and benthic. The result is the existence of a large potential of resources, currently unexploited, inhabiting areas within the 200 miles exclusive economic zone.

The above facts suggest an interesting development perspectives of new fishery industries which, coupled with those already established, make up a highly attractive alternative for new investors.

The excellent natural conditions of some of the country's aquatic areas makes for significant potential for the development of aquaculture, carried out both in fresh and sea waters. In the case of continental aquaculture there is a sizeable potential in the southern zone of the country, where rivers and lakes exist, whose cold and pure waters are among the world's most suitable for the development of salmonids. In the case of marine aquaculture, there are natural conditions along the entire coast for the large scale development of scallops, oysters and mussels and other species, the culture of which is a feasible enterprise.

Weather conditions, geographic features and the location of fishing areas close to harbours, facilitate the continued development of fishery activities throughout the year.

4.1 **Sustained Growth of Capture**

In recent years, the total capture of fishery products shows a sustained growth. In 1985, it amounted to 4,986.000 tons, with an increase of more than 6.6 percent with respect to 1984. (Fig.10: Total Capture of Fishery Products, 1977-1985). (Sernap, ProChile, 1985).

Of this total, more than 93% (4,660.000 tons) are finfish use for fishmeal, 3.6 percent (182,000 tons) to seaweed and 2.7 percent (144,000 tons) to seafood. (Sernap, 1985).

4.2 Principal Chilean Fishing Zones

The major fishing zones are in the north (I and II Regions) and the center-southern areas (VIII Region), where more than 86 percent of captures is concentrated, mainly exploiting pelagic species (sardine and jackmackerel) in an industrial way by purse seiner vessels. Another important zone is the X Region, where trawling fishery and collection of seafood is carried out. (Fig.11 Main Fishing Areas). (Sernap, 1985).

4.3Major Chilean Markets

In 1985 the major markets for fishery products, considering total exports (included fish meal), were: the Federal Republic of Germany, 15.8%; the United States, 14.4%; Japan, 11.1%; and the People's Republic of China, 9.3%; nearly 77 percent of these exports is concentrated in 10 principal markets, mainly in Europe, the United States of America and Far East nations. (ProChile, 1986).

On the other hand, if we do not consider fish meal, the principal markets in order of importance are Japan, United States and Spain. In the case of exports of frozen, canned, dry and other products, there is a greater diversification in what are refered to as destination markets. These are France, Italy, South Africa, Argentine, Brazil and a few others. (Figure 12: Main Export Markets of Fishery Products). (ProChile, 1986).

FIGURE 10

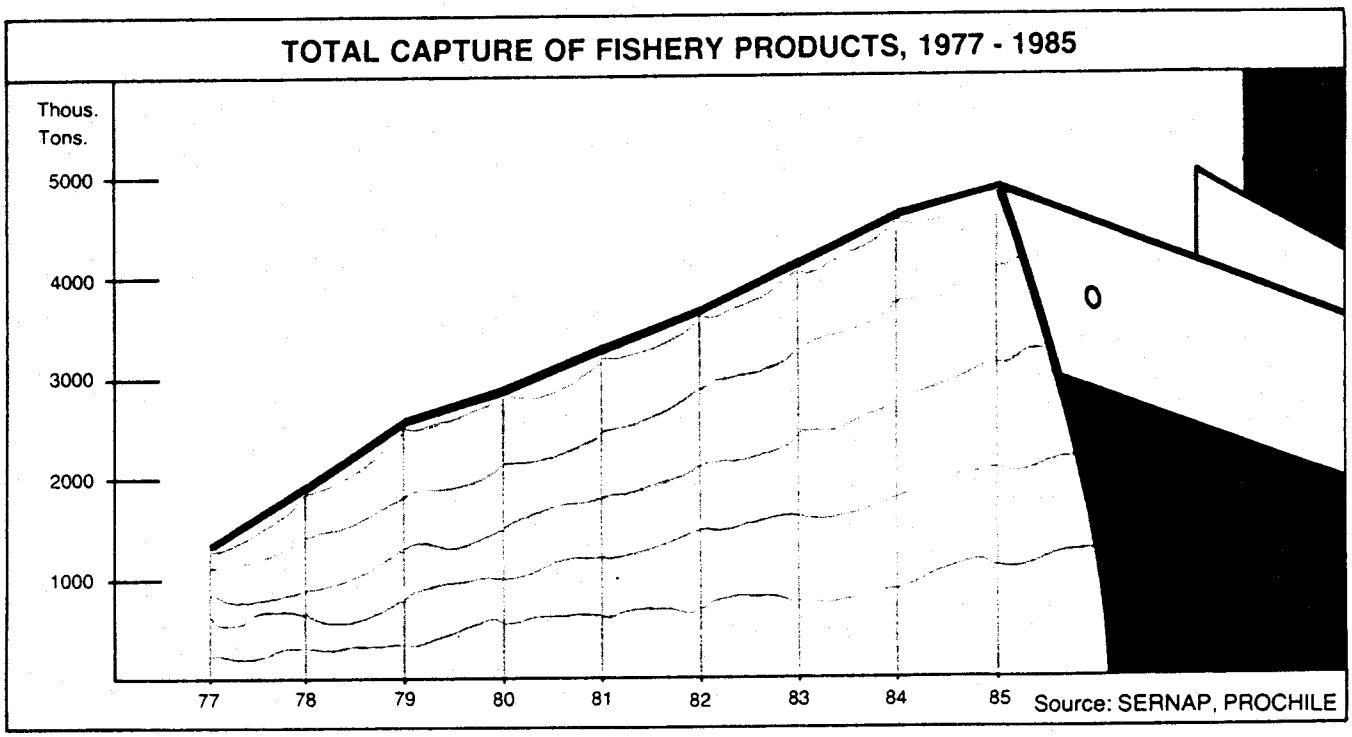


FIGURE 11

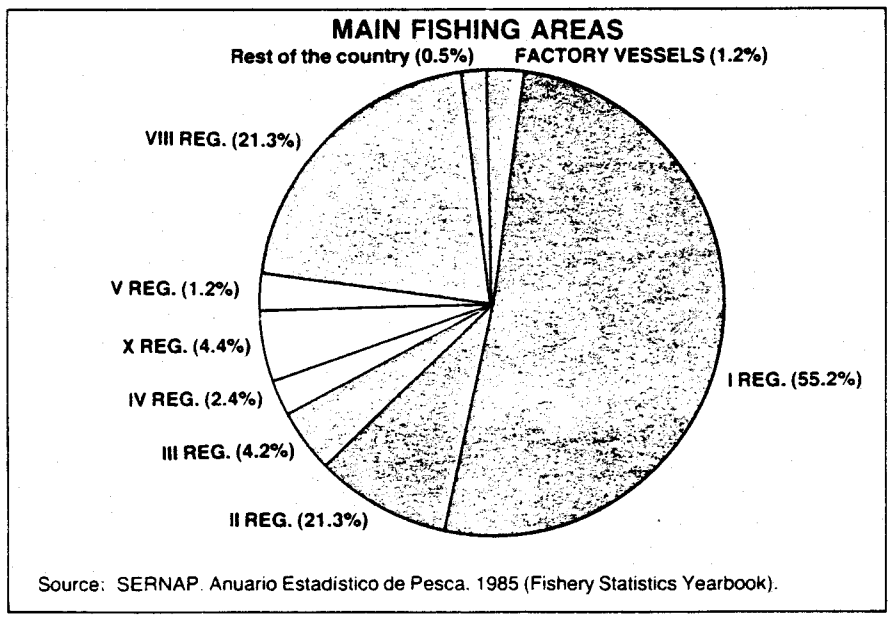


FIGURE 12

1985: MAIN EXPORT MARKETS OF FISHERY PRODUCTS
(Thousand US$)

Country	Fish meal	Frozen canned and others	Frozen canned and others %	Total exports	Total exports %
Germany	63,355	8,964	3,8.	72,219	15.8
U.S.A.	30,595	35,553	15.2	66,148	14.4
Japan	4,353	46,425	19.9	50,778	11.1
The People's Rep. of China	42,953			42,953	9.3
Spain	1,480	24,884	10.66	26,364	5.7
South Africa	20,900	2,922	1.2	23,827	5.2
Italy	22,070	632	0.3	22,702	4.9
Far East	12,761	6,156	2.6	18,917	4.1
France	6,074	2,911	1.2	8,985	2.0
Other	19.772	104 887	44.9	124,607	27.2
TOTAL	**224,263**	**233,337**		**457,500**	

Source: ProChile, Banco Central de Chile (Chilean Central Bank)

4.4 Seafood Exports

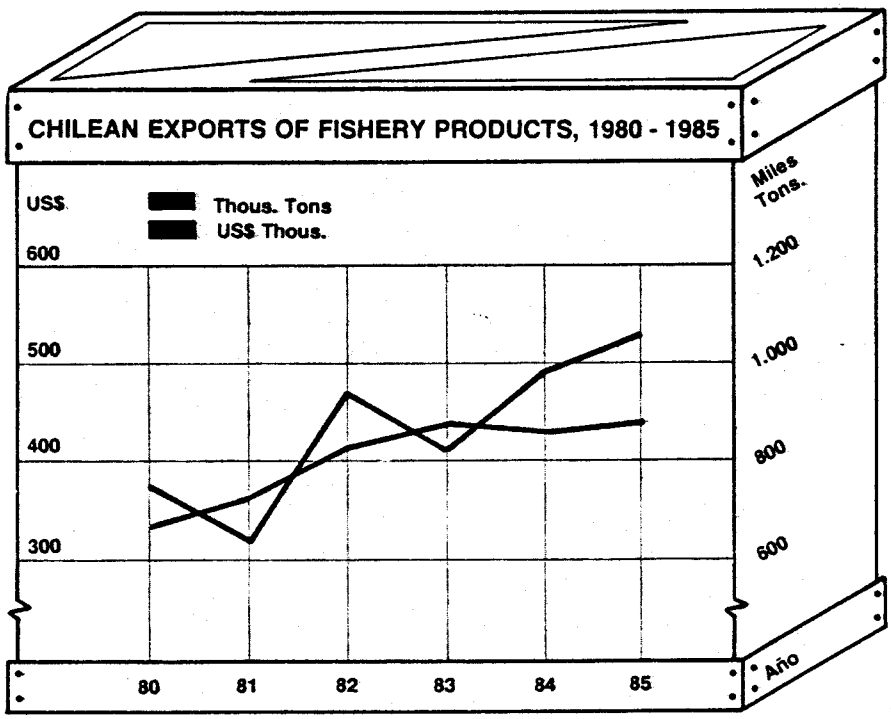
Chilean fishery exports reached in 1985 a volume of 224 thousand tons, amounting to US$ 457.6 million; thus showing an increase in value of nearly 32 percent with respect to 1984 and representing 12.1 percent of the country's total exports.
The most important type of products are fishmeal, frozen and canned. Export of seafood (without fish meal and oil) reached in 1985 US$ 147.2 million, an increase of 7.2% over 1984. (Figure 13: Chilean Exports of Fishery products). (Sernap, 1985).

4.5 A Buyer's guide to Chilean Seafood

Below is a sampling and no more than that of just a few species available from Chilean waters. No molluscs are included, no canned or smoke products, no freshwater species, though many offer bargains to seafood buyers. But a buyer's guide to all the seafood Chile has to offer will take all this report and more. What I am including are some species already in the U.S. market and one (the cojinoba) that seems a likely candidate in the future.

While interest thus far in Chile's seafood has been in fresh fish (such as Chilean sea bass), an array of other products exists. Chile is well- equipped for canning and freezing, and least well-equipped for fresh. The lack of airline space alone limits the export of fresh seafood from Chile, especially during the fruit harvest. Buyers might consider the market potential of some of Chile's frozen, smoked and canned products, as well as fresh.

FIGURE 13



EXPORTS OF FISHERY PRODUCTS 1984 - 1985			
Products	**1984**	**1985**	**% Share 1985**
Fish meal	276,022	275,276	60.14
Fish oil	28,549	35,122	7.67
Frozen fish	35,580	45,870	10.02
Frozen seafood	40,096	31,417	6.86
Canned fish	19,776	11,513	2.51
Canned seafood	18,387	30,197	6.69
Seaweed	14,346	12,951	2.82
Other	8,425	15,313	3.34
TOTAL	441,181	457,659	

CHILE: UTILIZATION OF CAPTURE AND PRODUCTION 1985 (Tons)				
Products	**Capture**	**%**	**Production**	**%**
Fish meal	4,384,074	94.5	1,109,190	81.5
Oil	–	–	184,092	13.5
Canned	156,549	3.3	44,713	3.2
Frozen	87,230	1.8	20,686	1.5
Dehydrated in alcohol	4,350	–	139	–
Fresh	1,789	–	1,049	–
Smoked	760	1	127	–
Dry-salted	634	–	238	–

Source: SERNAP. Fishery Statistics Yearbook, 1985 ProChile

4.5.1 **Congrio- Chilean Kingklip**
(Genypterus spp.)

Exported as kingklip or golden kingklip, congrio is a fast riser these days, outstripping sea bass in exports by a margin of 2 to 1. Congrio is a firm-fleshed fish similar to monkfish in taste and texture, has a good shelf life and sells for less than sea bass and slightly less than New Zealand kingklip. Congrio are caught along much of the 2,800 mile coastline, and are available throughout the year. Air space can be a problem for fresh during the fruit harvest, November through January. In 1984, about 5.3 millions pounds of fillets were exported at a value of $3.1 million, with most of the product going to Spain. (Fig 14: King Clip Exports).

There are three species of congrio, the most common being the golden congrio (G. blacodes), followed by the red congrio (G. chilensis) and the black congrio G. maculatus). The golden and the red are the more desirable because of their lighter flesh. Congrio averages between 7-12 pounds, and are taken offshore by foreign factory trawlers and inshore by Chile's artisanal fleet of dayboats. A few companies operate their own vessels for generally better quality fish and to secure availability.

Fresh skinless, boneless fillets of kingclip were selling in Los Angeles, California, this year for $2.00-$2.25 a pound; IQF fillets for $1.50. (Seafood Business Magazine, Spring 1986).

4.5.2 **Mero or Chilean Sea Bass**
(Polyprion yanezei)

Called mero, mero blanco, and Salmon de roca, this member of

the Serranidae family averages 20-50 pounds in the Northern Chile waters and 15-25 pounds in the colder waters of the south. They are taken in the longline fishery generally in 1-3 day trips. Production of this species quadrupled in 1984, as the fish made a big splash on the U.S. market. One California company alone imported 100,000 pounds per week. The attraction is the fish's large white flaky fillets, flavor, and large profit margin.

While the resource is under some strain, supplies of fresh sea bass are available in limited quantities throughout the year, but especially during the winter months. In 1984, 2 million pounds of sea bass were exported at a value of $2.3 million with 87% going to the U.S. market as fresh and frozen fillets. In 1985, 4.5 million pouds were exported. (Fig. 15 Seabass Export). (ProChile, 1986).

High quality fresh skinless, boneless fillets sold for $2.20-$2.50 a pound delivered West Coast last year; IQF fillets went for $1.75 to $1.80. Prices spect to go up, as supplies tighten. (Seafood Business Magazine, Spring 1986).

4.5.3 **Centolla or Chilean King Crab** (Lithodes antartica)

Similar to Alaska's deepwater golden king crab, Chilean king crab, called centolla, average about 4.5 pounds; their legs and caparace are spinier than Alaska king crab making for a prettier but more difficult product; these spines, however, are hacked off at the plant. Centolla are available in standard Alaska 5 pounds packs of frozen meat: fancy at $6.40-$6.60 a pound; merus, $10.50-$10.70; red leg meat, $3.15-$3.25; salad, $1.75; whole

FIGURE 15

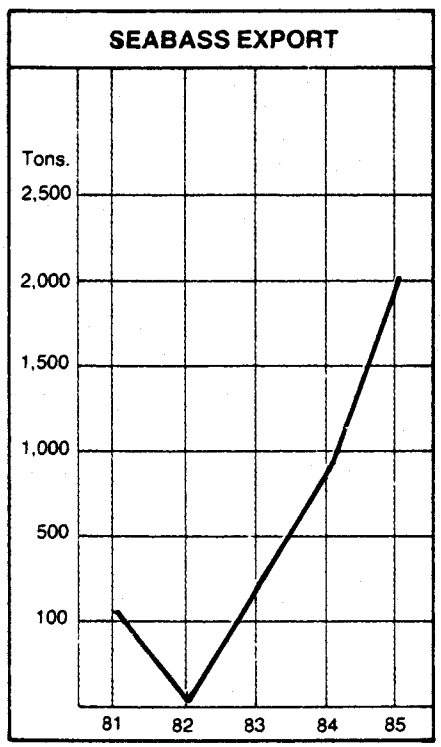
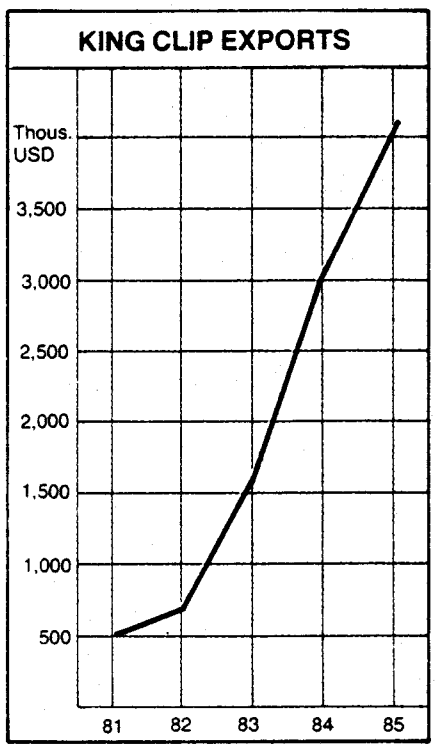


FIGURE 14



crab, $2.85-$3.20; and clusters, $3.20-$3.40 (all prices FOB Valparaiso, 1985-1986). (ProChile, 1986).

Supplies of centolla are expected to tighten as stocks continue to sustain heavy exploitation, including rampant ilegal fishing. The center of the fishery is Punta Arenas, at the tip of South America, where most of Chile's 5.8 million pounds of centolla were landed in 1984; Argentina added 0.4 million pounds for the total South America catch. Most of Chile's centolla goes to the U.S.

About 80 percent of Chile's centolla is landed between August and February with peak production in December and January. As male crab molt in March, the condition of the crab is poorest in Spring. Normally, live-weight recovery is 22%, the same as Alaska king crab. The flesh of the centolla is similar to the more expensive Alaska king crab for which is sometimes substituted.

Several large, well equipped processing plants operate in Punta Arenas, where most of the catch is processed. Some 20 or so smaller plants (some of them as small as a garage) also produce crab, sometimes of dubious quality. Generally, the quality of chilean centolla is excellent and is comparable to Alaska king crab, which it undersells by about 20 percent.

4.5.4 Pacific Salmon

Silver salmon have found a home in cold Chilean waters, and production has been escalating since the first succesful harvest in 1979-80, of 382,000 pounds. Chile exported over a quarter of a million pounds of coho in the first six months of 1985, valued at

$6 million - a threefold increase over the same period the year before; projections are for 8-10 million pounds by the end of the decade as new operations get underway. A Norwegian group has started farming Atlantic salmon, which could add to the exports. Most of the production to date is pen-farmed, but returns of ranched silvers are increasing as are returns of king salmon at two release sites.

Chile's southern coast, resembling southeast Alaska and northern Norway, is ideal habitat for both wild and farmed salmon. With investment incentives provided by the government, cheap labor, available materials, low feed costs (fishmeal), Chile is bidding to become a major salmon producing nation. Investment returns are reportedly good, and more production is coming on line.

Pen raised salmon can be harvested year round, but are mainly marketed between December and March when prices are strongest in the U.S. Prices in December were $3.55 a pound for fresh, first quality Chilean silvers, 3-4 pounds, and $3.75 a pound for 4-6 pounds FOB West Coast. (ProChile, 1986).

4.5.5 **Cojinoba or Chilean Amberjack** (Seriolella sp.)

An unknown fish in the United States and a delicacy in Japan, the cojinoba is an abundant species in Chilean waters, but is taken almost entirely by Japanese trawlers operating inside the country's 200 mile zone. In 1984, Japan harvested 5.7 million pounds of this small, delectable amberjack; this compared with local landings of only 165,000 pounds. There are two species, S.

violacea and S. caerulela; the former is found to the North (where some of it ends up as fish meal), the latter to the South. The southern variety is considered superior as the flesh is less oily and more delicate.

While this Amberjack is taken almost entirely by factory trawlers working well offshore, the species is reported to be available inshore as well. The fish hasn't been targeted apparently because of the absence of a viable market. But a fish this good seems destined to be discovered sooner or later. It is abundant, has an excellent shelf life, freezes well, is similar to pompano in flavor, texture and size, makes wonderful sashimi, and the Japanese love it. What more can a fish offer?

4.5.6 **Albacora or Chilean Swordfish** (Xiphias gladius)

Swordfish begin appearing off Chile in November with catches peaking in February and March. Most of them are taken close to shore by harpoon and quickly bled and delivered.

Swordfish can be large off Chile, exceeding 1,000 pounds (the world record of 1,182 pounds was set in Chile), and ports like Tocopilla and Iquique are famous for these monsters.

Swordfish are taken primarily in the warmer waters of northern Chile, from San Antonio to Iquique. In 1984, Chile exported 114,000 pounds of swordfish for a value of $260,000 (ProChile, 1986). The fish are taken almost entirely by a small artisanal fleet which targets on swordfish on a part time basis. Fresh swordfish fillets in March 1986 were selling for $3.70 a pound FOB Los Angeles. (This compares with $4.30 a pound for California swordfish earlier in the year and $3.30 a pound for

Taiwanese swordfish.) The Chilean swordfish is highly regarded for its rose-colored flesh. (Seafood Business Magazine, Spring 1986).

V. INTERNATIONAL SEAFOOD TRADE

5.1 Exporting Seafoods

5.1.1 Markets

Overseas markets represent a tremendous growth opportunity for Chilean seafood producers, but they also present a constant challenge. To capitalize on this opportunity, potential exporters need access to a market, a reliable supply of product, adequate facilities, dependable transportation and sufficient capital. In addition suggested exporters should have endless patience to cope with the headaches of doing business abroad.

An efficient way to establish an overseas market is to attend various trade shows. For example, foreigners constitute one third of the attendance at the Boston Seafood Show. International shows are held worldwide. The largest international food trade show, ANUGA in Cologne, West Germany, features 5,500 exhibitors. (The Fish Boat, Sept 1986).

Major export opportunities exist in Western Europe and Japan. Europeans especially are showing heightened interest in lighter, healthier foods. Italy imports more than 55 percent of its seafood, France more than 50 percent and Spain more than 25 percent. (The Fish Boat, Sept 1986).

Japan is both the world's largest fish producer and importer. The Japanese eat more than five times the seafood Americans do. In 1985, Japan imported 1.6 million tons of seafood. (Aoyagi, 1983). Although most seafood shipped from the United States to Japan originates in Alaska and the Pacific

Northwest.

5.1.2 **Technical Aspects**

Quality is not just a Japanese concern. A shipment of inferior product to any buyer will not only hurt the exporter's reputation, but might hurt the entire country's reputation.

Most seafood is frozen and packaged before export. Loss in quality of a frozen product can result from excessive temperature variation, sublimation, enzyme activity, drip, oxidation and bacteria. Temperatures in a freezer should be kept at a maximun of minus 15 degrees F, preferably lower. Sublimation, the evaporation of ice, results in a loss of weight and revenues. Some products must be blanched (heat treated) before freezing in order to destroy enzyme activity. The enzymes in some cold water fish work at their peak when cold. Drip loss may cause a loss of up to 20 percent in weight. Freezing will not sterilize a product. Some bacteria do quite well in the cold; indeed, microbiologist freeze some bacteria to preserve them.

Packaging of the product makes a great difference in quality. We can expect to see a lot of innovation in packaging in the next few years. Proper packaging prevents dehydration and oxidation. Oxygen breaks the double bonds in fat, causing rancidity. The higher the fat content in a fish, the shorter the shelf life. Vaccum packaging, by reducing the oxygen level, greatly extends shelf life. (Moody, 1986).

When developing new markets, either domestically or overseas, it is imperative that only quality products be shipped. Non compliance on the part of some exporters could do a lot of

damage.

Seafood is exported by rail, trucks, ship and air. The surface methods require freezing the product. Air freight is relatively expensive, but enables delivery of fresh product anywhere in the world within 24 hours.

Packaging is crucial in air shipping. Leaking fish boxes can be disastrous. Fish juice and water from melting ice create a brine solution that is extremely corrosive to aluminum, the major component of airplanes. For this reason , U.S carriers do not allow packing in wet ice. Most shippers use blue ice, which will maintain the temperature of a product without lowering it and, unlike wet ice, will not prevent dehydration. Each airline has its own requirements for packaging. There is no standardization among airlines.

5.1.3 **Payments**

The most important aspect of the export process is sometimes the most difficult- getting paid. The best way is to get cash in advance, then ship the product. Selling on consignment is riskier and not recommended unless you know your buyer very well. In a consignment sale, goods are shipped, customs is paid and the product is warehoused. The overseas buyer can use the warehouse receipts to obtain financing. With the product already on hand, the buyer can also make his deals more competitively.

The most practical method of receiving compensation for your goods is by letter of credit. A contract is drawn up strictly defining what you will be sending and how much you will receive. Any deviation in product quantity or quality from that stated in

the contract can prevent you from getting paid. The prospective shipper has to be extremely careful in drawing up the export documentation. Even a spelling error may be grounds for non-payment.

At the same time, the shipper's domestic bank will deal directly with the foreign bank representing the overseas customer. Generally, if anything goes wrong and the shipper is not at fault, he will be paid by the domestic bank, which will then seek restitution.

5.2 Changes in the access of resources and International Seafood Trade

In the early 1970's, there was a growing concern of coastal states that the fish stocks off their shores were being rapidly exploited by foreign fleets. These nations were concerned about their coastal stocks being seriously depleted before they would have a chance to share in the utilization of these stocks on a substantial basis.

This was a major element in the agitation for changes in the international law of the sea, which led to the convening of the Third United Nations Conference on the Law of the Sea (UNCLOS III) in 1973. At the Conference, countries with typical coastal state concerns greatly outnumbered those with distant water fishing interest. As a result the 200 mile fishing zone quickly became a expectation.

By the end of 1977, most of the coastal nations of the world, both developed and developing, had declared a 200 miles

Economic Exclusive Zone. Now, the restricted access to most of the world's marine fish stocks has changed fish production patterns and the international trade in seafood. (Fitch, 1985).

Nations which before the introduction of the EEZ were highly dependent on distant water fleets for supplies, shows a decline in catches, a decrease in their exports and a rise in imports. The opposite situation has occured for nations with long coastlines, and no previous long distance fleet, such as Chile.

Evidence of this shift is readily obtained from FAO statistics (Table 1), by comparing catches in 1976, the year before the establishment of the EEZ, with catches in 1979. (shown in metric tons).

TABLE 1

Country	1976 catch	1979 catch	Decrease
USSR	10,132,210	9,113,999	1,018,211
Spain	1,468,888	1,205,120	263,768
Poland	750,072	601,153	148,919

In these important distant water fishing nations the data indicate a decline in total catch over this period.

On the other hand, other countries registered considerable increases, primarily those whose fishing operations were primarely concentrated in home waters and with large fish resources off their coast. Prime examples are the following (catches in metric tons). FAO, Year book of Fisheries Statistics, various issues.

TABLE 2

Country	1976 catch	1979 catch	Increase
Iceland	986,137	1,644,815	658,678
USA	3,050,478	3,510,854	460,376
Mexico	526,331	874,886	348,555
Chile	1,450,782	2,500,254	1,049,472

These countries had been the target of foreign fleets prior to extended jurisdiction and were in a position to displace foreign fishing effort.

The EEZ has brought immediate benefit to Chile, a country with no distant water capacity at all. Apart from now being able to charge foreign countries for the privilege of fishing in their coastal zones, it has been able to expand its own fishing industry without interference. 1976 catch was 1.45 million MT and 2.5 millions in 1979, increasing 1,000.000 MT in that period.

The increase in total catch is not only due to displacement of foreign fleets, but also to an increase demand in seafood in the loser nations or the important distant water fishing countries.

The loser nations reduced their supply due to the extended juridiction, and countries like U.S.A and Chile increased catches for exports. All of this suggest that extended jurisdiction has created opportunities for a significant expansion of international trade in seafood, which indeed has taken place. The following is a production data taken from FAO statistics from loser countries. Their production record in thousands of metric tons of product follows:

TABLE 3

Country	1976 output	1979 output	decrease
USSR	6,020	5,382	- 638
West Germany	369	330	- 39
Poland	385	353	- 32

Over the same period world output of seafood rose by 6.4% from a level of 23.6 millions MT to 25.2 millions of product

weight. (Copes, 1983). Countries that benefited from catch increases also advanced their production of seafood. (Copes, 1983). Data available for the more important developed countries (Table 4) shows the following (in thousands of metric tons):

TABLE 4

Country	1976 output	1979output	Increase
U.S.A.	1,516	1659	143
Canada	418	527	109
Iceland	310	527	217

The most favored policy of nations that have lost the free access to traditional fishing waters, has been to increase participation in the exploitation of the resources within the EEZ of other countries or unexploited areas not under the jurisdiction of coastal countries. Various methods with different impacts on seafood trade have been in operation. By establishment joint ventures between companies. Several companies from Japan, Republic of Korea and Spain had been specially active in this area, particularly in Chile and other Latin American countries.

Another method to offset the limitation of fishing within coastal waters is developing fishing abilities for deep sea fishing outside the juridiction of coastal countries. Polish and Soviet distant water fleets have chosen to develop such operations in addition to operations, within other nations coastal waters. An example of this is the growth of the Soviet jack mackerel catch that is mainly related to the succesful development of the Chilean jack mackerel fishery off Chilean 200

mile economic zone. In this area Russians were able to expand their catch from 49 thousand metric tons in 1978 to 554 thousands metric tons in 1981. (Kaczynski, 1984). There are different policies that have been adopted by countries that have been in the position to utilize the catch within their EEZ:

-Over the side sales, a strategy followed by USA, Iceland and Norway.

- Give permits for fishing to foreign countries in response of opening of foreign markets or to get assistance in fisheries development. Canada and Norway give access to Economic European Comunity vessels in return for tariff concessions in the European Economic Comunity market. In the United States legislation exists which links the access of foreign fleets to US fishing grounds to foreign concessions in trade policies, and to the obligation to assist US fisheries development.

5.3 Non Tariff Barriers in International Seafood Trade

A non-tariif barrier is a subtle but effective way of impossing restrictions on products entering a country. (Johnston, R., 1985).

Another author defines a non-tariff trade barrier as "a government regulation other than a tariff that directly affects the volume or composition of international trade.

As soon as Chile starts developing marketing strategies in seafood products, adding value to the products, it will start facing problems in international trade such as non tariff trade barriers.

Chile right now face these problem but seems to be less affected compared to other countries. Several barriers are maintained by countries, the major barriers maintained are:

- Subsidies in the case of Canada.
- Quantitative restrictions practice by Japan.
- Reference prices practice by the European Economic Comunity.
- Licensing practice mostly by Spain.

A particular country can use several of non-tariff barriers to restrict imports. Other examples of non-tariff barriers are government standards pertaining to health, labelling and packaging.

Government requirements regarding documentation, weights, measurements are also examples.

5.3.1 **Quantitative Restrictions**

The Japanese government imposes quota restrictions on 11 groups of fishery products. (Fig. 16: Fish and seafood products under Japanese import quota). All other seafood products may be imported without quantitative limits. (Slavin., 1983).

Current and projected supplies, distant water allocations by foreign governments and joint venture investments by Japanese fishing interest are among the factors reviewed in setting quotas. (Kusakawa., 1983).

Generally, a domestic surplus will result in reduced quotas in subsequent periods until the surplus is cleared, decrese distant water allocations in marginally larger quotas and a increase in joint venture activity in either a larger quota or greater quota shares to the joint venture partner. (Slavin.,

FIGURE 16

Fish and Seafood Products under Japanese Import Quota.

Fish and Seafood Import Quota Items

Live, Fresh, Chilled (Iced), Frozen, Salted, Brined or Dried:

- Herring
- Cod and Pollock
- Yellowtail
- Mackerel
- Sardine
- Horse Mackerel
- Saury
- Scallop
- Squid (except Cuttlefish)
- Cod or Pollock Roe
- Seaweed (including Kelp)

1983).

Chile seems to be affected with the quota system in species such as scallops. Japan only imported 4.5 tons in 1984 from a total Chilean exports to other markets of 43 tons. However, this can also be related to the subsidizing effect of Canadian scallops exports to Japan.

5.3.2 **Subsidies**

The Canadian fishing industry receives government assistance from federal and provincial subsidy programs.

The Canadian government offers a host of subsidies to its fishermen, including grants to construct fishing vessels, money to operatethe vessels, grants for harbor development, fish handling and unloading system and even money to pay fishermen for not fishing in the form of seasonal unemployment insurance benefits for fishermen.

In addition, the canadian government provides export marketing assistance and economic and regional development programs for Canadian fishermen.

Chile can also be affected with Canadian subsidies. U.S is the most important export market to Canada and the second in importance to Chile.

Chilean seafood might not be able to compete with the subsidized Canadian seafoods in U.S market, thus, losing market share.

5.3.3 **Reference Prices**

Minimun import price or reference prices can restrict the

ability of an exporting country to penetrate a market. It loses a importer country the possible cost advantages in production.

The European Economic Comunity (EEC) practice the reference price system. If your export is priced below a certain reference price, it may be subject to a variable levy which in effect makes its price less competitive with that of the domestic EEC product or excludes the product entirely.

As noted above, it is clear that Chile will be affected by the reference price because is a nation with cheaper labor cost, in consequence can reach the market with a competitive price.

5.3.4 Licencing

Several countries issue import licenses in a highly discretionary way.

All exporters to these countries may apply for licenses, but only those from certain countries are awarded. The decision may be based on foreign policy, fishery access issues, or other matters not related to the marketability of your product.

All seafood imports require imports license in Spain and is much better if a country has bilateral agreements with Spain.

Imports from countries without bilateral agreement are considered in a case by case basis and are the last in receiving imports licensing.

To issue licenses Spain take into account the condition of the domestic fishing industry and the current status of countries with bilateral agreements.

Price of the import relative to domestic prices and to the price of other imports, is an implicit criterion for approval.

5.4 What trade barriers are perceive by Seafood Traders in Seattle

A survey was done in October consisting in interviewing people of the seafood industry in Seattle area. A total of four interviews was done using a questionnaire prepare by the International Institute of Fisheries Economics and Trade. (Anex 1 pre-test Questionnaire). The objective was to identify factors that industry members believe affect international seafood trade.

The results described here are only those factors that industry members from Seattle area believe are very or somewhat important.

The results are the following:

-Tariff barriers; everybody agree that was a very important factor especialy with countries such as Japan and Korea that presents high tariffs for some imported seafoods.

-Import quotas; is a very important factor especially with countries such as Japan and Spain.

-Grading standards; is a somewhat important factor regarding sizes, labeling and market specifications. Is important to use metric quantities for labels for Japan and all other countries.

-Non tariiff barriers by U.S.; is a somewhat important factor. Some emphasis should be done here because Canadian imports are affecting the domestic market.

-Monetary controls; is a somewhat important factor for the companies dealing with Korea.

-Currency limitations by importing countries; U.S. exports to

Latin America had drop dramatically due to the debt problem.

-Strenght of the U.S. dollar; very important factor. Is the most important barrier noticed. U.S. has lost export power in several countries. The weakness of the U.S. dollar will obviously to sell more.

-Selective domestic subsidies in importing countries; very important factor. U.S. seafood exports must compete in a subsidized market such as Canada. The principal market for Canada is U.S. and more important is that U.S. producers must compete with subsidized Canadian exports.

-Restrictive business practices; somewhat important. Was indicated that Orientals countries have a strong collusion.

-Transportation costs; very important. There is a big concern in those companies that export using Japanese ships due to the strenght of the yen.

-Availability of product; very important. Is not a easy task in getting the product, there are seasonal availability for most of the species.

Is difficult to provide the product in a regular basis, but that's part of the business and customers understand.

- Competition from other suppliers; very important. Competition is always present, for example Norwegian farm salmon is a strong competition for the Pacific salmon.

-Competition from substitutes; very important for example with crab. Surimi imitation crab has displaced crab meat inthe market. Crab meat is almost five times more expensive than imitation crab.

In general, imports are growing, companies are putting more efforts in importing seafood from abroad. The tendency of the market today is towards consuming fresh products so emphasis is done in importing fresh products overseas.

Survey Questions

Date:

Respondent:

I. What is your role in exporting seafoods (e.g., broker, sales agent, shipper...)?

II. What are the primary seafood products your company handles for export? Identify those that account for 80% of your trade, by value.

III. Please list the major reasons for exporting the particular products in which you trade. Rank them (#1 = most important, etc.).

IV. For each of the products listed in II, please state what you feel to be the most important reasons that you do not export more. Let's start with (shrimp):...

V. What products, if any, have you stopped exporting within the past 3 years? Why?

VI. What products, if any, do you plan to stop exporting in the near future? Why?

VII. Please indicate the share of your exports resulting from various practices:

Practices	% of Exports
1. Trade shows	
2. Telex or telephone	
3. Travel to customer	
4. Government leads	
5. Leads from third parties	
6. Sales representatives abroad	
7. Other (please identify)	

VIII. Now I wonder if you would indicate whether each of the following is a "very important," "somewhat important," or "not important," trade constraint for each of the products listed above. Some of these you have already identified: Let's start again with (shrimp?):

1. Tariff barriers (if "very important," which countries?)
2. Export controls (if "very important," please identify)
3. Import quotas (if "very important," which countries?)
4. Grading standards
5. Restrictions on packaging and labeling
6. Political barriers
7. Non tariff barriers by your own country
8. Restrictive state-trading policies (which countries?)
9. Restrictive customs procedures
10. Antidumping regulations
11. Health and safety regulations
12. Monetary controls (e.g., deposit requirements by customs authorities)
13. Currency limitations (by importing countries)
14. Currency limitations (by your country)
15. Other rules and regulations that effectively discriminate against foreign suppliers (please state and identify countries)
16. Other non-tariff trade restrictions (please identify)
17. Strength of the U.S. dollar vis-a-vis European currencies
    (i) 1981-1984
    (ii) currently
    (iii) next year (expected)
18. Strength of the U.S. dollar vis-a-vis the Japanese yen
    (i) 1981-1984
    (ii) currently
    (iii) next year (expected)
19. Strength of the U.S. dollar vis-a-vis (other)
20. Selective domestic subsidies in importing countries
21. Restrictive business practices, such as international collusion
22. Restrictions on types of transaction (e.g., countertrade)
23. Credit availability
24. Adequacy of transportation facilities
25. Transportation costs
    (i) air
    (ii) ship
    (iii) rail
    (iv) track
    (v) other
26. Adequacy of storage facilities (capacity, services)
27. Availability of product
28. Inability of your company to deal with large orders
29. Inability of your company to provide product on a regular basis
30. Competition from other suppliers
    (i) other U.S. companies
    (ii) other countries (please identify)
31. Competition from substitutes
32. Lack of market information

33. An "image" problem resulting from your own past behavior or the behavior of other suppliers of the product
34. The risks of not being paid for what you sell (is there insurance against this risk?)

IX. Could you please identify, in a general way, strategies you use to address trade barriers (example: use of third countries)?

X. Could you please describe aspects of your business which have not been addressed so far and which may be helpful to us in understanding and identifying factors which affect seafood trade. Examples include long term vs short term selling; existing regulations and government activities. Again, please indicate whether each of these is "very important," "somewhat important," or "not important."

Thank you for your cooperation. If you wish, we would be pleased to share with you a copy of our final report.

VI DISCUSSION

Domestic Market Development

To improve the domestic consumption of seafood in Chile, market development program needs to be established. The question that arises is who should to develop the program ?

Large private companies will not do anything in the domestic market unless convinced that it offers profitable opportunities. On the other hand, small traders are restricted to their own activities and obviously they cannot afford it.

It seems that the governments role will be extremely important in such a program. The government should recognize the economic and nutritive importance of developing the domestic seafood market and their responsibility that has to concern them in promoting the market.

Nutrition and social concerns are not only the reasons to modify policies in favour of the domestic seafood market but also money can be saved in the imports of substitutes, such as beef.

The government has to be convinced of this need. The responsibility to convince the government should lie with a Fishery Agency. Currently these agencies work with a extremely limited budget and in their staff rarely include industry planners or marketing officers.

A Fishery Development Agency should plan a entire marketing development program and bring it into operation with government funding at least until such time as the private sector can take over with direct industry members contributions.

The activities for this Agency should include: improving seafood merchandising, educating Chilean consumers on the health benefit of seafoods and stimulating the private sector to ensure that they too become involved in the development planned. This does not happen overnight and the point must be once again emphasized that an increase in seafood consumption will not be achieved unless started by government initiative.

Chilean Seafood in U.S. market

How the U.S. market figures in Chile's future is not clear. Her traditional trading partners in seafood are Japan and Europe, and will continue to be for some time to come. Chile offers excellent material at a reasonable price, thus American companies can buy fish cheaper from Chile. There are some problems, such as the quality at sea and the one to two flights per day leaving for the U.S and a fruit season that starts in November until January using the space available affecting primarely fresh shipments. However, Chile has much more to offer than fresh products. Chile has a highly developed canning industry and modern freezing plants, if a company is interested in frozen or canned products.

ProChile, the country's export organization, is doing a good job, dedicated to increasing exports to the U.S. Its activities include collecting and disseminating trade leads, and participating in foreign trade missions and fairs.

The extent to which Chile can expand its participation in U.S. and other markets depends mainly on the fish resources. Here the fishery agency in charge plays the important role of regulation. Good management of the resources needs to be

maintained.

Chile, in the last few years, has practiced a policy of nonregulation and overexploitation, due to the country's quest for immediate cash. Chilean Abalone (Locos), for example, is now subject to a two year closure due to overfishing. The seaweed fishery, wild scallop fishery, and the shrimp fishery have all been overexploited in the past. Currently Kingcrab is under heavy exploitation.

Other species like salmon as a product of mariculture and private investment, can be expected to increase in supply with annual harvests predicted between 4,000 and 10,000 tons by the end of the decade.

Shellfish are all unavailable for export to the U.S. as a live product because of Federal Drug Administration regulations. The issue is laboratory controls with techniques for testing its own waters along with relevant legislation. According to ProChile, within a year Chile will begin exporting live shellfish to the U.S. If that is the case the future promise a spectacular increase in the international market for Chilean fish and shellfish.

International Seafood Trade

There is no doubt that Chile has obtained a tremendous benefit since the establishment of the EEZ. There is a increase in the catch of a million tons from 1976 to 1979 and a increase of 3.5 million tons from 1976 to present.

Also the seafood exports have increased: Frozen mollusc exports increased from $17 million to $25 million from 1980 to

1985, and Chilean crustacea increased from $12 million to $22 million. In fresh and frozen fish exports there was a increase from $46 million to $47 million from 1981 to 1985. The data indicate that in molluscs and crustacea there is a much higher increase compare to fish. Most of the fish is going to fishmeal, and also is captured by foreign vessels operating in joint ventures, or paying only fees for the right to fish in Chilean waters. Since 1978, the soviet bloc has been fishing off the 200 mile limit, in addition to having been seen within 200 miles. In 1982 the foreign catch of the Chilean jack mackerel by the soviet bloc was 670 thousand metric tons. (FAO, Yearbook Fisheries statistics 1980,1981,1982). According to Chimenelly (1982) the number of Eastern bloc factory ships operating off Chile 200 mile economic zone have increased every year. In 1985, the total catch for foreign vessels allowed in Chilean waters was 58 thousands tons. Yet within or without the 200 mile limit, more than eleven times this amount was caught by the soviet block. To Chile jack mackerel is, at least for the time being, an important raw material base for a fish meal fishery. Yet, there is growing national trend in using jack mackerel for direct human consumption.

It seems that Chile is sharing authority over the fisheries in its own EEZ. Eastern bloc countries are guided by quite different national objectives and political environments than Chile. This makes it difficult to establish even simple joint management systems. It would be to mutual advantage if political considerations were subjugated to good management of Chile's

Exclusive Economic Zone.

Non-tariff trade barriers

Major trade barriers such as subsidies, quotas, reference price and licensing, affects all the countries involved in international seafood trade. There are differnt reasons why a country establishes trade barriers. For example, Japan through the quota system, protects its fishermen and maintains high prices. Japanese traders can benefit from this, but consumers are affected.

Trade barriers affect countries involved in seafood trade in different ways. If we compare the U.S. and Chilean seafood industries with the subsidized seafood industry of Canada, we see that Canadian exports to the U.S. are dominating U.S. markets, and are injuring U.S. fishermen in some regions. In Chile this problem does not exist as there is little or no imported seafood. However, Chile is affected by the subsidy of Canadian exports to the U.S. Chilean caught species such as hake and other groundfish have a decreased demand in the U.S. because of the Canadean subsidy. Canadian seafood with the subsidy system is a major competitor of Chile in the international market.

On the other hand, Chile is clearly more affected by the reference price system. This is due to Chile being able to sell seafood cheaper than other countries. Thus, in the reference price system, price is no longer a priority for Chile. Quality standard, government relations, balance of trade between countries, and fishery access issues become more important factors in determining wheather a seafood product is competitive

in the European Economic Comunity market. Chile has bilateral agreement with Spain. In this way Chilean companies can obtain export licences for the Spanish market. In return, export license benefits are given to Chile for Spanish access to Chilean waters. As a result, Spain has become the third major market for Chilean seafood.

Finally, using the questionnaire from anex 1, I will give some ideas of what trade barriers may affect Chilean seafood.

Tariff barriers are somewhat important. In most markets the import duty rise with the degree of processing. Chile is more a producer country with little marketing in seafood. As a result tariff affects less than a developed country such as the U.S.

Import Quotas are somewhat important. Chile can offer fishery access to countries that are willing to open their markets. Chile can use its fishing grounds as a leverage to reduce the effect of quotas.

Political barriers are somewhat important. Unfortunately, Chile has no economic relations with countries from the soviet bloc. This countries could be important for Chile seafood development.

Health and safety Regulations are very important. Shellfish are affected in the U.S. market by these trade barrier preventing the imports.

Credit Availability is very important. Even though government is concerned with increasing exports, credit availability is limited.

Transportation facilities are somewhat important. Some seafood operations are done in remote places with no roads only maritime

transportation.

Inability of the company to deal with large orders is very important. This trade barrier goes together with credit availability. Seafood companies are generally small and do not have the cash flow necessary for large orders.

Inability of producing product in a regular basis is somewhat important. It depends on the species, some are subject to closed seasons others are exploited year around.

Image Problem are somewhat important. Companies, new in the export business, have made mistakes damaging the image of the entire seafood sector.

The tariff and non-tariff barriers affects the U.S and Chile seafood trade quite differently, according to the data obtained in interviews with traders in Seattle with what I believe affects the Chilean trade in seafood.

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