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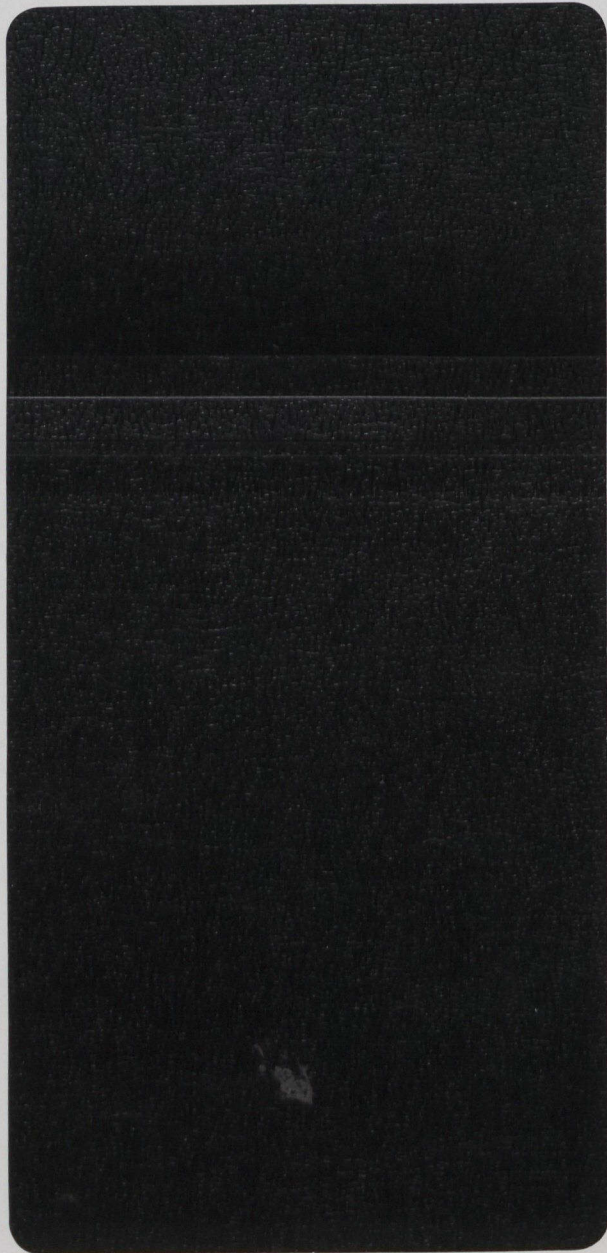
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INDUSTRIAL STUDY  
PREPARED AT THE REQUEST OF THE  
CANADIAN EMBASSY  
SANTIAGO - CHILE NOV.1990  
REPORT



STRATEGY & MARKETING CONSULTING  
Asociados a Adimark y Price Waterhouse  
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EXECUTIVE SUMMARY

CHILE - INDUSTRIAL SECTORS ANALYSIS

Chile's GDP in 1989 reached 10,500,000 million USD. The average annual growth rate for the GDP in the last 10 years has been 4%.

Industrial production should reach around 4,5 billion USD in 1990. The average annual growth rate for the last 10 years has been 3,3%.

INDEX OF THE REPORT

The structure of the industrial sector has significantly changed since 1973. Due to the liberalization of the domestic market and the openness of the external trade, the industrial sector has been oriented towards the export market.

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II	THE FOOD INDUSTRY . . . . .	7	14 TO 18
III	THE METAL INDUSTRY . . . . .	12	19 TO 27
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The food industry production grew 40% between 1980 and 1989. Main subsectors are the Cattle Slaughtering & Meat, Fish & Seafood and Fruit processing industries. Several investments in new technologies have been made in recent years oriented to increase productivity and product quality. In order to compete internationally, imports by these sectors are mainly capital goods and chemicals. Machinery imported for the food industry reached 17 million USD in 1989.

Regarding the meat sector, it is expected that the larger bovine slaughterhouses will need to invest significantly in new and more efficient slaughtering facilities, post-mortem technologies and waste management equipment (water treatment) and facilities. Total output of beef cattle was 358,000 tons in 1989, of which 65% were beef cattle. Imports of beef were less than 2% of total supply.







CHILEAN INDUSTRIAL STUDY PREPARED AT THE  
REQUEST OF THE CANADIAN EMBASSY  
November 1990

EXECUTIVE SUMMARY

Chile's GDP for 1990 is estimated to reach 23 billion usd. The average annual growth rate for the GDP in the last 10 years has been 4%.

Industrial production should reach around 4.8 billion usd in 1990. The average annual growth rate in the last 10 years has been 3,3%.

The structure of the industrial sector has significantly changed since 1973, due to the liberalization of the domestic market, and the openness of the external trade. From highly protected industries, oriented mainly to substitute imports, the different industrial sectors have reoriented their resources to exports, for which they necessarily had to improve efficiency and productivity.

When looking only to the Chilean industrial activity, the most important sectors in terms of their size and rate of growth in recent years, are the Food & Beverage, the Chemical, the Wood & Paper and Metal industries.

Total exports in 1990 should reach 8,4 billions usd, of which 35% are industrial exports. Wood & Paper, Foodstuff and Chemical products have been important industrial players in the growth of exports, representing around 30% of total exports.

Total imports on the other hand, should reach in 1990, 7.8 billion usd. The largest share corresponds to intermediate goods (Chemicals and steel products are the most important) with 4 billions usd and capital goods (mainly industrial machinery and transportation equipment) with 2,6 billions usd. The remaining 1,2 billions usd correspond to consumer imports.

The food industry production grew 40% between 1980 and 1989. Main subsectors are the Cattle Slaughtering & Meat, Fish & Seafood and Fruit processing industries. Several investments in new technologies have been made in recent years oriented to increase productivity and product quality, in order to compete internationally. Imports by these sectors are mainly capital goods and chemicals. Machinery imported for the food industry reached 17 million usd in 1989.

Regarding the meat sector, it is expected that the larger bovine slaughterhouses will need to invest significantly in new and more efficient slaughtering facilities, post-mortem technologies and waste management equipment (water treatment) and technics. Total output of red meats was 358,000 tons in 1989, of which 62% were beef cattle. Imports of beef meat were less than 2% of total supply.







The chicken and egg sectors have developed significantly during recent years. Production of broilers has increased from 64,000 tons. in 1979 to 104,000 tons. in 1989.

Egg production went up 45% in the same period reaching 1,636 million units in 1989. Main improvements have been made in farm management technics and genetic varieties.

The agribusiness sector exported 96 million usd in 1989, as a result of new processing plants in dried fruit, juice concentrate and tomato paste. There is investment potential for frozen fruits and vegetables.

As a result of the food industry growth, it is expected that technological improvements will be required in the packaging and canning industry. Some companies are introducing new products in the frozen and prepared food categories, thus, as consumers increase their adoption of these products, specialized equipment for food processing will be required.

The Chemical industry is mainly oriented to satisfy the growing demand of the Mining, Forestry and Agriculture sectors. Multinationals control most of the subsectors within Chemical industry subsectors. Imports of intermediate goods reached 1,181 million usd and investments of near 1,000 million usd are planned for next three years in production plants.

The Chilean forestry business is one of the most dynamic sectors representing approximately 3.1% of Chile's GDP. Its growth in the last years is impressive with a 22% per year since 1974. In 1989, this sector exported US\$ 790 M, representing 9.6% of total Chilean exports. Of the above amount, 90% corresponds to industrial forestry exports. The main subsector is Paper & Cellulose manufacturing. At the same time, it is the sector which has attracted most of new investment in last 10 years. Several projects for new cellulose and high quality paper plants are expected to materialized in next three years.

The Metal industry is a highly heterogeneous sector, since it is formed by companies of different sizes, product variety and technological level. The main production corresponds to non-electrical machinery. Metal products, mainly derived from copper and iron are also important. Imported inputs represent approximately 37% of total inputs. Imported finished products represent 58% of total available supply.

Main investments in imported machinery have been made in the Textile and Cellulose industries. Other industries with significant imports in recent years are the Metal, Food and Printing industries.

The Chilean industrial sector has a significant potential for foreign investors. In fact, 900 million usd of foreign investment were materialized during 1989.







Higher potential sectors should be those related mainly to the wood industry (furniture, lumber, cellulose, paper), the chemical industry (methanol, urea, fertilizers and chemicals oriented to mining and wood processing), garments and foodstuffs related to agribusiness, beef and dairy products. Thus, there is a good potential in the coming years for selling machinery, technology and intermediate goods to these higher potential sectors.

Medium potential segments are expected to be the beverage sector, domestic household appliances, transportation equipment and electric machinery, footwear and metal products.

Lower potential areas are expected to be textiles other than garments, rubber, basic steel and non-ferrous basic industries and oil refining.

### 3. INDUSTRIAL PRODUCTION

Industrial production should reach around 4.8 billion usd in 1990. The average annual growth rate for Industrial Production in the last 10 years has been 3,3 %.

Throughout the last decade, the industrial sector, as a percentage of the GDP, fluctuated between 19% and 21%. This figure is lower than the 25-26% reached in the late sixties.

The food industry is the mayor player in the Chilean industrial production:

INDUSTRIAL PRODUCTION  
(Millions of US\$ of 1990)

Sub-Sector	1986		1990	
	GDP	%	GDP	
Foodstuff & Wine	1,105	29%	1,398	
Textiles & Shoes	423	11%	535	
Wood & Paper Prod.	627	16%	793	
Chemicals, Oil & Rubber	893	26%	1,286	
Non-Metallic Minerals Manuf.	172	4%	218	
Metal Industry	512	13%	640	
Other manufactures	14	0%	18	
<b>TOTAL INDUSTRY</b>	<b>3,845</b>	<b>100%</b>	<b>4,866</b>	

Source: Input-Output Matrix, Central Bank, 1990

Note: 1986 percentages have been applied to 1990 GDP.

The above-mentioned output is generated by approximately 25,000 companies, out of which less than 1% are big companies (more than 5 million usd annual sales), less than 2% are medium companies (more than 1,5 million up to 5 million usd annual sales), and 97% are small companies (less than 1,5 million usd annual sales).







I) CHILE - BASIC NUMBERS

1. CHILE'S GROSS DOMESTIC PRODUCTION

Chile's GDP for 1990 is estimated to reach 23 billion usd. The average annual growth rate for the GDP in the last 10 years has been 4 %.

The per-capita GDP for 1990 should reach 1,700 usd, as compared to 1,447 usd for 1970 and 1,556 usd for 1980.

Table Nr. 1 shows the growth history of both the GDP and the industrial production.

2. INDUSTRIAL PRODUCTION

Industrial production should reach around 4.8 billion usd in 1990. The average annual growth rate for Industrial Production in the last 10 years has been 3,3 %.

Throughout the last decade, the industrial sector, as a percentage of the GDP, fluctuated between 19% and 21%. This figure is lower than the 25-26% reached in the late sixties.

The food industry is the mayor player in the Chilean industrial production:

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Sub-Sector	1986		1990
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Non-Metalic Minerals Manuf.	172	4%	218
Metal Industry	512	13%	648
Other manufactures	14	0%	18
<b>TOTAL INDUSTRY</b>	<b>3,846</b>	<b>100%</b>	<b>4,866</b>

Source: Input-Output Matrix, Central Bank, 1990

Note: 1986 percentages have been applied to 1990 GDP.

The above-mentioned output is generated by approximately 25.500 companies, out of which less than 1% are big companies (more than 6 million usd annual sales), less than 2% are medium companies (more than 1,5 million up to 6 million usd annual sales), and 97% are small companies (less than 1,5 million usd annual sales).







Following is a breakdown of companies by industrial sector:

	Number of Companies =====	% ==
Food, incl. beverages and tobacco	5,600	22
Textiles and garments	6,060	24
Wood incl.furniture	3,040	12
Paper, incl.publishing	2,900	11
Chemical	1,650	6
Metal, incl.machinery	4,170	16
Others	1,950	8

Source: The Central Bank, 1986

About 75% of above companies are located in 3 geographical areas: Metropolitan Region (Santiago), the V Region (Valparaíso) and the VIII Region (Concepción). These regions generate 77% of the industrial value added, and employ 78% of the industrial labor force.

The industrial output is typical for a less developed country: a high percentage of the industrial value added is placed in consumer products, specially in the food industry.

	----- in percentages -----		
	Gross Value	Value Added	Employment
Consumer products	56%	57%	50%
Intermediate prod.	34%	31%	37%
Capital Goods and	10%	12%	13%
	----- 100%	----- 100%	----- 100%

Source: The World Bank (1980), PREALC (1987) and Central Bank.







### 3. EXPORTS AND IMPORTS

Chile's international trade (imports + exports) increased substantially over the last decade, from a figure close to 9.8 billion usd in 1980, to 16.2 billion usd in 1990. See Chart Nr.2.

#### A) EXPORTS

It is estimated that Chile's exports will reach about 8,3 billion of usd in 1990. This is a substantial increase when compared with the 1,2 billion usd of 1973. Chile's exports have been growing at an annual average rate of 8,9 % during the last ten years.

Up to 1973, the industrial contribution to exports was almost negligible, being close to 7%. As from 1974, the composition of exports has been changing dramatically, so that today industrial exports account for almost 35%, generating close to 3 billion usd of exports in 1990 (expected amount).

The increase in the export share of industrial products is even more relevant when considering that exports of other products also increased substantially, as can be seen in chart Nr. 3.

Following is a breakdown of exports per mayor segments:

	1973	1980	1985	1990
Mining: Copper	1,025	2,150	1,760	3,720
Other mining	105	620	590	510
Farming and Sea products	25	340	500	1,200
Industrial	90	1,560	980	2,920
Total	1,245	4,670	3,830	8,350

Figures: millions of usd

Source: Central Bank

	1980	1985	1990
Intermediate goods	1,110	2,910	4,060
Capital goods	330	990	2,540
Total Imports	1,440	3,900	6,600

Figures: Millions of usd, CIF values  
Source: Central Bank







The composition of the Industrial Exports in the last four years was as follows:

INDUSTRIAL EXPORTS

\*\*\*\*\*

Sub-Sector	1986	1987	1988	1989
Foodstuff	603	740	984	1146
Wine & Bev.	22	34	46	62
Wood Products	98	152	220	292
Paper & Cellulose	272	365	417	423
Chemicals	84	103	190	319
Basic Metal Ind.	77	87	97	80
Metal Products	23	27	42	55
Transportation Eq.	54	32	35	37
Other	27	74	90	126
	====	====	====	====
Industrial Exports	1260	1614	2121	2540

Source: Central Bank.

B) IMPORTS

Imports increased sharply between 1973 and 1990, from close to 1,5 billion usd, up to 7,9 billion expected for 1990. The imports' annual average rate of growth between 1973 and 1989 was 14,3%.

Chart Nr. 4 shows the composition of imports. Intermediate goods accounted in 1989 for 57% of imports (3,7 billion), while capital goods 30% and consumer products only 13%.

It is important to point out that capital goods have been increasing their share of imports since 1973, as shown in the following breakdown:

	1973	1980	1985	1990
Consumer products	240	1,230	340	1,170
Intermediate goods	1,110	2,910	1,840	4,060
Capital goods	330	980	560	2,640
Total Imports	1,680	5,120	2,740	7,870

Figures: Millions of usd, CIF values

Source: Central Bank







Within Consumer Products, Textile and Chemical products are the most relevant imports, with more than 80 and 60 million usd respectively. See Chart Nr 5.

Chart Nr.6 shows that Chemical and Metal products are the most relevant imports within the intermediate segment, reaching around 1,200 million usd each in 1989.

Intermediate products related to food and textiles reached figures close to 200 million usd each, while paper and wood related intermediate products generated imports of less than 100 million usd.

With regards to Capital Goods imported, Table Nr. 7 gives a full breakdown per segment from 1980 onwards. Machinery and equipment for industrial usage generated 190 million usd imports in 1989. The textile and cellulose industry were the most relevant users in this category.

There are other machinery and equipment, such as generators, office equipment, computers, etc, that generated 628 million usd of imports in 1989. Generators and computers were the most relevant imports in this category.

Machinery and equipment for other sectors, such as hydraulic turbines and pumps, telecommunications equipment, etc, accounted for 447 million usd of imports.

#### 4. FOREIGN INVESTMENTS AND JOINT VENTURES

There has been an important increase in foreign investment in Chile. In fact, in 1986 the government authorized, under D.L.600, a total foreign investment close to 260 million, while in 1989 the authorized foreign investment amounted to 2,9 billion usd.

When looking at "materialized" investments under D.L.600, in 1986 the figure was close to 180 million, as compared to 900 million of 1989.

The other means of investment, that is, the Chapter XIX of the Central Bank, shows also an important amount of materialized investment in 1989, that is, 1,3 billion usd.

For more information regarding "authorized" and "materialized" investments, see Table Nr. 8.

Tables Nr. 9 and 10 show that the main investment projects under development amount to 17 billion usd, out of which 14,7 billion are for the private sector and 2,6 billion for state enterprises. In addition, there are projects being evaluated by the Energy Commission worth 2,1 billion usd, plus others (Corfo, Fundación Chile) valued as approximately 2,4 billion usd.







When looking at the destination of industrial investments, Paper and Chemicals manufacturing account for 81 % of total investments in the industrial sector.

Table Nr 11 shows the destination of the investments per region.

Table Nr. 12 shows the degree of potential of expected investment openings in different segments. These expectations are related to the destination of foreign investments, as well as export developments in the last years. Chile's open economy has eliminated inefficient and uncompetitive economic sectors. The remaining industries are in a strong position, and are mainly related to the areas where they have a competitive advantage due to the availability of natural resources and high productivity: wood, mining and fishing. Other industrial sectors that supply these mentioned areas, such as chemicals (for example, flotation reactivities and solvents) will follow a growth trend.

Higher potential segments should be those related mainly to wood (furniture, lumber, cellulose, paper), chemical products (methanol, urea, fertilizers, chemicals oriented to mining and forestry industries), garments and foodstuffs related to agribusiness, beef and dairy products.

Medium potential segments are expected to be the beverage industries, domestic household appliances, transport materials and electronic equipment, footwear, metal products and seafood/agribusiness canning and packaging.

Lower potential areas are expected to be textiles other than garments, rubber, basic steel industries, non-ferrous basic industries and oil refining.

Table Nr. 13 is related to the Joint Ventures which have taken place in the past years. It is interesting to note that most of these ventures have been directed towards the paper/cellulose business, and the mining industry. The venture in the foodstuff business (brewery - CCU) has been an exception, and has been mainly related to the acquisition of the company when it was privatized few years ago. The same happened with the airline venture, when SAS participated in the privatisation of Lan Chile.

## 5. INDUSTRIAL SECTORS ANALYSIS

Given the above mentioned sectors' potential for investment openings, as well as the requirements expressed by the client, we have focused our analysis on following industrial sectors:

- a - Food Industry
- b - Metal Industry
- c - Chemical Industry
- d - Forestry Industry







## THE FOOD INDUSTRY

As a whole the food industry contributes 33% of total value added by the industrial sector and 42% of total industrial output, according to latest available data (1986). Growth in production value between 1980 and 1989 was 40%. The evolution of production and sales indexes of the food industry is shown in Charts No 14 and 15.

The food industry is composed of several sectors which have different structural characteristics and developments. These subsectors are:

Sub-sectors:	Code	1986 Total Supply (US\$ M)
=====		
* Slaughterhouses and Meat Process.	(3111)	761.2
* Dairy Products	(3112)	322.8
* Fruit & Vegetable Processing	(3113)	176.9
* Fish & Seafood Processing	(3114)	751.4
* Edible Oil & Hydrogenated Fats	(3115)	224.7
* Flour Milling, Bakery and Pastes	(3116/7)	870.4
* Sugar Refineries	(3118)	224.9
* Other Foodstuff	(3119/22)	422.4
* Softdrinks, Beer, Wine & Liquors	(3131/2)	373.0
* Tobacco industry	(3140)	94.0

Note: Figures are in US\$ M of 1989.  
For more details see Table Nr. 16 and 17.

However, not only physical volume of production increased. Within the food industry, quality, assortment and variety of goods increased significantly during the last decade, due to technological improvements in several sub-sectors, foreign competition and consumer habits sophistication.

At the same time, many industries reoriented their business to export markets, implying technological changes both in production processes and management technics. Since 1980, food exports have increased 162% reaching US\$ 984 M in 1989.

Another generalized trend within the food industry, is toward concentration of ownership in each market and the increase of foreign investments. Multinationals are the market leaders in almost all the sub-sectors of the food industry.

Following is a brief description of the main subsectors within the food industry:







#### a) Slaughterhouses and Meat Processing:

The Chilean cattle slaughtering and meat processing industry has changed significantly during the past decade. Technological improvements, better animal breeding technics and more professional management have resulted in a much more efficient industry as well as changes in consumers habits.

Value added by this sub-sector was 18% of total output in 1986 and near 98% of intermediate consumption was locally produced. Imported inputs are mainly chemicals.

With respect to beef cattle, in 1989 there were near 3,5 million head, a 9% increase from 1986. Total output of red meats was 358 ktons in 1989, of which 62% were beef cattle. Imports of beef meat were less than 2% of total supply.

Beef slaughtering is concentrated in few large facilities located in Santiago (Lo Valledor, Frigorifico O'Higgins y San Miguel) and in southern Chile (Ganasur, Feria de Osorno). These latter companies have modern facilities and are located near the breeding farms. However, near 80% of beef meat is processed in Santiago. The slaughterhouses have had limited technological improvements in the last 15 years. Main improvements have occurred in freezing facilities (freeze and deep freeze) and hygienic conditions.

It is expected that the larger bovine slaughterhouses will need to invest significantly in new and more efficient slaughtering facilities, Post-mortem technologies and waste management equipment (water treatment) and technics.

Main investments and technological improvements in recent years have occurred within the poultry industry. Although the number of hogs has increased to 1,5 million head, productivity has increased significantly more due to better technology in nutrition, genetics and processing equipment. In 1980, 50,000 tons of pork meat was produced. In 1989, with only 22% more hogs head, 110,000 tons of significantly better quality pork meat (less fat), were produced.

Although it is estimated that there are more than 100 industries processing pork meat as sausages, ham and other products, the five largest companies represent more than 80% of the market. Last year, the largest breeder of hogs, integrated forwardly, investing US\$ 7 M in a highly automated plant (Cecinas Super). Large competitors, like Winter, San Jorge, PF, Frigorifico O'Higgins, and La Preferida will surely follow with improvements in equipment in order to keep competitive.







The chicken and egg sectors have developed significantly during recent years. Production of broilers has increased from 64 ktons. in 1979 to 104 ktons. in 1989. Egg production went up 45% in the same period reaching 1,636 million units in 1989.

During the above period, the sector concentrated vertically and in terms of ownership. This has allowed the introduction of mass oriented technology which can take full advantage of scale economies. The largest companies have invested in new technologies for meat processing and in genetic techniques in order to increase productivity and product quality. Main competitors are "Agrícola Ariztía", "SuperPollo", "Champion" and "Agrícola Chorombo".

Other fowls industrialized in recent years are turkeys and geese. Only one company, Sopraval, has invested in the industrialization of turkey production and it controls the market. However, production is limited. With regards to geese, Fundación Chile (a research center owned by ITT and the Chilean Government) is developing a project for future industrialization.

#### b) Dairy Products:

Total domestic production of milk was 1,2 million liters in 1989. The industry is composed of 30 companies, which process more than 70% of total milk production. However, similar to other Chilean industries, the market is highly concentrated in three companies: Nestlé, Soprole (owned by the New Zealand Dairy Board) and Colún. Other important companies are Loncoleche, La Unión and Lechera del Sur.

Recent investments in new equipment have allowed the production of several new products on massive scale, like yogurt (production has increased by 5 times since 1980), extended life fluid milk, cheese and prepared desserts. The trend is to produce products with more value added, thus requiring the introduction of new technologies in dairy processing.

Nestlé company is the leader in several food categories: Ice cream and frozen food (Savory, Chamonix and Findus brands); Dried soups and other (Maggi brand); Coffee (Nescafé); Chocolates and Cookies (McKay, Hucke and Nestlé brands) and; processed milk products, like condensed, evaporated and dried milk and baby products (Nestlé).







c) Fruit and Vegetable Processing (Agribusiness):

Traditionally, canning was the main industry within this sector. However, since 1980 several investments in new processing plants for concentrated juices, dried fruits, frozen fruits and vegetables and tomato paste have been developed. More than 70% of production of the above products goes to exports. Total Agribusiness exports in 1989, reached almost 100,000 tons and US\$ 96 Millions.

Most of the processing plants recently opened, were bought abroad as a "turn-key plant". The principal investor is IANSA (owned by Sucden, Chicago Continental and Campos Chilenos), which is also the only producer of sugar beet and the owner of all sugar refineries.

d) Edible Oil and Hydrogenated Fats:

Excluding fish oil production, the industry is highly concentrated in two companies: Unilever and Watts. Unilever recently bought the two main producers of edible oil, Coprona and the Oil division of Compania Industrial (INDUS). It is also the leader in the margarine market. Unilever has modern facilities and there are investment plans to improve technical efficiency at Coprona and INDUS division.

Edible Oil refined during 1989 was 58.000 tons, representing 55% of total available supply.

e) Beverages Industry:

Within the softdrinks industry, three companies control the market: Coca-Cola Co., Pepsi International and Chilean "Compania Cervecerias Unidas (CCU)". The American companies have local bottlers who produce and commercialize several brands. Embotelladora Andina (related to Coca-Cola) is currently expanding regional facilities. Embotelladora Chile, owned by Pepsico in a Joint Venture with local investors, was created in 1987, after acquiring old facilities of a small bottler. Significant resources have been invested in the modernization of production lines and expanding its capacity.

CCU, in addition to producing several softdrink brands, is the main beer producer. CCU has been a virtual monopoly until 1990 in the beer market. It is associated with German beer producers. In 1990, a new company was created, Cervecerias Chile, which will commercialize the Heineken brand in 1991.







f) The Tobacco Industry:

This industry is controlled by one company, CCT, which is a conglomerate owned by British BAT Industries. In addition to tobacco, CCT operates the largest tomato paste company in Chile (Malloa), a Snack plant (Everscrip) and a biotechnology division (Bio-Plant).

CCT has approximately 90% of the cigarettes market, supplied both with local manufacturing and imports of finished products. The remain 10% represents imports done by a local distributor.

The metal industry is composed of the following sub-sectors:

Main investments in the next two years will go to the fishing industry (Fish flour and fish oil processing), Beer and softdrinks industry and agrusiness plants. Table No 18 shows principal investments.

As a result of the food industry growth, it is expected that technological improvements will be required in the packaging and canning industry. Some companies are introducing new products in the frozen and prepared food categories, thus, as consumers increase their adoption of these products, specialized equipment for food processing will be required.

Note: (figures are in US\$ M of 1989)

Table No 23 shows the composition of each sub-sector in terms of its domestic supply (including domestic and imported inputs), and its imported supply (imported finished products), according to latest available information (1986).

It is important to notice the significant share of imported inputs, which represented in 1986, 37 % of total inputs. Imported inputs are especially important in the basic metal industry and in the manufacturing of transportation equipment.

In terms of total supply by the metal industry, 54% was imported. Given the relatively low technological development and the small scale of the Chilean metal industry, imported finished products represent a mayor share of total supply of machinery and electrical equipment (see Table No27) and professional/scientific instruments.

According to a study done by CORFO in 1980, near 10% of the metal industry machinery was less than 10 years old. Since then, main investments have been devoted to modernize the basic metal industry specialized in copper and steel manufactures.

Table No 24 shows expected mayor investments for the next two years, accounting approximately US\$ 160 Millions.







## THE METAL INDUSTRY

The metal industry is a very heterogeneous sector since it includes the manufacturing of consumer, intermediate and capital goods. All the subsectors that compose the industry are highly integrated and almost 50% of total inputs are produced within the metal industry, both domestic and foreign. The evolution of production and sales indexes is shown in Charts No 19 to 22.

The metal industry is composed of the following sub-sectors:

Sub-sectors:	Code	1986 Total Supply (US\$ M)
* Basic Metal Industry	370	677
* Metal Products	381	698
* Non-electrical Machinery	382	957
* Electrical Machinery	383	627
* Transportation Equipment	384	687
* Professional & Scientific Equip.	385	170

Note: (figures are in US\$ M of 1989)

Table No 23 shows the composition of each sub-sector in terms of its domestic supply (including domestic and imported inputs), and its imported supply (imported finished products), according to latest available information (1986).

It is important to notice the significant share of imported inputs, which represented in 1986, 37 % of total inputs. Imported inputs are especially important in the basic metal industry and in the manufacturing of transportation equipment.

In terms of total supply by the metal industry, 58% was imported. Given the relatively low technological development and the small scale of the Chilean metal industry, imported finished products represent a mayor share of total supply of machinery and electrical equipment (see Table No27) and professional/scientific instruments.

According to a study done by CORFO in 1980, near 10% of the metal industry machinery was less than 10 years old. Since then, main investments have been devoted to modernize the basic metal industry specialized in copper and steel manufactures.

Table No 24 shows expected mayor investments for the next two years, accounting approximately US\$ 160 Millions.







The development of the Metal industry in Chile has been very different for each of the sub-sectors. Before 1973, the industry was highly protected by tariffs and other barriers. Due to the economic changes implemented during the last 15 years, sectors which used to be relatively important are today reduced significantly. Table No 25 compares the performance of each sub-sector of the Metal industry between 1979 and 1986.

According to the latest industrial census (1979), the metal industry is highly concentrated in medium and large companies, representing 83% of 1979 production. In most of the subsectors, and especially in Basic Metal Industry and non-electrical machinery, a few large companies control over 60% of the market.

When comparing in real values (US\$ M of 1989), domestic supply decreased more than 30% in subsectors related to the manufacturing or assembling of machinery (382), electrical machinery (383) and transportation equipment (384). At the same time, the relation value added/domestic supply by each industry also decreased significantly, showing the increased dependability on imported intermediate goods. Table No 26 shows main intermediate imported goods for the last two years.

The metal products sector (381) produces a large variety of intermediate and consumer goods, mainly for the domestic market. However, an interesting export experience developed during the last 10 years by an export consortia of manufacturers of "locksmith's craft", called Ferrex. The leading company is INCHALAM. Important manufacturers of fittings, with small export operations are NIBSA and FAS. These two companies have invested significantly in new technology in order to produce high quality products. The largest manufacturers of metal household products are FANTUZZI and ILKO, which also initiated exports in recent years.

The remaining 50% of the value added of the subsector is produced by structural metal products manufacturers. The most important companies are COMPAC, CINTAC, PRODINSA, AZA and ARMCO.

Within the subsector of non-electrical machinery, the most important domestic production is household appliances, being Compañia Tecno Industrial (CTI) the only manufacturer. In agricultural and forestry equipment, there are several small companies which mainly assemble imported parts and do modifications. Electrical parts are mainly imported.

Table No 27 shows main imported capital goods for the last ten years. Main investments in imported machinery have been done in the Textile and Cellulose industries. Other industries with significant imports in recent years are the Metal, Food and Printing industries.







## THE CHEMICAL INDUSTRY

The evolution of production and sales indexes of the Chemical Industry is shown in Charts No28 and 29. Highest growth is present in the production of chemical substances.

The chemical industry can be divided into 5 sub-sectors, according to international classification criteria:

Sub-sectors:	Code	1986 Total Supply (US\$ M)
=====		
*Manuf. of chemical substances	(351)	709.9
*Manuf. of other chemicals	(352)	813.1
*Oil refinement & other oil prod.	(353,354)	1,520.3
*Manuf. of Rubber products	(355)	213.7
*Manuf. of Plastic products	(356)	351.1

Note: Figures are in US\$ M of 1989.  
For more details see Table Nr. 30.

The first sector (351) is composed of the manufacturing of inorganic substances and gases, fertilizers, synthetic resins, artificial fibers and organic substances. Sector (352) includes paints, cosmetics, pharmaceutical products, detergents agents and other. Sectors (353,354) represent all processes related to oil refinery and derived products from oil and coal. Rubber manufacturing (355) is mainly composed of the tire industry and other minor rubber manufactures. Finally, sector (356) includes all manufacturing processes related to plastics. Imports of intermediate goods for the Chemical Industry are shown in Table Nr. 31.

From a structural point of view, the above subsectors could be grouped into three divisions, each having very different characteristics.

The first one, mainly sector 351, is the basic chemical industry, which is highly sensitive to technological changes and trade conditions. Usually, high scale economies are present. Thus, since the trade liberalization done in 1978, imports of both raw materials and finished chemicals have substituted a significant share of local production. According to available data from 1986, approximately 70% of total supply is imported. Imports by this division represent near 45% of total imports of the Chilean chemical industry. Of total inputs consumed by companies in sector (351), 49% are produced in Chile.







Significant investments have been made in Methanol and Urea production by foreign companies (US). Multinational companies are the most important participants in sub-sector (351), with the exception of Chilean "Soquimich", mainly devoted to production of fertilizers.

Major companies in sector (351) are Diamond Shamrock, Dow Chemical, Quimica Harting, Shell, Exxon, Hoechst and Anilquimica. There are approximately 70 companies in this sector.

One of the highest potential areas within sector (351) is the production of chemicals oriented to the mining and forestry industries, mainly flotation reactivities and solvents, since most of new investments are oriented to these sectors (See forestry industry investments).

In 1989, imports of main 5 reactivities for mining were US\$ 29.3 compared to US\$ 16 in 1984. (Sodium Sulphure [neutral and acid], Sodium Cianurum, Phosphoric Sulphure and Isopropyl Alcohol). Imported volumes for these 5 chemicals increased 51% from 20.9 ktons in 1982 to 32 ktons in 1989. The principal local manufacturer is Shell. \*

Another important group of imports is fertilizers for the fast growing Chilean agricultural sector. Imports of fertilizers increased 29% between 1984 and 1989, from US\$ 77.7 to US\$ 100. Volumes increased 120% in the same period, reaching 678.000 tons in 1989.

The second division corresponds to sectors (352, 355 & 356). Industries within these sectors are characterized by their contribution to employment (wages account for 45% of total production value) and by the large number of companies competing in each market.

Foreign companies like Goodyear and Bridgestone (Necsa) control the tire market and Bata Int'l in rubber shoes; Bayer, Hoechst, Roche, Parke-Davis the pharmaceutical market (with the exception of Laboratorio Chile); UniLever and Procter & Gamble the detergents market; B.D.F Chile, Barbara Lee, Wella in the cosmetics market.

The three sub-sectors mentioned in the previous paragraph account for 37% of total value added by the chemical industry. In average, 76% of total supply by each sector is produced in Chile. Near 55% of inputs are imported (raw materials & intermediate goods) and wages represent approximately 40% of total production value.







Regarding the Pharmaceutical industry, this sector is mainly devoted to formulating, breaking-up, packing and distributing drugs, since they are not manufactured in Chile. Therefore, imports are very important in this sector. In 1984, imported consumer and intermediate pharmaceutical goods were US\$ 26.6 Million and in 1989, US\$ 32.7, a 23% increase. The largest firm in the market is Laboratorio Chile.

Detergents manufacturers, mainly Unilever and Procter & Gamble, imported US\$ 20.3 M in chemicals used in their processes in 1989. (Sodium Tripolyphosphate, Carboximetil-Cellulose and Dodecilbenzene)

The Plastic sector (356), is a growing industry in Chile. It is composed by 452 companies which give employment to 22,500 workers. Today, there are 45 companies with more than 500 employees each, as compared to only two firms in 1982. This trend to larger companies is in line with technological changes, new export oriented business (requiring larger scale of production) and investment by foreign companies.

According to ASIPLA, an industrial association which groups the largest companies of the plastic sector, imports of intermediate goods, raw materials and finished products by its associates have increased by almost 100% between 1984 and 1989.

Main imports are plastic resins like PE/HD, PE/LD, PVC/E, PVC/S and PVC/C. The following table shows origin and volume for main imports:

MAIN IMPORTS BY THE PLASTIC INDUSTRY

<u>Product</u>	<u>Volume</u> (MTONS)	<u>Principal Country of Origin</u>
PE/HD	21,995	BRAZIL, USA, SAUDI ARABIA
PE/LD	14,628	USA, ARGENTINA, BRAZIL
PVC/E	2,350	SPAIN, MEXICO
PVC/S	22,478	COLOMBIA, ARGENTINA, S. AFRICA
PVC/C	1,608	USA
PVC/PVA	1,458	MEXICO, USA, S.AFRICA
PS/HI	5,358	COLOMBIA, BRAZIL, VENEZUELA
PS/GP	3,707	COLOMBIA, BRAZIL
EPS	887	HOLLAND, ARGENTINA, BRAZIL
PP	13,649	USA, ARGENTINA, BRAZIL

Capital equipment imported by the plastic sector during the last four years adds to US\$ 44 Millions, with US\$ 16,3 in 1989. Main suppliers of equipment are Germany, Taiwan, Austria and Brazil.







## THE FORESTRY INDUSTRY

The third division includes the oil refineries and manufacturers of products derived from oil. It is the most capital intensive sector of the chemical industry and is highly concentrated in state-owned companies (ENAP) and multinationals like Exxon, Shell & Mobil Oil. It represents 56% of total value added by the chemical industry. In addition to oil and its sub-products, main imports by this sector are related to capital equipment and transportation vehicles.

Code                      Total Supply  
(US\$ M)

Main planned investments in the Chemical Industry are shown in Tables Nr. 32, with an estimated total of around 1 billion US\$. Most of the new investments are related to plants oriented to export operations.

Manufacturing	342	714.9
Printing & Publishing	342	195.3

Note: Figures are in US\$ M of 1989  
For more details see Table Nr. 35.

The Chilean forestry industry is one of the most dynamic sectors representing approximately 3.1% of Chile's GDP. Its growth in the last years is impressive with a 22% per year since 1974. In 1989, this sector exported US\$ 790 M, representing 3.6% of total Chilean exports. Of the above amount, 90% corresponds to industrial forestry exports. The following table shows exports evolution:

### FORESTRY INDUSTRY EXPORTS (US\$ Millions)

	1978	1987	1988	1989
Logs & Chips	2.4	71.0	108.7	75.4
Sawn Wood & Furniture	94.0	152.0	219.0	292.0
Cellulose & Paper	159.0	365.0	417.0	423.0

Source: INFOR (Instituto Forestal)

Between 1974 and 1989, total Chilean exports increased by 280% while forestry exports increased in 522%.

Chile has currently the largest radiata-pine plantations in the world with 1.4 million Has., being 20% and 86% larger, respectively, than New Zealand and Australia. There are also approximately 8 million Has. of commercial native forest, although most of it is only suitable to produce pulp and exportation is highly restricted by the authorities.







## THE FORESTRY INDUSTRY

The evolution of production and sales indexes of the Forestry Industry is shown in Charts Nr.33 and 34. The Industrial Forestry Sector can be divided in the following subsectors:

Sub-sectors:	Code	1986 Total Supply (US\$ M)
* Wood Industry	331	341.6
* Furniture & Fixtures	332	183.1
* Paper Manufacturing	341	714.0
* Printing & Publishing	342	295.3

Note: Figures are in US\$ M of 1989  
For more details see Table Nr. 35.

The Chilean forestry industry is one of the most dynamic sectors representing approximately 3.1% of Chile's GDP. Its growth in the last years is impressive with a 22% per year since 1974. In 1989, this sector exported US\$ 790 M, representing 9.6% of total Chilean exports. Of the above amount, 90% corresponds to industrial forestry exports. The following table shows exports evolution:

### FORESTRY INDUSTRY EXPORTS (US\$ Millions)

	1978	1987	1988	1989
Logs & Chips	2.4	71.0	108.7	75.4
Sawn Wood & Furniture	94.0	152.0	219.0	292.0
Cellulose & Paper	159.0	365.0	417.0	423.0

Source: INFOR (Instituto Forestal)

Between 1974 and 1989, total Chilean exports increased by 280% while forestry exports increased in 522%.

Chile has currently the largest radiata-pine plantations in the world with 1.4 million Has., being 20% and 88% larger, respectively, than New Zealand and Australia. There are also approximately 8 million Has. of commercial native forest, although most of it is only suitable to produce pulp and exportation is highly restricted by the authorities.







Chilean pine-tree forests are on a growing cycle. Current harvesting of wood is from forest planted during the early 60's. However, most of the 1.4 million Has. will mature within the next 10-15 years.

To meet this increase in production the Chilean Timber Industrial Association (CORMA) estimates that current processing facilities will have to double in size and capacity in order to exploit the full potential of the plantations. These new investments are estimated in 3 billion US dollars by the Forestry Institute (INFOR).

During the last years, several investments have been developed in this sector by investors from New Zealand, Holland, US, Spain and most recently Japan with total investments of US\$ 600 M.

Tables Nr. 36 to 38 show estimated investments in the forestry industry between 1990 and 1992 as well as those developed since 1987. It is important to mention that most of the new investments are oriented to value added through the manufacturing process to pulp and wood. (Paper, boards, furniture).

#### Imports by the Cellulose and Paper Industry

The paper and cellulose industry imported US\$ 37.5 M in machinery and equipment for its plants. This is an increase of 312% over 1986 imports. Annual average growth on imports has been 72% since 1986. Accumulated imports since '86 are US\$ 71 M. These amounts include only equipment and machinery which are specific to the industry.

#### Imports by the Wood and Furniture Industry

Imports of equipment and machinery by this fast growing industry were US\$ 14.6 M. Compared to 1986, imports increased by 248% in 1989. Accumulated imports for the mentioned period were US\$ 41.2.

### Main Industrial Forestry Sectors

#### A.-Cellulose and Paper:

This sector constitutes 53% of the forestry industry production value and 45% of exports. As mentioned before, this sector is attracting mayor investments which will double its production capacity in the next years.







Wood pulp, paper and cardboard industries are highly concentrated in terms of ownership. Almost 100% of pulp production capacity and more than 90% of paper and cardboard production capacity is in four large firms: CMPC (Chilean), INFORSA (CMPC is mayor stockholder), Celulosa Arauco y Constitución and Forestal Bio-Bio.

#### B.-Boards:

This industry is dominated by two companies: Cholguan S.A. and MASISA. Currently, production is mainly devoted to the domestic market. Nevertheless, companies have made several investments in new technology in recent years, in order to produce boards with the quality required for international markets. Current plant capacity for particle board, plywood and veneers is almost 90%.

New investments in plants and technology are expected in order to take advantage of increased supply of wood and high export potential.

#### C.-Sawn Wood:

The Chilean sawn wood industry is very heterogeneous both in the size of sawmills as well as technology used. There are approximately 1.690 sawmills in the industry, although 12 companies account for more than 50% of sawn wood products and more than 70% of industry exports.

Sawmills can be classified in three groups: mechanized, traditional and temporary sawmills. The first type has capacity over 50.000 m<sup>3</sup>/year and almost all the processes are automated or mechanized. In 1985, there were only 6 sawmills in this category, increasing to 9 in 1989. Committed investments will increase the total number of mechanized sawmills to 15 before 1992. Only these sawmills possess the technology required for export.

Significant investments have been made in drying equipment in order to produce higher quality products. Thus, new technology plus better forest management techniques, have resulted in increasing exports of clear wood, which is used in furniture, and finger-joint wood products. At the same time, it has allowed the growth of the domestic furniture industry, since they depend on the availability of good quality new materials to compete in International markets.

Traditional sawmills have a production capacity between 10.000 and 50.000 m<sup>3</sup>/year. There are 22 sawmills that can be classified in this category. They have mechanized some of the process and most of them do not have drying facilities.







It is expected, in opinion of INFOR, that this type of sawmill will demand technological improvements given the expected higher supply of wood and the export potential of quality sawn wood.

Temporary sawmills, with capacities less than 10.000 m<sup>3</sup>/year, have very small facilities, (some more than 20 years old) and are entirely devoted to the domestic market. The estimated number of sawmills in this category is approximately 1.600, although this number changes significantly with economic conditions in the construction sector.

#### D.-Furniture and other finished wood products

This sector represented US\$ 35 M in exports (including US\$17 in pallets) during 1989. It is the most recent industry and its growth both in production and exports has been constant since 1984.

Few and small companies constitute this infant industry (10-15 companies). However, during 1990, KODAK International, in a joint-venture with local investors, invested US\$ 6 M in a fully automated furniture plant, which is expected to export US\$ 10 M during 1991 and to grow to US\$ 25 M by 1995.

Also, "Compania de Aceros del Pacifico", C.A.P., (one of the largest industrial conglomerates in Chile) invested US\$ 5.1 M in a modern furniture plant expected to start production during 1991.







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