

**C I N T R A F O R**

**CHILE'S FOREST PRODUCTS INDUSTRY:  
A COUNTRY PROFILE**

**WP 90**

**Shelley L. Gardner  
Ivan L. Eastin**

**June 2002**

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## EXECUTIVE SUMMARY

The goal of this paper is to provide objective and reliable information about Chile's forestry sector and its current and future role in the international forest products industry. The contents should provide a well-rounded view of forestry and associated issues in Chile and would be well suited to someone looking to gain insight on this topic, update their knowledge of the subject, compare Chile to other countries of interest, or begin to understand investment opportunities in Chile. While the document does provide investment information, someone seriously considering investing in Chile would most likely want to undertake a more thorough investigation of issues specifically related to their strategic plan and some appropriate resources for this have been cited.

Chile's favorable soil and climatic conditions allow for a rapid growth rate and production of marketable wood. They have an increasing plantation resource base (mostly radiata pine (*Pinus radiata*) and *Eucalyptus* species) and potential to expand their forestland further. Decree Law 701, now refocused from plantations and large landowner support to subsidizing planting and trimming costs for small landowners, has been the major and often criticized piece of forest management legislation since its induction in 1974. Not yet enacted, the "Recovery of the Native Forests and Their Promotion in Forestry" seeks to subsidize native forest management as well. Property rights are more respected for plantations, there is virtually no land tenure for native forest and what ownership does exist is hard to track.

Chile's forest industry has contributed about 3% of the total GDP over the last 15 years and made up 10% of all exports in Chile and 2% of the world trade in forest products. Their primary products consist mainly of roundwood, lumber, fiberboard, particleboard, wood chips, pulp, and newsprint. As the trend moves more toward secondary products such as sawnwood, molding and millwork, and furniture, they strive to strike a balance between the two. Non-timber forest products, such as sweetbriar rose (*Rosa eglanteria*), soapbark tree (*Quillaja saponaria*), and boldo (*Peumus boldo*), while hard to estimate due to the fragmented market, also significantly contribute to exports and may offer alternatives for more sustainable management. Wood pulp producers have made major investments in modern, low-pollution industrial plants and processing technologies to meet European market demand. Chile's exports focus makes them a reliable trading partner. Chile's ability to standardize and harmonize with market demand, share market information, adapt to the Argentinean crisis, and obtain more forest products marketing training; Chile's geographical location in relation to export markets, wood quality, use of natural resource-based exports as major momentum for economic growth, and technology restrictions; and forest-certification coupled with NGO pressure or boycotts are all potential challenges to the industry and important considerations for investors.

The major competitive threats regarding Chile are its likelihood of becoming more competitive in international markets as exports increase, increasing production and exports, and low production costs and labor costs relative to competing nations. Opportunities for countries interested in working with Chile include its positioning to resume higher growth, market-oriented economy, well-diversified international trade, well established State institutions, democratic government, and relatively qualified and ethical labor force.

The Chilean government provides active encouragement to private sector forest activity and is seeking to promote foreign direct investment (FDI) to capitalize on developing value-added products. The greatest opportunities include investment in sawmills, pulp plants, wood composite panels, and wood preservation. However, there are potential challenges or serious considerations for prospective investors. There is extreme consolidation of the industry. Empresas Compañía Manufacturera de Papeles y Cartones S.A. (CMPC) of Matte Holding and Angelini forestry own 80% of productive forestland and wield serious political power. There is a relatively small presence of foreign capital compared to the 1980's. Chile's production base structuring allowed for better positioning of local groups, so foreign investors associated with local groups, but withdrew when profits decreased. Environmental pressures/restrictions and plantation criticism make it increasingly attractive to divert investments to neighboring countries with fewer restrictions.

Chile has gained preferred market access to certain countries by participating in free trade agreements with Canada, Mexico, and tentatively with the European Union (EU). It has bilateral trade agreements with the Andean Pact countries, the Southern Cone Common Market (MERCOSUR) countries, and Central America. It has also received invitations to Asia-Pacific Economic Cooperation (APEC), Latin American Integration Association (LAIA), and North American Free Trade Agreement (NAFTA). Chile actively participates in negotiation of the Free Trade Area of the Americas (FTAA), but negotiations between Chile and the United States have been held up mainly due to the U.S.'s hesitation to address sensitive agricultural issues.

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## 1.0 INTRODUCTION

The major objective of this paper is to provide reliable and holistic information about Chile's forest industry and their current and future role in the international forest products industry. While Chile's forestry sector is well developed and information on the subject is available, much of it is in Spanish, expensive, proprietary, or its reliability is unknown. It is possible to find very different figures recorded for the same measurement. The basic methodology used was secondary data collection by reviewing the literature on all relevant subjects followed by a series of interviews conducted with a wide array of professionals involved in the industry and observations made while in Chile.

### 1.1 GLOBAL TRENDS

The current slowdown of the world economy appears to be bottoming out and becoming the mildest in recent history. However mild, it has been quite difficult for the emerging market economies, which may point to the fact that although globalization exposes them to the volatility of international trade, they have come only halfway toward full integration into international financial markets and are especially vulnerable (International Monetary Fund 2002). The extent and speed of the recovery of the U.S. economy looks promising, but the risks cannot be overlooked. The excess capacity in key sectors, over-leveraged households and corporations, and the sizeable current account deficit and the implied overvaluation of the dollar, are factors that may eventually limit a U.S. led global recovery. While the U.S. economy remains the single engine of world economic growth, global imbalances continue to increase (International Monetary Fund 2002; Neikirk 2001).

Several vulnerabilities threaten the ongoing recovery. These include global imbalances, other potential sources of asset price misalignments, and the cost-push effect of still another oil price shock. The stock markets in some industrial countries appear to be over priced, with implicit expectations of earnings growth that seem difficult to fulfill. A sudden realignment of expectations and the ensuing price correction would seriously damage consumption and investment demand in industrial countries and affect global growth. In addition, the extremely grave security situation in the Middle East has increased the risk of a prolonged oil price shock, which would have a contractionary effect on global demand that could end the ongoing recovery (International Monetary Fund 2002).

The UK, Canada, Australia, the Nordic countries, and New Zealand, have shown remarkable resiliency during the slowdown and may become a strong force for the recovery of global growth. Europe probably has the most significant chance of contributing to global growth over the medium-term. However, there appears to be no indication that Japan will soon contribute to the global recovery, despite its sizeable fiscal stimulus packages and a zero interest rate policy the effects of which have been limited by a deflationary process that has increased real rates. Despite several attempts at corporate and bank restructuring, its credit market remains burdened by bad debts (International Monetary Fund 2002).

While most industrial countries are nearing recovery, growth in the emerging markets is predicted to remain relatively low in 2002. Even countries with recognized strong policies are not expected to show a rapid recovery until 2003. The external financial conditions generally faced by emerging market economies impose restrictions on their policies during a global slowdown (International Monetary Fund 2002).

In the forestry sector, there is an estimated 3.87 billion ha of forest worldwide (covering 26% of the earth's surface), of which almost 95% are natural forests and 5% are forest plantations, however this is dependent on the definition of plantation used. Wood and non-wood products, energy, food and medicine, environmental services, as well as socio-cultural benefits are some of the benefits these forests provide. Global production of wood products alone is valued at about USD 400 billion per year (2% of the world's GDP) and strides are being made to develop valuation methods for non-market services provided by forests (Food and Agriculture Organization of the United Nations Forestry Department 2001 b).

There are serious challenges to the long-term management and rational utilization of forests. The absence of sustainable forest management practices in some areas, tropical deforestation, desertification, forest degradation, global climate change, and natural disasters threaten the resource. Progress is impeded by weak national institutions, lack of political will, the absence of global policies and strategies, restrictive trade policies and practices, the lack of an effective international organization to provide global leadership, inappropriate fiscal and development policies, lack of timely resource and trade information, and an extreme under-valuation of natural forests. While forest area in developed countries has stabilized and is slightly increasing overall, deforestation has continued in developing countries. The estimated net annual change in forest area worldwide during the past decade (1990-2000) was -9.4 million ha (the difference between the estimated annual rate of deforestation of 14.6 million ha and the estimated annual rate of forest area increase of 5.2 million ha). However, despite these challenges, progress has been made (Food and Agriculture Organization of the United Nations Forestry Department 2001 b; Roberts and Roper 2001).

Recent technical, policy, and institutional measures to improve forest management and conservation have reflected a more holistic philosophy demonstrated by a move to balance social, economic, and environmental objectives. This trend is more suited to reconciling the conflicting demands of different stakeholders for the many goods and services provided by forests. Efforts include reducing timber harvesting in natural forests while developing alternative sources of industrial wood, improving harvesting practices, reducing illegal forest activities, and increasing community-based forest management. There is a global trend towards greater reliance on plantations as a source of industrial wood. The development of a significant global plantation estate is quite recent - half of all plantations in the world are less than 15 years old. Asia has led plantation establishment globally (as of 2000, the FAO estimated 62% of all forest plantations were located in that region). Other significant developments include: rising private sector investment in plantations in developing countries, increasing foreign investments in plantations, and an expansion of arrangements where communities or small landowners produce trees for sale to private companies. While plantations seem to promote the protection of native forests, there are still environmental conflicts such as the replacement of native forests with plantations, the introduction of genetically engineered species, and the problems associated with monocultures (Food and Agriculture Organization of the United Nations Forestry Department 2001b).

On the economic side, there has been some recovery of global demand for industrial wood after the sharp drop in 1997-1998 caused by the Asian economic crisis. The effects of the crisis, although disruptive, were less severe and longer lasting than originally feared. Production of tropical wood products, however, has remained below earlier levels, and some Asian countries have experienced continued difficulties. Trade, which had dropped in 1997-1998, largely recovered in 1999-2000, but prices showed a mixed recovery, depending on the specific product. China has been growing in importance as a major consumer of wood, together with a dramatic increase in its wood imports in recent years, owing in part to harvesting restrictions for natural forests. This situation has had significant impacts on production and trade flows inside and outside the Asian region. A number of trade trends have continued, including an increased proportion of the total production of wood products being exported, increased domestic wood processing, increased trade among developing countries (particularly in Asia) and trade liberalization at a global level, even as some countries are introducing export restrictions (Food and Agriculture Organization of the United Nations Forestry Department 2001 b).

The certification of forest products, although still somewhat controversial, has been gaining acceptance. Interest has been greatest in major importing countries (i.e. western Europe and the United States) and in exporting countries whose main markets are in those areas. The area of certified forests continues to increase and is now estimated to be roughly 90 million ha. Nonetheless, this represents only about 2% of the world's forest area and, notably, most certified forests are located in a limited number of temperate countries, not in tropical countries for which concern about unsustainable timber harvesting practices is greatest. Recent developments include the further expansion of national certification schemes, mutual recognition of certification processes, the favoring of certified wood products by major retail chains in Europe and the United States as well as by various buyers' groups, and the certification of certain pulp and paper products and non-wood forest products (Food and Agriculture Organization of the United Nations Forestry Department 2001 b).

Forest industries continue to adapt to changes in raw materials, namely the increased supply of plantation wood and a wider range of species. These trends are driving the production of engineered wood products (particularly in Europe and the United States), which are capturing some of the market for plywood produced by tropical countries. The reduced availability of forest-based raw materials and excess low quality wood has resulted in more innovative ways of expanding wood supply and in a greater use of residues and waste (Food and Agriculture Organization of the United Nations Forestry Department 2001 b).

Forest management is being influenced by freer flows of labor, capital, goods and information between countries. The roles and responsibilities of government, the private sector, and civil society are being realigned and the relationships between them are changing. The private sector is undergoing both structural and functional changes. Large companies have grown even larger and have tended to become more vertically or horizontally integrated. Private enterprises own or control significant forest areas worldwide. Governments have increasingly given up responsibility for many activities through the privatization of state owned enterprises or modified concession agreements. Some companies have proactively adopted environmentally and socially acceptable practices. Companies are increasingly collaborating with one another as well as with communities and environmental groups on activities related to sustainable forest management (Food and Agriculture Organization of the United Nations Forestry Department 2001 b).

## **1.2 SOUTH AMERICA'S ECONOMIC ENVIRONMENT**

Argentina, Brazil, and Chile (the ABC countries) dominate South America's economy and have, with the exception of the recent economic downturn and economic crisis in Argentina, become more and more attractive to investors in the forest products industry in recent years.

MERCOSUR, the Southern Cone Common Market, is a four-nation trading block comprised of Argentina, Brazil, Uruguay, and Paraguay (Chile is an associate member). This common market is meant to allow:

- the free circulation of goods, services, and production factors among the countries; a common external tariff and a common commercial policy regarding other states or groups of states and the coordination of positions in international and regional commercial economic forums;
- the coordination of macroeconomic policies from different sectors among member States such as: foreign trade, agricultural, industrial, fiscal, currency, foreign exchange and capitals, services, customs, transports and communications policies, and conditions among member states;
- and the member States commitment to harmonizing their legislation in the pertinent areas so as to strengthen the integration process.

Two bodies, one of them of a political nature and the other of an executive nature, were established to administer the Treaty: the Common Market Council and the Common Market Group. MERCOSUR signed a frame agreement of inter-regional association, political cooperation and coordination with the European Union on December 15, 1995; a free trade agreement with Chile that was in effect as from October 1, 1996; a free trade agreement with Bolivia that was put in effect in March 1997; a frame agreement with the Andean Community to negotiate a free trade zone; and a frame agreement of commerce and investment with the Centro American Common Market signed on April 18, 1998. At present, MERCOSUR is negotiating with 30 countries in the hemisphere for the creation of a free trade area of the Americas (ALCA), which will be in force as of 2005 (MERCOSUR 2002).

The effects of the global slowdown on external demand, terms of trade and financing, and spillover from the Argentinean crisis, although relatively modest, have created a difficult environment for the countries of South America. These difficulties have prompted some countries to seek financial and technical support to reestablish the conditions for sustained economic growth, increasing the need for additional borrowing and debt relief (International Monetary Fund 2002).

When evaluating the Latin American debt crises, analysts tend to emphasize the lack of fiscal policy discipline as the ultimate cause of the problem while downplaying the importance of external shocks and financial vulnerabilities. Factors such as terms of trade shocks, mismanaged financial liberalizations, reversals in capital flows, and financial regulations in industrial countries that create a bias toward short-term loans, are among the outside factors affecting income, financing, and market access that have also been important in the generation of crises. Several Latin American countries have made significant progress in reducing their vulnerabilities through macroeconomic stabilization, structural reforms, and institutional development (International Monetary Fund 2002).

The confidence of investors in the region has failed to improve or has had limited improvement, partly because of the Argentinean crisis. The economy there shrank by almost 5% last year. Argentina has been cut off from all international and domestic credit, leading to its declaration of default. Under such conditions no country can function normally, leading to a downward growth spiral and increasing the risk of further political and social deterioration (International Monetary Fund 2002).

The severity of the slowdown has varied from country to country. Obviously, Argentina and neighboring Uruguay fared the worst, with output declining significantly for the third year running. Peru saw its economy stagnate with little change in GDP and Bolivia, Brazil, and Colombia recorded modest growth of between 1% and 2%. Chile, Ecuador, and Venezuela fared the best, with growth of around 3%.

Chile has also been exposed to a severe and prolonged external shock that has depressed its terms of trade, slowed the growth of its export volumes, and reduced net capital inflows. However, despite this adverse shock, the macroeconomic performance remains satisfactory with continuous growth, low inflation, and a sustainable external position. Chile remains an island of stability in Latin America. These results are much better than those obtained in the past when Chile was confronted with similar challenges (International Monetary Fund 2002).

Looking forward, with the exception of Argentina, the IMF projects that output growth in Latin America should gather momentum from this point forward on the heels of the U.S. and global economy and the associated strengthening of commodity prices. Inflation in most countries is projected to remain low.

### **1.3 CHILE'S COMPETITIVE ADVANTAGE**

Chile offers many resource and economic based competitive advantages. It has a competitive edge due to the incredible growth rate of the forestry resource. Favorable soil and climatic conditions allow marketable wood production in much less time. For instance, radiata pine can be used for pulp after 16-18 years of growth. In the northern hemisphere, the waiting period would be 18-45 years. In Chile, the radiata pine is ready for processing into saw logs after 20-24 years, as opposed to 40-60 years required in the northern hemisphere. While the industry focus is on plantation wood, Chile's native forests are incredibly diverse and a system for protecting them is well established.

The country offers the competitive advantage of sophisticated processing technology, sustainable plantation management techniques/forest certification, low production costs, and high-quality products. The strong work ethic and professionalism of the labor force also adds to Chile's productivity as a major worldwide competitor in the forestry industry (Continental Pacific LLC, 2001). Chile has significant potential to expand its forestland further than its current area [e.g., CONAF estimates that there are 2.5 million ha yet to be forested (Trade and Media Services Ltd. 2000)].

Exports have risen more than 50% since 1990, with sales expanding to Asia and North America in particular. Production has also increased steadily and is predicted to continue to do so (Trade and Media Services Ltd. 2000).

The Chilean government actively encourages foreign investment. Foreign companies in Chile are guaranteed equal treatment with domestic companies under the law. Foreign investors may contract with the government and obtain a guarantee that even if laws change, the government cannot unilaterally modify the contract. Additionally, there are no property taxes on active forestry land and company income taxes are only 15%.

Chile lends itself very well to doing business with cultures like that of the U.S. and the EU. They have many similarities with these cultures and business travelers tend to feel at home when they are in Chile and that it is easy to relate to people there.

Chile has a floating exchange rate and strong monetary policy allowing the stability of other variables relevant to financial markets.



## 2.0 GENERAL COUNTRY DATA

### 2.1 GEOGRAPHY

Chile, a republic in southwestern South America, is bounded on the north by Peru, on the east by Bolivia and Argentina, and on the south and west by the Pacific Ocean (Figure 1). It has an extreme northern-southern length of approximately 4,270 km (2,650 miles), but its average width is less than 180 km (110 miles). Archipelagoes extend along the southern Chilean coast from Chiloé Island to Cape Horn, the southernmost point of the South American continent. Among these are the Chonos Archipelago, Willington Island, and the western portion of Tierra del Fuego. Other islands belonging to Chile include the Juan Fernández Islands, Easter Island, and Sala y Gomez, all of which lie in the South Pacific. The country has a total area of 756,626 sq km (292,134 sq miles). There is an outstanding boundary dispute with Bolivia over its claim for an opening to the sea. Chile also claims the Antarctic Peninsula and other areas of Antarctica, comprising 1,250,000 sq km (482,500 sq miles). The major cities of Chile are Santiago, the capital and largest city (1998 population, 4,703,954); Concepcion, an agricultural and industrial center (372,252), Viña del Mar, a popular resort (335,512); and Valparaíso, a principal seaport (293,800). The dominant physical feature of Chile is the Andes Mountains, which extend the entire length of the country, from the Bolivian plateau in the north to Tierra del Fuego in the south (Dickey 2001; Microsoft Encarta 1997-2001).

#### 2.1.1 Physical Regions

Chile can be divided longitudinally into three topographic zones: The Andean *cordillera* on the east; the low coastal mountains on the west; and the plateau area, which includes the Central Valley between these ranges. Latitudinally, three major geographical and climatological regions can be distinguished: the northern (arid), central (Mediterranean), and southern (temperate marine) regions (Dickey 2001; Microsoft Encarta 1997-2001).

#### 2.1.2 Land Use

**Table 1: Land use in Chile**

Arable land	5%
Permanent crops	0%
Permanent pastures	18%
Forests and woodland	22%
Other	55%

Source: (1993 est.) United States Central Intelligence Agency

#### 2.1.3 Rivers and Lakes

The many rivers of Chile are relatively short, generally rising in the Andes and flowing west to the Pacific. In the northern and central regions, the rivers are fed primarily by the perpetual snow cover of the Andes. The most important rivers (from north to south) are the Loa, Elqui, Aconcagua, Maipo, Maule, Bio Bio, and Imperial. Although of limited value for navigation because of cascades and great waterfalls, the rivers are vital for the irrigation waters and hydroelectric power they furnish. Many of Chile's major lakes, including Lake Llanquihue, are concentrated in the scenic lake district of the southern region (Dickey 2001; Microsoft Encarta 1997-2001).





**Figure 1: Map of Chile**

Source: Map Courtesy of University of Washington Map Collection and Cartographic Information Services; CIA Map 1986.

## **2.2 CLIMATE**

Because of its great latitudinal range, Chile has a diversity of climates. In general, temperatures are moderated by oceanic influences. The northern region is almost entirely desert and is one of the driest areas in the world. Temperatures, however, are moderated by the offshore presence of the cold Peru, or Humboldt Current. The average temperatures at Antofagasta range from 18° to 23° C (64° to 74 ° F) in January and from 12° to 16°C (53° to 62°F) in July. In Santiago the average range is 12° to 29° (54° to 85°F) in January and 3° to 15C (38° to 58°F) in July. Temperatures decrease about 1 degree Celsius for each 150 m (about 1 Fahrenheit degree for each 275 ft) of elevation in the Andes. Rainfall increases southward, and the central region experiences a Mediterranean-like climate. Precipitation there is concentrated in the winter months (May to August) and ranges from an annual total of 260mm (14 in) at Santiago to 2 mm (0.1 in) at Antofagasta. Winters here are mild and summers are relatively cool. The southern region is cooler and experiences year-round rainfall. Precipitation reaches a maximum of about 5,000 mm (about 200 in) near the Strait of Magellan, much of it in the form of snow. The average annual temperature at Punta Arenas in the far south is about 7°C (44°F). Strong winds and cyclonic storms are common in the southern region (Microsoft Encarta 1997-2000)

## **2.3 FLORA AND FAUNA**

The indigenous plant life of Chile varies according to topographic region and climatic zone. The northern region has few varieties of vegetation (such as brambles and cacti) and is one of Earth's best examples of a true desert. The more humid Central Valley supports several species of cacti, espino (a thorny shrub), grasses, the copihue (a red bell-shaped flower and Chile's national flower), and the araucaria (monkey puzzle tree), which bears edible nuts. Southern Chile supports dense temperate rain forests containing laurel, magnolia, false beech, and various species of conifers, which become smaller and more stunted to the south. The cold temperatures and winds of the extreme south preclude heavy forestation and in Patagonia, a steppe vegetation of grasses is found. The Chilean flora is distinct from that of Argentina, indicating that the Andean barrier existed during its formation (Dickey 2001; Microsoft Encarta 1997-2001).

Animal life is less diverse than in other parts of South America because of the barrier to migration presented by the Andes. Indigenous mammals include the llama, alpaca, vicuña, guanaco, puma, Andean wolf, huemal (a large deer), pudu (a small deer), and the chinchilla. In the forest region, several types of marsupials also exist. Bird life is varied, but most of the larger South American types are absent. Aside from trout, which were introduced from North America, few freshwater fish inhabit Chilean streams and lakes. The coastal waters abound in fish and marine animals, which in turn support a rich variety of waterfowl, including different penguins. Whales are abundant and some six species of seals are found in the area (Dickey 2001; Microsoft Encarta 1997-2001).

### **2.3.1 Environment**

The Ministry of Health Environmental Programs Department, National Planning Office, Ministry of National Welfare Ecological Advisory Office, and Ministry of Foreign Affairs Department of the Environment are principally responsible for environmental matters (Dickey 2001).

Chile's main environmental problems are deforestation and the resulting soil erosion and air, water, and land pollution. Air pollution from industry and transportation and water pollution are especially problematic in urban centers, where the population has doubled in the last 30 years. Santiago's air pollution is largely caused by the inversion resulting from geographic conditions in the area (Dickey 2001). Fortunately, Santiago has a strong urban forest. They have wisely kept their steepest areas and waterways covered in vegetation and even have a 712 ha park within the city. This combined with citizens' devotion to balcony gardens and plans for more public transportation should reduce some of the pollution problems in the near future. Untreated sewage poses the major threat to the nation's water quality and while 94% of its urban dwellers do have pure water, 39% of its rural dwellers do not. The improvement of Chile's economic stature and an increased awareness of environmental issues have resulted in a more engaged and interested public. They are at a point where they are capable of affecting public policy, but often lack updated information regarding forest conditions, their development, and their value as a natural resource (Neira et al. 2002).

## **2.4 DEMOGRAPHIC DATA**

### **2.4.1 Population**

The population of Chile at the 1992 census was 13,321,803. The 2000 estimated population is 15,155,495, giving the country an overall population density of 20 persons per sq km (52 per sq mi) (Table 2). Some nine-tenths of the people live in the central region between La Serena and Concepción. In 2000, the rate of population increase was 1.2%. Some 84% of the population lives in urban centers, and nearly one-third of the country's entire population lives in the capital city of Santiago. Communities both in the south and in the northern desert are generally isolated and separated by vast, virtually unpopulated stretches of land (Microsoft Encarta 1997-2001).

**Table 2: Summary of Chilean Demographics**

<b>Indicator</b>	
Population (2000 est.)	15,155,495 (2000 est.)
Population density	52 persons per sq. mile
Population growth rate	1.2%
Population distribution	84% urban (1/3 of entire population in Santiago) 16% rural
<b>Age structure</b>	
0-14 years	28% (female 2,044,546; male 2,137,826)
15-64 years	65% (female 4,958,030; male 4,919,060)
Over 64 years	7% (female 641,101; male 453,234)
<b>Sex ratio</b>	
At birth	1.05 male(s)/female
Under 15 years	1.05 male(s)/female
15-64 years	0.99 male(s)/female
Over 64 years	0.71 male(s)/female
Total population	0.98 male(s)/female
Infant mortality Rate	9.6 deaths/1,000 live births
<b>Life expectancy at birth</b>	
Female	79.22
Male	72.43
Total Population	75.74
Total fertility Rate	2.2 children born/women
<b>Literacy (age 15 and over can read and write)</b>	
Female	95%
Male	95.4%
Total Population	95.2% (1995 est.)
Languages	Spanish/Castellano, Mapu-dungun
<b>Religions</b>	
Roman Catholic	77%
Pentecostal Protestant	11%
Jewish	1%
Traditional religions/Animism/Shamanism	<1%
<b>Ethnic groups</b>	
Mestizo	95%
Native American (Araucanians/Mapuche, Aymara, Rapa Nui)	3%
European	2%
<b>Nationality</b>	
Noun	Chilean (s)
Adjective	Chilean

Source: Dickey 2001; Microsoft Encarta 1997-2001

Compared with other South American countries, Chile has a population that is relatively homogeneous. The early Spanish settlers intermarried with the Native Americans, notably the Araucanian/Mapuche. *Mestizos*, persons of mixed Spanish and Native American ancestry, constitute 93% of the current population. European immigration has not been as important in Chile as in other countries of the Americas, as immigration was only mildly encouraged in the 19<sup>th</sup> century. German immigrants have, however, been an important influence in the Valdivia-Puerto Montt area. Italy, Austria, Switzerland, Britain, the former Yugoslavia, and France have also made significant contributions in the population. Syrians, Jordanians, and Lebanese also made up part of the waves of immigration. Today less than 2% of the country's population is of unmixed European descent and only 3% is pure Native American, primarily Araucanians/Mapuche concentrated in the southern region. As many as 600,000 pure Mapuches live mainly in Temuco and in the forest region south of the Bio Bio River. Remnants of other small tribal groups, such as the Aymara and Rapa Nui, are found in isolated oases within the northern desert or live a nomadic existence on the archipelagos and islands of the extreme southern coast (Dickey 2001; Microsoft Encarta 1997-2001).

## **2.5 GOVERNMENT**

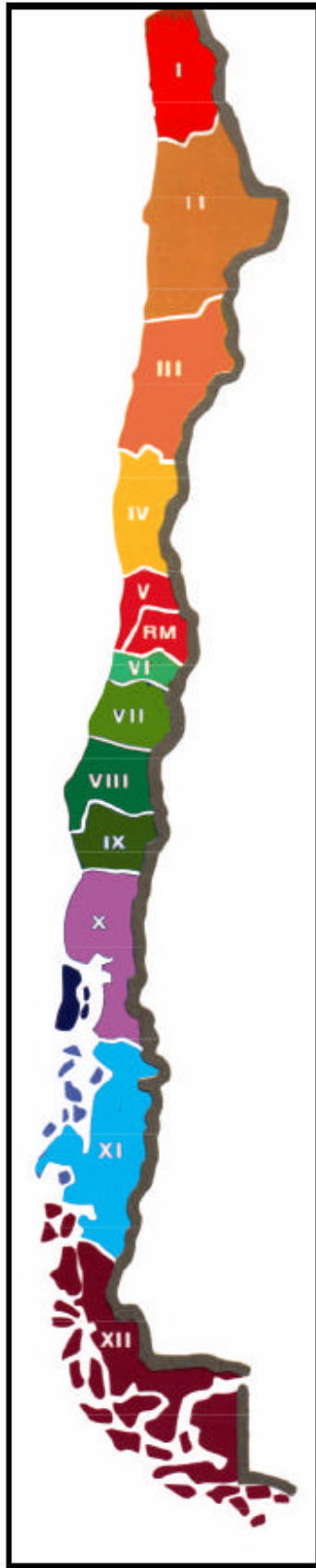
The government of Chile was based on the constitution of 1925 until a coup d'état in 1973. Although it remained nominally in effect, most of the constitution's provisions guaranteeing popular democracy and due process were suspended. A new constitution was approved in 1980 and enacted in 1981, but its major provisions were not fully implemented until 1989. After the restoration of democracy, in 1990, Chile continued to feel the legacy of the Pinochet regime. The constitution of 1980, the third Chilean constitution, is still in effect, even though it was created with a different Chile in mind. This constitution guarantees the active participation of the armed forces in government, establishes limitations on the right to strike and on freedom of information and expression, and institutionalizes a free-market economy. All citizens aged 18 and older are entitled to vote (Dickey 2001; Microsoft Encarta 1997-2001).

For the purpose of local administration, Chile is divided into 13 regions, beginning with Region I at the northern border with Peru and continuing in sequence to Region XII at the southern end (Figure 2). Greater Santiago is not numbered like the other 12 regions (it is shown as RM in Figure 2). The regions each have a capital and are subdivided into 51 provinces. The president appoints the governors who preside over the regions and the officials who govern the provinces. Provinces are further divided into municipalities. The 340 municipalities are headed by mayors and are the smallest unit of local government. In 1991, a constitutional amendment was passed granting significant autonomy to municipalities (Dickey 2001; Microsoft Encarta 1997-2001).

Businesses in Chile are predominantly owned and controlled by private interests. Prices, except those of regulated utilities, are set freely. The state retains holdings in several industries. The most important public corporation is CODELCO, the world's second largest copper company, which the government has said it will not sell. In 1994 and 1995, the Frei administration sold the government's remaining shares in an airline, electricity, shipping, and radio companies. The majority of new highway projects, as well as port and airport infrastructure, are being built under a private concession program (Dickey 2001; Microsoft Encarta 1997-2001).

## **2.6 BUSINESS CLIMATE**

Chilean politics is marked by broad consensus among the major parties regarding the importance of a democratic political system and a free-market economic system. Thus, business operations develop in a climate of free enterprise and free trade. Simplified bureaucratic procedures make the Chilean business environment one of the most transparent and friendly in Latin America. Current trends include innovation in export products, as well as in a wide range of services for the domestic market. High foreign and domestic investment have added new technologies to industrial processes and increased competition in distribution and marketing. U.S. companies established in Chile



**Figure 2: Regions of Chile**  
*Source:* Trade and Media Services Ltd.

have maintained successful operations there for decades. The Chilean-American Chamber of Commerce has a large membership of U.S., Chilean, and international firms and effectively represents the interests of the corporate community in Chile (United States Embassy Santiago 2001).

## **2.7 CURRENCY, BANKING, AND CREDIT**

The basic unit of currency is the Chilean peso, CLP, (649 CLP equal USD 1; 2002). The peso was introduced in 1975 to replace the escudo. The autonomous Central Bank of Chile (established in 1926) is the bank of issue and has broad powers to regulate monetary policy (Latin Focus 2001; Microsoft Encarta 1997-2001).

Money exchange operations are particularly active and efficient by Latin American standards. As a general rule, currency may be freely traded in two markets, the informal and the formal or inter-bank market. The Central Bank has the power to require that certain transactions be executed only through the formal market (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

The exchange rate theoretically is allowed to float within a band around a central rate that is adjusted to compensate for differences between Chilean inflation and that of its trading partners. The band allows for significant fluctuation in the real value of the CLP (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

### **2.7.1 Banking System**

The banking system, which includes a state bank, Banco de Estado, and a number of commercial and development banks, offers many of the asset and liability products available in international financial centers. Foreign trade financing and money exchange operations are particularly active and efficient compared to the rest of Latin America (Dickey 2001; United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

Authorities have not allowed new banks to enter the market since the early 1980's financial crisis except through the purchase of existing banks. This restriction applies to domestic as well as foreign banks. Vigorous economic growth in recent years has strengthened bank profits, but restrictions hinder banks' ability to enter some rapidly growing areas of business. A new banking law enacted in late 1997 has relaxed some of the restrictions by allowing banks to provide factoring and leasing services. The new law theoretically provides objective criteria by which to judge applications for new banking licenses, but the Government reserves the right to limit such licenses based on economic needs in the marketplace (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

The Superintendent of Banks and Financial Institutions regulates banking. In addition to conducting monetary policy autonomously from the government, the aforementioned Central Bank also regulates international capital movements and bank operations (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

Private banks handle most corporate business. Banco de Chile and Banco Santiago were the only Chilean banks with a direct presence in the U.S. as of June 1999. The banking sector has entered a period of consolidation as banks combine to achieve economies of scale to compete internationally (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

U.S. banks that operate in Chile concentrate mostly on corporate lending. However, Citibank and Bank of Boston are active in retail banking. Corporate lending is focused on medium-sized businesses because restrictions on the percentage of a bank's assets that can be lent to a single customer lead large firms to resort to international sources of finance (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).



## **2.7.2 Financing Availability**

Companies in Chile utilize a variety of financing sources, including retained earnings due to strong profitability, stock, direct investment, bank debt, bonds, Eurobonds, and issuance of American Depositary Receipts (ADRs) on U.S. stock exchanges. The larger corporations have evolved from the use of bank debt to public sources of funds such as stocks and bonds issued locally and also to international capital markets (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

Payment to suppliers is often made via an irrevocable letter of credit from a Chilean commercial bank to the supplier. This is fast and simple with no lengthy delays in the remittance of foreign exchange. Payments are made upon receipt of notice of shipment of goods. Other methods of payment to suppliers include cash against documents and open account. Suppliers dealing in open account usually have developed a long-standing relationship with the buyer (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

The U.S. Export-Import Bank and the Overseas Private Investment Corporation provide credit and insurance programs for U.S. exporters and investors in Chile. The Inter-American Development Bank is also active. The World Bank's Multilateral Investment Guarantee Agency's (MIGA) first project involved Chile. The Bank is quite willing to provide financing to Chile and has targeted guarantees to private sector investors in infrastructure. However, the country's currency reserves and balance of payments surplus have made new loans undesirable. In fact, Chile has been prepaying its multilateral institution obligations (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

Private companies can take advantage of the World Bank's International Finance Corporation (IFC), which is providing financing to private sector companies for infrastructure. The IFC is particularly interested in green-field projects, non-traditional industries, cross-border operations, and asset securitization (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

Major project financing is available through issue of equity and bonds in the international capital market, and through syndicated loans. Eximbank now offers project financing in Chile, but the amount to be financed depends exclusively on the U.S. content of the proposed project (United States & Foreign Commercial Service and United States Department of State 1998; United States Embassy Santiago 2001).

## **2.8 INFRASTRUCTURE**

### **2.8.1 Roads and Highways**

Chile has a network of about 79,800 km (about 49,585 mi) of roads, of which 14% are paved. The Pan American Highway, extending 3,460 km (2,150 mi) from the Peruvian border to Puerto Montt, is Chile's principal road artery. In 1995 there were about 888,600 passenger cars and 469,000 commercial trucks, buses and taxis. The Carretera Austral Presidente Augusto Pinochet Highway will eventually link Cochrane in Coyhaique with Puerto Montt after construction is complete. The Chilean government has targeted the highway network for more, mostly private sector, investment. With the government awarding over \$1 billion in road concessions to allow private firms to build and manage toll roads, the Pan-American Highway, the major north-south route, is in good condition, but mostly at capacity. Concessions either have been awarded or are in the process of being awarded for the most heavily used 1,000 miles of the Pan-American Highway, from La Serena to Puerto Montt. Roads are adequate in many areas, but many secondary highways are unpaved and some serious bottlenecks exist, particularly in urban areas. Because of the difficult terrain, many coastal cities rely on water transportation (Dickey 2001; Microsoft Encarta 1997-2001; United States Embassy Santiago 2001).



## **2.8.2 Railroads**

Chile's railroad system, the fourth largest rail network in Latin America (4,214 miles, or 6,782 kilometers), urgently needs to be upgraded and expanded. The railroads are mostly property of the state-owned company Ferrocarriles del Estado. The government plans to auction to private firms the right to operate the company's passenger service. Rail lines in the desert area are used mainly for mineral transport. There are 5 international railroads from Chile: a line to Tacna, Peru; 2 to La Paz, Bolivia; and 2 to Argentina (Dickey 2001; United States Embassy Santiago 2001)

The Santiago Metro subway has been in operation since 1976. It is efficient and well maintained and expansions to the system have continued. A USD 1 billion, 33 km extension to the subway system was just announced this year, which is scheduled to be operational in 2005. This would bring the total Metro network to 80 km from the existing 40 km (Chile Foreign Investment Committee June 2001; Dickey 2001; United States Embassy Santiago 2001).

## **2.8.3 Water Transportation**

Chile has a strategic location relative to sea-lanes between Atlantic and Pacific Oceans (Strait of Magellan, Beagle Channel, Drake Passage) (United States Central Intelligence Agency 2001). Fine harbors are few, however Chile has some 20 ports, 10 of which are used principally for coastal shipping. Major ports are located on the Pacific Ocean. The principal one is Valparaiso, which is about 80 miles (130 kilometers) from Santiago. Others are Arica, Iquique, Antofagasta, San Antonio, Talcahuano, and Punta Arenas. Foreign and local shipping lines handle international traffic, whereas several local companies handle coastal traffic. Recognizing that the port facilities are largely inadequate for the growing and changing nature of Chile's trade, the government is awarding service and management concessions for the ports (Dickey 2001; Microsoft Encarta 1997-2001; United States Embassy Santiago 2001).

## **2.8.4 Air Transport**

As of 1998, there were 378 airports in Chile, 58 of which had paved runways. The most important international airports in the country are located near Santiago (Arturo Merino) and Arica; others are at Antofagasta, Puerto Montt, and Punta Arenas. Chile's largest airline is the state-owned National Airlines of Chile (LAN-Chile), which provides both domestic and international service. LAN-Chile's only significant domestic competitor is Copper Airlines (LADECO), a privately owned company. In 1997, Chile's airlines carried 4,610,000 passengers on domestic and international flights (Dickey 2001; Microsoft Encarta 1997-2001).

Many international airlines operate from Santiago's airport, linking Chile with the United States and Europe. The U.S. and Chile signed an "Open Skies" aviation agreement in October 1999. Three major U.S. carriers now serve the Chilean market. A number of adequate airports are located throughout the country. The government is upgrading many regional airports and expanding the international airport in Santiago through awards of concessions to private companies. Two privately owned Chilean airlines operate nationwide and link Chile with many foreign countries. Smaller regional airlines are also beginning to impact domestic air travel (Dickey 2001; Microsoft Encarta 1997-2001).

## **2.8.5 Communication and Media**

Chile has a wide variety of modern communications media. In 1996 the country had 52 daily newspapers. *El Mercurio*, *La Nación*, and *La Tercera de la Hora*, all published in Santiago, have considerable influence. A national government network and several independent stations operate television, which was introduced in 1958. The country has more than 375 radio stations. In 1997 there were 354 radios and 215 televisions in use for every 1,000 residents (Microsoft Encarta 1997-2001).

Chile's telecommunications infrastructure is excellent and one of the best in the hemisphere. Cable, fax, telephone and Internet service rival those found anywhere in the world, in part because of heavy U.S. investment. The phone system is completely digital. There are 8 international long distance carriers and 3 cellular telephone networks. Personal Communication System (PCS) telephones were introduced in early 1998. Several Internet service providers supply the rapidly growing demand. Chile is among the Latin American markets with the fastest Internet growth rates (Dickey 2001; Microsoft Encarta 1997-2001; United States Embassy Santiago 2001).

### **2.8.6 Energy**

The electricity-generating plants in Chile produced 28.7 billion kilowatt-hours of electricity in 1998. The fast-flowing rivers that descend from the Andes and the coastal ranges are potentially rich sources of hydroelectric power. Although controversial for reasons of land right issues, major efforts have been made to harness this potential and by 1998 some 52% of Chile's energy was generated from waterpower. Chile is exceeded only by Brazil in its hydroelectric power potential (Dickey 2001; Microsoft Encarta 1997-2001).

The state lays claim to all petroleum deposits and a government agency, Empresa Nacional del Petroleo – ENAP, manages oil fields in Region XII. ENAP's oil production only meets 15% of Chile's needs and reserves are decreasing. The production of dry natural gas, as a by-product of petroleum extraction, grew in the 1970's and by 1997 was up to 2.1 billion cu m (75 billion cu ft). In 1998, Chile imported 197,000 barrels per day of oil primarily from Nigeria, Gabon, Venezuela, and Ecuador (Dickey 2001; Microsoft Encarta 1997-2001).

Chile's coal reserves have been increased by recent discoveries in the Bio Bío area. Reserves are now believed adequate to supply Chile's needs for 100 years. A number of petroleum-fired electric generators have recently been converted to coal (Dickey 2001; Microsoft Encarta 1997-2001).

### **2.8.7 Labor Force**

Chile's labor force is regarded as competent, productive, and relatively well educated. Many Chilean business people are well-educated professionals who travel internationally and speak English. Education is generally very important to Chileans. The civilian labor force totaled 5,851,500 or approximately 39.3% of the population in 1998. Of the employed work force in 1995, 48.6% was engaged in professional and white-collar occupations, 16% in agriculture, 16% in manufacturing, 8% in construction, and 2% in the mining sector. From 1987 to 2000, the workforce grew at an annual average rate of 2.3%, which is well above demographic trends (Chile Foreign Investment Committee; Dickey 2001; United States Embassy Santiago 2001).

As of 1992, the Central Union of Chilean Workers (Central Unica de Trabajadores de Chile – CUTCH) signed an agreement with the Confederation of Production and Commerce and the Ministers of Labor, Finance and Economy to increase the minimum wage rate by 17.1%. This cooperation marked a significant departure from the antagonistic labor relations of the previous 2 decades and showed the government's effort to resolve problems affecting workers' interests. Cooperation between unions and the administration continues to be excellent and important to Chilean economic reforms. In 1998, Congress adopted a measure to gradually increase the minimum wage through 2000 and it was increased to 100,500 CLP a month in early 2000, about USD 196 at the then current exchange rate. Salary levels are still very reasonable, particularly in the mining and industry sectors (Table 3) (Dickey 2001; United States Embassy Santiago 2001; PricewaterhouseCoopers 1999).

There is a minimum work age of 15, provided a child has the permission of their parents. This law is complied with in the formal economy, but is often not enforced in the informal economy. The legal workweek is 48 hours and 10 hours per day with limited exceptions. There are occupational safety and health standards and the government is putting expanded resources into enforcement of these measures to increase compliance (Dickey 2001).

Forestry employs an important segment of the population, especially in the southern part of the country. For manpower in the forestry industry, there were 117,542 persons employed in 2000, of which 54% were in industry, 34% in silviculture and extraction, and 12% in services. The adoption of new technologies and more stringent regulations has seen a fall in the number of labor accidents in Chile's forest industry (INFOR 2001; Continental Pacific LLP 2001).

**Table 3: Gross Monthly Wage and Salary Ranges**

<b>In CAD thousands as of Dec. 1998</b>		
	<b>From</b>	<b>To</b>
Managerial	1,841	11,180
Professional	827	1,881
Office Staff	142	988
Average wages:		
Skilled	183	649
Semiskilled	128	611

*Source: PricewaterhouseCoopers*

### 3.0 ECONOMIC DATA AND TRENDS

Chile has a market-oriented economy characterized by a high level of foreign trade. Market-led reforms over 25 years and an increasingly diversified economy with strong ties to buyers and suppliers in the Americas, Europe, and Asia have given Chile a wide range of options for further growth. Careful economic policy-making has secured long-term stability unknown elsewhere in Latin America. The inauguration of Ricardo Lagos in March 2000, succeeding Eduardo Frei, has kept the presidency in the hands of the center-left Coalition of Parties for Democracy that has held office since the return of civilian rule in 1990 (U.S. Embassy Santiago 2002, CIA 2001).

#### 3.1 THE HISTORICAL CONTEXT

Pre-Columbian Chile was populated by a variety of ancient cultures, many of them politically subject to the Incas who they predated by many centuries. The country's varied topography affected the different cultures of its population groups and the extent to which they were subject to Inca aggression. Native groupings included Aymara farmers in the desert north, who cultivated maize and tended flocks of llamas and alpacas; fishing communities in the coastal areas; Diaguita Indians in the mountainous interior; Araucanian or Mapuche Indians in the center and south, whose fishing and agricultural settlements were barely touched by Incan incursions; and numerous groups of archipelago hunters and fishers in the remote south (Dickey 2001; Microsoft Encarta 1997-2001).

All territory west of Brazil was granted to Spain by the 1494 Spanish-Portuguese treaty. The Spanish assigned the task of conquering Chile to Pedro de Valdivia, whose expedition reached Chile's fertile Mapocho Valley in 1541. Santiago was founded in the same year, with the cities of La Serena, Valparaíso, Concepción, Valdivia and Villarrica following soon after. The Bio Bio River marked the southern extent of Spanish incursions, where the resistance of the Mapuche tribes barred them. Valdivia rewarded his followers with enormous land grants, which resembled the great feudal estates of his Spanish homeland. Although mining and business overcame agriculture as Chile's major industries, it was the social structure of the estates that shaped colonial Chile. The native population was devastated by the unwitting introduction of infectious diseases, and the *mestizo* population, the offspring of Spanish and Indian unions, were used as tenant laborers on these huge estates, many of which were still intact in the 1960s (Dickey 2001; Microsoft Encarta 1997-2001).

By the 1820s, the cumbersome methods by which taxation was extracted by a stagnant and complacent Spain allowed a pan-American identity to develop into a push for full independence. Simón Bolívar and José de San Martín led armies of freedom fighters from Venezuela to Peru and from Argentina into Chile. Bernardo O'Higgins, son of an Irish immigrant and former viceroy of Peru, became supreme director of the new Chilean republic. The newly independent Chile was a fraction of its eventual size, consisting of Santiago and Concepción, and with questionable borders with Bolivia and Argentina. The coming of the railways and military triumphs over Peru and Bolivia in the War of the Pacific (1879-83) incorporated the mineral-rich Atacama Desert to the north and the southern temperate territories. Chile quickly achieved a degree of political stability and relative democracy, enabling rapid agricultural development and the advancement of mining, industry, and commerce. The now empowered working class and the new rich both challenged the political power of the landowning oligarchy in a brief but bloody civil war in the 1890s (Dickey 2001; Microsoft Encarta 1997-2001).

The first half of the 20th century saw the political climate swing between right and left with no government having sufficient support to cement large-scale reform. Infrastructure development was generally sluggish, leading to rural poverty and urbanization through desperation. It was not until the 1960s that the Christian Democrats, who targeted housing, education, health, and social services, successfully instituted social reforms. These policies threatened the conservative elite's privileges and also offended the radical left. Chile's politics were becoming increasingly militant, polarized, and ideology-based when Allende's Popular Unity coalition of Socialists offered a radical program advocating nationalization of industry and expropriation of latifundios in 1970. Allende introduced sweeping economic reforms, including the state takeover of many private enterprises and the wholesale redistribution of income. Increased public spending briefly stimulated growth, but conflicts of interest between their rightist counterparts combined with U.S. Cold War/communism concerns lead to the undermining of the Allende government with artificially created food shortages, skyrocketing prices, strikes, and political violence that brought Chile to the brink of chaos (Dickey 2001; Microsoft Encarta 1997-2001).

General Pinochet seized power in a bloody coup on September 11, 1973 using jets to bomb the presidential palace. Allende died, apparently by his own hand, and thousands of his supporters were murdered. Dark days followed, with assassinations, purges, and enforced exiles commonplace. It is estimated that as many as 80,000 people were tortured or murdered. Rumors of CIA involvement in the coup were given credence by the U.S. instigated suspension of credit from international finance organizations, and the contemporaneous financial and moral support given to Allende's opponents (Dickey 2001; Microsoft Encarta 1997-2001).

At the head of a four-man junta, Pinochet dissolved Congress, banned leftist parties and suspended all opposition. Pinochet's monetarist economic policies brought stability and relative prosperity, but in a 1988 referendum to approve his presidency, voters rejected him by a majority of 55%. In the 1989 multiparty elections, Christian Democrat Patricio Aylwin beat Pinochet's candidate, Hernan Buchi, and power was peacefully transferred. Democracy returned to Chile although many of the previous regime's power brokers wield a lingering influence (Dickey 2001; Microsoft Encarta 1997-2001).

More recently, Pinochet's arrest in London in 1999 at the request of a Spanish judge investigating human rights violations unleashed an international uproar. The general's temporary detention brought unresolved issues into the open for the first time in decades, but in February 2000 the general was pronounced too ill to stand trial and in early March he returned to Chile. In March of 2001, the Santiago Court of Appeals reduced the charges against Pinochet from acting as a conspirator in the crimes to acting as an accessory by covering them up. He was released from house arrest on bail while awaiting a possible trial (Dickey 2001; Microsoft Encarta 1997-2001).

During the early 1990s, Chile's reputation as a role model for economic reform, from a capitalist perspective, was strengthened when the democratic government of Patricio Aylwin, which took over from the military in 1990, deepened the economic reform violently initiated by the military government. Growth in real GDP averaged 8% during the period 1991-1997, but fell to half that level in 1998 (during Frei's presidency) because of tight monetary policies implemented to keep the current account deficit in check and lower export earnings, the latter a product of the global financial crisis. A severe drought exacerbated the recession in 1999, reducing crop yields and causing hydroelectric shortfalls and rationing, and Chile experienced negative economic growth for the first time in more than 15 years. Despite the effects of the recession, Chile maintained its reputation for strong financial institutions and sound fiscal policy that have given it the strongest sovereign bond rating in South America. By the end of 1999, exports and economic activity had begun to recover (U.S. Embassy Santiago 2002; International Monetary Fund 2001).

Eduardo Frei undertook the challenge of reconciling Chileans with their difficult past by accelerating human rights tribunals and inquiries into the fate of Chile's 2000 "disappeared". Unfortunately, resistance from the political arm of the military machine severely hampered his efforts. Frei also struggled in matters of constitutional reform, failing to eliminate eight institutional senators appointed by Pinochet who are not subject to a popular vote. Frei's economic reforms, however, did help alleviate crushing poverty to some degree (Dickey 2001; Microsoft Encarta 1997-2001).

In January of 2000, Ricardo Lagos, formerly Frei's public works minister, became president and is the first Socialist to hold the highest office since Allende. He defeated his right-wing rival, Joaquin Lavín, by a thin margin, securing 51.3% of the vote. While the recession was officially over in 2000, growth in 2001 was slower than expected due to weak domestic spending and sluggish investment (U.S. Embassy Santiago 2002; Dickey 2001; Microsoft Encarta 1997-2001).

### **3.2 CURRENT ECONOMIC POLICY CONSIDERATIONS**

Chile's monetary policy continues to focus on keeping inflation within the target band, under a freely floating exchange rate, and fiscal policy geared to maintain a central government structural surplus of 1% of GDP every year. Unemployment remains a concern and is being addressed by reallocating government expenditures towards labor-intensive projects and by a program to facilitate the rescheduling of debts of small- and medium-sized firms. Chilean authorities eliminated remaining restrictions on capital flows and approved legislation for a capital market reform to enhance corporate governance. The banking system remains sound though experts believe it would still be possible to strengthen the supervisory framework further. Chile has a very open trade regime and continues reducing its uniform external tariff unilaterally, but some experts recommend that the price-band scheme that generates higher tariffs on certain agricultural products be reconsidered (International Monetary Fund 2001).

### **3.3 MACROECONOMIC INDICATORS**

#### **3.3.1 Growth**

Chilean economic growth is mainly driven by exports concentrated in primary products and processed natural resources such as copper, fresh fruit, forestry products, and fisheries products. Thus, the world economic slowdown and decline in commodity prices negatively affected Chile's growth trajectory during their recession in the late 90's. Also, their tight monetary policy in 1998 in response to balance-of payments pressures greatly reduced domestic demand. When the recession officially ended in 2000, the GDP growth was 4.4%, but was slower than expected in 2001 (2.8%) because of weak domestic spending and sluggish investment (Table 4). While Chile's exposure to the U.S. is limited, the domestic economic activity was affected because of its very open economy and the shockwaves of the September 11 events. While the growth rate was only 1.5% as of February 2002, the Central Bank of Chile projects growth of 3.3%, reflecting the growth prospects of Chile's main trading partners, for the remainder of 2002 and 5.3% for 2003, which is consistent with the turnaround expected in world economic activity (Central Bank of Chile; Latin Focus 2002; U.S Embassy Santiago 2002).

**Table 4: Macroeconomic Indicators**

<b>Indicator</b>	<b>Total GDP current (millions USD)</b>	<b>GDP growth annual (%)</b>	<b>Inflation annual variation (%)</b>	<b>Unempl oyment (%)</b>	<b>Exchange Rate (CLP/US) (millions USD)</b>
1990	30.3	3.7		7.4	335
1991	34.7	8		7.1	372
1992	41.9	12.3		6.2	380
1993	44.5	7		6.4	426
1994	50.9	5.7		7.8	402
1995	65.2	10.6		6.6	409
1996	68.6	7.4	6.6	5.4	422
1997	75.3	7.6	6	5.3	438
1998	73.1	3.7	4.7	7.2	474
1999	67.7	-1.1	2.3	8.9	528
2000	71.3	4.4	4.5	8.3	573
2001	64.9 (est)	2.8	2.6	9 est.	656
2002	64.3 (est)	1.5 (Feb 2)	2.5 (Apr-2)	8 est.	649 (Apr 2)

Source: World Development Indicators Database, Latin Focus Consensus Forecast, IMF

### 3.3.2 Inflation

The Central Bank orients monetary policy on core inflation (excluding volatile oil prices). However, led by the U.S. Federal Reserve Board, monetary authorities around the world have embarked on an aggressive campaign to provide financial markets with abundant liquidity in the short-term. This attitude should prevail as Central Banks try to mitigate the detrimental impact of the U.S. attacks. The Central Bank of Chile lowered its benchmark rate considerably in 2001 and was abstaining from tightening again, despite the significant rise in inflationary pressures of the recent past. Officials were maintaining a “wait and see” stance and were contemplating lowering rates further depending on the damage to the Chilean economy. However, due to the growth prospects and a more stable exchange rate, inflation should reach 3.0% by late 2002 and 2.6% towards the end of 2003 (Central Bank of Chile 2002; Latin Focus 2001).

### 3.3.3 Unemployment

Despite the growth in economic activity in 2000 and early 2001, unemployment remained high. As of 2001, the seasonally adjusted unemployment rate stood at 9.0%, compared with 7.2% in 1998 (Table 4). The persistence of high unemployment may reflect a number of cyclical, structural, and institutional factors. Unemployment is predicted to decline steadily toward the end of 2002 and the outlook for employment remains one of moderate growth. Reducing unemployment will also depend on the application of new labor legislation not removing the flexibility from the market and discouraging hiring. Employment trends remain in line with controlled inflationary pressures (Central Bank of Chile 2002; International Monetary Fund 2001).

### 3.3.4 Exchange Rate

With liberalization of the exchange rate, the value of the Chilean peso (CLP) is determined by variables related to the stock market, arbitrage rates, indexed U.S. bond and Chile's sovereign debt. Since this regime was established, fluctuations in the exchange rate have changed over time, which seems appropriate when exchange rate is the main correction variable in the face of instability in the world economy (Table 4). However, the stability of other variables relevant to financial markets, such as sovereign spread and domestic interest rates, show the strength of this exchange and monetary policy, despite the fluctuations affecting international markets (Central Bank of Chile 2002).

### 3.3.5 Credit and Investment

Chile's credit rating remains the best in Latin America. It was ranked "A" by Standard & Poor's for long-term foreign currency and "AA" for long-term local currency despite the lack of confidence in emerging markets (resulting from the successive Asian, Russian, and Brazilian financial crises of the late 1990s). Since Chile first received an investment-grade rating in 1992, domestic firms have raised funds abroad by borrowing, selling bonds, and issuing stock. Chilean firms attract a substantial amount of internal investment with about \$28 billion of foreign investment entering the country since 1995. Also, because the majority of it is direct investment, it is not likely to flee the country for any temporary setbacks (U.S. Embassy Santiago 2002).

### 3.3.6 Fiscal Deficit

The difference between government spending and revenues or fiscal balance was a surplus of 0.5% for 2001 through September, but closed the year with a deficit of 0.3%. The fiscal policy was expected to be mildly expansive and a deficit of 0.6% was predicted assuming the price of copper and the growth in GDP would be as expected (Table 5) (Central Bank of Chile 2002; Latin Focus 2002).

**Table 5: Fiscal Balance**

	1997	1998	1999	2000	2001
<b>Fiscal Balance (%GDP)</b>	3.3	-0.3	-1.5	0.1	-0.3

### 3.3.7 Current Account Deficits

The balance of trade for 2001 posted a surplus, mainly due to the low level of imports, which reached the lowest point for the year. With this result, the annual balance reached USD 1.55 billion, which was slightly more than 2000, but based on lower exports and imports (Table 6). This figure was more favorable than forecasted in September because of fewer purchases abroad. At the close of 2001, the current account deficit had reached USD 1.025 billion or 1.6% of GDP (Central Bank of Chile 2002).

The deficit in the current account was expected to fall in 2002 because of lower net outflows in interest and profits as well as non-financial services. However, the balance of trade is expected to be slightly higher than 2001 (Central Bank of Chile 2002).



**Table 6: Balance of payments**

	<b>1997</b> <b>(millions</b> <b>USD)</b>	<b>1998</b> <b>(millions</b> <b>USD)</b>	<b>1999</b> <b>(millions</b> <b>USD)</b>	<b>2000</b> <b>(millions</b> <b>USD)</b>	<b>2001</b> <b>(millions</b> <b>USD)</b>	<b>2002</b> <b>(millions</b> <b>USD)</b>
<b>Trade balance</b>	-1,295	-2,435	1,664	1,436	1,025	1,651 (mar-02)
<b>Exports</b>	16,663	14,830	15,616	18,158	17,440	16,845 (mar-02)
<b>Imports</b>	18,220	17,346	13,951	16,722	15,877	15,194 (mar-02)
<b>Current account balance</b>	-3,728	-4,144	-78	-989	-903	
<b>Current account balance</b> <b>(% GDP)</b>	-4.5	-5.2	-0.1	-1.3	-1.4	
<b>External debt</b>	26,775	31,691	34,167	36,849	37,790	37,409 (mar-02)
<b>External debt (% GDP)</b>	32.2	39.9	46.8	49.2	56.9	

Source: Latin Focus; Central Bank of Chile

### 3.4 LEADING ECONOMIC SECTORS

The Chilean economy has, since the early 20th century, been dominated by the production of copper. Since the 1940s the industrial sector has expanded rapidly, largely due to government efforts at diversification. In the 1970s efforts were made to boost the output of the neglected agricultural sector and to reduce the country's dependence on imported food, and after a slow down in the production of major crops in the early 1980s, agricultural output improved later in the decade. Since the socialist administration was violently overthrown in 1973, the government has played a less dominant role in the economy and most nationalized companies have been returned to private ownership (Encarta 2001).

Today Chile is one of the leading industrial nations in Latin America as well as one of its largest mineral producers. Agriculture, forestry, fishing, mining, and manufacturing are the leading economic sectors. Chile has diversified the product mix of exports over time with dependency on copper gradually declining, but no real structural change has occurred (Table 7) (Central Bank of Chile 2002).

**Table 7: Exports by Sectors of Economic Activity**

<b>Sector</b>	<b>1990</b> <b>(%)</b>	<b>2000</b> <b>(%)</b>
Mining	54.7	46.4
Non-traditional	24.7	38.0
Manufacturing	11.2	11.5
Agriculture	9.4	8.6

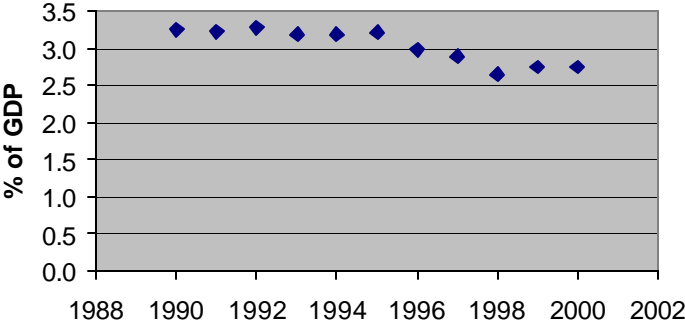
#### 3.4.1 Agriculture

Some 14% of the labor force of Chile is engaged in agriculture, forestry, and fishing, and this sector accounts for about 7% of the GDP. Except for sheep raising, conducted in the far south, the bulk of Chile's agricultural activity is concentrated in the Central Valley. Since the 1960s agrarian land-reform programs have been instrumental in increasing the number of small landowners, and modern farming methods have increased productivity. While only 3% of Chile's land area is currently under cultivation, agricultural production doubled from the early 1980s to the mid 1990s. Chile exports more than twice the amount of agricultural products it imports (Dickey 2001; Microsoft Encarta 1997-2001).

While the share of land devoted to export crops such as fruit and vegetables is increasing, about half of all farms still raise wheat, the traditional foundation of Chilean agriculture. Leading crops in 1999, with production in metric tons, included fruits, particularly grapes and apples (1.5 million), vegetables (2.5 million), root crops such as sugar beets and potatoes (837,000), and maize (787,500). Chile is the Southern Hemisphere's largest exporter of fruits, sending much of its crop to North America, where the fresh produce enjoys a market advantage due to the inverted growing season. The country also has an important wine making industry. Sheep are raised in large numbers in Tierra del Fuego and the Magallanes regions of Chilean Patagonia. As a whole, the country had about 4.1 million head of sheep in 1999, with a wool output of 15,300 metric tons. Other livestock included 4.1 million cattle, 2.2 million pigs, and 590,000 horses (Dickey 2001; Microsoft Encarta 1997-2001).

**3.4.2 Forestry and Fishing**

Forests cover 23% of Chile's land area. Some 24.4 million m<sup>3</sup> of timber was harvested in 2000 for industrial use. This output consists of both hardwoods and softwoods. Targeted for investment since the mid 1970s, the forestry industry accounted for more than 6% of annual exports by the early 1990s and accounts for about 3% of the GDP. Although forestry's contribution to GDP has increased, its percentage of the increasing GDP has decreased slightly in recent years (INFOR 2001; Encarta 2001).



**Figure 3: Forestry % of GDP**

Chile has one of the largest fishing industries in South America. Fishing accounted for about 1.7% of the GDP in 2000. The industry is composed of more than 70 companies, employs over 40,000 workers, and is mainly located in regions X-XII. Aquaculture is conducted in 234 coastal concessions for which the companies pay user fees to the government. Salmon and trout (Salmonid) production are the major components of Chile's edible fisheries sector. Exports were valued at USD 973 million in 2000, representing 5.4% of the total export revenue. Fresh and chilled salmon were exported to more than 100 countries. A further expansion was expected in 2001 and 2002 as total Chilean aquicultural output was expected to continue to grow based on development and growth of salmon, trout and new species like turbot. Exports of value-added salmon and trout products are expected to expand at a faster rate than whole eviscerated salmon. The export share of these products has increased from 29% in 1995 to over 56% of the total export value in 2000. With the exception of promotional activities, the Chilean government plays virtually no role in salmon and trout production and exports. ProChile is the export promotion agency and they support promotional campaigns mainly in the Far East. Chile's national fisheries service (Sernapesca) is currently reviewing new information from the USDA's Animal and Plant Health Inspection Service (APHIS) which is expected to result in recognition of U.S. salmon egg production areas as free of infectious salmonid anemia (ISA) and allow for free market access for shipments of U.S. salmon eggs this season (Hennicke 2001; INFOR 2001).

### 3.4.3 Mining

Mining is the most important economic sector in Chile, although the mineral component of exports is decreasing due to gains in other economic sectors. Chile is rich in mineral resources because of the size of the deposits rather than because of the diversity of minerals. Copper is by far the most important mineral, but others include nitrates, iron ore, coal, molybdenum, manganese, petroleum and natural gas, silver, and gold. Mining comprises 8% of Chile's GDP, 48% of exports, and is expected to grow 5% annually through 2005. The mining sector, with annual production exceeding USD 8 billion (mostly exported), should continue to lead Chilean industry because of foreign and domestic investment in projected new mines and modernization and expansion of existing ones. Chile has some of the world's largest known copper deposits and is the world's leading producer of this metal. Copper accounts for nearly 40% of all annual exports by value. CODELCO is the world's largest producer of copper (Dickey 2001; Microsoft Encarta 1997-2001).

### 3.4.4 Manufacturing

The manufacturing sector (along with mining and construction) contributes 30% of Chile's annual national output. Manufacturing is largely based on the refining and processing of the country's mineral, agricultural, and forestry resources. Chile is a major South American producer of steel, with an annual output in the early 1990s of some 336,700 metric tons of ingots. Copper is also refined, and the several oil refineries use both domestic and imported petroleum. Other important manufactures include food products, cement, pulp and paper products, textiles (cotton, wool, and synthetics), tobacco products, glass, chemicals, refined sugar, and electronic equipment. The assembly of automobiles is also important. The bulk of the country's manufacturing industry is located near Santiago and Valparaíso. Concepción is the other major industrial center (Dickey 2001; Microsoft Encarta 1997-2001).

### 3.4.5 Leading Sectors for Exports and Investments

Chile is extremely open to investment and the Country Commercial Guide listed Chile's best prospects for exporting and investment for 2002 based on size and market growth (U.S. Embassy Santiago 2002).

**Table 8: Chile's Most Promising Sectors for Investment**

<b>Non-agricultural goods</b>	<b>Agricultural goods</b>
1. Pollution control	1. Corn
2. Computer equipment	2. Wheat
3. Telecom equipment	3. Corn gluten feed
4. Travel and tourism	4. Forage seeds
5. Franchising	5. Pet food
6. Medical equipment	6. Soy protein isolates and concentrates
7. Food and processing equipment	7. Oak staves for wine barrels
8. Plastics mach. & resins	8. Candy
9. Construction equipment	9. Processed cheese
10. Electric power equipment	10. Condiments
11. Air cond. & refrigeration	11. Snack foods
12. Security equipment	12. Nutritional sport bars
	13. Frozen dinner entrees
	14. Edible nuts

### 3.5 FOREIGN TRADE

In 2001, annual exports were valued at USD 17.4 billion (Table 6). Metals and mineral ores typically constitute nearly half of the export total (Table 7). Other important exports include fruits and vegetables, wood pulp and paper products, and chemicals. In 2001, imports were valued at USD 16.7 billion. Principal imports are machinery and transportation equipment, electric equipment, mineral products, and chemicals. Chile's chief trading partners for exports are the EU, U.S., Japan, Brazil, and Argentina. Principal sources for imports are the U.S., EU, Argentina, Brazil, and Japan (Table 9) (Chile Foreign Investment Committee 2001).

**Table 9: Chile's major trading partners in 2000**

<b>Export Partners</b>	<b>% of exports</b>	<b>Import Partner</b>	<b>% of imports</b>
EU	27	U.S.	24
U.S.	16	EU	23
Japan	14	Argentina	11
Brazil	6	Brazil	6
Argentina	5	Japan	6

Chile's reliance on exports and its desire for market diversification have led it to seek opportunities to expand several current or potential markets and by the 1990s Chile's economy was one of the strongest in South America, earning invitations to join the Asia-Pacific Economic Cooperation (APEC) forum, the Latin American Integration Association (LAIA), and the North American Free Trade Agreement (NAFTA). Chile also became an associate member of MERCOSUR. Approval of Chile's NAFTA membership was held up in 1995 and 1996 by resistance in the U.S. Congress, but they have expressed interest in becoming a full member. It remains an active participant in the negotiation of the Free Trade Area of the Americas (FTAA). In the U.S.-Chile trade talks, Chile agreed to eliminate tariffs on U.S. paper and wood products in September of 2001. The governments aimed to conclude the negotiations by year end, however, negotiations were held up principally by U.S. negotiators' reluctance to tackle sensitive agricultural, environmental, and labor issues and to stall the passage of trade promotion authority (TPA). TPA would give the U.S. President the ability to negotiate bilateral trade agreements that could then be approved or rejected by the Congress, but not amended. The 11<sup>th</sup> round of FTA negotiations began in April 2002 in Santiago. Chile has signed free trade agreements with Mexico and Canada and bilateral trade agreements with all countries within the Andean Pact (Bolivia, Venezuela, Colombia, Ecuador, Peru), MERCOSUR countries, and Central America. Chile and the EU started negotiating a new free trade agreement during the second half of 2000 and reached a tentative, USD 7.7 billion free trade agreement in April 2002 (Chile Foreign Investment Committee 2001; Santiago Times 2002 (April 9, April 29, May 16)).

### 3.6 ECONOMIC OUTLOOK

Looking ahead, Chile is well positioned to resume a trend of higher economic growth driven in the short-term by the improvements in the global economy and a local policy mix that is demand supportive. The successful completion of the free trade agreements with the EU and being in the process of negotiating with the United States should also contribute to the resumption of economic growth and send a positive signal to other developing countries. In the medium-term, the economy is expected to reap the gains of the recent reforms in the domestic capital markets, which should essentially complete the process of financial integration with the rest of the world and increase efficiency in the mobilization of savings and investment (International Monetary Fund 2002). However, some question the long-term sustainability of this neo-liberal, export-based development model that has increased environmental exploitation and the acceleration of resource extraction in all primary sectors. While there has been a diversification of exports, there has not been a substantial change in the export structure, which still consists of 90% natural resources and very basic manufacturing levels. There are also very high inequalities in income distribution where high income classes profit disproportionately to other classes (Giljum 2002).



## 4.0 CHILE'S FOREIGN INVESTMENT POLICY

### 4.1 DOING BUSINESS AND INVESTING IN CHILE

A key feature of the Chilean government's development strategy is a welcoming attitude towards foreign investors, personified in the country's 1974 foreign investment statute, known as D.L. (Decree Law) 600. Under D.L. 600, investors sign standardized contracts with the government of Chile. The contracts give investors the right:

- to receive non-discriminatory treatment
- to participate in any form of investment
- to hold assets indefinitely
- to remit or reinvest earnings immediately (and to remit capital after one year)
- to acquire foreign currency at the inter-bank rate of exchange
- to opt for either national tax treatment (under which local firms are taxed at a rate of 35% on fully distributed earnings) or for a guaranteed tax rate (currently set at 42%)

Chile conducts pro-forma screening of foreign direct investment and the law requires that the government's Foreign Investment Committee approve investment proposals. Approval procedures are expeditious and applications are typically approved within a matter of days and almost always within one month. Since 1991, nearly all foreign direct investment in Chile has taken place through D.L. 600, but investors choosing not to use the law may invest via provisions of Chapter XIV of the Central Bank's Foreign Exchange Regulations (U.S. Embassy Santiago 2002; PricewaterhouseCoopers LLP 1999).

Chile's investment statute was recently modified in a series of major economic policy moves. The one-year residency requirement for foreign capital entering Chile under Chapter XIV of the Central Bank's Foreign Exchange Regulations was removed and as of May 2000, this type of investment capital may be repatriated immediately, adding to Chile's open investment climate. The "encaje," or lock-in, which required foreign investors to deposit a variable percentage of foreign-sourced loan funds and portfolio investment with the Central Bank in a non-interest-bearing account for up to two years, was also done away with in April of 2001. Additional reforms eliminated controls on flows of foreign capital into Chilean debt and equity markets and freed outflows associated with capital returns, dividends, and other investments from the need for Central Bank approval (U.S. Embassy Santiago 2002; PricewaterhouseCoopers LLP 1999).

This openness to foreign investment, along with Chile's wealth of natural resources, has led to nearly \$50 billion of new foreign investment since 1974. Foreign investors have purchased many of the assets privatized by the Chilean government over the last decade, and future privatization efforts offer additional opportunities. In these processes, foreign firms compete on an equal basis with domestic firms. The major exception to the government's openness to foreign investment is the fisheries sector. According to 1991 amendments to the navigation law (D.L. 222), vessels fishing in Chile's 200-mile Exclusive Economic Zone (EEZ) must have majority Chilean ownership (although exceptions are made for some distant waters). The law permits bilateral agreements to allow foreign-owned vessels to fish in Chile's EEZ, but no such agreements have been concluded (U.S. Embassy Santiago 2002; PricewaterhouseCoopers LLP 1999).

For anyone potentially interested in investing in Chile, there are a few well-written guides available, such as Ernst & Young, "Doing Business in Chile" (2001), as well as PricewaterhouseCoopers, "Doing Business and Investing in Chile" (1999). These guides highlight tax topics, business law, corporate law, economic structure, bilateral investment treaties, mining, oil, gas, and natural resource laws, industrial development incentives, technology transfer, trademarks, patents, copyrights, and foreign exchange. Also specific investment and concession opportunities offered by the government of Chile can be obtained through the U.S. Commercial Service in Santiago. For official information on investing in Chile, one may contact:

Comite de Inversiones Extranjeras (Foreign Investment Committee)  
Karen Poniachik, Executive Vice President  
Teatinos 120, P. 9, Santiago, Chile  
Tel: (56-2) 698-4254; Fax: (56-2) 698-9476

## **4.2 BARRIERS TO ENTRY**

Chile generally has few barriers to imports or investments, allowing foreign firms to enjoy the same protection and operate under the same conditions as local firms. Certain imported luxury goods such as yachts, some types of jewelry, furs, imported automobiles, certain food items, etc. are also subject to luxury taxes. There are differentiated taxes on alcohol and tobacco products. Imports are subject to the same 18% value-added tax (VAT) as are domestic goods (U.S. Embassy Santiago 2002; PricewaterhouseCoopers LLP 1999).

One of Chile's most important non-tariff barriers is the requirement that all imported livestock products originate in facilities previously inspected by the Chilean Ministry of Agriculture. Import restrictions on fresh fruit are gradually being resolved, with more U.S. products now allowed to enter Chile. Imports of unprocessed U.S. poultry are still prohibited. Chilean grading and quality standards on beef are unique in the world and effectively prohibit imports from the U.S. The difference between corn-fed and grass-fed cattle and subsequent excessive use of antibiotics and hormones in the corn-fed cattle, present some serious health concerns, as well as taste differences. Chile only approves the import of processed food products on a case-by-case basis. There is no blanket approval process for permitting identical products to enter Chile after they have been tested and found in compliance with local health regulations. To enter a product, the importer must obtain the permission of the Health Service Officer at the port of entry, who will take samples and perform the necessary tests. This process raises the overhead cost of introducing new products into the market. Labeling and fortification standards are also unique to Chile's Health Ministry and sufficiently distinct from U.S. standards that some U.S. processed food products must be labeled and/or formulated especially for Chile. These issues are being addressed in bilateral negotiations with the Government of Chile. Chilean law hurts sales of certain other industries. For example, international pharmaceutical companies argue that current law does not provide effective patent protection (U.S. Embassy Santiago 2002; PricewaterhouseCoopers LLP 1999).

## 5.0 CHILE'S FOREST AND PLANTATION RESOURCES

The forest regions of Chile lay in a vertical strip along the Pacific coast south of Santiago in regions IX – XII. The native forests are concentrated in the most southern regions (IX – XII), while plantations are most plentiful in regions VII – IX. Chile is moderately forested with a forest cover of around 23%, while 45% of Chile has soil conducive to forestry. The native forests cover about 13.4 million ha and represent about 17.8% of Chilean territory. Plantations, primarily radiata pine (*Pinus radiata*) and species of the genera *Eucalyptus*, constitute an area close to 2 million ha, equivalent to 2.8% of the national territory (Table 10, Appendix 2) (Corporacion Nacional Forestal (CONAF) 2001; Food and Agriculture Organization of the United Nations Forestry Department 2001).

**Table 10: Forest and Plantation Area in Chile (1995)**

Total Area (thousand ha)						
Land Area						Inland Water
Forest			Other Wooded Land		Other Land	
Closed	Open	Plantation	Shrubs/Trees	Forest Fallow		
12,298	1,133	2,153	14,670	0	44,627	783
16.3%	1.5%	2.8%	19.4%		59.0%	1.0%

Source: FAO, 1995

Many natural resource professionals in the country are very conscious of the need for long-term forestry planning and actively promote sustainable management of natural resources. The law requires foresters to replant following harvest activity and the industry standard is to plant four trees for every one harvested. However, this is mitigated in those mature forests that can accommodate sustainable growth through successful natural regeneration (Food and Agriculture Organization of the United Nations Forestry Department 2001 Continental Pacific LLC 2001).

With a Mediterranean climate and a long dry season, Chile's single forest fire season normally occurs between October and April, with a period of maximum activity between December and February. On average, some 5,200 forest fires are recorded each season. The majority is in Region IV (approximately 500 km north of Santiago) to Region X (city of Puerto Montt). Further north, vegetation is scarce or non-existent in the Atacama Desert. In the southern Regions XI and XII (Coyhaique and Punta Arenas cities), the abundant moisture and low population density (fewer than 0.7 inhabitants per square kilometer) protect the lush, humid temperate native forests from fires. Fires affect an average of 52,400 ha each season, destroying mainly native vegetation (95.7%). This vegetation is composed principally of pasturelands, scrubland, shrubs, and, to a lesser degree, plantations. The average size of fires has dropped from 38.2 ha in the 1960s and 1970s to around 9.1 ha in the 1990's. There are fewer large fires - 87.1% of the fires are less than 5.0 ha and 92.4% are under 10.0 ha (Food and Agriculture Organization of the United Nations Forestry Department 2001).



Although, not a major topic of this paper, the urban forests of Chile are quite impressive. Santiago has one of the world's largest urban parks. Parque Metropolitano covers 712 ha and includes mostly San Cristobal, Chacarillas, Piramide hills and the Santiago Forest. The city is covered with large street trees and parks and the city has wisely left the riverside vegetated and devoted to recreation. Most steep areas within the city are forested, which greatly reduces erosion and mudslides. Although Santiago still has horrible air pollution due to the inversion created by its geography, the immense urban forest is making significant contributions to the air quality. Most of the high-rise buildings have plants streaming off the balconies and balcony garden books can be found in almost all of the bookstores. Urban forests make an enormous economic contribution by, among other things, serving the purpose of infrastructure that would otherwise need to be built. They stabilize the soil, improve air quality, provide shade, control the air temperature and wind speed, abate noise, manage storm water, conserve energy, provide an aesthetically pleasing environment, improve the health and well being of city inhabitants, and generally make the city a desirable place to live and do business – an essential natural asset to Chile.

## 5.1 FOREST COVER

The FAO estimates of forest cover in 2000 and the annual change rate between 1990 and 2000 (Table 11) are based on an examination of inventory reports and other documents and are part of the results from the Global Forest Resources Assessment 2000. Only native adult productive forests were used to estimate (using linear extrapolation) the deforestation rate resulting in -0.13% per year, this annual deforestation rate was also used for the estimation for the whole native forest area reported on the National Forestry Catastro of 1995 (which includes all forest classes). Before 1995, Chile used to report only dense mature and productive forest area, but 1995's National Forest Catastro includes all forest types, which significantly modifies the statistics of forest cover (i.e. up to 1993 the reported forest cover was less than 8000,000 ha, but on the last forest Catastro the total area reported as forest is more than 13,500,000 ha). However, Chile is also one of the most active countries in Latin America in planting trees averaging, 85,000 ha/year, which helps to compensate for the trees lost from the harvesting of natural forests, but not the forest ecosystems (Food and Agriculture Organization of the United Nations Forestry Department 2001).

**Table 11: Estimated Forest Cover and Annual Rate of Change (2000)**

	Land area '000 ha	Forest Cover 2000 '000 ha	Forest Cover Change 1990-2000		Distribution of land cover/use %		
			'000 ha/year	%/ year	Forest	Other Wooded Land	Other land
<b>Chile</b>	74,880	15,536	-20	-.13	20.7	19.6	59.6
<b>South America</b>	1,753,520	885,618	-3,711	-.41	50.5	3.9	43.0
<b>World</b>	13,139,618	3,869,453	-9319	-.24	29.4	11.2	58.6

Source: FAO

## 5.2 NATIVE FOREST RESOURCES

Within Chile's unique landscape, nature has produced some of the world's most impressive forests. Twelve "types" of natural forest occur in Chile, which cover approximately 13 million ha or 17.8% (Table 12 and 13). While area and regional distribution of native forests are readily available, there is not much data on age distribution, yearly plantings, and harvest projection data. All native forests are managed on the basis of rules and regulations adopted for each type. The most extensive areas of natural forest are the temperate southern beech (*Nothofagus* spp.) rainforests (comprising six distinct forest types). These are found in southern Chile including Tierra del Fuego. Smaller areas of araucaria (*Araucaria araucana*) and alerce (*Fitzroya cupressoides*) forest are protected (at least in law). The giant alerce or "redwood of the Andes" is recognized as one of the largest trees in the world and is the second longest-lived tree known to botanists (the bristlecone pine of California is the oldest). Chile has a National System of Protected Wildlands (SNASPE) with 31 national parks, 48 national reserves, and 15 national monuments covering almost 20% of the land area (about 14 million ha). However, both the forest type representation and the reserve size in many regions is inadequate. The majority of protected areas are in regions XI and XII, leaving most of the country unprotected. Because the majority of forestland is privately owned and the government has limited resources to purchase this expensive forestland, active participation from the private sector in the conservation of native forests is needed in addition to SNASPE (Food and Agriculture Organization of the United Nations Forestry Department 2001; Neira et al. 2002; Wilcox 1996).

The 12 native forest types and their associated tree species from north to south:

1. **Esclerofilo (Sclerophyllous):** Espino (*Acacia caven*), quillay (*Quillaja saponaria*), maitén (*Maytenus boaria*), trevo (*Trevoa trinervis*), guayacán (*Porliera chilensis*), and algarrobo (*Propopis alba*)
2. **Palma Chilena (Chilean Palm):** Chilean palm (*Jubaea chilensis*) with litre (*Litrea caustica*), peumo (*Criptocarya alba*), boldo (*Peumus boldo*), maitén, and espino
3. **Roble – Hualo:** Roble (*Nothofagus obliqua*), hualo (*Nothofagus glauca*), peumo, maitén, quillay, litre, avellano (*Gevuina avellana*), and radial (*Lomatia hirsuta*)
4. **Ciprés de la Cordillera (Cordilleran Cypress):** Cordilleran cypress (*Austrocedrus chilensis*), peumo, boldo, maitén, and quillay
5. **Roble-Raulí-Coigue:** Roble, raulí (*Nothofagus alpina*), and coigue (*Nothofagus dombeyi*). These are mainly secondary forests or a mix of these three species with luma (*Amomyrtus luma*) and arrayán (*Luma apiculata*)
6. **Lenga:** Coigue, roble, araucaria (*Araucaria araucana*), ñirre (*Nothofagus antarctica*), and Magellanic coihue (*Nothofagus betuloides*)
7. **Araucaria:** Araucaria, coigue, roble, ñirre, canelo (*Drimys winteri*), and lenga (*Nothofagus pumilio*)
8. **Coigue-Raulí-Tepa:** Coigue, raulí, tepa (*Laureliopsis philippiana*), trevo, and olivillo (*Aextoxicon punctatum*)
9. **Siempreverde (Evergreen):** Tepa, luma, canelo, and tineo (*Weinmannia trichosperma*)
10. **Alerce:** Alerce (*Fitzroya cupressoides*), Magellanic coihue, Chiloé coigue (*Nothofagus nitida*), prickly-leafed mañío (*Podocarpus nubigena*), tineo, and Guaitecas cypress (*Pilgerodendron uviferum*)
11. **Ciprés de las Guaitecas (Guaitecas Cypress):** Guaitecas cypress, Chiloé coigue, prickly-leafed mañío.
12. **Coigue de Magallances (Magellanic Coihue):** Lenga, tineo, prickly-leafed mañío, Magellanic coihue, and Guaitecas cypress.

**Table 12: Native Forest Types by Area (minus Palma Chilena)**

Forest type	Hectares	Share of total percent
Alerce	246,993	1.8
Cipres de las Guaitecas	972,181	7.2
Araucaria	253,715	1.9
Cipres de la Cordillera	45,079	0.3
Lenga	3,400,346	25.3
Coihue de Magallanes	1,801,637	13.4
Roble-Hualo	184,783	1.5
Roble-Rauli-Coihue	1,370,218	10.2
Coihue-Rauli-Tepa	456,919	3.5
Esclerofilo	342,631	2.5
Siempreverde	4,350,814	32.4
<b>TOTAL</b>	<b>13,443,316</b>	<b>100.0</b>

Source: CONAF - CONAMA 1997

**Table 13: Regional Distribution of Native Forest**

Region	Area (ha)	% of Region	% of National
I Tarapaca	7,682	.13	.06
II Antofagasta	0	0.00	0.00
III Atacama	0	0.00	0.00
IV De Coquimbo	1,377	.03	.01
V Valparaiso	94,008	5.88	.70
R.M. Santiago	93,345	6.04	.69
VI Libertador Bernardo O'Higgins	117,798	7.35	.88
VII Maule	369,708	12.19	2.75
VIII Bio Bio	785,766	21.19	5.86
IX Araucania	907,521	28.52	6.76
X Los Lagos	3,610,314	53.96	26.90
XI Aysen del General Carolos Ibanez del Campo	4,830,743	43.90	36.00
XII Magallanes y Antartica Chilena	2,625,054	19.93	19.56
<b>TOTAL</b>	<b>13,443,316</b>	<b>17.80</b>	<b>100.00</b>

Source: CONAF - CONAMA 1997

On a global level, Chile's native forests make major contributions to biodiversity, size and life-span of tree species, endemism, level of productivity, biomass, carbon storage and sequestration, climate regulation, ecological and evolutionary value, as well as being a fundamental component of the natural landscape which is vital for wildlife habitat and the continued development of a tourist industry. These assets plus the timber and non-timber forest products, fuelwood, watershed protection, soil stabilization, and maintenance of hydrological and nutrient cycles the forests provide are extremely crucial on the local level. The World Wildlife Fund has listed Chile's temperate forests as one of the top conservation priority forest regions in the Southern Hemisphere. Conservation International and the World Conservation Union have identified Chile's forests as one of the 25 hot spots for biodiversity conservation in the world (Neira et al. 2002).

The original extent of natural forest in Chile is uncertain, but has been estimated at close to 30 million ha. Like most forested regions of the world, clearing for agriculture and settlement began hundreds and even thousands of years ago. These forests were reduced by 20% between 1540 and 1900, an era encompassing colonization by Spain and later settlement by other Europeans. The native forest shrank by another third or more this century to its present area of about 13 million ha. It is estimated that less than 45% of the current forest cover remains as mature native forest. Current losses are estimated to be in the range of 120,000 to 200,000 ha each year, much of it involving conversions to non-native plantations and, even though the government has specific forest protection and management laws, they are only partially implemented (Neira et al. 2002; Wilcox 1996).

High-grading and forest clearing followed by substitution with exotic species are believed to be the two most significant disturbances affecting native forests. High-grading is the more common of the two and while it does not cause a huge reduction in the total area of native forests, it does cause severe degradation by altering forest structure and composition, as only the largest, healthiest trees of commercial species are removed. The replacement of native forests with non-native plantations is far more destructive. This involves clearing all existing vegetation and is the primary cause, in terms of impact, of often irreversible, native forest destruction and fragmentation. However, high-grading quite often progresses in the clearing of the resultant degraded forests and their replacement with plantations (Neira et al. 2002; Wilcox 1996).

Fire and fuelwood collection also cause significant disturbance to the native forests. Around 15 million cubic meters of fuelwood are harvested in Chile each year, although 50% of this is from non-native species. Surprisingly, urban and rural populations are each responsible for about 47% of fuel-wood demand while the balance is used for commercial and industrial purposes. Before the wood chip industry boom, over 80% of the annual volume cut from forests was for fuelwood or wood-charcoal production. This logging occurs in part because there are many landless and impoverished villagers without alternative fuel sources, but also in part because fuelwood production is a profitable business as wood provides a major source of energy for industrial plants as well as private households (Wilcox 1996; Marchak 1995).

### 5.3 PLANTATION RESOURCES

Chile is also notable for its extensive plantation estate covering almost 2 million ha. *Pinus radiata* comprises approximately 76% of the plantations, *Eucalyptus* species another 17%, and other broadleaved species about 7% (Tables 14 and 15) (Food and Agriculture Organization of the United Nations Forestry Department 2001).

The forest industry in Chile is expected to double over the next four years. The number of hectares projected to be forested in four years far exceeds what exists today. Chile is about the only forest product exporter that can make such a claim. As the United States and other countries face higher restrictions, Chile is poised to meet future demand for pulp and other forest products (Continental Pacific LLC 2001).

**Table 14: Plantation Area by Species Groups**

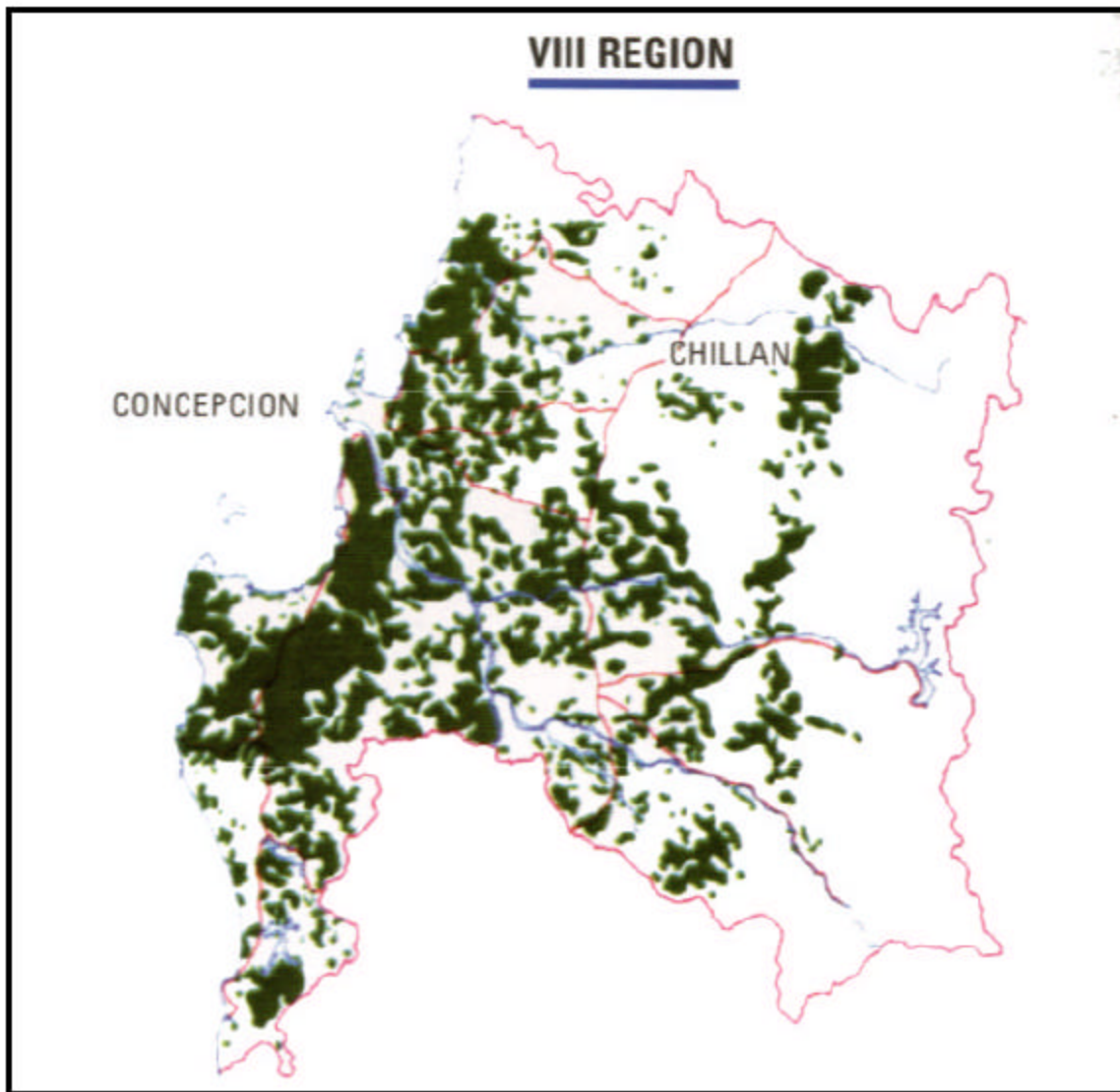
Species Group	Area	
	ha	%
Radiata pine ( <i>Pinus radiata</i> )	1,420,015	75.5
Eucalyptus ( <i>Eucalyptus</i> spp.)	317,015	16.9
Tamarugo ( <i>Prosopis tamarugo</i> )	20,632	2.6
Atriplex ( <i>Chenopodiaceae atriplex</i> )	49,320	1.1
Pino Oregon ( <i>Pseudotsuga menziesii</i> )	12,620	0.7
Alamo ( <i>Plantanus chiapensis</i> )	4,114	0.2
Other species	58,001	3.0
<b>TOTAL</b>	<b>1,881,925</b>	<b>100.0</b>

Source: FAO

**Table 15: Plantation Area by Region**

<b>Region</b>	<b>Total</b>	<b>Radiata Pine</b>	<b>Eucalyptus</b>	<b>Other Species</b>
<b>Total</b>	1,835,985	1,387,041	308,762	140,182
<b>I</b>	24,491	-	178	24,313
<b>II</b>	602	-	1	601
<b>III</b>	1,723	1	829	893
<b>IV</b>	54,695	655	2,143	51,897
<b>V</b>	56,672	15,583	35,856	5,233
<b>R.M.</b>	12,659	1,001	9,927	1,731
<b>VI</b>	84,024	59,715	22,022	2,307
<b>VII</b>	347,349	326,422	16,400	4,527
<b>VIII</b>	761,916	642,705	111,228	7,983
<b>IX</b>	302,840	224,672	67,994	10,174
<b>X</b>	166,403	116,017	42,204	8,182
<b>XI</b>	22,561	-	-	22,561
<b>XII</b>	50	-	-	50

Source: INFOR



**Figure 4: Plantation Distribution in Region VIII**

*Source:* Directorio Forestal de Chile

In 2000, the total planted area did not increase much compared to the early nineties figures (Table 16). Lands are still available, but most of the deforested lands located in areas that are suitable for developing plantations are distributed among hundreds of thousands of small property owners, many of whom have problems with the legal titles to their lands. Even so, it is estimated that there are about 2.5 million ha still to be forested. Planting costs vary from region to region with the terrain and the density. Planting usually ranges from 400-1600 trees per ha, depending on the regime desired (Hennicke 2001; Trade and Media Services Ltd. 2000).

Radiata pine matures in about 20-24 years in Chile and thinnings are available for use after about 15 years. However, this rapid growth produces lower density wood. The best growth conditions for radiata pine exist between Constitución in Region VII and Valdivia in Region X where annual growth rates are usually higher than 25 m<sup>3</sup>/ha. Radiata pine can reach heights of approximately 40 m and grows about 1.5-3 cm in diameter per year (Table 18) (Hennicke 2001; Trade and Media Services Ltd. 2000).

Eucalyptus is the second largest tree species planted in Chile and its planting has increased at a more rapid pace than radiata pine in the last few years. Eucalyptus products command higher prices and they can be harvested even sooner than radiata (10-15 years) and its growth potential can reach 30 m<sup>3</sup> per ha/year. As of December 2000, over 358,000 ha of eucalyptus were planted (Hennicke 2001).

**Table 16: Yearly Plantings including forestation and reforestation, but not natural regeneration**

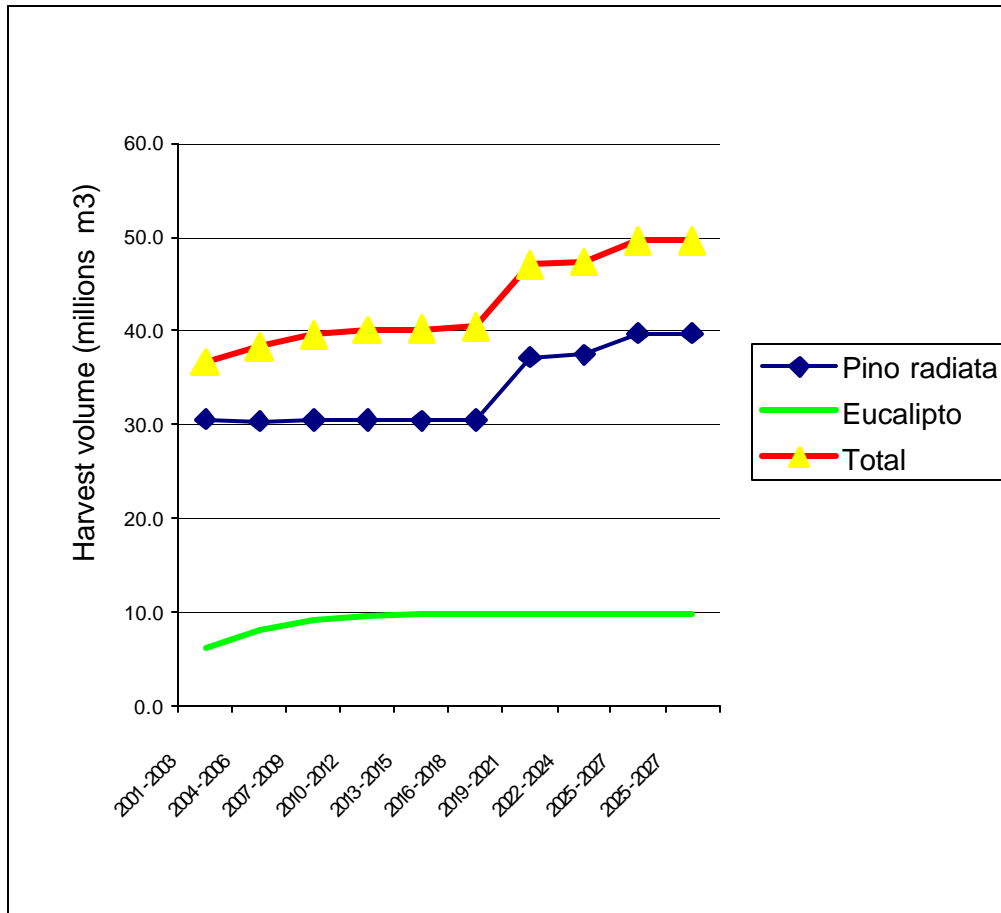
<b>Period</b>	<b>Total (thousands of ha)</b>	<b>Forestation (thousands of ha)</b>
1950-59	13.1	
1960-69	19.2	
1970-79	72.4	
1980-89	79.1	
1990	94	32
1991	117	38
1992	130	42
1993	125	44
1994	110	48
1995	100	55
1996	79	51
1997	79	30
1998	87	21
1999	108	39
2000	102	44

Source: Cerda, INFOR

**Table 17: Radiata pine age distribution**

<b>Age in Years</b>	<b>1965 (ha)</b>	<b>1980 (ha)</b>	<b>1990 (ha)</b>	<b>2000 (ha)</b>
0-5	19,663	303,994	325,626	433,861
6-10	52,612	192,220	344,426	276,435
11-15	86,233	76,959	396,240	319,025
16-20	69,858	51,974	142,772	297,982
21-25	27,003	44,655	40,307	120,231
26-30	4,395	33,898	10,363	17,742
≥ 31	921	13,239	9,365	8,841

Source: INFOR



**Figure 5: Future Available Harvest**  
 Source: Cerda, INFOR



**Table 18: Radiata pine annual growth rates**

Region	Class of Site	Site Index	Volume Increase (m <sup>3</sup> /ha/year)
VII	I	28	25.3
	II	24	23.5
	III	20	21.7
VIII	I	32	31.6
	II	28	27.1
	III	24	22.7
VII	I	20	18.1
	II	16	14.3
	III	12	10.7

**Table 19: Approximate Planting Cost for Chile's Central Region by levels of planting**

	Low (USD)	Average (USD)	High (USD)
Natives	422	376	632
Exotics	158	232	375

### 5.3.1 Advantages/Disadvantages of Plantations

In general plantations can provide extremely fast growth rates and streamline production. They can be environmentally beneficial for the environment if they are not growing at the expense of native plant communities, but rather at the expense of previously eroded land. Plantations sequester carbon, improve water retention, reduce erosion, and increase the amenity value of degraded hills and plains and the availability of plantations reduces the demands for wood products and firewood from native forests.

While plantations have undeniably produced substantial economic benefits, they also present potential problems. Plantations are not forests. They are agricultural crops, seeded entirely for commercial purposes. They are not habitats for wild flora and fauna and they often displace such habitats. They displace other vegetation that are or may be vital to the balance of all ecosystems. The species used are generally exotic and planted in monocultures and while the initial planting may be free of natural pests and diseases that situation will not last and plantation regions may not be in the position to combat scourges yet to arrive increasing both financial and environmental risk for the industry. Pest outbreaks, fire or fluctuating markets could hit a plantation owner particularly hard because plantations are not diversified. The trend towards monoculture requires external inputs, develops a very limited range of uses and few users (generally a single large firm) - all leading to social and environmental losses and being targeted by environmental groups.

While the slow growth rate of native hardwood species is a serious economic concern, the replacement of primary forest by plantations leads to a loss of benefits specifically associated with primary forests, which plantations cannot replace. Plantations typically have sparse canopies and so do not protect the land as well as native communities. Of concern to long-term sustainability are the size and life-span of tree species, endemism, level of productivity, biomass, biodiversity (including the genetic reservoir), carbon storage and sequestration, ecological and evolutionary value, as well as being a fundamental component of the natural landscape which is vital for wildlife habitat and the continued development of a tourist industry. These assets plus the timber and non-timber forest products, fuel wood, watershed protection, climate and soil stabilization, and maintenance of hydrological and nutrient cycles the forests provide are extremely crucial (Neira et al. 2002).

In addition, there are social impacts on local and indigenous populations who often see their traditional forms of ownership impaired by displacing “campesino” and indigenous forest and farming practices. The impositions of northern agroindustrial and monoculture technologies have brought unparalleled ecological, cultural, social, and economic harm to indigenous and traditional farmers in the past. Included in these losses are the loss of vast reservoirs of agrobiodiversity sustained by traditional “seed savers”. These localized agroecological practices were in many places ecologically sustainable not because they respected the limits of carrying capacity of the land, but because they mimicked the complexity and diversity of the ecosystem (Shiva 1992). Agroecosystems tend toward maturity – passing from a less complex to a more complex state. This directional change is inhibited in monoculture agriculture characterized by low diversity and low maturity. Succession is radically changed with monoculture. Plantations usually represent secondary successional stages where an existing community is disrupted by deforestation and by maintaining a simple, man-made community at the site. Tendency toward complexity must be detained using agrochemical inputs, resulting in an artificial ecosystem that requires constant human intervention. Commercial seedbed preparation and mechanized planting replacing natural methods of seed dispersal; chemical pesticides replacing natural controls on populations of weeds, insects and pathogens; genetic manipulation replacing natural processes of plant evolution and selection; and altered decomposition (since plant growth is harvested and soil fertility maintained not through nutrient cycling, but with fertilizers). Although capable of supporting market demand, sufficient evidence shows that the ecological equilibrium in such artificial systems is very fragile, as pointed out, they lack the ability to cycle nutrients, conserve soil, and regulate pest populations, and have low energy efficiency. Yield per unit area can be one indicator of the rate and constancy of production, but it can also be expressed in other ways, such as per unit of labor input, per unit of cash investment, or as energy efficiency ratios. For instance, industrialized monocultural agriculture has a 3:1 output to input ratio vs. polycultural 10-15:1. By planting polycultures, the agricultural strategy accompanies the natural tendency toward complexity - enhanced crop biodiversity both above and below ground mimics natural succession and thus less external inputs are required to main the crop community (Hecht 1995).

#### 5.4 LAND TENURE AND LAND USE CONFLICTS

Chile, not unlike the U.S., has gone through much consolidation in its forest industry and two large holding companies currently control the majority of the forestry plantation. **Empresas CMPC of Matte Holding** (includes: Forestal Mininco, CMPC Celulosa, CMPC Papeles, CMPC Tissue, CMPC Productos de Papel, CMPC Maderas, Bosques del Plata, Productos Austral, Evases Impresos, Planta Remanufactura, Forsac Peru, Protisa Peru, SOREPA, Confort, Elite, Toalla Nova, Edipac, Cartulinas CMPC, Inforsa, FABI Argentina, Papelera del Plata, and IPUSA Uruguay) controls 609,000 ha of plantations and **Angelini forestry company** (who controls the Bosques Arauco S.A.: Celulosa Arauco y Constitucion S.A., Forestal Arauco S.A., Aserradero Arauco S.A., Paneles Arauco S.A., Alto Parana S.A., Alto Parana S.A., Bosques Arauco S.A., Forestal Celco S.A., Forestal Valdivia S.A., Forestal Choguan S.A., Inv. Forestales Bioforest S.A., Portuaria Arauco S.A., Arauco Generacion S.A., Arauco Wood Products, Inc., Arauco Forest Products B.V., Distribuidora Centromaderas S.A., Compania Puerto de Coronel S.A. Compania Puerto de Coronel S.A., Puerro de Lirquen S.A., Fundacion Educacional Arauco S.A., Arauco Asia, Araucomex ) controls almost 800,000 ha, of which 500,000 are in plantation. These two companies also own six of the country’s eight existing cellulose plants. Smaller plantation holdings are listed by region in Table 20 (Neira et al. 2002).

**Table 20: Area of Chilean Plantations by Landowner Size  
(excluding Matte and Agelini holding companies)**

<b>Region</b>	<b>Large and medium size landowners (ha)</b>	<b>Small landowners (ha)</b>	<b>No information on land tenure (ha)</b>
IV	1,610	-	58,075
V	34,363	11,518	2,900
VI	59,249	14,403	1,986
VII	178,296	44,462	14,053
VIII	198,150	45,038	29,235
IX	76,622	23,180	3,812
X	46,910	10,029	2,322
XI	5,306	-	-
XII	13	-	-
<b>TOTAL</b>	<b>600,519</b>	<b>148,680</b>	<b>112,383</b>

Source: Global Forest Watch – Chile; Neira et al. 2002

Some international companies owning plantations in Chile include the Shell Corporation, which owns 40,000 ha of forestry plantations through its affiliate Empresa Forestal and Agrícola Monteaguila; Forestal Millalemu, backed by Swiss capital, owns 80,000 ha; and Forestal Bio Bio, backed by U.S. capital controls 47,049 ha. In some cases these plantation-based companies also own land with native forests (for example, Forestal Millalemu owns approximately 40,000 ha). There are also wood processing mills, owned by both national and international corporations that do not own land in Chile and buy wood from private owners of native forest and plantation land (Neira et al. 2002).

Right now there is no land tenure registry for areas of native forest and property rights are more respected for plantations (Molina personal communication 2002). However, it is known that of the 13 million ha of native forest, 29% of native forest land is protected under the SNASPE, a significant portion of native forest is in the hands of small landowners (but the actual amount is still unknown), 2-3% are owned by 9 large forestry companies (Table 21), and Neira et al. (2002) combined studies by Peña (1994) and CODEFF and estimated that rural family agriculture manages almost 9 million ha, of which 2 million ha are classified by the government as having soils ideal for forest use, but which may or may not actually contain forest stands and, within these 2 million ha, there are approximately 400,000 ha of native forest.

**Table 21: Major companies with native forest holdings**

<b>Company</b>	<b>Area (ha)</b>	<b>Region</b>
Forestal Savia (formally called Trillium)	103,000	XII
Forestal Mininco	70,000	VIII, IX
Forestal Millalemu	40,000	VIII, IX
Soc. Agrícola Alicahue	20,000	-
Forestal Anchile	20,000	X
Forestal Los Lagos	20,000	X
Soc. Agrícola y Ganadadera San Lucas Ltda.	15,728	XII
Inversiones Emasil	10,000	X
Forestal Taquihue	6,700	X
<b>TOTAL</b>	<b>305,428</b>	<b>-</b>

Source: Global Forest Watch – Chile; Neira et al. 2002

A considerable amount of forest land under the control of small and medium landowners, along with much of the state-owned land, have been transferred to large companies. The social consequence of this has been population loss in rural areas that can be seen in the abandonment of houses, clinics, and schools, especially in areas where plantations are predominant. Displaced people tend to migrate to cities or create informal settlements on public land near main roads (Neira et al. 2002).

#### **5.4.1 Mapuche Land Tenure Conflict**

Land tenure issues also arise concerning indigenous communities. These communities have been receiving land titles from the government within the framework of current policies implemented by CONADI. Much of this land is forested, and is bought from forest industries with government funds set aside for this purpose. Despite implementation of these policies, there are significant conflicts between the indigenous Mapuche communities and some forestry companies. These conflicts frequently concern lands occupied by forestry plantations, some of which are claimed by indigenous groups as ancestral lands that ended up in the hands of private companies or non-indigenous owners (Neira et al. 2002).

Industry wants to resolve this issue, affecting region IX because investment in this area is avoided, however no one really has any ideas for a solution. Meanwhile, industry is missing out on business opportunities right in the heart of Chile's forestlands. The problem here is viewed primarily as small bands of people living on the fringes of the forest with very few communities actually involved. They have tried training indigenous people as employees, but this entailed many complicated problems, such as western education levels. Industry also believes that some indigenous groups want to maintain conflict rather than accept any offer. Companies with less involvement in this region do not deal with the situation as frequently, but do not see an easy solution either (Molina, Koster, Valenzuela, Arana personal communication 2002).

For CONADI, their work is more social in nature and they believe that the Mapuche need more negotiation skills, education, and development work. While this is a huge problem for the forest industry, it seems small compared to the other indigenous issues handled by CONADI, when it is only affecting region IX and only involves some communities of Mapuche. CODEFF points out that the indigenous situation parallels that of the small forest owner, however, the indigenous peoples are even more impoverished. Both have been bought out and affected by huge plantation development. Indigenous groups do have more access in region IX and X, but it is hard for them to manage forests and they often sell off their trees for much needed income. They need more tools and support and it is not necessarily a good idea to give training for business or technology, which contradicts their way of life and may not be what they truly desire. Cooperatives, etc. may prove to be a better method (Alzamora, Verscheure personal communication 2002).

From an indigenous perspective, the policies which are currently promoted by the government that affect their lands and natural resources without their consent constitute a violation of the 1993 law (Law 19.253, known as “Ley Indígena”). According to indigenous traditions, agreements are to be honored and the current administration is not doing so.

Forestry has experienced enormous growth in Chile in recent years. Orienting its activity to the production of timber, wood chips, and paper, mainly for export markets, this industry has been expanding south into the Mapuche territory during the last several years (Aylwin 1998; Marchak 1995; Mapuche International Link; and University of Wollongong Creative Arts Department).

After the agrarian reform during the sixties and early seventies was finished, the forestry industry started acquiring huge tracts of land in southern Chile that were, and continue to be, claimed by the Mapuche. Most of these lands (estimated to be several hundred thousand hectares) have been planted with exotic, fast growing species (mainly radiata pine and eucalyptus species) by the companies who now own them. These plantations are surrounding many Mapuche communities that continue to exist in the area (Aylwin 1998, Marchak 1995, Mapuche International Link, and University of Wollongong Creative Arts Department). A monocropped forest is a disaster for peasants who are then deprived of all grazing, food, raw materials, and medicines that the earlier forest community had provided them (Scott 1998). This modification has resulted in important changes not only in the landscape, but also in the soil, which has been seriously damaged by erosion and impacts of exotic tree resin. The same plantations have affected natural springs, most of which have dried up due to their absorption by the new plantations. Finally, these plantations have seriously affected the labor possibilities of the Mapuche in the area. Their lack of expertise and desire to participate in western forest science activities leave them few alternatives (Aylwin 1998; Marchak 1995; Mapuche International Link; and University of Wollongong Creative Arts Department).

Due to this situation, many communities demanded CONADI to acquire the lands they claim to belong to them through the land fund. Nevertheless, because of the limited resources existing in this fund created by the 1993 law, many of these demands have not been satisfied by this government agency (Aylwin 1998; Mapuche International Link; and University of Wollongong Creative Arts Department).

After years of waiting for a solution without a response, many communities affected by the forestry industry, started taking other actions to seek justice and take back their ancestral, but systematically ignored rights. Several direct actions have been implemented by Mapuche organizations against forest companies that in various ways are affecting their lives. For instance, a group of Mapuche families occupied lands that were being developed by Forestal Arauco, Mininco and Millalemu in the county of Lumaco, demanding restitution and the police detained several of the participants. A group of unemployed Mapuche youths were accused of burning several trucks loaded with trees belonging to the same companies, again in Lumaco. In January of 1999, several Mapuche communities in the Province of Arauco occupied lands, which they claimed to belong to them, but were being developed by logging companies. For almost 10 days, the Mapuche occupied El Rincon (Loncoyan Grande), a farm in the county of Puren, currently owned by Forestal Mininco one of the biggest private companies present in the Mapuche territory (Aylwin 1998; Mapuche International Link; and University of Wollongong Creative Arts Department).

The explosiveness of these actions demonstrates the desperate situation of the communities affected by these developments. The reactions coming from the government have been contradictory. While CONADI has been trying to negotiate the acquisition of these lands for those families who legitimately claim them, the national government has continued to use everything available to them, including repression, to impede the continuation of actions which it fears may damage property and investment in the area (Anonymous 1999; Aylwin 1998; Mapuche International Link; and University of Wollongong Creative Arts Department).

Also linked to land disputes in both Chile and Argentina is the racist and intimidating attitude of the police, who have been reported interrupting peaceful manifestations of protest, religious celebrations, and cultural gatherings with the use of unnecessary force on many occasions. Many cases of detention without guarantees, restriction of freedom of movement, harassment and threats, as well as unmotivated imprisonment of leaders have been registered by various NGOs or associations. The situation is particularly grave in Chile, where the government still makes use of the Law of State Internal Security inherited from the former authoritarian regime and continuing on in the militarization of Mapuche territory (Nesti 1999).

It has been concluded that the existing legislation does not grant sufficient protection to the natural resources existing within indigenous lands affected by the developments that are being implemented throughout their territories and the insufficiency of the compensatory policies considered in them. In all circumstances, this has allowed the neo-liberal policies applied by the Chilean state to strongly affect the economic, social, and cultural situation of the indigenous groups, resulting in their marginalization and in profound social inequities. Many authors agree that the assigning and strengthening of human rights responsibilities to non-state actors and the need for international institutions to call for the timely intervention of the State in the protection of indigenous rights to land and environment are important for land right protection.

Aylwin (1998) thought that the situation was unlikely to change until the Chilean society shows more respect for its ethnic and cultural diversity, which has been hidden for centuries. Nesti (1999) thought that certain conditions must exist for the relation between the recognition of indigenous people's rights and environmental protection to be productive. The protection of indigenous people's rights to preserve their land and environment has to start from the recognition of their specific relation with their land. The cultural and spiritual value that indigenous peoples place on land should be at the basis of any recognition of collective rights, which will lead to effective participation and to free and informed consent for projects or decisions affecting them. Calbucura (1994) concluded that the collective property system is the only condition required to establish them as an ethnic minority group and until this condition can be guaranteed by legal means, the Mapuche will not be able to exercise their rights within the state law.

For more detailed information about this situation, Appendix C provides an annotated bibliography, using a wide range of English language sources (ranging from peer-reviewed scholarly articles, chapters, and monographs to governmental and NGO reports, but somewhat lacking on native ethnographies). The appendix provides a review of the Mapuche culture group, social structure, ethnobotany and traditional ecological knowledge (TEK), history, and legal framework, as well as land right issues pertaining to the Bio Bio River hydrodams and highway expansion that indirectly relate to the forest industry issues.

While some of these things may not seem related to the conflict at first, it is imperative to come to an inclusive understanding of the situation in order to find the best solutions. Historically there has been a failure to recognize TEK and a predominance of the myth of the "tragedy of the common" and resulting persistence of top-down environmental managerialism. When TEK was actually recognized, trade related intellectual property rights (TRIPs) conflicts arose from indigenous people feeling that they were taken advantage of. In order to resolve land conflicts and progress to a point at which the role of local knowledge is seen as a form of social capital that produces natural assets and to where authority and empowerment of localized social movements abounds, traditional use rights (TURs) studies need to incorporate a bioregional framework of interdisciplinary research capable of understanding ecological commons management, biodynamics, watershed, biota; political, economic, legal, and administrative regimes; sense of place, cultural distinctiveness of place; anthropogenic ecosystem services, cultural and environmental history of land ethics, resource location, and TEK. Political autonomy for indigenous communities and collaborative environmental management (CEM) or co-management, combining efforts and knowledge, as well as traditional and modern scientific knowledge could make for more sustainable forestry and a better public image for the companies involved. Niche marketing, land trusts, and social venture capital are all viable ways of achieving this goal (Peña 2001 a and b; Hecht 1995).

More recently CMPC and Arauco sold some Mapuche land to CONADI and the Mapuche declared the Mininco land deal a triumph (Santiago Times May 15, 17 2002) - actions that seem to be leading to a conflict resolution. Unfortunately hydrodam and highway expansion conflicts are still causing continued disagreements and violent actions. The Mapuche have also joined other indigenous groups in forming a permanent U.N. forum that promises to give indigenous people a unique voice within the U.N. system, commensurate with the distinctive problems which many indigenous people still face, but also with the unique contribution they make to the human rights dialogue. The forum will have 16 representatives and be part of the U.N. Economic and Social Council (ECOSOC) (Deutsche Presse-Agentur 2002).

## **5.5 GOVERNMENT INSTITUTIONS AND REGULATORY POLICY**

### **5.5.1 Institutions**

The institutions involved in the forest sector in Chile are the state, the forest industry, trade associations, small landowners, and non-governmental organizations (NGOs). The state's main function is to promote the management of native forest and forestry plantations, implement legislation, and administer SNASPE. The forest industry directs ownership and management of extensive forested lands and it has increased forest products exports' to Chile's GDP through the industrialization of the sector. Industrialization has mainly been accomplished by increasing the number of paper and pulp processing plants. Small landowners hold a significant share of forestland, however, its use is restricted to mainly fuelwood collection and livestock shelter. Environmental NGOs work towards promoting forest stewardship, developing conservation plans for natural resources, and serving as vehicles for public support of species and ecosystems protection (Neira et al. 2002).

#### *5.5.1.1 State Agencies*

The Ministry of Finance and Ministry of Agriculture determine the institutional framework of the forest industry. The Ministry of Agriculture administers the state agency in charge of forests, CONAF, and Chile's Forest Institute, INFOR (also linked to Corporacion de Fomento), SAG, and INDAP. CONAMA, through its ministry, also has a role with respect to forest use and conservation, but its focus is on the development and implementation of Chile's environmental norms and regulations. ProChile is part of the Ministry of Foreign Affairs (Neira et al. 2002; Bush 2000).

The National Forestry Corporation (CONAF) essentially follows two lines of action: 1) to promote forestry as a productive option to small landowners based on the commercialization and industrialization of the forestry sector; and 2) to recuperate and to protect the natural heritage of Chile by minimizing the deterioration of forest ecosystems. Insuring the competitiveness of Chilean forest exports is an important aspect of these actions. This agency is represented at both the provincial and regional level (Bonte 2002; CONAF 2002; Neira et al. 2002).

The National Commission of the Environment (CONAMA) mission is to promote a sustainable environment through the process of coordinating political actions with the strategies defined for environmental matters. Its fundamental objectives are to recuperate and improve environmental quality, prevent environmental degradation, promote the protection of Chile's natural heritage and the sustainable use of natural resources, introduce environmental considerations to the industrial sector, involve the public in environmental management, strengthen the environmental institutions at the national and regional levels, and perfect environmental legislation and develop new instruments of management. CONAMA is in charge, among other things, of administering Chile's environmental impact assessment system (Sistema de Evaluación de Impacto Ambiental, or SEIA), which evaluates all infrastructure development projects, from industrial projects such as hydroelectric plants and wood-processing mills to large forest management projects. Based on this evaluation system, CONAMA can impose conditions on the implementation of these projects prior to their approval (Arana 2002; CONAMA 2002; Neira et al. 2002).

The Forestry Institute (INFOR) supports public institutions and private firms in the forestry sector through the generation of information and technologies to sustainably assign and use forest resources, addressing the improvement of information on forest resources and land use, diversification of production options, and promotion of increased domestic consumption and exports of forest products (INFOR 2002; Neira et al. 2002; Vargas 2002).

The Agricultural and Livestock Development Service (SAG) performs forest activities involving sanitary monitoring of products and quarantine surveillance and hunting and fishing licenses.

The Agricultural Development Institute (INDAP) facilitates access to capital and technology for small rural landowners. It often works in marginal areas with small ownership (usually forested).

ProChile promotes the export of all Chilean goods, including forest products, and represents Chile at international trade shows and assists companies in the development of export markets.

The National Commission of Indigenous Development (CONADI) serves to improve, promote, coordinate, execute, and expand the action of the State at the central, regional, and communal level. These actions favor the integral development of the people of communities, native associations, and their cultures and heritages both economically and socially, prompting their participation and contribution to national life. While this organization mostly deals with social services, it plays an important role in remedying the existing land right conflicts between forestry companies and the Mapuche people.

#### *5.5.1.2 Forest Industries, Trade, and Professional Associations*

The National Wood Corporation (CORMA) is a trade organization that brings together forest sector companies dedicated to improving industrial forest development in Chile and unites nearly 300 professionals, businessmen, and businesses. It plays a key role as the forest industry's representative in all government related matters. CORMA has considerable political influence and is led nationally by officials of the largest forestry plantation companies. It is a national association with representation in all forested regions of the country. CORMA's motto, "Chile, Forestry Country" denotes CORMA's more recent projection of its task to the growing intensity of the country's interest in the environment, understanding public opinion, educating the public, and the participation in political debate over forestry definitions, silviculture, and economic and legislative institutions that affect the interests of the sector (Arana 2002; CORMA 2002; Neira et al. 2002).

The Association of Forest Engineers is a trade association that consists exclusively of forest engineers. Its main role is to promote the development and cooperation, protection, progress, prestige, and scientific and technological improvement of association members. It aims to actively contribute to the development of the national community of forest engineers. This trade association also represents the interests of forest engineers in governmental, academic, and other areas linked to the forest sector (Neira et al. 2002). The Group of Forest Engineers for the Native Forest (AIFBN) is an association that was established in response to the increasing concern about and interest in the condition of native forests in Chile. It focuses on promoting the management and conservation of native forests. AIFBN coordinates various efforts carried out by forest engineers regarding sustainable use of native forests, as well as developing policies, raising awareness, and building capacity related to the management and conservation of native forests (Neira et al. 2002).

The Lumber Industry Association (ASIMAD) and the Technology Research Corporation (INFEC) are also private associations related to forest products that are involved in setting standards for the different market segments of the industry and conducting specific research in these areas (Bush and Smith 2000).

#### *5.5.1.3 Non-Governmental Organizations (NGOs)*

The Chilean environmental NGOs that focus primarily on forest issues are the National Committee for the Defense of Fauna and Flora (CODEFF), the National Network of Ecological Action (RENACE), Defenders of the Chilean Forest, and Ancient Forest International (AFI) - Chile. These organizations work at the political level and with the public in carrying out education and awareness raising campaigns, monitoring forestry projects and the implementation of relevant laws and regulations, building capacity among small- and medium-size forest landowners, improving the management and conservation of forests, and protecting threatened species and forest ecosystems. Their role has been very important in communicating the public's opinion on forest issues. There are also several citizens' groups that participate in various campaigns dealing with forestry projects specific to their interests (Neira et al. 2002; Wilcox 1996).



Fundación Chile is another important private, non-profit institution. The Chilean Government and the ITT CORPORATION of the United States created it in 1976. Its mission is to contribute to market innovation and technology transfer in goods and services in order to add economic value to Chile. Fundación Chile undertakes projects that involve technology transfer, institutional communication, and added value in productive sectors based on renewable natural resources. Most of its contributions have added new but proven technologies to the economy. It currently promotes the development of companies in agribusiness, aquaculture fisheries industries, forest products industry, and ecotourism. It also boosts human resource productivity with new information and telecommunications technologies, promotes the use of new technologies in education, innovation in educational management, certification of job skills, and continued and long-distance learning. Their mission is to contribute to the innovation in markets for goods and services and to the transfer of technologies aimed at providing Chile with added economic value. The vision is to become the country's leading technology institution, recognized nationally and internationally for the creation and dissemination of innovative businesses and technologies that significantly impact the institution's target sectors and improve the quality of life. Throughout its history the institution has developed an innovative model for technology transfers based on creating companies on the total quality concept and on research and development activities. Fundación Chile has shown that with its model comparative advantages based on natural resources can be used productively and in a sustainable way (Fundación Chile 2002).

### **5.5.2 Current Institutional Situation in the Forestry Sector**

The government has been developing a new National Forestry Service to exist in tandem with CONAF, which is the agency directly responsible for forest administration. As mentioned earlier, CONAF has the main objectives of contributing to the conservation of forests, expanding the forest base, and overseeing the process of use of the country's resources. CONAF was restructured in the late 1990s to reflect the emphasis of new forestry policies on diversification of forestry activities, which reflected the government's push for socio-economic improvement. In response, CONAF has strengthened its regulatory functions and is now responsible for proposing legal and regulatory guidelines for the improvement of forestry legislation, policies and strategies for forestry and environmental control, and responsibility for a range of measures such as legislation and compliance (Arana 2002; Trade and Media Services Ltd. 2000).

### **5.5.3 Historical Management, Forest Legislation, and Government Subsidies**

Forest related legislation dates back to colonial times in Chile, but the principal piece of legislation concerning forest conservation and protection, the current Forest Law, did not come into force until 1931 (Table 22). The first law restricting forest exploitation was passed in 1872, but it was not as effective as the 1931 Forest Law that was motivated primarily by the desire to halt destructive processes affecting forests. It established norms prohibiting the felling of trees and shrubs in particular areas; provisions regulating the logging, exploitation and use of forest resources; stipulations prohibiting the use of fire as a means of exploitation in certain forest lands; regulations regarding the creation of parks and reserves; tax exemptions for planting trees; and encouraged pine plantations. The government agency for promotion of primary and industrial production, Corporación de Fomento de la Producción (CORFO), stimulated private planting through low-interest loans and partnerships. Although the law has since been modified, in practice it is only partially implemented. Nevertheless, the law lacks key elements of modern environmental legislation, like preventive norms and incentives. There are no incentives to promote the sustainable use of native forests or to participate in timber certification schemes (Neira et al.; Marchak 1995).

From 1965-1973, the Chilean government publicly financed nurseries and two major pulp mill complexes, namely Arauco I and Constitución. CONAF was established to oversee the development of the forestry sector, which at that time was seen as imperative to Chile's development strategy. CONAF undertook a system of tree planting partnerships called the "convenios de forestación" in the early 1970s, where small landowners provided land and CONAF provided the management and logging for plantation species. 75% of the value of the products went to the public sector and 25% to the landowners. Forest production increased at an average of 8.5% per year from 1960-1974 (Marchak 1995).

Beginning in 1974, the authoritarian regime's forest policy, *Forest Development Law 701*, reduced state involvement in this economic sector. This strategy limited the government's role to the three areas of the control of legislation affecting the forest sector, promotion of forest related activities developed by the private sector, and management of protected areas and other land under the National System of Protected Wildlands (SNASPE). Within this framework, a privatization process and a program of forestry plantation subsidies were instituted. Privatization transferred the state's forest related industrial capacity and forestlands to the private sector, while subsidies dramatically increased the number of plantations (particularly of radiata pine). Forest Development Law (Law 701) incorporated subsidies for the establishment of commercially viable plantations, referred to as afforestation, in lands not covered with vegetation. It provided up to 75% in subsidies (some years, the subsidies actually rose to 90%), based on the area to be reforested, for tree planting costs, together with tax exemptions, for plantations established between 1974 and 1994. This law also lists management plans as tools to regulate the use of natural resources and specifies that a management plan must be in place prior to the felling or exploitation of native forests or plantations. Decree Law 701 requires preventative measures, such as logging permits and authorizations, as well as permits for violations. This law facilitated the structuring of all forest legislation and specified the key institutions responsible for their implementation. It was also the key element that allowed for increased plantation-based forest activity. Throughout the 20-year Decree Law 701 program, Chile invested over USD 170 million in plantation subsidies that have provided the wood products to support growth in Chile's exports to over USD 2 billion (Neira et al. 2002).

While increased activity generated explosive growth in the forest sector (mainly pulp production), increased investment in forest industries, and tree planting, a high price was paid in public subsidies and negative environmental and social impacts were produced, namely the substitution of plantations for native forests and the resultant impact on rural populations in these areas. Decree Law 701 did not refer to native forests, but its subsidies were not intended for their conversion to plantations. In the beginning, it was mostly the already degraded and marginal lands that served as plantation acreage, but as these lands were converted, more marginal lands were created through forest clearing and high-grading and exporting of wood chips. No government support was provided for management or restoration of those forests. The substitution of plantations for native forest, as in other areas of the world, was due in part to a misunderstanding of the definition and real value of native forests. Many native trees and their associated vegetation are considered shrubs or weeds without economic value, which allows for their elimination and later substitution with non-native species (Neira et al. 2002).

The main laws pertaining to native forests deal mostly with the promotion of their exploitation, with the exception of a limited number of regulations that aim to conserve certain species, either by restricting their use or prohibiting their exploitation. This is the case with forests found within protected areas, watersheds, forests that serve as soil stabilizers, and certain species of trees that are legally protected as natural monuments (Neira et al. 2002).

Concurrent with Decree Law 701 in 1974, forest products companies consolidated their investments in the industry and by 1989, two holding companies (Matte Holding and Angelini) controlled about 39.6% of the forestry plantations as well as 68.9% of forest products exports. A previous export ban on unprocessed forest products, such as roundwood and wood chips, was lifted in 1975 (Neira et al. 2002; Marchak 1995 and Food and Agriculture Organization of the United Nations Forestry Department 2001).

In 1980, *Supreme Decree 259* imposed restrictions on the silvicultural systems allowed in certain native forest types and degrees of slope. Logging of native forests in private estates now required a CONAF approved management plan and illegal logging could theoretically incur penalties such as fines. However, illegal substitution of plantations for native forests was rarely prosecuted. The fines that were given tended to be less than the profits earned. About 48,600 total ha or 6,000 ha per year of native forests were converted to plantations in regions VII and VIII from 1978-1987. It was also estimated that 31% of the native forests in the coastal range of region VIII were converted to plantations in that period (Marchak 1995).

In 1991, 41 Chilean university faculty members issued a statement calling for immediate political action to conserve native forests and asked for the termination of massive subsidies for the planting of monoculture exotic species that displace native stands, arguing that the subsidies facilitated destruction of native forests by encouraging foreign and domestic investment in plantations. In 1992, after heated debate in Chile, the president introduced a bill for the recovery and promotion of the native forest (Marchak 1995).

With the *Law of Bases of the Medium Environment (LBGMA)*, enacted March 9, 1994, came CONAMA and with it the environmental institution. Law 19.300 recognizes the existing technical and legal competences in the distinct services of State sectors and the need to coordinate environmental management assembly with each one of them (CONAMA 2002).

*Decree Law 701*, modified in 1998, now focuses benefits away from larger plantation owners to small landholders. Planting costs are subsidized by as much as 90% for the first 15 ha and 75% for the remainder. A subsidy of only 15% of planting costs is available for larger farmers in the case they are planting land that has been severely eroded by land that can only be used for reforestation. A maximum of USD 15 million dollars yearly is allotted for this purpose. Special land tax exemptions are also part of the program. During 2000, over 42,000 ha qualified for the planting subsidy, with payments totaling USD 11.6 million. Less than 500 ha qualified for the trimming subsidy with disbursements of USD 10,000. The combined subsidy costs incurred under Decree Law 701 during 2000 totaled only USD 11.7 million, slightly more than the USD 10.1 million in 1999. The Chilean government paid subsidies of USD 203.9 million from 1974 to 2000 (Hennicke 2001).

Chile has also committed to several international agreements with environmental implications, some of which apply specifically to forests.

*The Convention on Biological Diversity* was signed in 1992 and ratified in 1994. The objective of this international convention is the conservation of biodiversity, sustainable use of its components, and equitable participation in benefits derived from biodiversity and genetic resources. However, a national level conservation strategy, one of the commitments made under the convention, has not been defined yet (Neira et al. 2002).

*The United Nations Framework Convention on Climate Change*, signed in 1994, aims to stabilize the concentration of greenhouse gases in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system. Such a level was supposed to be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, ensure that food production is not threatened, and enable economic development to proceed in a sustainable manner. The implications for forests are related to the potential use of forests' carbon storage and sequestration ability within the framework of establishing the Clean Development Mechanism (CDM). The CDM is a mechanism of the Kyoto Protocol to allow industrialized countries more flexibility in meeting their greenhouse gas emission reduction targets, while assisting developing countries in more sustainable development. Through the CDM, industrialized countries can invest in energy and reforestation projects in developing countries and receive credits for the tons of greenhouse gases avoided or sequestered through the project. The investing country can then use the credits to meet its reduction target or sell them in the carbon market. Although there is interest within the Chilean government in potentially participating in the CDM, there was question as to whether Chile could qualify for the credits and some NGOs in the country have expressed skepticism about its benefits. This last concern is related to the fear that implementation of such a mechanism would promote a new wave of plantation establishment (Neira et al. 2002).

*The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)*, ratified by Chile in 1975 is directed at the control of international trade in endangered fauna and flora. Members of CITES agree to ban the international commercial trade in an agreed-upon list of endangered species and to monitor trade in species that may become endangered. Alerce, Guaitecas cypress, and araucaria are 3 Chilean tree species on this list and CITES has proved a useful tool in discouraging international trade in these species (Neira et al. 2002).

*The Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere* was enacted in Chile in 1968. It is meant to preserve areas of extraordinary beauty as well as native species of flora and fauna on the American continent. It has proven to be a very valuable tool in the conservation of protected wildlands and its success has been due to the fact that each member country must commit to the maintenance and improvement of protected areas. It has been imperative to Chile's efforts to incorporate new areas of representation within the SNASPE (Neira et al. 2002).

*The Montreal Process* brings together non-European countries that have temperate and boreal forests in order to develop criteria and indicators for the sustainable management of temperate and boreal forests. The Santiago Declaration, signed by Chile in 1995, contains a set of seven agreed upon, national level criteria and 67 indicators that can be used for tracking and reporting progress towards sustainable use of resources. Later stages in the Montreal process presume that member countries will adopt national criteria and indicators for forest management. This process is still being developed in Chile and is not a legally binding agreement (Neira et al. 2002).

CODEFF believes that Chilean legislation contains the necessary tools to achieve the objectives set forth in the agreements, but that the objectives are not part of a larger forest policy or conservation and sustainable use strategy, which allows them only limited effect on the conservation of natural resources. Legislation lacks the means to detect activities (such as illegal logging) that compromise forest conservation, enforce what is detected, and incentives to promote activities that support forest conservation, including forest management and sustainable use (Neira et al. 2002).

For instance, illegal logging has affected Chilean native forests throughout history. It is caused in part by a lack of knowledge and understanding of the value and ecological processes in native forest ecosystems, forest management and civil society in general, and inadequate funding of the government agencies responsible for implementing regulations. It is illegal to fell trees in forests and plantations without prior authorization from CONAF. This authorization is given once a management plan has been approved. Logging without an approved management plan and failure to fulfill management plan obligations are illegal logging violations. CODEFF examined reports against individuals who violated forest regulations over 5 years and found a total of 400 violations, the majority of which were for logging without an approved management plan. The disparity in criteria for applying sanctions was attributed to the lack of persistence by the government and to judicial discretion in setting penalties, which leaves room for personal and political influences to come into play. The result sometimes is meek penalties or dismissal of cases - 60% of the violations examined went unpunished, while the rest received fines much lower than those recommended by CONAF. Alerce forests are still being exploited in order to sell the wood commercially. Today, less than 50% of the original alerce forests remain. Since 1987, the illegal logging of alerce has been monitored and investigated by CODEFF with funding from the World Wildlife Fund (WWF). Most investigations were carried out in cooperation with CONAF, which officially reported the violations and took the responsible parties to trial (Neira et al. 2002; Wilcox 1996).

Many small landowners with native forests, as well as others interested in the responsible management of these forests have expressed the need for subsidies that promote the sustainable management of native forests in Chile like those for plantations and Chile has been developing legislation to promote the sustainable management of native forests for several years now. The government drafted a piece of legislation that loosely translates as, "*Recovery of the native forests and their promotion in forestry*" in the 1991 bill that would provide landowners with subsidies to manage native forests. This legislation is meant to complement the Forest Development Law (Law 701), but it has yet to be approved, primarily due to lack of consensus among the different stakeholders. However, the process has generated a national debate among ecological groups, who oppose any replacement of native species by exotic species as allowed by the bill, and by business groups, who oppose any additional restrictions to their property rights, leading to an uncertain situation for private owners of native forests and a decrease of their commercial value. The debate has made the public and policy makers aware of the lack of current information regarding Chile's native forests and their importance. The German government supports a program that promotes the sustainable management of native forests among small landowners by offering subsidies and believes in the importance of having this initial monetary aid and technical assistance to transform the management of native forests into a profitable activity both economically and environmentally (Neira et al. 2002; Versherua personal communication 2002; Hennicke 2001; O'Ryan 1996).

**Table 22: Forestry Laws**

<b>Legislation</b>	<b>Year</b>
New Compilation Book VII	Colonial Period
Ordinance of New Spain and Laws of the Indies	1855
Civil Code (Article 783)	1871-72
Laws Regulating Logging	1883
Decree 656	1925
Forest Decree 256	1931
Forest Law (Decree 4.363)	1931
Washington Convention of 1940 (Convention on Nature and Wildlife Preservation in the Western Hemisphere)	1967
Forest Development Law 701	1974
CITES Convention of 1973	1975
Modification to Forest Development Law 701	1979
Supreme Decree 259	1980
Law 18.348 CONAF and Protection of Renewable Natural Resources – not yet enacted	1984
Law 18.362 National System of Protected Wildlands – not yet enacted	1984
Law 19.300 Basic Environmental Regulation	1993
Law of Bases of the Medium Environment (LBGMA)	1994
Law 19.561 (Modification of Law 701)	1998

*Source:* Neira et al. 2002; Lara et al. 1995

## **6.0 FOREST PRODUCTS, PRODUCTION, AND TRADE**

### **6.1 CHILE'S FOREST PRODUCTS INDUSTRY**

The forest products industry in Chile is an important contributor to the national economy, accounting for more than 10% of all Chilean exports and 2% of the world's trade in forest products. According to INFOR's latest statistical report (INFOR 2001), principal forest product exports are chemical wood pulp from forestry plantations, sawnwood, and wood chips. The latter products come from a mix of native forests and plantations. The main consumption and production of wood products is concentrated in regions VII, VIII, IX, and X.

Development of Chile's forest products industry has occurred mainly through expanded commercial forestry planting with excellent conditions for radiata pine and eucalyptus species. It has in turn spurred the expansion of a mechanized equipment industry and of modern and efficient technical services. During the past decade, investment in the Chilean forest products sector has exceeded USD 3 billion and this is expected to reach USD 5 billion by 2005. By 1998 the country had four particleboard plants, four medium density fiberboard (MDF) plants, seven plywood plants and four veneer mills. Chile's investments in the pulp industry have doubled capacity in the last few years and are projected to reach 3.5 million tons by 2010. It is thought that future growth in the forest products industry will occur through the development of Chile's native forests if the proposed legislation is able to pass, although slow growth rates of native hardwood species is of concern (Hennicke 2001). Presently, only a small percentage of wood products come from native forests and mainly in the form of wood chips for pulp. However, this trend may change as more people come to believe that a realistic forest management policy for sustainable timber and non-timber production from native forests balanced with plantation forests would improve the long-term survival of these valuable and unique forest ecosystems while addressing wood and other product supply demands at the same time (Neira et al. 2002).

Five thousand companies are involved (directly or indirectly) in planting radiata pine, 2,000 in planting eucalyptus, and over 1,700 companies concentrate on processing wood. All together, over 17,000 companies are involved in planting, managing, harvesting, and processing wood in Chile. Over 132,000 people are involved in some way in the forest products sector of the economy (Blackman 1998).

The Chilean forest products sector produces both primary and secondary products. The primary segment includes logs, wood chips and pulp, fiberboard, particleboard, lumber and newsprint. The secondary industry includes sawnwood, molding and millwork, dimension parts, and furniture. Approximately 25% of Chile's wood products are used within its borders. Chile's domestic demand for forest products is equal to 5 million m<sup>3</sup> of logs or nearly 2.75 million m<sup>3</sup> of sawnwood. Chileans use nearly 50% of this for building construction (Bush 2000). Sodimac, like Home Depot in the U.S., is an important retail outlet for some wood products (Cerde personal communication 2002).

#### **6.1.1 Roundwood Production**

The Chilean forest industry consumes more than 20 million m<sup>3</sup> of roundwood annually. The consumption is balanced between pulp and solid wood uses, such as lumber and secondary processing activities. Around 68% of roundwood output is used by the forestry industry and the remainder is used for firewood (about 50% of the population uses firewood in homes for heating and cooking). The industrial utilization of roundwood includes pulp, wood chips, sawnwood, and lumber production. Thinnings from plantations are the main source for roundwood used for pulp and wood chips are mainly a by-product of sawmill operations and native forest exploitation (Hennicke 2001; Trade and Media Services Ltd 2000).

Chilean total roundwood production rose in 1997 after a small fall in 1996 only to drop in 1998, rise in 1999 and reach 35.7 billion m<sup>3</sup> in 2000. Production is expected to grow further as tree farms reach maturity and are harvested for lumber.

Total softwood log production expanded again in 2000. However, this expansion was not as large as expected, due to the export demand for softwood logs for lumber falling to almost zero. FAS postulated that a significant increase of transport costs is the main reason for the fall and foreign demand for softwood logs is not expected to expand significantly again in the near future. Although production of softwood lumber is expected to grow in the next few years, exports will probably not grow at the same rate because the industry is trying to add value to its output by increasing manufacture of exportable wood products. In the coming years, though, as the availability of knot-free lumber increases, exports of softwood lumber will rise. Softwood log production expanded in 1999 because of a strong comeback of South Korea's lumber demand. Production fell significantly in 1998, after many years of a constant expansion, as export demand fell to almost zero and South Korea (which had purchased over 90% of exports in the past) suspended all imports due to the country's severe economic crisis in 1997/1998. Production increased in 1997, as the demand in the domestic and export market stayed strong and an increasing number of tree farms reached maturity.

### 6.1.2 Sawmilling

Sawmilling is a traditional activity in Chile and remains the single largest consumer of logs (production between 8-9 m<sup>3</sup>/year), with pine logs making up close to 80% of total inputs. Chile's sawnwood production has almost doubled from 1992-2000, although it lags in growth relative to other sectors in the forest industry. Close to 1/3 of the lumber produced is exported, mostly output from larger sawmills. The remaining 2/3 is consumed locally. The resource available has increased throughout the past two decades from about 3 million m<sup>3</sup> at the beginning of the '80s to 6 million m<sup>3</sup> in the 90's and is expected to increase to 20 million m<sup>3</sup> by 2010 and 30 million m<sup>3</sup> by 2020 (Hennicke 2001; Trade and Media Services Ltd. 2000).

Chile has over 1,500 sawmills. However, the majority of production is concentrated in approximately 50 mills. The typical larger Chilean sawmill produces in excess of 50,000 m<sup>3</sup> annually. Total production of sawnwood is now near 5.7 million m<sup>3</sup>/year and has increased fourfold since 1985. Some of the larger capacity mills are Aserraderos Arauco S.A., Aserraderos Mininco S.A., and Andinos S.A. About 10% of the sawnwood is remanufactured into finger-jointed blocks, edge-glued panels, molding, millwork or furniture. The tendency is for the smallest, most inefficient mills to close (Table 23) (Bush and Smith 2002; INFOR 1998).

Softwood lumber expanded again in 1999-2000 when compared to the previous year due to a relative strong export demand for sanded softwood lumber and production is expected to increase further as the export demand gets stronger and the local construction business recuperates. The fall in softwood lumber production in 1998 was a result of the fall in the domestic construction industry, together with a weaker export demand. 1997 saw a significant increase because of the increase in the domestic construction industry together with a strong export demand.

**Table 23: Sawmill Production by Sawmill Size (1997)**

Range of Production (m <sup>3</sup> /year)	Number of Mills	Sawnwood	
		Production (m <sup>3</sup> )	Participation (%)
TOTAL	1,571	4,661,329	100.0
Very large: > 50,000	18	2,302,903	49.4
Large: 20,001-50,000	24	709,962	15.2
Medium: 10,001-20,000	33	449,138	9.6
Small: 5,001-10,000	42	307,422	6.6
Very small: <5,000	960	891,904	19.2
Not producing	495	-	-

Source: INFOR

### **6.1.3 Plywood, Veneer Production, and MDF**

The production of wood-based panels (particleboard, medium density fiberboard (MDF), plywood, oriented strand board (OSB), and veneers) plays an increasingly important role for the Chilean forest products industry. Investment in panel production in Chile has been to increase production capacity and improve economies of scale. As a result, they have had to develop other markets to make up for Chile's small domestic market and isolated location. Current expansion in MDF and OSB will place Chile as one of the leaders in these areas in Latin America. Exports of wood-based panels have risen from nothing in 1974 to nearly USD 123.5 million in 2000, Chile's annual board capacity reached 1.5 million m<sup>3</sup>, with over 50% of this available for export. Over 50% of the wood-based composites (MDF, plywood, particle board and hardboard) produced in Chile are used in the furniture industry and one-third are used in construction. The balance of wood-based composites is used in packaging or other applications (Koster and Valenzuela personal communication 2002; Bush and Smith 2000).

Competing panel producers have recently expressed concerns that Chilean products are being imported by Mexico and the Caribbean, two important markets for the U.S., and increasing market share in the U.S. domestic market. The main reason for decline in all of these markets is price. Chilean producers are able to produce a lower quality panel for less money. While these products are said to be of lesser quality, the price differential is extreme. Since most buyers in these markets are only concerned with price, the U.S. is put at a distinct disadvantage. In addition, some products look much like U.S. plywood, giving the consumer the false impression that the quality is also similar. The Chilean government's effective management of their plantations, incentives (such as tax breaks, beneficial credit programs, and subsidies), and trade agreements also facilitate exporting (FAS 2000).

Masisa is probably Chile's biggest manufacturer of (MDF) and particleboard for building and furniture making. They sell it as is or covered with melamine paper or wood veneer. The MDF is used mostly to create furniture such as kitchen tables, counter-tops, desks and cabinets. These applications require different weights and thicknesses. Also, the smoothness and composition of the board is key, with no rough edges or porous consistency often found in raw wood or particleboard. And because of the importance placed on stability, finish and durability in the industry, MDF needs to pass stringent field tests in order to be successful in the competitive U.S. market. Masisa looked for a niche market in the MDF business and decided three things were needed: cutting-edge technology that allows for the creation of numerous sizes and densities, a product that excels in quality and durability, and one-on-one face time with the customer to understand their specific needs. Masisa MDF's density is viewed as the best and they offer three different weights (Koster and Valenzuela personal communication 2002).

### **6.1.4 Molding and Millwork**

Production statistics on molding and millwork are almost non-existent, but these products have been increasing in importance in the North American market, Japan, and Korea. Chile's molding and millwork is of high quality and much development has been done within this industry (Arana personal communication 2002).

### **6.1.5 Furniture**

One of the specific secondary markets on which Chile has recently focused is the furniture industry. Chile now sells ready-to-assemble furniture in the United States of America and Europe, office and kitchen furniture in Latin America, and furniture parts in Asia. Production costs for furniture making in Chile are among the lowest for major worldwide exporters and furniture exports topped USD 100 million in 2000. This sector has invested over USD 200 million in new capital projects that involve using a native species, lenga, and the construction of a new door and window frame manufacturing facility (ProChile 2002). Chile's top furniture products include futon frames, upholstered and non-upholstered chairs, kitchen and bedroom furniture, and seat parts and components.



### 6.1.6 Special Forest Products

Special forest products, also referred to as non-wood or non-timber forest products (NTFPs) are considered all tangible animal and plant products other than timber, which can be collected from natural forests for subsistence as well as for trade such as fruits and nuts, wild mushrooms, and medicinal plants. Forests have traditionally satisfied the needs of their inhabitants with a wide range of products. In Chile, like in other areas, forests provide food, medicinal ingredients, fiber, resins, flowers and greenery, essential oils, dyes, forage for livestock, etc. Also as throughout the world, the vast and intimate knowledge of these resources are linked with the traditional ecological knowledge (TEK) of the indigenous people and rural communities that live in and near these forested communities and can be seen in their plant classification, utilization of plants in aspects of daily life, and embedded in the symbolic relations established between plants and basic cultural values. While NTFPs have obviously been used since human time immemorial, western society for the most part separated themselves from this knowledge while caught up in the high-modernist ideology of the industrial age. Now in the post-modernist era, western society is trying to reconnect with the natural world and take control of their own health and natural products are a way for them to do that.

Some of the best-known Chilean NTFPs are wild mushrooms, which are called pinatras, caracuchas, chicharron del monte, etc. Fruits and plants, such as pehuen, chupon, nalca, and murta are also widely used, as well as other food alimentations and additives, native ornamental plants, medicinals, plants with biological action, dyes, essential oils, fibers, tannins, forest species seeds, furniture material, species with energy or industrial potential, artisan materials, and animal products. These products generate significant income through national and international commercial sales and form the basis of the subsistence economy and way of life for numerous families inhabiting rural communities in southern Chile (Neira et al. 2002; Humucio C. 1999; Ros-Tonen 1995).

Pehuen is the Pehuenche (people of the pehuen) name for araucaria. The nuts or piñones are the staple of the Pehuenche people (considered Araucanians along with the Mapuche group) who inhabit the forests and meadows of the high volcanic region of the araucaria forest type. Nutritional values of piñones are considered very high. Each seed is a hard, white fruit firmly wrapped in a papery husk. The cones, about the size of a pineapple, are knocked to the ground when ripe, collected, dried, and stored for year-round consumption. They are eaten fresh-roasted, boiled, or dried and ground into a flour or meal that can be used in a variety of foods (Wilcox 1996).

Sweetbriar rose (*Rosa eglanteria*) is mainly used for rosehips. A number of *Rosa* species (Rosaceae) native to southern Europe and North Africa were introduced to Chile by Spanish colonizers. These species are now widely distributed in Chile. Chile annually exports dehydrated rosehips to Europe. Rosehips are the enlarged floral cups (receptacles), which surround numerous small, hard dry fruits (achenes) commonly called seeds. Rose hips are bright orange and oval and become fleshy but are not true fruits. They are collected from the wild. Rose hips are brought to the processing plant where they are dehydrated and seeds are removed and dry pulp is exported, mainly, to European countries. The dry pulp is used in herbal teas and marmalades and has been used as a pigment for laying hens and broiler chickens. It contains large amounts of vitamin C (1000-2000 mg/100g), riboflavin, pectins, nicotinic acid, and malic acid. The vitamin C content varies with the site of collection, harvest date, and dehydration methods. The achenes are a by-product of pulp extraction and have been used to feed pigs, hens, chickens, and chinchilla rabbits. Achenes contain 8% oil composed of oleic, linoleic, linolenic, and transretinoic acids. This oil is used in the cosmetic industry and is reported to accelerate the regeneration of damaged tissue, and promote wound healing.

The bark of soapbark tree/Quillaja (*Quillaja saponaria*) is one of the major sources of industrially used titerpenoid saponins. Quillaja extracts have been used as foaming agents in beverages, emulsifiers in food, wetting agents in photography, etc. for decades. Overexploitation of the bark has caused some damage and a shortage of this resource, but this can be remedied by using the whole quillaja wood for the production of saponins. This raw material can be obtained in large quantities from pruning operations, reducing the need to fell trees.

Boldo (*Peumus boldus*) is an evergreen shrubby tree growing 6 to 8 meters in height found in the Andean regions of Chile and Peru and is also indigenous to parts of Morocco. Boldo is cultivated in some parts of Italy, Brazil and North Africa to meet the demand for its medicinal leaves in European and Canadian markets where it is widely used. Indigenous uses of boldo have been widely documented. For many years in Chile the fruit has been eaten as a spice, the wood used for charcoal, and the bark has been used in tanning hides. It is also used in Chilean folk medicine as an anthelmintic against worms, which has been attributed to its ascaridole content of the essential oil found in the leaves. In parts of Peru, the leaves are used by indigenous people as a diuretic and to combat liver diseases and treat gallstones. Indigenous uses were verified by researchers who showed that boldo leaves had diuretic, stomachic, and cholagogic properties. Boldo leaf is the subject of a German therapeutic monograph that suggests its use for mild gastrointestinal spasms and dyspeptic disorders as well as a subject of a U.S. monograph, which shows that boldo causes clinically significant diuresis. Boldo's history in traditional medicine is well documented. The plant is used in homeopathy in the treatment of digestive disorders, as a laxative, choleric, diuretic, and for hepatic disturbances. The leaves have been used for worms, and Dr. James Duke (1985) reports its traditional use for urogenital inflammations like gonorrhoea and syphilis, as well as for gout, jaundice, dyspepsia, rheumatism, head colds and earaches. In Brazilian herbal medicine today, boldo is highly recommended as a digestive tonic, to eliminate gas and bloating, for digestive and liver complaints and as a diuretic. The Physicians' Desk Reference for Herbal Medicine cites that boldo has been shown to be antispasmodic, choleric and to increase gastric juices but is contraindicated in patients with bile duct obstructions and those with severe liver diseases. Boldo is rich in phytochemicals including at least 17 known alkaloids. A total of at least 38 phytochemical compounds have been identified. In herbal medicine today, boldo is used extensively throughout Europe, North America, South America and Latin America as a specific for gallstones and gallbladder inflammation, and for many types of liver, stomach and digestive disorders. The average therapeutic dose is reported to be 3 to 4.5 grams of the dried leaves daily. Boldo has been documented to have abortive properties and its use during pregnancy is contraindicated.

The FAO has published an entire study of non-wood forest products of Chile, *Productos Forestales no Madereros en Chile* (Roasio 1998). Although it is in Spanish, it is a great, detailed account of many of the products used in Chile. The FAO also has an office in Santiago.

### **6.1.7 Pulp and Paper Production**

International sales of cellulose, exported mainly as chemical pulp, make Chile the leading exporter of this product. Seven companies account for 100% of Chilean pulp production and over 70% of paper and containerboard. Leading producers include Celulosa Arauco y Constitución, Exportadora e Importadora CMPC, Celulosa del Pacífico, Papelera Concepción, and Papeles Bío-Bío (ProChile 2002).

Wood chip output in 2000 was up from 1999 due to the increasing prices for wood pulp as the Asian countries' economies showed signs of recuperation. Another significant fall of wood pulp prices had a negative effect on wood chip demand and production was expected to stay about the same or slightly higher into 2002. The effect of the Asian Crisis, which affected economies in most parts of the world, dropped wood chip export prices in 1997, but was felt most in 1998, as a result of a lower export demand and lower export prices. Wood chip production and exports were not expected to fall significantly at the time because most chip producers had long-term contracts with importers (Hennicke 1998-2001).

**Table 24: Forest Products Production 1992-2000**

	Units x1000	1992	1993	1994	1995	1996	1997	1998	1999	2000
Roundwood	m <sup>3</sup>	28373	29855	31053	34580	29831	29977	31729	33973	35717
Industrial Roundwood	m <sup>3</sup>	19357	20534	21387	24880	19382	19570	21314	23179	24437
Sawlogs and Veneer Logs	m <sup>3</sup>	8482	9238	10011	11645	11024	12132	10313	11783	12424
Pulpwood and Particles	m <sup>3</sup>	10322	10743	10823	12591	7765	7063	0	0	0
Other Indust Roundwd	m <sup>3</sup>	553	553	553	644	593	375	263	249	211
Wood Fuel	m <sup>3</sup>	9016	9321	9666	9700	10449	10407	10415	10794	11280
Wood Residues	m <sup>3</sup>	1976	2080	1916	1916	1916	1916	1916	1916	1916
Sawnwood	m <sup>3</sup>	3020	3113	3364	3802	4140	4661	4551	5254	5698
Sawnwood (C)	m <sup>3</sup>	2565	2663	2927	3394	3744	4274	4222	4933	5351
Sawnwood (NC)	m <sup>3</sup>	455	450	437	408	396	387	329	321	347
Wood-Based Panels	m <sup>3</sup>	490	613	722	834	942	1041	971	1063	1187
Veneer Sheets	m <sup>3</sup>	28	40	46	69	88	87	104	112	97
Plywood	m <sup>3</sup>	57	59	64	73	69	65	129	166	214
Particle Board	m <sup>3</sup>	234	255	299	348	379	425	321	301	366
Fiberboard	m <sup>3</sup>	171	259	313	344	406	464	417	484	510
Wood Pulp	t	1685	1867	1955	2113	2146	2077	2210	2434	2592
Mechanical Wood Pulp	t	181	183	184	184	214	209	230	370	372
Chemical Wood Pulp	t	1499	1682	1769	1929	1932	1868	1980	2064	2220
Dissolving Wood Pulp	t	5	2	2	0	0	0	0	0	0
Recovered Paper	t	136	136	136	136	136	136	136	136	136
Paper and Paperboard	t	508	526	553	573	680	614	642	795	861
Newsprint	t	161	185	186	206	198	184	163	225	244
Printing+Writing Paper	t	82	86	98	70	83	116	137	129	144
Other Paper+Paperboard	t	265	255	269	297	399	314	342	441	473

Source: FAO

Note: t = metric tons

## 6.2 FOREST PRODUCTS IMPORT

While imports are not nearly as important to Chile as its forest product exports, domestic demand is expected to rise and so this may become more important in the future. For now, its forest products trade balance is definitely positive (Table 25).

### 6.3 FOREST PRODUCTS EXPORTS

In 2000, Chile's forest product exports totaled USD 2.37 billion, up from USD 1.96 billion the year before, due to the recuperation of prices for cellulose and demand for wood chips, logs for pulp, and lumber. Forestry exports sales were expected to fall slightly for 2001 because of weaker demand in its main markets. FAS predictions speak of an economic slowdown in the U.S., the main market for Chilean forestry products in terms of sales, and unchanged demand in the main European countries and Japan. 1998's exports were affected the most by the economic recession's weak demand and low prices for cellulose, wood chips, and logs for pulp production.

Export sales of secondary products were led by medium density fiberboard (MDF) wood trim with USD 112 million in sales, followed by dressed sawnwood at USD 43 million, and clear wood blocks at USD 23 million (ProChile 1999).

Although production of softwood lumber is expected to grow in the next few years, exports will probably not grow at the same rate because the industry is trying to add value to its output by increasing manufacture of exportable wood products. In the coming years, however as the availability of pruned lumber increases, exports of softwood lumber will rise. Increasing pruned lumber is the result of successful management of radiata pine plantations. Softwood lumber expanded again in 2000 when compared to the previous year due to a relative strong export demand for planed softwood lumber. For 2001 and 2002, production was expected to increase further as export demand increased and the local construction business recuperated.

The major world markets for Chilean forest products include Japan, the U.S., Korea, the EU, China, and Taiwan. The U.S. was Chile's largest export market in 1998, 1999, and 2000, accounting for almost 20% of total exports, followed by Japan with about 13% of total exports in 2000, which was Chile's largest export market in 1997 and before. Chile's main exports to the United States are pulp, wood moldings, and boards. New Chilean exports to the U.S. market include wood chips and furniture — two segments that have seen outstanding growth. Exports to the U.S. have been increasing in spite of a federal court injunction preventing the USDA from issuing new import permits for unprocessed temperate wood products. U.S. imports of Chilean wood products have been dramatically increasing from 1996-2001 with the most dramatic increase in 1998 (Continental Pacific LLC 2001; Henniecke 1998-2001).

The fastest growing areas are in secondary manufacturing. From the 80's to the 90's growth in secondary manufacturing rose from USD 60 million to over USD 300 million, a 500% increase. In the primary sector, sales during the same period rose from USD 500 million to USD 1.2 billion, an increase of approximately 140%. It can be seen that the largest increases in products are in value-added items and less in the export of basic raw materials. This supports the belief that Chile is moving into secondary production of wood products (ProChile 2002).

The companies Arauco, CMPC, Terranova, Forestal del Sur, Copihue, Bio Bio, and Masisa contributed the highest percentages to forestry exports in 2000 (INFOR 2001).

For 2000, native wood products (sawnwood) exports were valued at USD 81.6 million and represented 3.5% of the exports of forest products. This figure has risen 7.2% from 1995-2000. Lenga, rauli, ulmo, roble, and coihue have risen the most (23%). Lenga accounts for the largest percentage of exports. It accounted for USD 4.54 million in 1995 and USD 12.78 million in 2000. Major destinations for these products are the U.S., Italy, Spain, Bolivia, Argentina, and Japan (Informativo Maderas 2001).

While not readily available because of the extreme fragmentation of the market, a small portion of NTFP exports are provided in Table 30. This market should become more promising when ways to access an accurate valuation are possible and as development of the native forest product industry progresses. Exports rose from USD 12.9 million in 1990 to USD 34.2 million in 1997 and the intermediary value was estimated to have been about USD 43 million. These figure are also most likely undervalued, as the data is difficult to obtain (Rosasio 1998).

**Table 25: Forest Products Imports, Exports, and Consumption 2000**

	Units	Import		Export		Production	Consumption
		Quantity	USD (x1000)	Quantity	USD (x1000)	Quantity	Quantity
Sawnwood	m <sup>3</sup>	0	0	1718000	293633	5698000	3980000
Sawnwood (C)	m <sup>3</sup>	0	0	1678000	275676	5351000	3673000
Sawnwood (NC)	m <sup>3</sup>	0	0	40000	17957	347000	307000
Wood-Based Panels	m <sup>3</sup>	0	0	435000	123544	1187000	752000
Veneer Sheets	m <sup>3</sup>	0	0	52000	17422	97000	45000
Plywood	m <sup>3</sup>	0	0	98000	38390	214000	116000
Particle Board	m <sup>3</sup>	0	0	42000	5944	366000	324000
Fiberboard	m <sup>3</sup>	0	0	243000	61788	510000	267000
Wood Pulp	t	13400	6222	1835000	1110420	2592000	770400
Mechanical Wood Pulp	t	100	52	0	0	372000	372100
Semi-Chemical Wood Pulp	t	0	0	0	0	0	0
Chemical Wood Pulp	t	13300	6170	1835000	1110420	2220000	398300
Dissolving Wood Pulp	t	0	0	0	0	0	0
Paper and Paperboard	t	255900	178800	313400	189754	861000	803500
Newsprint	t	3400	1977	183000	104144	244000	64400
Printing+Writing Paper	t	91500	76641	17500	12532	144000	218000
Other Paper+Paperboard	t	161000	100182	112900	73078	473000	521100
Roundwood	m <sup>3</sup>	0	0	681000	35847	35717000	35036000
Industrial Roundwood	m <sup>3</sup>	0	0	681000	35847	24437000	23756000
Wood Fuel	m <sup>3</sup>	0	0	0	0	11280000	11280000
Wood Residues	m <sup>3</sup>	0	0	0	0	1916000	1916000
Other Fiber Pulp	t	0	0	0	0	0	0
Recovered Paper	t	0	0	22000	3428	136000	114000

Source: FAO

Note: t = metric tons

**Table 26: Amount of Forestry Exports by Products 1995 – 2001**

<b>Product</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
<b>Total</b>	<b>2,369.3</b>	<b>1,807.9</b>	<b>1,829.9</b>	<b>1,660.5</b>	<b>1,970.7</b>	<b>2,365.2</b>	<b>2,205.6</b>
<b>Chemical Pulp</b>	<b>1,270.4</b>	<b>764.4</b>	<b>689.2</b>	<b>692.3</b>	<b>766.8</b>	<b>1,110.4</b>	<b>863.2</b>
Raw	195.7	109.6	93.4	106.4	125.4	154.7	138.1
Bleached, fluffed pine	902.9	523.1	492.5	463.5	503.8	744.2	554.7
Bleached Eucalyptus	171.8	131.6	102.8	122.4	137.6	211.5	170.4
<b>Wood Chips</b>	<b>232.8</b>	<b>170.9</b>	<b>147.0</b>	<b>130.5</b>	<b>133.0</b>	<b>133.7</b>	<b>148.1</b>
Native	138.5	91.4	87.0	60.6	42.8	29.1	16.0
Eucalyptus	64.4	59.1	50.4	68.6	90.3	103.7	128.5
Radiata	29.9	20.4	9.6	1.3	-	0.9	3.6
<b>Roundwood</b>	<b>144.2</b>	<b>103.5</b>	<b>106.9</b>	<b>23.2</b>	<b>50.1</b>	<b>35.8</b>	<b>26.3</b>
<b>Roundwood for pulp</b>	<b>29.2</b>	<b>11.6</b>	<b>14.9</b>	<b>10.7</b>	<b>28.9</b>	<b>30.2</b>	<b>22.0</b>
Radiata	11.8	6.8	5.8	6.2	5.1	4.0	4.0
Eucalyptus	15.6	4.7	9.1	4.5	23.8	26.2	18.0
<b>Roundwood for sawnwood</b>	<b>115.1</b>	<b>92.0</b>	<b>91.9</b>	<b>12.5</b>	<b>21.2</b>	<b>5.6</b>	<b>4.3</b>
Radiata	112.1	90.1	88.5	11.4	19.5	3.0	1.9
Other species	3.0	1.9	3.5	1.1	1.6	2.6	2.5
<b>Sawnwood</b>	<b>222.9</b>	<b>185.6</b>	<b>217.4</b>	<b>176.9</b>	<b>173.3</b>	<b>189.7</b>	<b>178.8</b>
Radiata	209.9	174.7	205.8	162.8	156.7	172.0	168.0
Other species	13.0	10.9	11.6	14.1	16.6	17.7	10.9
<b>Wood Panels</b>	<b>80.7</b>	<b>96.2</b>	<b>110.4</b>	<b>86.6</b>	<b>116.6</b>	<b>123.8</b>	<b>144.6</b>
Fiberboard	8.3	7.3	7.5	6.8	7.5	7.1	8.5
Particleboard	11.8	9.8	9.8	4.6	4.2	5.9	8.9
Plywood	3.2	1.9	3.2	10.2	36.5	38.4	58.4
Veneer sheets	11.2	19.4	24.3	18.6	20.0	17.4	13.9
MDF	46.1	56.8	65.0	46.4	48.2	54.7	54.7
<b>Secondary Products</b>	<b>189.9</b>	<b>264.9</b>	<b>354.7</b>	<b>330.8</b>	<b>462.4</b>	<b>457.6</b>	<b>492.6</b>
Elaborate Wood	32.3	43.6	79.1	74.0	122.2	144.2	146.2
Doors and windows	36.5	38.7	48.6	49.8	77.5	85.2	102.6
Molding	44.4	53.5	87.3	112.0	172.4	137.3	177.4
Furniture	33.0	33.0	44.8	46.1	48.1	51.9	46.1
Laminated products	31.1	69.1	68.8	13.2	28.1	26.1	20.3
Other products	12.5	26.9	26.1	28.8	34.5	44.4	-
<b>Papers and Paperboard</b>	<b>190.7</b>	<b>174.9</b>	<b>165.9</b>	<b>163.7</b>	<b>212.5</b>	<b>250.3</b>	<b>270.1</b>
Newsprint	111.3	98.0	76.6	69.1	86.0	104.1	110.5
Other paper	79.4	76.9	89.3	94.5	126.5	146.2	159.6
<b>Non-wood products</b>	<b>31.7</b>	<b>40.7</b>	<b>31.9</b>	<b>56.5</b>	<b>28.6</b>	<b>25.0</b>	<b>26.1</b>
Other products	6.0	6.8	6.4	7.0	6.9	7.4	36.1

Source: CONAF – INFOR

Note: Units are USD Million, FOB

**Table 27: Chile's Forestry Exports by Destination**

Country	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990
United States	466.6	486.1	358.0	318.3	233.2	217.1	176.2	136.8	88.4	68.0	50.4
Japan	302.2	271.0	253.3	362.4	347.5	484.1	360.5	307.3	285.1	286.2	219.4
Belgium	178.1	92.7	122.4	107.3	116.7	246.6	118.5	77.1	83.2	63.3	83.4
Italy	152.8	82.5	96.3	89.2	90.6	115.9					
China	144.9	98.9	130.9	61.7	67.9	65.9					
Argentina				90.5	88.6	82.8	71.1	60.2	50.8	28.9	9.8
Taiwan	130.0	88.6	65.4	92.1	92.0	114.9	86.2	52.0	41.2	13.0	13.6
So. Korea	90.3	109.0	48.0				183.4				
Korea								135.8	63.4	51.4	54.8
Others	900.3	726.3	586.2	653.4	702.2	968.8	568.4	437.9	513.7	402.2	424.3
<b>Total Exports</b>	<b>2,365.2</b>	<b>1,955.1</b>	<b>1,660.5</b>	<b>1,829.9</b>	<b>1807.9</b>	<b>2,369.3</b>	<b>1,564.3</b>	<b>1,207.1</b>	<b>1,125.8</b>	<b>913.1</b>	<b>855.3</b>

Source: INFOR

Note: Units are USD Million, FOB

**Table 28: Softwood lumber exports by destination**

Country	January-October 2001	2000 (m <sup>3</sup> )	1999 (m <sup>3</sup> )	1998 (m <sup>3</sup> )	1997 (m <sup>3</sup> )
U.S.	1,315,963	632,758	1,137,898	750,261	462,179
Japan	482,494	439,967	513,219	456,602	564,745
Mexico	173,648	123,736	11,753	0	0
Saudi Arabia	141,349	144,059	117,638	108,969	79,460
United Arab Emirates	96,739	110,965	81,454	167,127	88,296
World	2,628,805	1,944,795	2,480,623	1,982,628	1,660,109

Source: World Trade Atlas

**Table 29: U.S. Imports From Chile**

<b>HTS Number</b>	<b>1996 (USD)</b>	<b>1997 (USD)</b>	<b>1998 (USD)</b>	<b>1999 (USD)</b>	<b>2000 (USD)</b>	<b>2001 (USD)</b>	<b>Percent Change 2000 - 2001</b>
4409 wood, continuously shaped	6,753,729	8,876,253	58,690,903	157,726,551	140,484,865	175,723,346	25.1%
4407 wood sawn	64,738,214	89,219,451	96,881,400	150,504,694	144,098,475	133,066,419	-7.7%
4411 fiberboard	3,669,911	10,227,260	14,688,771	42,362,861	44,364,500	50,285,732	13.3%
4408 vener sheets and sheets for plywood	2,448,683	4,802,582	5,297,634	6,205,292	5,010,764	5,909,689	17.9%
4412 plywood, veneered panels	0	36,525	22,668	883,554	4,057,671	2,774,898	-31.6%
4403 wood in the rough	1,406,880	1,612,090	1,057,925	767,277	624,547	889,114	42.4%
4418 windows and doors	151,892	78,437	22,731	7,799	176,295	150,488	-14.6%
4410 particle board	26,629	0	3,171	0	0	0	N/A
<b>Total</b>	79,195,938	114,852,598	176,665,203	358,458,028	338,817,117	368,799,686	8.8%

Source: USITC



**Table 30: Volume and Price of Some Non-wood Forest Products (1996)**

<b>Product</b>	<b>Exported Volume (metric tons)</b>	<b>FOB USD</b>
sweetbriar rose ( <i>Rosa eglanteria</i> )	8,363	28,917,309
soapbark tree/Quillaia ( <i>Quillaja saponaria</i> )	1,224	4,151,161
wild mushrooms ( <i>Citaria</i> spp., <i>Boletus</i> spp., etc.)	5,495	7,689,550
boldo leaves ( <i>Peumus boldus</i> )	1,383	810,938
Wicker	850	696,194
American bamboo ( <i>Chusquea</i> spp.)	37	10,528
hazelnut oil ( <i>Gevuina avellana</i> )	0.3	7,408
<b>TOTAL</b>	<b>17,352.3</b>	<b>42,283,088</b>

Source: (Neira et al. 2002)

### 6.3.1 Strategic Outlook

Chile's large plantation base of radiata pine and eucalyptus added to their determination to optimize production, silviculture, and increase production quality should allow the country to continue its recent growth in exports. Chile is increasingly likely to become more competitive in international markets. Chile has gained preferred market access to certain countries by participating in free trade agreements with MERCOSUR, Canada, and Mexico. Chile is able to purchase high-technology equipment duty free that will continue the modernization of its industry. Segments of the industry are moving away from primary products into secondary, higher value items and additional clear sawnwood. This should help alleviate some of the recent downturns in regional and product markets. Chile's strong economic and fiscal policies should continue to attract foreign investment to modernize the industry. Chile is increasing its spending on capital improvement and infrastructure projects that will increase the competitiveness of the industry. The location of their export markets, environmental situation, and indigenous situation, as well as the consolidation of the industry are disadvantages for them. With Arauco controlling the majority of the industry with their political power, negotiating with them is difficult. For instance Oxiquim, a chemical company, makes 50-60% of their sales to Arauco and it is difficult to get a fair price. Having Louisiana Pacific in the picture makes things better now by giving them more negotiating leverage, but the strategy is to look for other markets in South America. Because two main companies own 80% of the productive land, it is very difficult for someone else to invest in land ownership in Chile (Mollenhauer and Rosasti personal communication 2002).

As Chile continues to expand its forest products industries, especially the value-added sector, they plan to strike a balance between their commodity exports and value-added exports, diversify their products and species used, and look for niche markets to further decrease their reliance on commodity products. Chilean firms will be seeking to become even more involved in world markets and to increase the quality of their products to meet the demands of domestic and foreign market segments. These trends suggest among other things, an increasing need for additional forest product marketing information and skills in the marketing of both wood and non-wood products. This training will need to incorporate adaptations for the changes involved in shifting from mostly primary product marketing activities to a more secondary product economy where products are highly manufactured (e.g. furniture) (Bush 2000). In order for this to happen, Chilean academia will need to cooperate more with the business sector. Chileans tend to focus on modeling for companies, but there is a need for more focus on sharing of market information. This should help with the standardization and harmonization issues with market demand and increasing firms' competitiveness while decreasing their reliance on third parties. Chileans' focus on exports gives them an advantage over countries that focus on domestic demand, making them a more reliable trading partner. The Argentina Crisis has caused them to increase the volume of their specialty products. While there are not many types, supporting industries like transportation and chemicals can continue to work together with the forest industry on these issues.

Because exports have been the engine of economic growth in recent decades, possible protectionist measures arising in countries that purchase its products are a permanent source of concern, especially when the exports are based on natural resource exploitation, which makes them highly prone to allegations of environmental damage. The forest sector does have some weak points, but they also have a well-diversified international forestry trade; for the most part, plantations are managed sustainably; wood pulp producers have made the necessary investments in modern low-pollution industrial plants; and although not perfect, there are well established State institutions for regulating and controlling forestry management. Restrictions on production technologies (such as Totally Chlorine Free bleaching), eco-labels, sustainable forestry management and forest certification requirements, NGO pressures and boycotts, and threats to plantations can all be seen as threats to trade in forest products, but in order to compensate for the higher production costs firms will need to search for competitive advantages by differentiating themselves in terms of environmental benefits or socially conscious products. Many Chilean firms are ready for product certification, but are waiting to see which system will be best for Chile. They are concerned with the risk of monopoly of one label and only 10 NGOs exist in Chile, so there is virtually no representation for the companies and not everything fits the model established for deciding what is "sustainable".

Milalemo is one certified company in Chile and actually collaborates with CODEFF on a forest moratorium on endangered plants regenerating in the understories of plantations and restoration of these areas. The idea is to make companies manage for these species (Versherua personal communication 2002). Many believe even with its problems, certification is the best hope to stop degradation, have monitoring, and improve timber company performance. The loss of diversity is not well understood and an all-inclusive valuation system for forests needs to be established.

## **6.4 FOREIGN INVESTMENT IN CHILEAN FOREST PRODUCTS INDUSTRY**

### **6.4.1 Overview**

In the second half of the 1980s the Chilean economy received major capital flows in the form of FDI in other resource-based production sectors. This inflow coincided with strong growth in exports of forestry products, paper and pulp, and some agricultural (mainly fresh fruit) and fisheries products. In most cases, investment helped to fortify local groups and boost exports. In the 1990s, however, tougher competition on in world commodities markets and slimmer profit margins meant that some of the foreign investors that had been very active during the previous decade withdrew or relocated (U.N. ECLAC 2001).

Chile's enormous natural advantages in the forestry sector have been reflected in the rapid growth of the country's tree plantations. Since the 1974 Law 701 legal framework was revised by a package of laws, which reduced the tax incentives and incorporated stronger environmental and social provisions, the private sector began to invest heavily in exports, particularly of pulp. The ratio of output to external sales of pulp quickly rose above 65% and in 2001 stood at above 80%. The increase in investment came about in an international context marked by increasing competition and growing concentration of production. Seeking to benefit from economies of scale, optimize operations, streamline production structures and reduce costs, major companies increased the scale of their production activities and geographical diversification. It therefore became necessary to seek new terrain in which to invest and to take advantage of the special incentives offered by countries keen to develop their industries. So, countries with low relative costs such as Chile, Brazil, and South Africa became attractive destinations for international market leaders, which led to an increase in their share of world production. During the second half of the 1980s, the sector recorded large amounts of FDI, much of which entered the country under the debt-equity conversion program. In fact, the forestry sector was the main target of Chapter XIX transactions, accounting for almost 30% of the total. In most cases, foreign firms forged alliances with the main local groups in the sector (Matte and Angelini). The most significant investments included (U.N. ECLAC 2001):

1. A joint venture between the local firm Compañía Manufacturera de Papeles y Cartones S.A. (CMPC) of the Matte group and the United States firm Simpson Paper Company to develop an industrial complex known as Celulosa del Pacífico (CELPAC), which produced bleached pulp and derivatives;
2. The purchase of Forestal e Industrial Santa Fe S.A. (an industrial complex producing bleached pulp and derivatives) and its raw materials supplier Forestal Colcura S.A., in addition to the development of a reforestation program by a consortium led by the United Kingdom-Netherlands firm Royal Dutch-Shell and Citicorp and Scott Paper of the United States;
3. The purchase of a majority share in Compañía de Petróleos de Chile S.A. (COPEC) from the local group Angelini by the New Zealand firm Carter Holt Harvey Co. These resources enabled COPEC to prepay its external borrowings, an operation which it had been unable to undertake after its bid to gain control of the country's largest private business complex (Rozas 1992). In mid-1987 forestry activity represented 56% of COPEC assets, headed by Compañía de Celulosa Arauco y Constitución S.A. (CELCO); and
4. The purchase of Forestal Bío Bío S.A. and Papeles y Bosques Bío Bío S.A., which together produced 40% of the newsprint manufactured in the country at that time, by the New Zealand firm Fletcher Challenge.

Most of these investments were associated with the transfer of existing assets that had been rendered relatively non-convertible either by high levels of borrowing on the part of domestic firms or simply by the fact that the controlling local shareholders had gone bankrupt. These assets were largely acquired by transnational firms from the United States (Simpson Paper Co. and Scott Paper Co.) and New Zealand (Carter Hold Harvey and Fletcher Challenge), which had no existing operations in the country or by transnational banks that were carrying large sums of Chilean external debt. So, the forestry sector channeled investments worth USD 192 million through Decree Law 600 between 1982 and 1989 and USD 1.026 billion through Chapter XIX between 1985 and 1989 (U.N. ECLA C 2001).

The increase in installed capacity at world level, combined with a steep decline in demand from the countries of the Organization for Economic Cooperation and Development (OECD), caused a sharp price drop, which obliged companies to reduce costs and improve efficiency. In the first half of the 1990s investments in Chile were in the process of maturing, and this was reflected in an increase in output and exports. Between 1990 and 1996, output grew by 11.9% per year, while productivity recorded an increase of 7.9%. Sector growth displayed a shift towards specialization in pulp production and downstream integration in the forestry sector, reflecting firms' attempts to benefit from economies of integration, associated with natural advantages, and economies of scale, associated with the size of plants. Pulp exports grew from about USD 400 million to almost USD 2 billion between 1985 and 2000, coming to account for 11% of the country's external sales (U.N. ECLAC 2001).

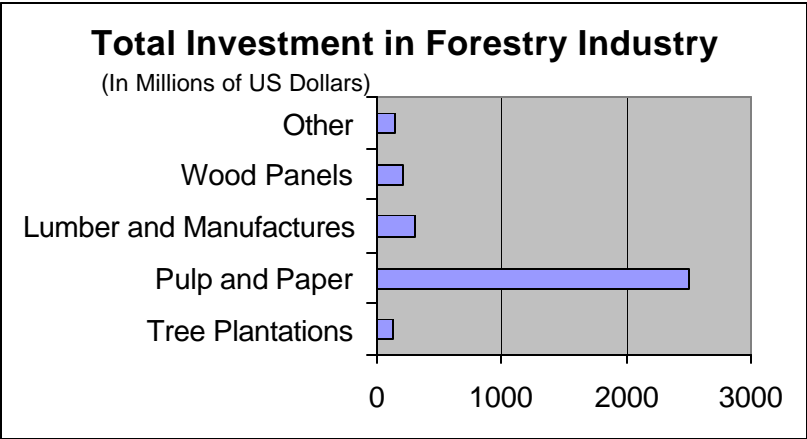
In response to these trends, transnational corporations began to withdraw from the Chilean forestry industry. The Matte group bought the assets of Royal Dutch-Shell (Forestal e Industrial Santa Fe), and Simpson Paper (Celulosa del Pacífico) sold its assets to the Matte group. In September 1997, CMPC bought 80% of Forestal e Industrial Santa Fe from Royal Dutch-Shell, thus gaining 100% control of the short-fiber pulp plant. In December of the same year, CMPC acquired the stake of Simpson Paper and other minority shareholders to own Celulosa del Pacífico and Forestal Angol outright, in an operation that represented a total investment of USD 476 million. After these purchases, CMPC embarked upon a process of reorganization, which included merging and transferring some assets. Later, the alliance between Carter Holt Harvey and COPEC was dissolved, and the Angelini group took control of the assets held by the New Zealand firm. In December 1999 the Angelini group gained control of COPEC after purchasing Carter Holt Harvey's stake in the company for some USD 1.233 billion. The main alliances between domestic and foreign firms thus came to an end, FDI flows to the sector stagnated and local groups positioned themselves as the main agents of production and export. Currently, these local groups are embarking upon strategies involving the international expansion of production that will allow them to take advantage of subsidies and lower land prices to develop new plantations in neighboring countries (U.N. ECLAC 2001).

In summary, the relatively small presence of foreign capital in the Chilean forestry sector can be attributed to a variety of factors. The production base of the sector was structured several decades ago, so private local groups were able to position themselves better than in other sectors and maintain their market share until their investments matured at the end of the 1980s. The Matte and Angelini groups were large property holders in the sector and their firms displayed positive levels of growth, output and export competitiveness, especially in pulp. Given these conditions, the best alternative available to foreign firms was to associate with local groups, which were already well run, were integrated into local input networks and had developed competitive exports. Competition on commodities markets became tougher in the 1990s, with a significant decrease in profits, and this prompted the withdrawal of the foreign investors that owned stakes in some of the sector's leading companies (U.N. ECLAC 2001).

Foreign investment has also been instrumental in the development and export performance of resource-based activities. In the second half of the 1980s foreign investors were heavily involved in the forestry sector and the industry associated with its derivatives, particularly pulp. U.S. and New Zealand firms used the debt conversion mechanism to form partnerships with local groups to extract forestry resources, and the sector and its exports expanded rapidly in the first half of the 1990s, but in the second part of the decade these partnerships came to an end and foreign investors withdrew almost entirely from the forestry sector. During the past decade, investment in the Chilean forest products sector exceeded USD 3 billion and this is expected to reach USD 5 billion by 2005 (FAS, 1998). In 1998 the country had four particleboard plants, four medium density fiberboard plants, seven plywood plants and four veneer mills. Chile's investments in the pulp industry have doubled capacity in the last few years and are projected to reach 3.5 million tons by 2010 (U.N. ECLAC 2001).

However, as stated before the Chilean government provides active encouragement to private sector forest activity and Chile is seeking foreign investment to capitalize on its wealth of raw materials, in developing value-added wood products. Opportunities include investment in sawmills, pulp plants, wood composite panels, and wood impregnation. As the forestry resource increases, the production of lumber, particleboard, paper and pulp will also grow. A wide variety of projects have resulted from investment in forest products industries, but much more will be required in the future (Figure 6 and Table 31). A recent example is the Louisiana Pacific investment of USD 40 million in 2001 for an OSB plant (Continental Pacific LLC 2001; Trade and Media Services Ltd 2000; Feller Rate Vision De Riesgo 2001).

Some major recent joint venture corporate expansions with Chilean companies have been: Boise Cascade’s (U.S.) joint venture with Chile’s Maderas Condor for USD 150 million OSB plant near Valdivia; Chilean-owned Bomasil and Louisiana Pacific’s (U.S.) USD 33 million OSB plant near Puerto Montt; Chile’s Masisa and Georgia Pacific’s (U.S.) joint chemical resin business in Concepcion; Forestal Terranova’s export agreement with Canada’s Premdor for the production of door frames (ProChile 1999).



**Figure 6: Investment in the Chilean Forest Products Industry 2001**  
Source: CONAF

**Table 31: Investments in Chile forest products**

Country	Local firm	Investor	Project	Investment (USD Millions)
<b>R.M.</b>				
U.S.	Woodgrain Chile Ltd.	Woodgrain Millwork Inc.	Process prefabricated wood products	3
U.S.	Maderas Beagle S.A.	Jeld-Wen Inc.	Wood doors	5.9
Cayman Isles	Infodema S.A.	Darby Emerging Markets Fund	Exports of wood in semi- and fully-processed form	2.6
Mexico	Delher Limitada, Industrial de Muebles	V. Delgado C. and others	Making kitchen and bathroom furniture	0.6
U.S.	Manufacturas y embalajes Inland Chile Ltda.	Inland Chile I & II Inc.	Corrugated carton plant	37.35
U.S.	-	Union Camp Corp.	Building and commissioning paper and carton plant	18
U.S.	Mead Packaging Chile	Mean Packaging International	Paper-making plant, for cartons, etc.	2
U.S.	Xerox de Chile S.A. Reproducciones	Xerox & Pacific Services and Development Corp.	Photocopy paper and other materials	1.2
Uruguay	Inversiones Andinas Limitada	Compania Litex Sociedad Anonima	Corrugated carton plant	.995
<b>Region VIII</b>				
Japan	Volterra S.A.	Sumitomo Corp/Nippon Paper	Forest exploitation and chipwood production	53.2
Japan	Astillas Exportaciones Limitada	Mitsubishi Corp.	Chipwood production	6
Canada	Foraction Chili S.A.	3429458 Canada Inc.	Central wood processing plant	5.6
Korea	Poong Jun Chile S.A.	Poong Jun Co Ltd.	Lumber export facility	4.5
Japan, Spain	Fibranova S.A.	Sumitomo Corp/IFC	Processing wood and derivatives	4.2
Sweden, Germany	Aserraderos Los Alpes S.A.	Svenska Scanmark Tra Stal Aktiebolag & F & J Lumber International & others	Installation of sawmill for exports and the production of pallets	1.95
Sweden	JCE Chile S.A. & Modulos JCE S.A.	Consafe Invest Aktiebolag y JCE	Forest planting and mouldings for housing in export markets	1.75
Japan	Inversiones Forestales CCA S.A.	Itochu Corp.	Woodchip production for pulp	1.16
Spain	Maderinter S.A.	Envases Querol S.A.	Sawn wood processing plant	1.0
<b>Region VI</b>				
UK	Corrupac S.A.	Inversiones Stone de Chile BVI Ltd.	Papers and cartons	5
<b>Region VII</b>				
Sweden	Alby Kemi Chile Limitada	Albry Kemy Aktiebolag & Eka Novel Elektrokemi Aktiebolag	Lumber production	15.6
Switzerland	Licancel S.A.	Linvest Limited & Cellulose Attishholz A.G.	Bleached pulp production	186

Holland	Cia Shell Forestal Limitada	Shell Overseas Investments	Eucalyptus pulp production	61.2
<b>Region IX</b>				
Korea	Forestal Lautaro S.A.	Eagon Industrial Co Ltd. Eagon Forest Products Inc.	Production of wood products	18.9
China	Forestal Minfortune S.A.	Zhizhong Wang	Boards and panel production	.7
	Celulosa del Pacifico S.A.	International Finance Corporation	Bleached pulp production	105.8
<b>Region X</b>				
Japan	Forestal Anchile Limitada	Daio Paper Corp, Nagoya Pulp Corp.	Forests and wood production	70
Ireland	Forestal Neltume - Cerranco S.A.	Granby Trading Limited	Forest harvest and lumber	11.5
Panama	Bosque y Maderas S.A., Bomasa	Forestal del Norte S.A., IFC	Forests and plywood	10.5
Liechtenstein	Maderera Ecoforestal Limitada	Alpebola S.A. – Schaan	Wood processing	2.2
U.S.	Cia. Chilena de Chapas S.A.	Pacific Coast Veneers Inc.	Board production	1.5
U.S.	Chile Veneers S.A.	R.E. Diaz P and others	Veneer production	.850
U.S.	Aserraderos Paillaco S.A.	Cascade Wood Products Inc.	Wood production	1.0
Austria	Forestal Integral S.A.	J. Purstinger and others	Sawmill installation	.774
France	Forestal Santa Cruz Limitada	Hubert Industries S.A.	Development of sawmill and secondary processing plant	.700
<b>Region XII</b>				
Canada	Forestal Trillium Ltda.	Bayside Ltd. Sentarn Enterprises, Talmata Corp.	Wood and forest exploitation	180.5
<b>Region XI</b>				
Germany	HOL Chile Importadora y Exportadora Limitada	HOL – Export GmbH	Production and sales of wood boards and refined products	.450

\* Source: *Lignum Chile* 1998; Trade Media Services Ltd.

An example of an investment in Chile's native forest resource that has received a lot of media attention due to its controversial nature is the Rio Condor Project involving the forestry company Savia, formerly Trillium, which has its headquarters in Bellingham, Washington. Its primary business is in real estate and construction. In the 1980's they entered the logging business. The Trillium's Rio Condor project was proposed in 1995 and was financed by capital from Bayside Limited (60%) and Goldman Sachs (40%), both from the USA. The Rio Condor project, representing an investment of USD 1.2 billion, intended to cut native forests and export wood products. Approximately 30-60% of the wood would be used for the production of wood chips and sawn wood principally for export to Europe. Trillium purchased 258,000 ha (637,260 acres) on the island of Tierra del Fuego in the extreme South of Chile and planned to exploit the old growth Coigue de Magallanes comprised of lenga (a Mapuche word for *Nothofagus pumilio*) and of 15% Coigue (*Nothofagus betuloides*). Chilean scientists estimated that approximately one half of Trillium's land had not been touched by man in the past. Trillium proposes to build a USD 150 million processing plant, which would include a sawmill, a wood drying plant, an energy regenerating plant, an aerodrome, and a port. The plan also includes the construction of a 1,600 km road. Trillium Corporation has received enormous support from the Chilean government to facilitate its investment. Trillium was able to purchase the land at a price significantly lower than the market value (between USD 1.70 and USD 117 per hectare). Trillium was also able to utilize government subsidies in the form of tax rebates and exemptions. A complete environmental impact statement was prepared in 1995 to explain the project and demonstrate that it could be conducted sustainably and harvesting began in 1996. The USD 12.5 million project (U.S. 1995) was to cover a total of 257,929 ha, of which less than half was initially targeted for timber harvest. The project came under fire as not being environmentally sustainable, but a great deal of effort was expended by Trillium to show that the project was in fact "sustainable". CODEFF was by and large in support of the project, mainly out of respect for their apparent commitment to an ecosystem-based approach to logging and wanting to encourage this philosophy throughout the forest industry. Defensores del Bosque were adamantly against it mainly on the basis that Savia's payment was due on Jan. 31, 1999, but they had not paid any money, nor had they carried out any public works in Region XII by 2000 and was still authorized by the current government, through CONAMA, to start exploitation of native lenga forest. Its environmental impact study was approved, the last approval necessary. Since then, the business announced the start of logging in 500 ha of land for 2000 by CONAF. They have also, under the name of Calafate, acquired the woodchip mill Magallanica de Bosques, in Punta Arenas, Region XII (Defensores del Bosque Chileno 2000; Wilcox 1996). CONAF also commented that Savia is a company of land developers, not ecologists and they have different goals than to manage native forest correctly and they need to better understand what is expected of them (Bonte personal communication 2002).

## **6.5 CHILE'S FOREIGN INVESTMENT IN THE FOREST PRODUCTS INDUSTRY**

While the extent of Chile's foreign investment data is not as widely available or detailed as that of foreign direct investment (FDI) in Chile, large forestry firms in Chile do tend to invest in other countries in order to expand and diversify the industry. Argentina, Brazil, Venezuela, Uruguay, Central America, and Mexico are some of the principle countries in which investments are made. Before this year's crisis, Argentina provided a very good investment climate with less environmental and indigenous pressures and good quality land that was less expensive and required a shorter rotation length (14-15 years) (Vargas personal communication 2002; Feller Rate Vision de Riesgo 2001). It is also the opinion of some that while it is relatively easy for Chileans to cross the Argentinean border for business, Argentina is not as open to do business with other countries, with the exception of the U.S., because of its conservatism.

Arauco acquired Forestal Parana, one of the most important companies in Argentina for cellulose exportation, in 1996. Arauco also owns plantations in Uruguay and was planning to construct an MDF plant in Argentina. CMPC has operations with important market positions in Argentina, Peru, and Uruguay.

Forestal Terranova S.A., who's principle subsidiary is Forestal Millalemu, sold Masisa S.A. in September of 2000. It has investments in Venezuela and Brazil and maintains commercial subsidiaries in Mexico, Colombia, Venezuela, and Costa Rica. Terranova also planned a finger jointed lumber and MDF plant in the U.S., another MDF and particle board plant in Venezuela, and 2 sawmills in Brazil and Venezuela. It purchased forest land in Venezuela and Brazil for USD 40 million (Feller Rate Vision de Riesgo 200; INFOR Dec. 2001).



Masisa acquired Mac Millan Guadiana, a Mexican subsidiary of Weyerhaeuser, planned an OSB plant in Brazil and consolidated a commercial office in Peru to focus on furniture. Masisa also has investments in Argentina (Koster and Valenzuela personal communication 2002; INFOR Dec. 2001).

Oxiqum, a supporting industry producing chemicals for wood products, is a partner with Terranova in Venezuela with plants right next to each other. They also have technology agreements with Borden and GP.

Muebles Sur S.A. installed a direct sales outlet in Mexico (INFOR Dec. 2001).

CMPC have joint ventures with P&G, Simpson Timber, offices in Atlanta and Japan for development with Home Depot, and a project in Argentina (Molina personal communication 2002).

Some Chilean companies consolidated to form a strategic alliance among the subsidiaries of Terranova, Terranova International, and the Mexican society Maderas y Sinteticos de Mexico (a subsidiary of Masisa) that constitutes a society in Mexico called MASNOVA of Mexico. MASNOVA's property is distributed in equal parts among associates. The objective of this agreement is to market all of the MDF panels and particleboard that these companies manufacture (INFOR Dec. 2001).

### **6.5.1 Strategic Outlook**

Chile's constitutional guarantees for foreign investment combined with an increasing resource base have provided a wide variety of projects for investment in forest products industries, but much more will be required in the future, as increasing production capacity will involve the development of numerous new projects for expansion. Expansion will open numerous opportunities for suppliers of all types of machinery and equipment for tree cultivating and harvesting, log processing, paper and pulp mill construction and equipment, and machinery for the manufacture of fiberboard, plywood, and furniture. Related services also can be expected to grow, such as consulting, forestry management, environmental planning, engineering, reforestation services, and marketing services that are geared to forestry and wood products. However, the consolidation of forestland ownership and resulting political power of the owners makes investing in forest land nearly impossible in Chile.

## 7.0 CONCLUSIONS/OUTLOOK

With the events of this year, it is difficult to predict South America's economic future, but Chile is well positioned to resume a trend of higher growth driven in the short-term by the improvements in the global conditions and a local policy mix that is demand supportive. The successful completion of the free trade agreements with the EU and being in the process of negotiating with the United States should also contribute to the resumption of rapid growth. In the medium-term, the economy is expected to reap the gains of the recent reforms of the domestic capital markets, which should essentially complete the process of financial integration with the rest of the world and increase efficiency in the mobilization of savings and investment. However long-term sustainability of a natural resource export-based development model is questionable.

Chile also provides an excellent investment climate. It has a democratic government with solid political stability, a stable legal system with clear and non-discriminatory laws, tradition of respect for the law, constitutional guarantees for foreign investment, a gateway to other Latin American markets, a qualified labor force and excellent professionals, and an honest public sector with clear-cut procedures. The forest industry has an increasing resource base, increasing production, and a wide variety of projects for investment in forest products industries and more available in the future.

Chile is increasingly likely to become more competitive in international markets as its exports continue to increase. Chile has gained preferred market access to certain countries by participating in free trade agreements with MERCOSUR, Canada, and Mexico. Chile is able to purchase high-technology equipment duty free that will continue the modernization of its industry. The trend in the industry is moving away from primary products into secondary, higher value items. Chile is increasing its spending on capital improvement and infrastructure projects that will increase the competitiveness of the industry. Chileans continue to work on increasing the quality of their products to meet the demands of domestic and foreign market segments, forest product marketing training, academia and business sector collaboration, sharing of market, standardization and harmonization with market demand, and adapting to the Argentinean crisis. Chileans' focus on exports gives them an advantage over countries that focus on domestic demand and make them a more reliable trading partner for the future.

The location of their export markets, environmental situation, and indigenous situation are disadvantages for them, as well as the very consolidated industry and native forests. In the face of uncertainty surrounding the use of native species, the country's main forestry entrepreneurs have abandoned or frozen their activities in native forests and native timber. Plantations are also limited and environmental pressures have made it increasingly attractive to divert investments to neighboring countries that have less restriction. Because exports of natural resource origin have been the momentum of economic growth in recent decades, possible protectionist measures arising in countries that purchase its products are a permanent source of concern. The forest sector does have well-diversified international forestry trade; for the most part, plantations are managed sustainably; wood pulp producers have made the necessary investments in modern low-pollution industrial plants; and although not perfect, there are well-established State institutions for regulating and controlling forestry management. Restrictions on production technologies (such as Totally Chlorine Free bleaching (TCF)), eco-labels, sustainable forestry management and forest certification requirements, NGO pressures and boycotts, and threats to plantations can all be seen as threats to trade in forest products, but in order to compensate for the higher production costs firms will need to search for competitive advantages by differentiating themselves in terms of environmental benefits or socially conscious products. Many Chilean firms are ready for product certification, but are waiting to see which system will be best for Chile. They are concerned with the risk of monopoly of one label and the fact that only 10 NGOs exist in Chile, so there is virtually no representation for the companies and not everything fits the model established for deciding what is "sustainable".



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# Appendices





## APPENDIX A: POLITICAL INFORMATION

**Country name:**

*conventional long form:* Republic of Chile

*conventional short form:* Chile

*local long form:* Republica de Chile

*local short form:* Chile

**Government type:** republic

**Capital:** Santiago

**Administrative divisions:** 13 regions (regiones, singular - region); Aisen del General Carlos Ibanez del Campo, Antofagasta, Araucania, Atacama, Bio-Bio, Coquimbo, Libertador General Bernardo O'Higgins, Los Lagos, Magallanes y de la Antartica Chilena, Maule, Region Metropolitana (Santiago), Tarapaca, Valparaiso  
*note:* the U.S. does not recognize claims to Antarctica

**Independence:** 18 September 1810 (from Spain)

**National holiday:** Independence Day, 18 September (1810)

**Constitution:** 11 September 1980, effective 11 March 1981, amended 30 July 1989, 1993, and 1997

**Legal system:** based on Code of 1857 derived from Spanish law and subsequent codes influenced by French and Austrian law; judicial review of legislative acts in the Supreme Court; has not accepted compulsory ICJ jurisdiction

**Suffrage:** 18 years of age; universal and compulsory

**Executive branch:**

*chief of state:* President Ricardo LAGOS Escobar (since 11 March 2000); note - the president is both the chief of state and head of government

*head of government:* President Ricardo LAGOS Escobar (since 11 March 2000); note - the president is both the chief of state and head of government

*cabinet:* Cabinet appointed by the president

*elections:* president elected by popular vote for a six-year term; election last held 12 December 1999, with runoff election held 16 January 2000 (next to be held NA December 2005)

*election results:* Ricardo LAGOS Escobar elected president; percent of vote - Ricardo LAGOS Escobar 51.32%, Joaquin LAVIN 48.68%

**Legislative branch:** bicameral National Congress or Congreso Nacional consists of the Senate or Senado (48 seats, 38 elected by popular vote and 10 appointed (all former presidents who served 6 years are senators for life); members serve eight-year terms - one-half elected every four years) and the Chamber of Deputies or Camara de Diputados (120 seats; members are elected by popular vote to serve four-year terms)

*elections:* Senate - last held 11 December 1997 (next to be held NA December 2001); Chamber of Deputies - last held 11 December 1997 (next to be held NA December 2001)

*election results:* Senate - percent of vote by party - NA%; seats by party - CPD (PDC 14, PS 4, PPD 2), RN 7, UDI 10, UCCP 1, independents 10; Chamber of Deputies - percent of vote by party - CPD 50.55% (PDC 22.98%, PS 11.10%, PPD 12.55%, PRSD 3.13%), RN 16.78%, UDI 14.43%; seats by party - CPD 70 (PDC 39, PPD 16, PRSD 4, PS 11), RN 24, UDI 21, Socialist Party 1, right-wing independents 4

**Judicial branch:** Supreme Court or Corte Suprema (judges are appointed by the president and ratified by the Senate from lists of candidates provided by the court itself; the president of the Supreme Court is elected by the 21-member court); Constitutional Tribunal

**Political parties and leaders:** Center-Center Union Party or UCCP [Francisco Javier ERRAZURIZ]; Christian Democratic Party or PDC [Ricardo HORMAZABAL]; Coalition of Parties for Democracy ("Concertacion") or CPD - including PDC, PS, PPD, PRSD; Independent Democratic Union or UDI [Pablo LONGUEIRA]; National Renewal or RN [Alberto CARDEMIL]; Party for Democracy or PPD [Guido GIRARDI]; Radical Social Democratic Party or PRSD [Anselmo SULE]; Socialist Party or PS [Ricardo NUNEZ]

**Political pressure groups and leaders:** revitalized university student federations at all major universities; Roman Catholic Church; United Labor Central or CUT includes trade unionists from the country's five largest labor confederations

**International organization participation:** APEC, CCC, ECLAC, FAO, G-11, G-77, IADB, IAEA, IBRD, ICAO, ICC, ICFTU, ICRM, IDA, IFAD, IFC, IFRCS, IHO, ILO, IMF, IMO, Inmarsat, Intelsat, Interpol, IOC, IOM, ISO, ITU, LAES, LAIA, MERCOSUR (associate), NAM, OAS, OPANAL, OPCW, PCA, RG, UN, UNCTAD, UNESCO, UNHCR, UNIDO, UNITAR, UNMIBH, UNMOGIP, UNTAET, UNTSO, UNU, UPU, WCL, WFTU, WHO, WIPO, WMO, WToO, WTrO

**Diplomatic representation in the US:**

*chief of mission:* Ambassador Andres BIANCHI

*chancery:* 1140 Connecticut Avenue NW, Washington, DC 20036

*telephone:* [1] (202) 785-1746

*FAX:* [1] (202) 887-5579

*consulate(s) general:* Chicago, Houston, Los Angeles, Miami, New York, Philadelphia, San Francisco, and San Juan (Puerto Rico)

**Diplomatic representation from the US:**

*chief of mission:* Ambassador (vacant); Charge d'Affaires Philip S. GOLDBERG

*embassy:* Avenida Andres Bello 2800, Las Condes, Santiago

*mailing address:* APO AA 34033

*telephone:* [56] (2) 232-2600

*FAX:* [56] (2) 330-3710

**Flag description:** two equal horizontal bands of white (top) and red; there is a blue square the same height as the white band at the hoist-side end of the white band; the square bears a white five-pointed star in the center; design was based on the U.S. flag



## APPENDIX B: FAO LAND AREA DEFINITIONS

### Total area

Total area (of country), including area under inland water bodies, but excluding offshore territorial waters.

### Forest

Land with tree crown cover (or equivalent stocking level) of more than 10% and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity *in situ*. May consist either of closed forest formations where trees of various stories and undergrowth cover a high proportion of the ground; or open forest formations with a continuous vegetation cover in which tree crown cover exceeds 10%. Young natural stands and all plantations established for forestry purposes which have yet to reach a crown density of 10% or tree height of 5 m are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention or natural causes but which are expected to revert to forest. Includes: forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and width of more than 20 m; plantations primarily used for forestry purposes, including rubberwood plantations and cork oak stands. Excludes: Land predominantly used for agricultural practices.

### Closed forest

Formations where trees in the various stories and the undergrowth cover a high proportion (> 40%) of the ground and do not have a continuous dense grass layer (cf. The following definition). They are either managed or unmanaged forests, primary or in advanced state of reconstitution and may have been logged-over one or more times, having kept their characteristics of forest stands, possibly with modified structure and composition. Typical examples of tropical closed forest formations include tropical rainforest and mangrove forest.

### Open forest

Formations with discontinuous tree layer but with a coverage of at least 10% and less than 40%. Generally there is a continuous grass layer allowing grazing and spreading of fires. (Examples are various forms of “cerrado”, and “chaco” in Latin America, wooded savannas and woodlands in Africa).

### Plantation

Forest stands established by planting or/and seeding in the process of afforestation or reforestation. They are either:

- of introduced species (all planted stands), or
- intensively managed stands of indigenous species, which meet all the following criteria: one or two species at plantation, even age class, regular spacing.

### Other wooded land

Land either with a crown cover (or equivalent stocking level) of 5-10% of trees able to reach a height of 5 m at maturity *in situ*; or a crown cover (or equivalent stocking level) of more than 10% of trees not able to reach a height of 5 m at maturity *in situ* (e.g. dwarf or stunted trees); or with shrub or bush cover of more than 10%.

**Other land**

Land not classified as forest or other wooded land as defined above. Includes agricultural land, meadows and pastures, built-on areas, barren land, etc.

**Inland water**

Area occupied by major rivers, lakes and reservoirs.

## APPENDIX C: MAPUCHE

Anonymous. 1999. The Americas: A new twist to an old tale. *The Economist*. 352 (8135): 40.

The Economist gives a very brief description of the recent tensions between Mapuche Indians and forestry companies in Chile including the damage and occasional violence directed at the forestry companies and the resulting sieges of Mapuche villages by special forces police. The article also describes who the Mapuche are and how the forestry companies and their plantations invaded their land with the help of subsidies from General Pinochet's dictatorship. These plantations make a substantial contribution to Chile's export earnings, but do next to nothing for the Mapuche. The article does not really offer much insight into the situation, however its appearance in The Economist, a very reputable source among many professions including forestry, is important.

Aylwin, Jose. 1998. Indigenous Peoples Rights in Chile: Progresses and Contradictions in a Context of Economic Globalization. Canadian Association for Latin American and Caribbean Studies (CALACS) XXVIII Congress: Simon Fraser University, Vancouver, B.C. 18 pp.

This paper gives a great description of Chile's culturally diverse population and historical background, including the historical denial of this diversity. The Aymara, Rapa Nui, and Mapuche cultures are described, which is not common in the literature. Aylwin then goes on to explain how the 1993 indigenous law came about and the contradictions of this government policy that followed in the context of economic globalization. Land issues concerning the Bio Bio Hydrodams, the expansion of the forest industry, and the construction of highways are summarized. The author concludes that neoliberal policies applied by the Chilean state have strongly affected the economic, social, and cultural situation of the indigenous groups, resulting in their marginalization and in profound social inequities. He feels the situation is unlikely to change until the Chilean society shows more respect for its ethnic and cultural diversity, which has been hidden for centuries.

Berdichewsky, Bernardo. *The Araucanian Indian in Chile*. 1975. International Work Group for Indigenous Affairs (IWGIA): Copenhagen. 37 pp.

Berdichewsky describes the plight of Chilean and Argentinean Mapuche as important ethnic minorities that are racially discriminated against and socially exploited. They share the problems of misery, pauperization, unemployment, and economic exploitation of the working masses of the Chilean people, but they are also the object of racial discrimination, which impacts their ethnic freedom and cultural expression. He blames both Mapuche and peasant problems on the exploitative Hacienda or plantation cattle ranch system, which was set up to serve as the fundamental labor force in the agricultural areas. This system made agrarian production, as well as land rental possible for the landlord class. However, with the Mapuche, it was always accompanied by racial discrimination. The author explains how this system came about with the change of communal property to small land property, the agrarian reforms of the 1960's and 70's, and the counter agrarian reforms that were taking place at the time due to the military coup in 1973. Good insight was given as to how the government affected the agricultural structure through time. Most was focused on Chilean Mapuche, but information on Argentinean Mapuche was extremely useful, as most publications do not include this group.

Calbucura, Jorge. 1994. Legal Process of Abolition of Collective Property: The Mapuche Case. 48<sup>th</sup> International Americanist Congress (ICA), Symposium: Borders and Indigenous Groups in South America. Stockholm-Uppsala. 12 pp.

Calbucura describes the legislative process used by the Chilean government that resulted in the disappearance of the majority of indigenous reservations. He uses the usurpation of land by landowners and the privatization of collective property as the explanation. A series of legislative actions promoted by the Republic of Chile demonstrates this. The legal premise of these actions sought to deny the legitimacy of the legal basis for collective property rights and question the minority status of the Mapuche. The collective property system is the only condition required to establish them as an ethnic minority and until this condition can be guaranteed by legal means, the Mapuche will not be able to exercise their rights within the state of law.

Degarrod, Lydia Nakashima. 1998. Female Shamanism and the Mapuche Transformation into Christian Chilean Farmers. *Religion*. 28 (4): 339-350.

This article uses historical material from 1881 through 1930 to examine the emergence of a new form of shamanism among the Mapuche during their first decades under the dominion of the Chilean state. It links the emergence of a female shamanism with the policies implemented by the Chilean government and the Catholic Church to integrate the Mapuche into the Chilean society as Christian farmers. It explains how gender roles changed to fit the idealized model of the dominant culture. The new image of women as weak and frail and needing the support of men contrasted drastically to the image of women before pacification when they fought next to men, worked the agricultural fields, and engaged in many sports. New emphasis on monogamy also confused husband/family loyalties. Degarrod uses the Mapuche case to conclude that in the cultural politics of state formation domination takes a gendered form. In the case of nation building, the dominated gender group reproduces the domination internally by re-genderizing those elements of the culture that are criticized by the dominating group. Thus, women dominate in the public sphere of shamanism in societies that have been edged out by political and religious centralizations. The sector of the Mapuche society that had been classified as progressive reclassified those elements of the culture that were rejected by the dominating group's society as traditional or feminine. The Mapuche women in resisting the government's modernization campaigns required that tradition be consciously maintained, defended, and valued. So, the shaman women made tradition sacred and obligatory in order to resist the Chilean state. Degarrod's study gives a good background of Mapuche culture that is left out of most of the literature that usually describes the culture as it is, leaving out this transformation and what led to it.

Faron, L.C. 1961 *Mapuche Social Structure: Institutional reintegration in a Patrilineal Society of Central Chile*. Urbana: The University of Illinois. 247pp.

This is a monograph compiled using participant observation and informants while Faron lived with the Mapuche for one year. His purpose was to offer a conceptualization of the structure of Mapuche society rather than to account for all aspects of Mapuche life. He views Mapuche society as having undergone a series of basic reintegrations during its long history. Mapuche society has been affected by internal adjustments determined largely by factors arising from outside forces. These factors played an important role in the structure of Mapuche society. For instance, it is in the context of morality that Mapuche live in greatest isolation from their colonial setting and the structural integrity of Mapuche society is a product of resistance and adaptation. He concludes that Mapuche society will continue with the economic accommodation instrumental to further change. They have already dealt with subsistence problems by entering into relationships with Chilean farmers and businessmen. However, the advantages of utilizing their land more productively on a half-share basis with Chilean farms are by no means all in their favor and further changes in their social structure will very likely result from the struggle over land. Faron offered an interesting perspective, but because the book was written in 1961, much of the important history of Mapuche land rights had not yet occurred.

Gasteyer, Stephen P. and Cornelia Butler Flora. 2000. Modernizing the Savage: Colonization and Perceptions of Landscape and Lifescape. *Sociologia Ruralis*. 40 (1): 128-149.

This paper proposes that colonization and landscape reconfiguration are linked and are important in understanding the relationship between land use, culture, ideology and society. The authors state that an important part of the colonization project is the perception of land as barren, infertile, and unsafe and the people on it as non-existent or savage. Case studies of the Midwestern United States, Patagonia in Argentina, and Palestine are used to demonstrate how colonization has led to the transformation of the landscape and the oppression (and often removal) of the indigenous population. Through historical analysis and field research it is shown that in all three places, there was at first an awe at nature, followed by a fear of wilderness, which was exacerbated by a fear of the native peoples, who were displeased to have the new settlers on their land. There was then an expressed desire on the part of the state to subjugate the people to serve as a civilizing or Christianizing influence or as a protection from raids. There were then actions on the land that served to change the landscape, asserting human dominion over it and these actions were referred to as “progress”. Also, there was relatively equitable land distribution initially, waves of migration in and out of the area, and export-based agricultural production. The authors point out how social capital is built around perceptions of the landscape for colonizers and colonized. For the colonizers, by interpreting the land as harsh and the natives as savage they developed a unification of purpose in achieving a dominion over both. For the colonized, the recognition of a greater integration with nature is serving as a unifying element in their struggle for indigenous rights, as can be seen in recent land right movements. Revisionist histories of the native peoples have emerged, coupled with doubts about the prevailing system of interaction with the environment for all three areas. For my purpose, besides providing a concise overview of the history of the Argentinean Mapuche (most of the literature focuses on Chilean Mapuche), this study adds an interesting and logical perspective for land right issues today in Chile and some possible reasoning behind it.

Gumucio, Juan Carlos. 1999. *Hierarchy, Utility and Metaphor in Mapuche Botany*. Uppsala, Sweden: Uppsala University. 210pp.

This book is about the knowledge and management of plants among the Mapuche of southern Chile. Field studies were carried out over a period of two years, with participation in various activities and rituals in which plants play an important role. Herbalists, shamans, and other specialists have explained the practical use and significance of different species. The discussion integrates the formal plant classification, the utilization of plants in aspects of daily life, and the symbolic relations established between plants and some basic cultural values. The study shows how community rituals, social gatherings, and the practice of traditional medicine by shamans and herbalists contribute to the persistence of traditional plant lore. Mapuche groups and their territory, historical background, economy, social organization, religion, medicine, and language are used to frame the study of plant taxonomy, plant utility, and plant symbolism.

Institute for Policy Studies. 1980. *Indian Populations Under Authoritarian Regimes: The Case of the Mapuche in Chile*. Institute for Policy Studies: Washington, D.C. 36 pp.

This is a compilation of presentations made at a symposium sponsored by the Latin American Studies Program of the Johns Hopkins University, School of Advanced International Studies in conjunction with the Letelier-Moffitt Memorial Fund for Human Rights and Survival International. It includes essays on human ecology, cultural survival, the Mapuche past, present, and future, international human rights law, and fighting for a future to inherit the past. These are all related to the 1979 decree law 2.568 and the Mapuche’s pursuit of its being repealed. This law is criticized for striking at the very essence of Mapuche society. It calls for the liquidation of Indian communities and dissolves programs and institutions devoted to protecting their interests. Facilitating the development of the Indians through individual ownership of plots and their total integration into Chilean society as an ethnic minority leaves them to compete as equals within the Chilean economic system without the appropriate tools to do so.



Mapuche International Link. 1998. *The Mapuche Nation*. Mapuche Inter-regional Council / Mapuche International Link at <http://www.mapulink.org>.

This website is a combined effort of two organizations. The Mapuche Inter-regional Council (CIM) is described as an umbrella organization located in Temuco city, which is in the heart of Mapuche territory. CIM is made up of a network of groups and organizations based in various regions of Chile. Its objective is promoting the cultural, social, and economic development of the Mapuche nation. CIM is also a member of the Un-represented Nations and Peoples Organization (UNPO). The Mapuche International Link (MIL) is an organization that brings together Mapuches from Chile and Argentina living in Europe and is a member of the Mapuche Inter-regional Council. The majority of the website is in Spanish, but there are English options as well. This is a great resource that has compiled news articles, action groups, photos, meeting and conference information, and essays related to the Mapuche. It also summarizes Mapuche culture, language, and current situation.

Marchak, Patricia M. 1995. *Logging the Globe*. McGill-Queen's University Press. 404pp.

This book looks at changes in the forest industry caused by restructuring and the increase in industrial forestry in plantations and natural forests. Ecological, social, and economic implications are reviewed. Case studies from all over the world are used to illustrate current trends. Marchak concludes with industrial forestry sustainability issues and suggests ways in which the global demand for forest products can be met in more efficient and sustainable ways. I focused my attention on chapter 12, a case study of Chilean temperate and plantation forests, as well as chapter 1, 8, and 13 in order to better understand the context of chapter 12 in relation to the entire book. Chapter 12 does a very good job of summarizing the forest situation in Chile. Marchak compares the industry in Chile to that of Brazil, which is an extremely important and often overlooked point. She also touches on forest policy, the plantation economy, the major companies involved, and the social impact, namely indigenous people who have been displaced from their land due to industrial forestry. Molding and millwork, sawmilling, plywood and veneer production, and composite panel production are left out, however. Chapters 1, 8, and 13 give a good overview of the issues the forest industry is facing. Her discussion of plantation costs and benefits is very thorough, but her conclusions, I believe are incomplete. Her suggestions include the standard argument of reducing consumption and using other fibers, like hemp, instead of wood. While these are definitely good things, reducing consumption does not happen automatically and she gives no argument as to why other fiber crops are better than pine monocultures.

Mariqueo, Vicente Q. *The Mapuche Tragedy*. 1979. The Documentation Department of International Work Group for Indigenous Affairs: Copenhagen. 66 pp.

This account of the Mapuche people, written by a Mapuche leader, offers a unique inside perspective of the situation, but no real analysis. It describes the Mapuche people; their social, political, and religious organizations; the land problem and the laws associated with it; Mapuche organization and their participation in the electoral process in Chile; and the problems in Mapuche society at the time due to these issues. He points out that the traditional land tenure system was better than the one introduced by the Spanish. They had no conflicts over land because the land belonged to everyone. Changing everything to private property allowed the Mapuche to be taken advantage of and completely disrupted their way of life. The document also includes a United Nations report from the time as well as description of the 1979 decree law 2.568 on Indian affairs which had just been enacted.

Nesti, Lorenzo. 1999. Indigenous people's right to land: international standards and possible developments. The cultural value of land and the link with the protection of the environment. The perspective in the case of Mapuche-Pehuenche. Thesis. European Master's Degree in Human Rights and Democratization. University of Padua, Italy and University of Deusto, Spain. 69pp.

Nesti uses bibliographic analysis and the documentation of a case-study of the building of two dams on the Bio Bio river in Chile (resulting in the flooding of the ancestral lands), to illustrate the ability of the Mapuche-Pehuenche to deal with indigenous peoples' land rights in the context of international human rights, international environmental law, cultural anthropology, and political science. He attempts to explain why the right to land and preservation of the environment, as well as existing and potential ways to protect it, is so relevant to indigenous people. He concludes that assigning and strengthening human rights responsibilities to non-state actors and the need for international institutions to call for the timely intervention of the State in the protection of indigenous rights to land and environment are important for land right protection. Certain conditions must exist for the relation between the recognition of indigenous people's rights and environmental protection to be productive. The protection of indigenous people's rights to preserve their land and environment has to start from the recognition of their specific relation with their land. The cultural and spiritual value that land assumes in indigenous people's lives should be at the basis of any recognition of collective rights to effective participation and to free and informed consent to every project or decision affecting them.

Pan American Union. 1955. *The Araucanians*. Washington, D.C.: Pan American Union. 15 pp.

This is a very brief and somewhat dated government document overview of Araucanian or Mapuche history, social structure, art, dress, diet, physical description, traditional games, oral tradition, and religion. It portrayed the Araucanians as courageous, vigorous, and patriotic. It describes Araucanians at the present time as much better farmers than their ancestors, excellent cattle rangers, horsemen, and skilled craftsmen. It portrays the influences of Spanish and Chilean culture as positive and does not address any problems or land right issues. The image of the fierce Araucanians that stood up to the Incas and the Spaniards and would have rather died fighting rather than surrender incorporated throughout this publication was criticized in much of the other literature for only giving today's Mapuche something to look back on, but nothing to be proud of now.

Rehue Foundation. 2000. *Fundacion Rehue*. Rehue Foundation webpage at: <http://www.xs4all.nl/~rehue>.

The Rehue Foundation was founded in 1990 as an organization that gives support to small projects of the Mapuche communities in Chile. The foundation is an independent non-profit NGO. Their major objective is to improve the quality of life of Mapuche communities. They also attempt to protect, promote, and defend the collective and individual rights of the Mapuche people. Because the Rehue Foundation believes education is a means to achieve this, accounts of Mapuche history, culture, and their struggle for self-determination and justice are found on their webpage. They report that since 1990 they have successfully realized a number of projects in Araucanía and presently are implementing the Project Agricultural Machinery in Labranza, province of Cautín. Their projects depend entirely on donations from private parties and institutions. News, articles, links to organizations, art, culture, photos, and maps are all presented.

Scott, James C. 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven: Yale University Press. 445pp.

My focus in this book was on Chapters 1-3. Although this book does not address the Mapuche directly, its overview and analysis of state systems that attempt to make a society more legible proved to be very insightful in the Mapuche situation. Its description of communal land tenure as being illegible to the state really clarifies why the Mapuche's own land system clashed so much with that of the Spanish and how disruptive it was for them to have it changed. Scott also uses scientific forestry as a metaphor for the forms of knowledge and manipulation characteristic of powerful institutions with sharply defined interests. Simplification, legibility, and manipulation operate in forest management similarly to urban planning, rural settlement, land administration, and agriculture. The dangers of dismembering an exceptionally complex and poorly understood set of relations and processes in order to isolate a single element of instrumental value are the same in each. He surmises that the most tragic episodes of state-initiated social engineering have originated in a destructive combination of four elements namely: administrative ordering of nature and society, high-modernist ideology, an authoritarian state that is willing and able to use the full weight of its coercive power to bring these high-modernist designs into being, and a civil society that lacks the capacity to resist these plans. Chile's authoritarian regimes further contributed to Scott's theory; however, democracies have similar histories with their indigenous populations, in which they act as an authoritarian regime, and it can be difficult to fully measure the differences between these two types of scenarios.

Stuchlik, Milan. 1976. *Life on a Half Share: Mechanisms of Social Recruitment among the Mapuche of Southern Chile*. New York: St. Martin's Press. 222pp.

This study is a result of Stuchlik's fieldwork in three Mapuche communities from 1968-1970. His objective was to analyze contemporary Mapuche society from two viewpoints: its formal structure and its organization. While Stuchlik's ultimate aim did not have much to offer my particular study, the data he collected did. He offered excellent descriptions of what he terms society as a whole, life zone, community, reservation structure, generational differences, domestic group, land tenure, and economic cooperation. His view is that the fundamental factor that influenced the present day's social structure was the arbitrary and forced localization of Mapuche groups on the reservations. The gradually diminishing force of the traditional social structure on one hand and the necessity of solving problems resulting from a new situation on the other were the mechanisms of the restructuring of their society. The changes caused by the foundation of reservations were expressed in the economic sphere by a changed distribution of means of production and of labor within the domestic groups. In pre-reservation period, contacts between domestic groups were often of a political or festive nature, but with the creation of reservations, the means of production and labor were distributed more unequally and one domestic group had to ask others for help more often without being derived from the structure of authority.

Titiev, Mischa. 1951. *Araucanian Culture in Transition*. Ann Arbor: University of Michigan Press. 164 pp.

This is a monograph concerned with the present day contemporary culture of the Mapuche. Titiev intended to report new information acquired in the field, particularly with respect to kinship and sociopolitical organization; to fit these aspects of Mapuche life into the total pictures of their current culture; to augment existing data and to suggest fresh interpretation on the basis of first hand observations; and to project the present situation against the Mapuche's former customs in order to gain insight into the dynamics of culture change. Titiev saw the Mapuche as a changing culture. He saw the Mapuche as virtually indistinguishable from the poorer Chilean farmers who live in their vicinity. He noted differences in language, religion, kinship, marriage, and events in the life cycle from the Chileans, but in the absence of a structural analysis of Mapuche institutions, his conclusions seem always to imply simply that Mapuche society is coming more and more to approximate Chilean society. His viewpoints seem to be very different from other authors. However, the study was done in 1951 and his descriptions of Mapuche culture are still very useful.

University of Wollongong Creative Arts Department. *Stories of the Mapuche*. University of Wollongong Creative Arts Department webpage at: <http://www.uow.edu.au/crearts/journalism/Bradley/homepage/home2.htm>

This webpage is intended to accurately portray the situation faced by the Mapuche. Articles document where the Mapuche come from, how their culture has been challenged, and how they struggle to maintain it within modern Chilean society. Case studies including the damming of the Bio Bio, forestry in Chile, and road construction are used to present current land rights issues. Everything is illustrated with photos and maps. The layout of the webpage is difficult to navigate, but the content is good and the maps and photos were extremely useful in portraying the situation.

Wilcox, Ken. 1996. *Chile's Native Forests: A Conservation Legacy*. NW Wild Books: Bellingham, WA. 148 pp.

This book is based on extensive research and interviews conducted in Chile and the U.S. between 1989 and 1994. The contacts cited included scientists, academics, government officials, and foresters. Chile's major forest ecosystems are described and illustrated with maps and photos. Also included are brief histories of forest exploitation and conservation over the last 500 years as well as the greatest threats to these forests and what experts believe to be the highest priorities for preservation. Reference was made to the Mapuche's use of fire as a management tool, land rights issues, Mapuche mythology, and traditional medicinal plants. Wilcox made this publication simple and therefore available to everyone. He included culture as well as biology, making it a more complete assessment of the environmental issues surrounding Chilean forests.

### COUNTRY SETTING AND CULTURE GROUP

Mapuche means "people of the land" (*Mapu* = land, *che* = people). The Mapuche are also known as 'Araucanos', the name given to them by the Spanish colonialists. They were the original inhabitants of the Southern Cone of the South American Continent, a region that today covers half of Chile and half of Argentina. Now they are concentrated in the provinces of Arauco, Bio Bío, Malleco, Cautin, Valdivia, Osorno, Llanquihue, and Chiloe in Chile and Neuquen, Rio Negro, Chubut, Buenos Aires, and Santa Cruz in Argentina, but many have migrated to the main cities. Mapuche account for nearly 1.2 million in Chile (10% of the total population) and 200 thousand in Argentina, constituting the third largest indigenous people in South America (Calbucura 1994; Alywin 1998; Nesti 1999).

The provinces occupied by the Mapuche today are situated in South Central Chile. Chile is such a diverse country that it is difficult to summarize its many ecosystems. Between the Bio Bio river and the Tolten river, the characteristic forest is mainly comprised of *Nothofagus* species (southern beeches or roble) together with *Laurelia*, *Drimys* and *Gevuina*. The sector of the coastal range known as Cordillera de Nhuelbuta has a forest cover similar to that found in the Andes with *Acacia caven*, *Lithrea caustica*, and *Maytenus boaria*. The region of Araucania is also characterized by forests of *Nothofagus*, in some places associated with *Araucaria* (monkey puzzle tree), which forms pure stands at the highest altitudes (> 1500 m) (Gumucio 1999; Wilcox 1996).

The Bio Bio is a very important river in Chile. It measures 400 km and covers 25 million hectares. Its origins are in the Lagoon of Icalma y Galletué (IX Region) and its end is near the town of Concepción, in the Arauco Gulf. The first part of its course, the upper Bio Bío, flows quickly through the high canyons of the Andean Cordillera, while the second part, the lower Bio Bío, flows gently through wider channels. This lower reach is heavily affected by chemical, wood, and fishing industries and by the lack of cleaning residual waters coming from the surrounding towns and villages. The Bio Bío provides drinking water for over one million people, provides important nutritive elements for the gulf, and is one of the most important fishing areas of Chile. The Upper Bio Bío is an area of enormous diversity of flora and fauna since it contains a mix of species indigenous to the dry areas of the north and the humid south. According to the National Commission for Fauna, of the 243 species of vertebrates in danger of extinction living in Chile, 77 are in the Upper Bio Bío. There are also five volcanoes in the area, of which, three are active (Gumucio 1999; Wilcox 1996).

South of the Tolten river is the area of the Valdivian rain forest Lowlands, which are dominated by *Nothofagus* species, *Podocarpus*, and a variety of other broadleaf evergreens. From 1000 m, the dominant tree is the *Austrocedrus chilensis* with a *Nothofagus antarctica* midstory. Forests of *Fitzroya cupressoides* also grow here (Gumucio 1999; Wilcox 1996).

## SOCIAL STRUCTURE

The Mapuche people can be both sedentary and nomadic communities, carrying on very different activities: hunting and gathering, herding, farming and fishing. Their traditional organization has been based on the extended family structure, known as *Lof*, and under the authority of a chief called *Lonko*. The daily way of life of the community was regulated in the *Ad-Mapu*, a kind of code orally transmitted by the community wise-elders (*Ulmen*). The *Ulmen* were chosen to ensure that the communal law was respected and acceptable standards of behavior of its members were maintained. They also acted for the prevention and resolution of internal disputes. Today the elders are still an important authority within the community. The highest authority of the community is the *Lonko*. A Council of *Lonkos*, comprised of representatives of all regions (*Butanmapu*) used to meet in times of war choosing a *Toqui*, as military leader in charge of the army, while the communities organized themselves in *Ayllarehue* (eight *Lonkos*) (Stuchlik 1976; Faron 1961; Titiev 1951).

Their socio-cultural and political relations have always been shaped and complemented by their spirituality, their religious beliefs, and the strong relationship between man, land, and nature. The Mapuche have a deeply religious society. Their religious organization is formed by the *Machi* as the spiritual leader, although this was a much more complex organization before Spanish invasion. Usually the *Machi* have a deep knowledge of traditional medicine, which they use in activities of purification of ill persons from the evil spirits by entering in trance during a rite called *Machitun*. During this rite, the whole community is involved in the invocation of the God, *Ngenechen*, to help the *Machi* to receive enough strength to get inside the body of the sick, recognize the evil and find the remedy. The purification comes by the use of medicinal plants, song/chanting, and the communication of the *Machi* with the ancestors, which is represented by the *rewe* (a kind of totem that strengthens the link of the community with the land) (Gumucio 1999; Degarrod 1998).

The most solemn expression of this religiosity is the *Nguillatun* ceremony. This ceremony takes place in the *Nguillantue*, an area specially allocated by the community. During the *Nguillatun*, Mapuche of all ages give thanks to *Ngenechen* for two to three days. The community, with the guide of the *Machi*, tries to strengthen the relations within itself and between the families in a collective act of renewing the past of the ancestors and of understanding the needs for the future. In these ceremonies, the language is fundamental since it represents the land and it spreads the planetary vision that unifies the community. That is why the Mapuche language is called *Mapudugun*, the “language of the land”. It is supposed to emerge from the listening to the land and all the elements of nature such as, sounds of wind, rain, trees, movements and sounds of animals, and the color of the mountains. Although this language is an oral one, some Mapuche organizations in Chile are working for the creation of an alphabet in order to preserve and sustain the oral tradition and to avoid its disappearance (Degarrod 1998).

## ETHNOBOTANY

The persistence of Mapuche traditional plant lore can be seen in their plant classification, utilization of plants in aspects of daily life, and the symbolic relations established between plants and basic cultural values. Over 320 plant species have been recorded as having been named by the Mapuche. Mapuche people speak about plants with a sense of pride and generally have a good level of competence and proficiency even though many plant uses have been replaced by industrially manufactured products. Mapuche plant utility spans the areas of food and drink, medicine and sorcery (as mentioned earlier), dyeing, construction (forts, houses, and boats), and fire making. Plants used for food are explicitly recognized as the nutritional basis for social power and strength. Cultivation has been very much transformed since the introduction of European cultigens like grains, fruits, and many introduced weeds (Gumucio 1999).

## HISTORY

When the Spanish arrived to the Americas, the Mapuche people had different names according to the region or a particular feature of the environment they were living in: *Puelche* (living in the land of the east), *Pikunche* (living in the land of the north), *Lafquenche* (living in the land of the Pacific coastal region in the west), *Huilliche* (living in the land of the south), *Pehuenche* (people of the pine nut tree, living beside the Bio Bío river), *Waidefche* (people from the cordillera), and *Ranquilche* (people from the apple tree region). The strategic border was the one in the north, with the Inca Empire, in correspondence with the Maule River, established after a long war. Before the colonialists (in Mapuche called *huincas*, literally 'usurper') arrived, the Mapuche had a population estimated at more than one million and had already developed a regional cultural diversity without centralized power and with distinct ways of life, subsistence, religions, languages, social organizations. Nevertheless they maintained a strong sense of unity not to be defeated by the invaders (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

The arrival of the Spaniards introduced significant alterations into indigenous people's life. The ideas guiding the colonizers in their American conquest, led them to impose their laws and beliefs, as well as to take possession of indigenous lands and wealth, severely affecting their integrity and subsistence.

The conquest of Chile was not an exception in this regard. The Spaniards attempted to control the vast territory until then inhabited by indigenous people and to subjugate them by means of the foundation of fortified cities, the distribution of their lands to their soldiers in payment for their services to the crown, and the assignment of natives through the "encomienda" system (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

The Spaniards attempt to control the lands of these people was frustrated by Mapuche resistance, which lasted for almost three centuries. The Mapuche were able to expel the conquerors from their territories in southern Chile, where they continued to live independently after the negotiation of a series of treaties with the newcomers, the best known of which was the treaty of Quilin in 1641 (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

According to these treaties, the Bio Bio river was established as a border between both people, recognizing the independence of the Mapuche territory and authorities. Likewise, the Mapuche committed themselves to respect this border, let the missionaries and traders enter into their territory, and agreed to send the prisoners back. Nevertheless, contact with the newcomers, in addition to the introduction of important changes in their culture, resulted in a strong reduction of their population. Aside from the deaths caused by the war, the introduction of unknown diseases brought in by the Spaniards (typhus, smallpox, syphilis, etc) resulted in the death of many (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

The imposition of the "encomienda" system on those Mapuche living in Chile's central valley (the Picunche), and their settlement in indigenous "pueblos" or villages until the end of the colonial period, resulted in their blending with the Spanish population, thus giving birth to a new population of mixed blood or "criollo" origin which assumed a new cultural identity, influenced by that of their indigenous ancestors, but also by the Spanish (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

The advent of the Republic did not introduce substantial changes in these people's situation. In spite of the acknowledgement of the free status of native population, as well as of their equality with the rest of the population, made by Chile's liberator, Bernardo O'Higgins, through Supreme Edict of 1819, the Mapuche continued to live independently for several decades in their ancestral lands south of the Bio Bio river. There, they maintained their territorial autonomy, laws, authorities and traditions as they had for centuries before (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

On the Argentinean side, the Mapuche, allied with other tribes, established their territorial autonomy in 1835 with the establishment of the Confederation of Salinas Grandes. Under the leadership of the Cacique Juan Calbucura, the Ranqueles, Salineros, Pampas, Manzaneros, Tehuelches, and Arribanos peoples were brought together. This confederation controlled the largest indigenous territory to date. Because of the peace treaty signed between General Urquiza and the Cacique Juan Calbucura, this confederation preserved its territorial autonomy for over 40 years. The "Conquest in the Desert" (1833-1881) brought an end to this autonomy with Chile renouncing its historical rights over Patagonia and establishing that the Andes constitute the border between Chile and Argentina (Gasteyer 2000)

Decades later, Chilean authorities in Santiago started debating the need to take control over the Mapuche territory, as well as to include their rich lands in the agricultural development strategy of the country. For this purpose, the Parliament passed a law in 1866 declaring the lands south of the Bio Bio river to be "fiscal", empowering authorities the right to allocate the lands to individuals for their colonization, and creating a commission in charge of settling down the Indians in those lands over which they were able to prove possession (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

Parallel to this, the Chilean army, with the support of the government, launched a strategy in order to enable the military occupation of their territory. Although the Mapuche resisted this occupation, in what was called "Pacification of the Araucania", the army ended up defeating and subjugating them, imposing Chilean laws and authorities over their ancestral lands by 1881 (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

Immediately after this occupation, the Mapuche were settled down in lands granted by the State through communal titles extended to their Chiefs and family members. The 3,000 "reducciones", as these titles were called due to the reduction they imposed on the size indigenous traditional lands, granted by the State to the Mapuche, included 510,000 ha of land, which represented only 6.39% of their ancestral territory south of the Bio Bio river (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

The remaining land was left for colonization, either with European settlers that were encouraged to come by the government, to whom the lands were given upon their arrival, or by Chilean colonizers, to whom the lands were sold at convenient prices (Gasteyer 2000; Mariqueo 1979; Berdichewsky 1975).

Since then and until recent years, the laws and policies applied by the Chilean State to these people, save rare exceptions, have been oriented to promote their assimilation into national society and to privatize Mapuche collective property, demonstrating little respect for their cultures and identities (Table 1). Two legal premises have been used to promote these objectives: the progressive denial of legal rights of expression and self-determination to the Mapuche and the gradual weakening of whom the law recognizes as Mapuche (Calbucura 1994).

**Table 32: Chronology of Laws Enacted to Regulate Mapuche Reservations**

<b>Date</b>	<b>Law ID #</b>	<b>Description</b>
1927 August.	Law No. 4.169.	"Division of Indigenous Communities". The division of Mapuche collective property can be requested by any one of its members.
1930 January.	Law No. 4.802.	Eliminated the <i>Comisión Radicadora de Indígenas</i> of 1866 y 1883. This law created the Indian Courts whose objective was to proceed with the division of collective property.
1931 June.	Law No. 4.111.	This law authorizes the division of Mapuche collective property. For a division to take place it must be requested by a third of its members.
1931 June.	Decree-Law No. 4.111; Article 54.	An individual is considered "indigenous" (i.e., Mapuche) when he/she belongs to a family whose chief is a member-owner of collective property granted by a <i>Título de Merced</i> . Excepted from this law are those indigenous individuals who have complied with the law of Obligatory Primary Education.
1959 December.	Law No. 14.511 replacing Law 4.111.	This law decrees that the President of the Republic has the right to expropriate Mapuche collective property.
1960 January.	Law 14.511.	This law created the <i>Juzgados the Letras the Indios</i> , modifying the functions of the Indian Courts created in 1930, by Law No. 4.802.
1960 January.	Law 14.511; Article 29.	A person is considered Mapuche when he/she belongs to a family whose chief is a member co-owner of collective land in a community possessing a <i>Título de Merced</i> . Excepted from this law are: 1) individuals who have successfully completed High School or its equivalent, as determined by the Director General of Secondary Education and 2) Indigenous individuals who have been granted a professional degree by the University of Chile or by other accredited University.
1967 July.	Agrarian Reform, Law No. 16.640.	This law includes the Mapuche as beneficiaries of the agrarian reform considering them as another type of "peasant" (farmer).
1972 September.	Law 17.729.	Decrees that Mapuche collective property is "indivisible". Division of collective property can now be achieved only when 100% of the community members agree to it.
1979 March.	Law No. 2.568 modifying Law No. 17.729.	This law decrees the "indivisibility" of collective property but now one member of the community may request the division of property. The law declares that "upon the division of collective property both the land and the individual cease to be classified as indigenous".

These policies had their maximum expression under the military government of General Pinochet between 1973 and 1989, a period during which a legislation imposing a clear threat to the subsistence of indigenous lands and cultures was enacted, together with the repression of indigenous organizations.

In 1972, the Popular Unity government of Salvador Allende tried to restructure the situation of Mapuche land. It issued Law 17.729, the first legislation favorable to Mapuche in the history of Chile. This law provided for the allowance of credit, the cancellation of debts and of all the decrees of expropriation of Mapuche lands. Any further division of their land was to be requested by an absolute majority of the community members. No taxes were to be imposed on Mapuche lands. A Directorate of Indian Affairs was set up as new government agency to promote the social and educational development of the communities. During the one year the law was in effect, the Mapuche regained a good deal of land that had been in the hands of large landowners.



Immediately after the coup of 1973, all the gains of Law 17.729 were reversed by the new regime and the lands were expropriated again (Mariqueo 1979; Berdichewsky 1975). In 1979, Decree Law 2.568 returned things as they were and made them even worse, as is evidenced by the repressive nature of its title: "For the Indian, Indian lands, the Division of the Reserves and the Liquidation of the Indian Communities". Indigenous people were no longer defined in terms of different languages or culture and provisions were made for the division of Mapuche lands at the request of one single person. This person needed not to be a Mapuche, but just an occupant, a usurper of the land. Divisions could not be annulled or rescinded and there could not be an appeal against a judgment of land division. In this way, following a division, the lands were no more considered as indigenous (Mariqueo 1979; Institute for Policy Studies 1980).

Calburcua (1994) states that there is nothing in the American continent resembling the legal restrictions that Chile has imposed on the Mapuche. He blames military subjugation for Chile's uninterrupted policy to restrict, deny, and nullify the constitutional rights of the Mapuche. I believe Scott (1998) would agree with this statement, as he listed military subjugation as one of his four requirements for a failed government scheme. However, the ethnic groups are not the only ones to suffer under authoritarian rule.

The victory of the opposition to the military regime in 1988 referendum led to a transition process initially directed by President Aylwin. In the meanwhile a big debate was taking place in regards to the recognition of the various indigenous peoples living in Chilean territory (not only the Mapuche, but also Rapa Nui in the Eastern Isle, Aymaras in the north of Chile and Kawáskar and Yamana in the extreme south). In 1989, with the Acuerdo de Nueva Imperial, principles for mutual recognition and new forms of relationship aimed at development were fixed. Those principles are translated in the Law 19.253, known as "Ley Indígena" in October 1993 (Nesti 1999; Aylwin 1998; Calburcua 1994). The spirit of this law recognizes indigenous people's right to exist without discrimination. The law protects existing land holding and provides a small amount of funding to acquire land and to promote social and economic development. Some argue the legislation does not go far enough in that it fails to recognize indigenous people as separate people under the constitution. Others agree, however, that the new law is a hopeful step toward resolving first nation struggles within the Chilean nation (Wilcox 1996).

In 1994 different decrees fixed criteria for the recognition as indigenous, for the constitution of indigenous communities, and for the organization and management of a Public Record of Indigenous Lands and Waters. As implementation of the Ley Indígena, three important measures were taken: 1) the constitution of the National Corporation for Indigenous Development (CONADI), a decentralized public agency with its own legal personality and budget, dependent on the Ministry of Planning and Cooperation, 2) the creation of a CONADI Counsel, formed by 17 members, 8 elected by indigenous communities and 8 as ministerial representatives, 3) the constitution for a fund to finance projects for indigenous local development and the realization of the Fund for Indigenous Lands and Waters, which permitted the assignment of 13,000 ha of land that were the object of conflict for indigenous communities and 33,000 ha from the Ministry of National Properties (Nesti 1999; Aylwin 1998).

By 1996, 1,357 mining exploration or exploitation concessions had been granted by the State to national and international enterprises. Of these concessions, 104 of them were located within indigenous lands. In that same year, an important number of aquaculture concessions, most of them for salmon farming purposes, including almost all the lakes and ocean shores existing in the Mapuche territory, had been authorized by governmental agencies. Also in that year, approximately 75% of the water rights available in the same territory (regions of Bio Bio, Araucania and Los Lagos, had been given by the State to those who requested them. Only 2% of these rights were in the hands of the Mapuche (Aylwin 1998).

### **THE BIO BIO RIVER HYDRODAMS**

In the 1960's, ENDESA (National Energy Enterprise), planned the construction of a series of hydroelectric dams in the upper basin of the Bio Bio river in southern Chile, in an area which constitutes the ancestral homeland of the Pehuenche, a branch of the Mapuche with a population of five thousand (Nesti 1999; Aylwin 1998; Mapuche International Link; Calburcua 1994; University of Wollongong Creative Arts Department).

In spite of the opposition coming from the seven Pehuenche communities living there, the construction of the first dam planned, Pangué, was finished by ENDESA, now a privately owned company, in 1996. The lack of environmental and indigenous protection laws at the time of its approval at the beginning of the 1990's, and the reduced number of families to be relocated by this project, are arguments which may help to explain why this project was finally materialized (Nesti 1999; Aylwin 1998; Mapuche International Link; Calbucura 1994; University of Wollongong Creative Arts Department).

In 1994, ENDESA announced the construction of a second dam in the area, Ralco, which due to its dimensions (3,500 ha of land), would imply the relocation of approximately 100 Pehuenche families living in two of the seven Pehuenche communities (Ralco Lepoy and Quepuca Ralco), including approximately 500 people (Nesti 1999; Aylwin 1998; Mapuche International Link; Calbucura 1994; University of Wollongong Creative Arts Department).

The Pehuenche people strongly opposed the construction of this second dam, which they saw as a threat to the subsistence of their traditional economy, closely linked to their habitat and the diverse resources existing there (forests, waters, pastures, etc.), as well as to their cultural survival (Nesti 1999; Aylwin 1998; Mapuche International Link; Calbucura 1994; University of Wollongong Creative Arts Department).

The fact that the environmental impact assessment study regarding the social and cultural impacts of Ralco was rejected by 20 government agencies, including the National Corporation for Indigenous Peoples (CONADI), due to its negative impacts on the present and future lives of the Pehuenche did nothing to persuade the government, as Chile decided to authorize ENDESA's plan anyway. The main argument given by the government in support of its decision, was the need of Ralco to satisfy the growing demands of energy coming from the industrialization process which has been taking place throughout the country, and especially those needs associated to the development of the forest industry in the region of Bio Bio where these dams are being constructed (Nesti 1999; Aylwin 1998; Mapuche International Link; Calbucura 1994; University of Wollongong Creative Arts Department).

According to indigenous law, the Pehuenche lands, which are considered to be indigenous, cannot be sold to non-indigenous peoples, but only exchanged for other lands of the same quality and equivalent price. This exchange has to be made not only with the agreement of those parties directly involved, but also with the consent of CONADI, which is legally mandated to protect indigenous lands. The National Council of this entity declared in 1997 that it would not give authorization for the exchange of Pehuenche lands, due to the impact that this project would have on the Pehuenche population. Nevertheless, ENDESA continued with its plans in the area, and went ahead in building a road to access the dam site. ENDESA was able to turn around the will of many families who initially opposed this project, due to employment and housing offerings that were made to them (Nesti 1999; Aylwin 1998; Mapuche International Link; Calbucura 1994; University of Wollongong Creative Arts Department).

Everything indicates then that the opinion of the peoples' affected was not respected and that ENDESA, with the support of the government continued the implementation of Ralco, a project which is seen by many indigenous and non-indigenous as a symbol of the type of development that Chile is adopting (Nesti 1999; Aylwin 1998; Mapuche International Link; Calbucura 1994; University of Wollongong Creative Arts Department).

The situation has not improved in more recent times and in May of 2002, the court ruled that ENDESA will be permitted to purchase the lands in question without permission from its owners in favor of their using the Electricity Law, which gives government regulators strong legal powers to meet Chile's growing energy needs, against the Pehuenche lawsuit claiming that this violated the 1993 Indigenous Law that grants indigenous groups property rights to their ancestral lands (Santiago times May 10 and 20, 2002).

## THE CONSTRUCTION OF HIGHWAYS IN THE SAME TERRITORY

The developments affecting Mapuche territory do not only come from the private sector, but also from the State. Similar to what has been happening in other developing countries, the current administration, due to the expansion of the economy, has been working in the last years in the construction of new roads, as well as in improvement of those that already existed, in areas where natural resources are located (Aylwin 1998; Mapuche International Link; University of Wollongong Creative Arts Department).

These ideas have led the Ministry of Public Works to plan the construction of two highways crossing the heart of the Mapuche territory. The first one, called the Coastal Highway, with a total of 949 kilometers, is being constructed along the Pacific coast in southern Chile, from the region of Bio Bio to the region of Los Lagos. Built by the Ministry of Public Work together with the Chilean army, it crosses through densely populated Mapuche territories, such as those of Lake Budi in the Araucania, where the Mapuche Lafquenche live, and San Juan de la Costa in Los Lagos, where the Mapuche Huilliche live (Aylwin 1998; Mapuche International Link; University of Wollongong Creative Arts Department). One purpose of this road is to provide a means for the extraction of the timber that exist in that area, one of the few areas of remaining native forest which have not been extracted yet by logging companies.

The second project deals with the construction of a new fast highway going from Santiago to Puerto Montt, more than 1,000 km long, the construction of which, according to the government plan, will be leased to the private sector. More specifically, this project will include an extension 20 km long and 40 m wide, parallel to the city of Temuco in the Araucania region, which will affect four Mapuche communities including 48 families. The highway will cross an area that currently is occupied by houses, agricultural lands, and sites of historical and cultural significance for the Mapuche. It will also result in the division of communities into two units separated by its construction (Aylwin 1998; Mapuche International Link; University of Wollongong Creative Arts Department).

Aside of the fact that the two projects referred to here are of State responsibility, both of them also have in common the fact that indigenous communities were not informed of them until very recently, when the construction of these highways was seen as inevitable. The people affected were never consulted by the government in previous stages of these projects nor when they were in the process of being discussed. Moreover, in the case of the Coastal highway, the communities living in the surroundings of lake Budi area, recently declared an Area of Indigenous Development according to the 1993 legislation, were only informed of this initiative when its construction was almost arriving to their territory, and their lands were being marked for this purpose (Aylwin 1998; Mapuche International Link; University of Wollongong Creative Arts Department).

The reaction of the Mapuche against these developments has been one of surprise and anger. Especially in the case of the Temuco Bypass, committees and other organizations have been created in opposition to this project, and later, when the project was seen as inevitable, to negotiate an adequate compensation. The terms of this compensation are still unknown. What does seem apparent is that the government will not renounce its expansion plans into the Mapuche territory (Aylwin 1998; Mapuche International Link; University of Wollongong Creative Arts Department).