A Market Study of Argentina & Brazil

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by

The Western Canadian Wood Machinery
&
Services Export Association

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Preamble

This is the final report in a larger project undertaken by the members of the Western Canadian Wood Machinery and Services Export Association (West CAnEX) in cooperation with the Canadian Forest Service and FRDA. The objectives of the projects were:

.. to assess the potential for exports of wood machinery and engineering products into select jurisdictions with either emerging or an established forest products industry; and

.. to develop a sound market develop0ment plan for those jurisdictions where the export opportunities warranted.

The report was initially released within the Association and has led to considerable market development effort and some very positive export success.

The other reports released under this project are market studies on Australia, Chile, Indonesia, Malaysia, New Zealand, and the SE United States.

Acknowledgments

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Disclaimer

The views expressed in this report do not necessarily represent those of the Canadian Forest Service or the BC Forest Service.

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1.0 EXECUTIVE SUMMARY

1.1 Forest Resources

Brazil and Argentina possess a wealth of resources in the plantation forest sector that overwhelm Chile in size but not yet in quality. With increased emphasis by both countries on their forestry sector and with growth rates much higher than North America this resource base is expected to grow significantly in the future.

1.2 Market Opportunities

The market is divided into two segments. Those sawmills producing for the domestic market only and the larger firms which are attempting to sell internationally. There is little opportunity for domestic producers due to the lack of national standards for sawn timber but there exists significant opportunity to assist the larger firms.

Both the Brazilian and Argentine sawmill sectors will need "total" solutions for assistance with the development of their sawlog processing and marketing of the end product. This situation provides a unique opportunity for Association members.

Immediate opportunities exist for harvesting equipment as this sector is undergoing a mechanization process.

1.3 Competitive Environment

The sawmill sector in both countries is very underdeveloped with only a few firms attempting to sell sawn timber internationally.

With the easing of restrictions on the importation of foreign equipment the harvesting sector has now been opened up to worldwide access and thus is an extremely competitive marketplace.

1.4 Approach to the Market

Successful entry into this market will depend upon providing an integrated approach for the value-added processing of a wood resource that is already at a level of over capacity. This approach should encompass all facets of the sawmilling process, from plantation management to the marketing of the end product.

BRAZIL

2.0 Political Overview

Brazil is the fifth largest country in the world and has the tenth largest economy. The country is divided into five regions; North (mainly the Amazon Basin); Northeast; Southeast (coastal states south of the Northeast until Sao Paulo); South (from Parana south); and Central-West (Mato Grosso, Mato Grosso do Sul, Goias, Tocantins, and the Federal District).

The federal government consists of three branches; the executive, legislative and judiciary. The President is the head of the executive branch and the Cabinet, which exercises control over the various departments of the civil service. Unlike many parliamentary democracies members of the Cabinet are not also members of the legislature.

The legislative branch (Congress) is made up of the Senate and House of Representatives. There are three senators from each state (27 states) while the number of representative from each state is calculated according to percentage of total population.

The judicial branch is headed by the Supreme Court which oversees a network of federal, state and local courts. The state and local courts operate independently of the federal courts within the bounds of the Constitution.

State governments follow a pattern similar to the that of the federal government. Each state has a governor as chief executive and power is divided among the state executive, legislative and judicial branches.

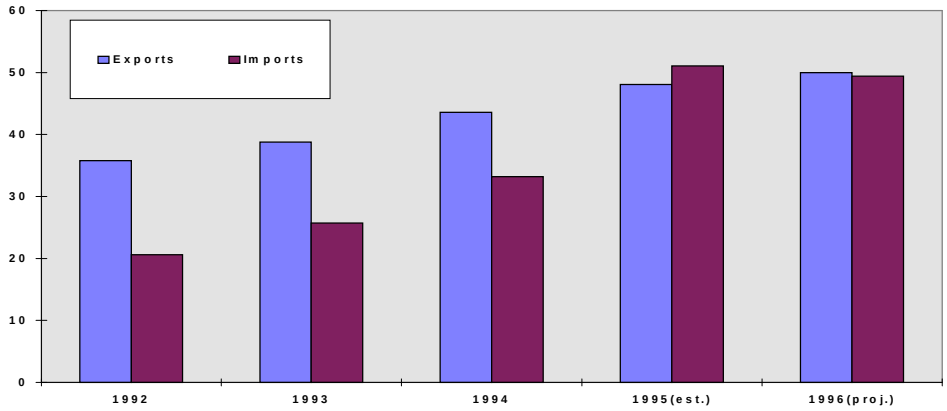
The Brazilian judicial system follows the Napoleonic Code however, legal proceedings are slow and cumbersome.

3.0 Brazilian Business Environment

3.1 Economic Trends

The Brazilian economy can be described as basically free enterprise with extensive state and semi-state participation in strategic sectors. These sectors include steel, transport, utilities and petroleum. Except for distribution the petroleum industry is a state monopoly.

Brazil - Exports and Imports



Source: EDC

In the past Brazil has suffered from hyper-inflation but fiscal and monetary restraint and the introduction of a new monetary unit (the Real) by the current government has brought this to manageable levels. Following are the latest economic figures as released by EDC.

Brazilian GDP Growth and Inflation					
	1992	1993	1994	1995(est.)	1996(proj.)
GDP (% growth)	-0.9	4.2	5.7	4.9	3.0
Inflation Rate (%)	1158	2540	1142	23.3	19.6

Source: EDC

EDC reports that the 1994 economic stabilization plan and the introduction of the new currency, the ***real***, continue to be successful in holding down the inflation rate. At the end of 1995, year-over-year inflation was at its lowest level in 20 years. Despite the early success of the *real* plan, implementing a long term stabilization program in Brazil must be centered on deep fiscal adjustments to overhaul Brazil's public finances at all levels of government. Fiscal reform remains constrained by the constitution. Without constitutional amendments, budgetary problems will not be addressed sufficiently and could derail the current stabilization plan.

3.2 Currency and Foreign Exchange

The Central Bank allows the official exchange rate to float freely within periodically established bands, but participation limited to authorized dealers.

There is an active, parallel exchange that, although illegal, is quoted in the daily newspapers. At present one Real is worth approximately one U.S. dollar.

3.3 Exporting to Brazil

In an effort to reduce imports and increase exports Brazil's foreign trade policy has relied upon the imposition of varying levels of import duties. The level of duty carries according to the degree to which the goods are deemed essential. Currently the majority of imports range from 15 to 65 percent but this should be reduced in the future as Brazil moves to harmonize its trade policy with its obligations from its membership in such organizations as the WTO (ex-GATT).

Import duties are generally levied on an ad valorem basis on the CIF value of the product. Overall the import tariff schedules contain over 13,000 classifications. Tables of classifications of goods subject to duties and tariff rates are established by decrees. Changes are frequent and are published in the Official Gazette.

Import duties must be paid before customs clearance is given, unless they are transported to a bonded warehouse. Port and dock taxes are high by international standards, at approximately 6 to 8 percent of FOB import values.

With few exceptions all imports are subject to license or permit. These licenses are controlled by DECEX, the Foreign Trade Department of the Bank of Brazil.

All imports may be made either by fully prepaid letters of credit, which can be financed by local banks, or by arrangement of credit terms with a minimum of 180 days, depending on the value of the import. Until recently, all import licenses and documentation were processed by the Bank of Brazil, but now authorized banks may carry this out.

The following is a brief summary of the documentation procedures:

1. Filing of the application for an import license, which should include the required general information concerning the importer, exporter, manufacturer, country and port of origin, port of unloading, description of the merchandise, FOB price in foreign currency, and other supplementary documents as required.

2. Payment of the application fee.

3. Examination of the prices of the merchandise to be imported as per the manufacturer's or exporter's catalogues, price lists, or pro forma invoices filed with the application form.

4. Issue of the import license.

5. Completion of an import declaration containing all data related to the respective import, including duties and taxes incurred. This should be done after the arrival of the merchandise but before customs clearance.

Commercial departments of Brazilian embassies and consulates abroad will provide more detailed information or assistance.

In Brazil the following organizations provide assistance:

1. The Itamaraty Commercial Information Division and the Commercial Promotion Section of the Ministry of Foreign Relations, both in Brasilia
2. Chambers of Commerce
3. Industry associations

3.4 Taxation

Tax System

- Corporate income tax is taxed at a single tax rate, with surcharges on income over certain levels
- Net income available for distribution to shareholders is taxed only at source
- Income from activities exercised abroad is not subject to corporate income tax
- Individual taxpayers, including resident aliens, are taxed on worldwide income at progressive rates
- Non-residents are taxed only on Brazilian-source income.

Tax Administration

- Tax administration is generally based on self-assessment.
- Taxes are withheld at source on most income payments.
- Corporate and individual tax returns are due within four months of the year-end.
- Consolidated tax returns and/or group relief are not permitted
- Penalties are imposed for failure or delinquency in filing returns or paying tax
- Tax audits are sporadic, but usually detailed

Taxation of Corporations

- There is no distinction in terms of tax burden between local and foreign owned corporations
- Income derived from activities exercised abroad is not taxed
- There are surcharges on net income above certain levels
- Net income is taxed at the corporate level. Tax on net income available for distribution to shareholders is withheld by the distributor.

- Dividends received are excluded from taxable income because they are taxed at source.
- Occasional gains, including capital gains, are taxed at the corporate income tax rate.
- Interest paid on loans from foreign shareholders is fully deductible for tax purposes on the accrual basis.
- Exchange losses on foreign loans are deductible on the accrual basis.
- Inter-company transactions are generally honoured by Tax authorities if negotiated at arm's length.
- Groups of affiliated companies may not file a consolidated tax return.
- Books must be kept on the accrual basis.

Taxation of Foreign Corporations

- Subsidiaries of foreign corporations receive the same tax treatment as domestic companies.
- Dividends payable by subsidiaries of foreign corporations to foreign shareholders are subject to withholding income tax (15%).
- Foreign corporations are not normally subject to tax on income arising from their sales to Brazil.
- Local salesmen/agents with authority to make binding contracts may increase the tax exposure of exporters to Brazil.
- Charges from head offices or affiliates to Brazilian subsidiaries are generally disallowed for tax purposes. Remittance permission is also generally refused.

Partnerships and joint ventures

- Partnerships must be formed by resident individuals to enjoy special tax treatment. Otherwise, partnerships have the same tax status as a jointly owned corporation.
- Partnerships are generally treated as conduits for tax purposes.
- Partnerships are not recognized as legal entities eligible for treaty benefits or fiscal incentives.
- Non-incorporated joint ventures as separate taxpayers do not exist in Brazil.

Indirect taxes

- Excise tax is levied at varying rates on nearly all merchandise produced in or imported to Brazil.
- Import duties are levied at varying rates on most imports.
- Many payroll taxes are levied, in addition to social security contributions.
- Financial transactions are subject to a financial transactions tax at varying rates.
- Companies must contribute to various social and welfare funds.
- A state value-added tax is levied on most sales and imports.
- Service tax is levied by municipalities at varying rates.

3.5 Business Practices

Governments have customarily supported free enterprise and the free trade system. However, state and semi-state entities control nearly all of the public utility sectors and the petroleum industry.

Generally speaking, Brazil has become a relatively closed economy in recent years. However, the government has promised to move toward freer trade in recognition of that country's membership in the WTO.

Privatization and denationalization of state-owned entities has been under considerable discussion. This has been carried out under the National Privatization Program with companies in the steel, petrochemical and fertilizer sectors being targeted for privatization.

Brazil encourages exports by offering a number of export-linked incentives, including duty exemptions or reductions for imported materials that are incorporated into exported products, value-added tax benefits, special financing arrangements and some others.

3.6 Foreign Investment

Investor considerations

- Local and foreign investors are generally treated as equals regarding investment incentives and tax concessions
- There are no special federal tax incentives to attract foreign investors
- Many state and local governments offer investment incentives
- Incentives are available for the promotion of exports
- Tax holidays are available for locating in the poorer Northeast and Amazon regions
- Brazilian corporate taxpayers, including those that are foreign owned, may invest part of their tax bill in government approved projects, which are normally granted total or partial tax exemption.
- Export orientation is generally favoured
- Exchange controls are extensive

Foreign investment is generally welcome and actively sought out, particularly if it brings new technology, develops new agriculture, increases exports or decreases imports, and creates new jobs. There has been a trend to favor minority foreign participations in local companies and joint ventures in which local shareholders retain voting control.

The majority of tax incentives occur at the state and municipal level. The only free trade zone in Brazil is located around the port of Manaus in the Amazon region.
.
Capital and earnings may be repatriated, but dividends in excess of certain limits are subject to progressive taxation. Repatriations may have to wait until foreign currency becomes available.

3.7 Labour

Investor considerations

- An adequate, stable and growing workforce is available but is mainly semi-skilled and unskilled
- Labour costs are generally low by international standards
- Labour disputes are mainly resolved through collective bargaining but government influence is high
- Labour legislation is paternalistic towards employees.
- Labour unions are becoming more active
- Wages are adjusted regularly due to high inflation
- All employees must be paid an additional month's wage each year as a compulsory bonus
- Employers must contribute to social security and welfare institutions
- Requests for foreign personnel are scrutinized by Federal authorities
- Employee dismissal is regulated by the Federal government

With a current population of 155 million and a two percent growth rate there is no shortage of human capital. The labour force is approximately 62 million with 35 percent being female.

Approximately 25% of the population is rural with the remainder living in the major cities. Sao Paulo is expected to have a population of 26 million by the year 2000 making it one of the fasted growing cities in the world. Presently Sao Paulo and Rio de Janiero have a population of 17 million and 11 million respectively. There are 20 other metropolitan areas with a population exceeding one million.

A majority of Brazilians are of European or African heritage. However the national language is Portuguese. Neither English or Spanish is widely spoken in the rural areas.

Brazil has a very young population with 47 percent under the age of 20. Seventy-four percent of the population over the age of 10 years is considered to be literate. Approximately 5 percent of students go on to post-graduate education.

There are extensive social security laws and labour regulations that govern employer-employee relations. However, foreign investors have not experienced

much difficulty in the way of labour problems, principally because they have adopted local standards and practices.

A minimum wage is established by law. Because of Inflation it is adjusted occasionally in accordance with the National Salary Policy. Currently (September 1995) it is the equivalent of $US 110 per month but it should be noted that only rural, unskilled and migrant workers receive this amount.

3.8 Access to other South American nations.

Brazil is a member of the Latin American Integration Association (LAIA) and a signatory to the World Trade Organization (WTO), formerly the GATT.

Brazil, Argentina, Paraguay and Uruguay are the signatory members of Mercosul, which was officially ratified on January 1, 1995 after a phasing in period. Under this agreement most tariffs have been reduced to zero. Movement of labour, goods and services is unrestricted; capital investment encouraged; macroeconomic policies coordinated; and foreign trade policies and tariffs for non-member countries harmonized.

4.0 Brazilian Forest Industry

4.1 Structure of the Forest Industry

Brazil offers an abundance of available land with good climates for growing a wide variety of trees. The country has great potential as a “forestry country”. What it does not have, and the same can be said of Argentina, is a “forestry culture”. The nation was colonized by cutting down forests to make way for agricultural land. In that sense trees were viewed more as a nuisance than as a resource.

The three southern states of Parana, Santa Catarina and Rio Grande do Sul are prime examples of a region which has seen extensive clear-cutting. Originally, about 85 percent of Santa Catarina and Parana were forested, as was 40 percent of Rio Grande do Sul. Today, Santa Catarina is 11 percent forested; 6 percent of Parana; and only 3 percent of Rio Grande do Sul. These three states are the core of Brazil’s plantation forests where the vast majority of softwood is grown.

The Brazil forest industry can be divided into two distinct entities. First, there is the northern Amazon region which focuses around the harvest of the natural hardwood forests. In contrast, the second region is the softwood plantation forests the Brazilian south - predominately in the three states mentioned above.

Native stands, mainly in the Amazon and western regions of Brazil, provide about 70 percent of the log harvest. Industrial plantations in the south account for the remaining 30 percent.

In 1994, about 291 million m^3 of native timber were cut. Fuel and other rural uses consumed 62 percent of this wood. Another 26 percent was made into charcoal (76 million m^3). Only about 25 million m^3 (8.6%) were converted into forest products, and 8 million m^3 more went to the pulp mills.

Plantations provided a harvest of 90 million m^3 in 1994. Pulp mills processed 38 percent of this wood. Not far behind were the charcoal plants, which consumed 27 million m^3 of plantation timber (30%). Forest products mills and fuel/rural consumption were about equal at 14 to 15 million m^3 each (about 16%).

The *Brazilian Wood Profile and Survey* reported in 1994 that Brazil's wood processing industry plans to invest $US 10 billion in new and expanded mills by the end of the century.

The industry consists of mills producing lumber, veneer, plywood, particleboard, fibreboard, pulp and paper, as well as associated silviculture and logging work. About 600,000 Brazilians depend on the forestry sector for direct employment, with another 3.5 million jobs indirectly related to forestry.

North and south, Brazil's sawmills cut about 15 million m^3 of lumber in 1994 with 40 percent of this number in the plantation-grown softwood in southern Brazil. Softwood lumber production is forecast to increase sharply during the rest of the decade as demand grows in the furniture industry and market share increases due to environmental pressure against rainforest lumber.

Plantations in Brazil's southern "timber" states cover about 2 million hectares. This amounts only to about 3.5% of the total land area of Parana, Santa Catarina and Rio Grande do Sul.

Total industrial wood consumption in the southern region is about 1.65 million m^3 per month. Pulp mills consume 54 percent of the harvest; panel plants producing particleboard, plywood and veneer account for 33 percent. Direct consumption of wood by furniture plants and sawmills is equal at 10 percent each with the energy sector consuming the remaining 15%.

Brazil - Forest Products Profile, 1994

PRODUCTS	PRODUCTION (,000 m^3)	REVENUE ($US X 1,000)
Group A		
Lumber:		
Northern Region	8,000	2,000,000
Southern Region	5,000	750,000
Others	1,000	200,000
Panels:		
Veneer	500	150,000
Plywood	1,900	665,000
Fibreboard	510	163,000
Particleboard	670	214,000
Group B		
Pulp & Paper	9,500	6,000,000
Group C		
Other products	Not reported	1,000,000

Source: Brazilian Wood Profile

Plywood production in Brazil tripled in less than a decade, but remains below installed capacity. In 1993 plywood plants produced 1.6 million m^3, with half of this being exported. The United States and Britain are the major export markets for plywood.

Brazil has almost 400 plywood plants with a capacity of 2.5 million m^3 a year. About 29% of that capacity was not working in 1993. This improved in 1994 to an idle capacity of 15%.

Recent estimates indicate that plywood plant log consumption is 80 percent hardwood and 20 percent softwood. The majority of this comes from tropical forests.

4.2 Forest Resources

Brazil: Forested Areas in the Southern States (,000 hectares)

Species	Parana	Santa Catarina	Rio Grande do Sul
Pine	661,908	482,950	200,000
Araucaria	66,000	17,500	---------
Black acacia	--------	---------	180,000
Eucalyptus	221,273	32,000	180,000
Total	**949,181**	**532,450**	**560,000**

Source: Foresters Association of Parana, Rio Grande do Sul & Santa Catarina

Brazil: Lumber Production by Region and Species (,000 m^3)				
	1980	1985	1990	1995
Southern region tree species				
Araucaria	1,987	480	380	240
Deciduous trees	2,364	540	270	150
Pine	130	700	2,500	5,300
Total	**4,481**	**1,720**	**3,150**	**5,690**
Northern region states				
Para	3,600	3,500	3,750	3,800
Rondonia	628	1,800	1,000	800
Mato Grosso	611	800	1,500	2,500
Others	554	900	750	900
Total	**5,393**	**7,000**	**7,000**	**8,000**

Source: ABPM/FAO

4.3 Log Exports

Exports of softwood (plantation) logs more than quadrupled from 1993 (185,000 m^3) to 1995 (780,000 m^3). Seventy-five percent of these sales were to the European Union; South Korea was second at 17 percent. Plantation owners believe they can boost log exports by up to 20 percent per year during the next five years. Factors favouring the export of Brazilian logs are oversupply to domestic pulp mills and Malaysia's restriction on log exports.

4.4 Structure of Wood Machinery Manufacturing Sector

Brazil has a well developed base of local manufacturers of wood machinery that focus on simplicity of design and providing incremental technological changes in line with their local customer's willingness to accept change. While some of these machinery manufacturers may export to lesser developed countries, both in South America and Africa for the most part they supply the local market and are thus captive to that market's low level of sophistication.

It is reported that the majority of machinery suppliers have to service their customer base on a "black market" basis in order to avoid taxation. This type of business practice necessarily requires that both companies and transactions remain small in order to avoid detection.

The focus is on long term customer service as often machinery is overhauled and upgraded on a recurring basis as opposed to new models being sold. There are approximately 20 manufacturers of wood machinery in Brazil with Schiffer Metalurgica of Ponto Grosso, Santa Catarina being the largest (see trip notes).

Argentina

2.0 Political Environment

- Democratic government
- Educated workforce
- Stability and convertibility of currency
- Declining external debt burden
- Strong policies for deregulation and reduction of large state participation in overall economy

Argentina comprises six major regions: Northwestern; Northeastern; Western (Cuyo), Central (Pampeana); Southern (Patagonia) ; and the Metropolitan Area (Buenos Aires and environs).

Under the Constitution, Argentina is organized as a federal republic on lines similar to those of the United States. The country is currently divided into 23 provinces and the federal capital of Buenos Aires.

The federal government consists of the executive branch, which is headed by the President; the legislative branch (Congress), consisting of two chambers, the members of which are senators and deputies; and the judicial branch. Provincial governments are generally organized along similar lines.

The judicial branch at the federal level is represented by the courts of justices, headed by the Supreme Court of Justice. Legal concepts have their origin in Roman law and the Napoleonic Code.

Similar lines are followed at the provincial level.

Thirty-five percent of the total population of 34 million is located in the capital city of Buenos Aires. The average annual rate of population increase is estimated at about 1.5 percent.

The 1980 distribution of population was 17 percent rural and 83 percent urban.

The population is mostly descended from Spanish, Italian and, to a lesser extent, other European nationalities. The language of Argentina is Spanish with English being the most readily understood by the business community.

3.0 Business Environment

3.1 Economic Trends

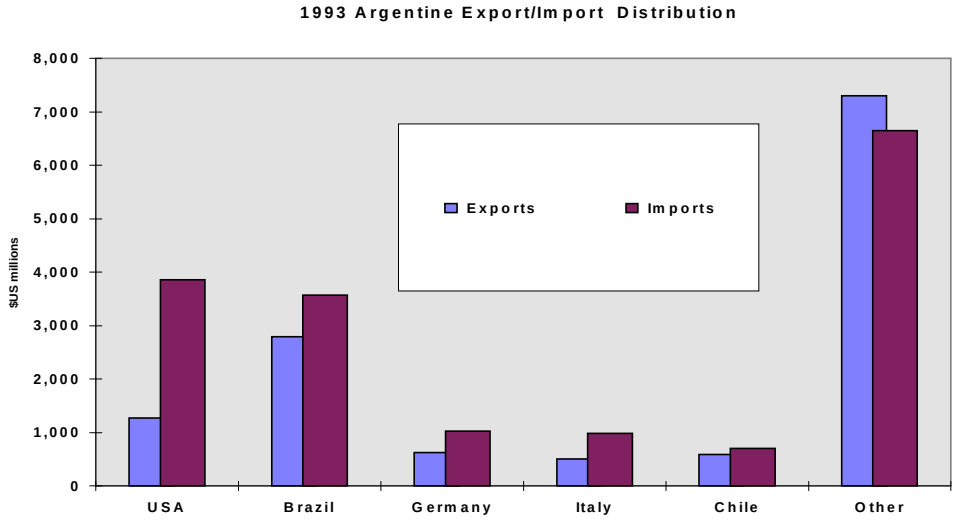
- Argentina has a free enterprise system
- There has been a reduction of state regulation of business
- Import duties and export withholdings have been reduced from previous levels
- The inflation rate has dropped substantially
- There is a need for more industrial investment and modernization for the country to become more internationally competitive
- Foreign investment and local investment are treated equally

Argentina - Growth and Inflation

	1992	1993	1994	1995(est.)	1996(proj.)
GDP (% growth)	8.7	6.0	7.4	-2.5	2.4
Inflation rate (%)	17.7	7.3	3.7	2.0	2.4

Source: EDC

The main thrust of government policy is to achieve overall economic growth in a climate of internal economic stability, i.e., containment of inflation, fiscal surplus and a reduction of foreign debt. The principal methods of applying this policy are reductions in public expenditures and increases in revenues to reduce the fiscal deficit; privatization of state entities; increased competitiveness; encouragement of foreign investment; and further opening of the economy.



Source: Price & Waterhouse, Doing Business in Argentina

There is a very definite policy and trend, generally supported by public opinion, toward privatization of state-owned and operated enterprises. This constitutes a reversal of policies that had been followed for decades.

Over the years the Argentine legislature has dealt extensively with incentives for new industrial development, covering a wide range of activities and regions. Under the Law No. 24331, issued in 1994, Argentina has allowed the setting up of free trade zones, where goods would not be subject to import or export duties.

The private sector has a number of industrial, commercial and financial associations and federations that cooperate with the public sector. Now that a policy of privatization is being implemented, large industrial groups are participating in joint ventures in the oil and gas industry, in road and rail concessions, and in a number of other activities previously carried out by government bodies.

3.2 Currency and Foreign Exchange

As of January 1, 1992 the peso (symbol $) has been established as the official currency. Since April 1, 1991 the exchange rate has been established by law, with the peso maintained on par with the US dollar. This implies that, in the future, the exchange rate can be modified only by another law and eliminates the possibility of financing the public debt by the issuance of currency. This law was brought in to effect in order to counter a traditionally inflationary economy.

3.3 Exporting to Argentina

- A registered counterpart (importer) must exist in Argentina
- The importer is entirely responsible for clearing Customs and for use or disposal of imported goods
- Regulations cover temporary imports

There are currently no exchange controls or credit-term limitations on imports, which may be paid before import or financed freely as agreed between the intervening parties.

Customs duties are being progressively reduced in accordance with the free enterprise and free trade policy being implemented by the government. Duties currently range between 0 and 20 percent with the highest rates being applied on textiles.

Value-added tax is also payable at the time of importation, together with a 3 percent advance on income tax.

Since 1991, when a decree on deregulation of customs procedures was established, there have been no prior import or export authorizations or procedures required before import or export through customs other than the specific customs declaration itself. Exceptions are made for restrictions derived from international agreements and for health or environmental regulations.

Customs and storage facilities (at airports and seaports) are adequate and reasonably secure. The main port of entry is Buenos Aires, where most main roads and railroads start. Argentina has no major deepwater ports.

3.4 Taxation

Tax System

- Tax revenue is derived principally from indirect taxes
- Resident corporations and individuals are liable to tax on income from both Argentine and foreign sources
- Capital gains are generally treated as income
- The tax on business assets is in the process of being abolished

The principal taxes are:

1. National
    a. Profits tax
    b. Tax on assets
    c. Value added tax
    d. Excise tax
    e. Customs duties
    f. Tax on fuels

2. Provincial and City of Buenos Aires (Federal District):
    a. Turnover (sales) tax
    b. Land Tax
    c. Stamp tax

3. Municipal:
    a. Business and other licenses and permits
    b. Rates (to maintain public services etc.)

Tax Administration

- Tax administration is generally based on the taxpayer's self-assessment

- Corporate returns are due within five months of the fiscal year end with no extensions
- Penalties for failure to comply with tax regulations are heavy, extending to imprisonment
- The statute of limitations is normally five years

Taxation of Corporations

- Resident corporations are liable to tax on income tax from both Argentina and foreign sources
- Intercompany transactions are generally treated as transactions with independent parties, provided they are at arm's length
- Consolidated group tax computations are not permitted
- There are special inventory valuation rules; LIFO is not permitted
- Capital gains are subject to normal profits tax treatment
- Dividends are not subject to taxation
- Depreciation is normally on a straight line basis, and goodwill is not deductible
- Leasing agreements are not specifically addressed by legislation

Taxation of Foreign Corporations

- Branches of foreign corporations are subject to profits tax on all income from worldwide sources that is obtained by the Argentine branch.
- Foreign corporations are subject to profit tax only on their Argentine source income
- Profits of foreign-domiciled exporters on their exports to Argentina are considered of foreign sources and are generally not subject to profits tax.
- Argentine source income received by foreign corporations (from subsidiaries or other parties) is subject to a withholding tax in full and final settlement.

Taxation of Foreign Operations

- Foreign source income of individuals and corporations resident in Argentina is subject to tax
- Tax credits are possible for taxes paid abroad

Partnerships and Joint Ventures

- Earnings of partnerships are assessable to profits tax only in the hands of the partner concerned. Tax losses are likewise distributed among partners.
- Partnerships are required to withhold taxes from profits attributable to non-resident partners at the rate of 36 percent, in full and final settlement.
- Joint ventures are not recognized by Argentine tax legislation as separate entities; profits tax is assessable only in the hands of the venture partners (corporate or individuals)

Value added tax

- VAT is charged on the supply of most goods and services and on imports
- Exporters are granted a tax credit for VAT billed by their suppliers
- Taxpayers with gross incomes not exceeding a stated maximum need not register as VAT taxpayers; instead they may choose to be subject to a flat 50 percent surcharge on the rate charged by predecessor owners or suppliers

Other Indirect Taxes

- The tax on assets is levied on all businesses and sole traders and on rural property of individuals and undivided estates. It is in the process of being abolished.
- All provinces and the Federal District levy land taxes and sales taxes, and stamp taxes are levied at the provincial level; rates and methods of assessment vary with the jurisdiction
- Excise taxes apply to the sale of a wide variety of items, but exports are exempt.

Tax Treaties

- Argentina has signed tax treaties for avoiding double taxation with Austria, Bolivia, Brazil, Chile, France, Germany, Italy, Spain, and Sweden. The treaties tend to follow the model treaty of OECD.

3.5 Business Practices

Work generally begins in offices between 8:00 AM and 9:00 AM (one hour earlier in factories). Government offices are generally open from 9:00 AM to 1:00 PM and from 1:30 PM to 5:30 PM. Banks are open to the public from 10:00 AM to 3:00 PM. Many supermarkets and foodstores are open on Saturday afternoons and Sundays.

The metric system is standard throughout Argentina except in a few special instances where, for technical reasons, other internationally accepted bases have been adopted.

Business is generally conducted in a relatively formal manner, although forms of address have become more relaxed and the use of first names is a spreading practice. Business entertainment often involves formal social events such as cocktail parties, presentations of products and press conferences.

Canadian visitors require a valid passport.

3.6 Foreign Investments

- Equal opportunity and treatment are given to foreign investors
- Imports are encouraged
- Extensive privatization of energy, communications and utilities has occurred.

- There has been a trend toward the modernization of capital equipment.

Argentina has traditionally welcomed foreign capital and expertise. Exceptions have been rare. The present government has stated that it is firmly convinced foreign capital and expertise are essential to Argentina's development and that it intends to establish and maintain conditions that support this fact.

3.7 Labour

The attitude of local business and industry toward foreign investment has improved considerably over the recent years. Local business is generally favourable to foreign investment in their companies, particularly where special technology or risk capital is required.

Labour unions and individual workers have a generally favourable attitude toward foreign investment and management. Exceptions have been rare.

- A skilled and semi-skilled labour pool is available
- Strong unions are present, generally organized by industry
- Current unemployment is higher than average as a result of recession and streamlining of state enterprises
- Employer social security contributions add 33 percent to payroll cost.
- There is a compulsory 13^{th} month salary
- Only negligible resistance is offered to foreign management/managers
- Fringe benefits are generally a matter of the employer's attitude to labour

The Argentine Labour force is estimated at 12.4 million with the unemployment rate near 10 percent. Labour is generally eager to learn and can be readily taught additional required skills.

Employer/employee relations are established by law. Labour participation in ownership and management is rare and there are no profit sharing requirements.

As of June 1994 average monthly wages and salaries are equivalent to approximately $US 450 for skilled and $US 350 for semi-skilled labour, and range between $US 1,000 and $US 5,000 for managerial and professional staff.

Legislation establishes that ordinary working hours may not exceed 8 per day or 48 per week. Saturday afternoon (after 1:00 PM) and Sunday are obligatory rest periods.

Expatriate employees with long term assignment in Argentina require at least a temporary visa, which represents a work permit valid for one to three years. After the first visa has expired the expatriate may apply for a permanent visa.

3.8 Access to other South American nations

Argentina is a member of the Latin American Integration Association (LAIA) which was created by the Montevideo Treaty of 1980. This association includes Mexico and all the Latin American countries in South America.

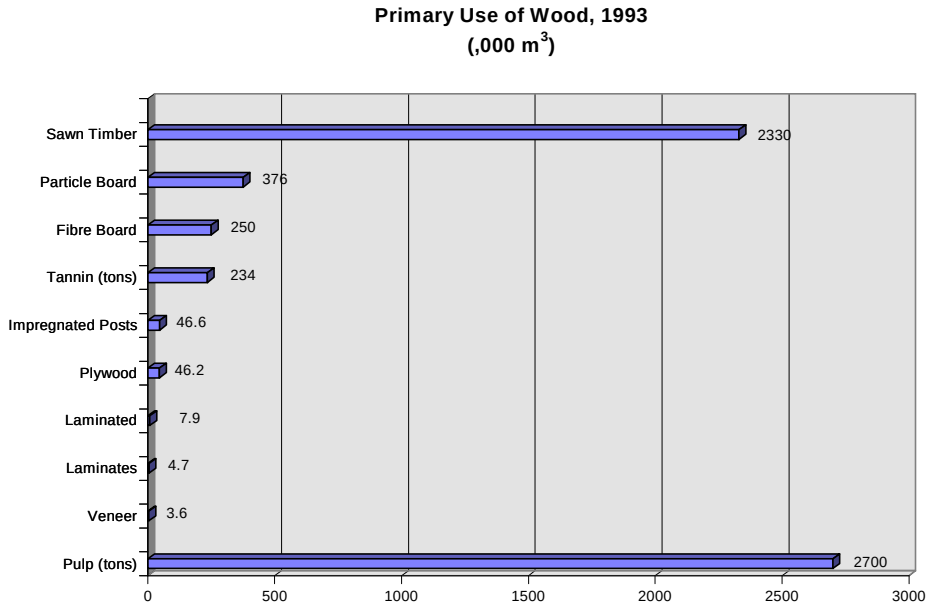
Argentina is also a signatory member of Mercosur.

4.0 Argentine Forest Industry

4.1 Structure of Argentine Forest Industry

This long neglected sector has now been declared a priority by the current authorities who are currently trying to create the conditions that will hopefully attract much needed foreign investment in this sector in order to modernize and expand it. It is estimated that the Argentine forest sector is 10 years behind the development of the Chilean forest industry.

The Argentine pulp and paper industry is controlled by a few large multinational firms while the sawmill sector is dominated by small and mid-sized companies, the majority of which employ no more than 15 people. These small mills are common sights beside the Argentine highways and often exist side-by-side.



Source: Direccion de Producion Forestal

The sawmilling industry employs about 21,000 people and the chipboard industry close to 1,000. Other wood processors employ a further 1,400. In the pulp and paper sector just over 10,000 people are employed, of which 5,600 are in pulp plants and about 4,500 in paper and paperboard operations.

Argentine does not yet have a large, domestically-based forest products companies to rival its counterparts in Chile, New Zealand, Australia and South Africa. The single largest firm, the previously government-owned Alto Parana, has been in hands of Citibank and a group of bankers. Its main influence has been to drag down pulp log prices.

Nearly all of the country's commercial timber is in private ownership. State-owned lands are not significant suppliers of wood - about 10 percent of the total in 1993.

The state has had a hand in the expansion of the plantation sector to its current size, particularly with a subsidy introduced in 1978. The subsidy, which was tax related had the unfortunate side effect of attracting investors who planted forests only for the tax benefits, without considering the viability of the end product. Many of the plantations were planted far from ports or plants and received little care.

This has led to the present situation where Argentina has an estimated capacity to process 11 million tons of logs annually but actual output is well below this level since at any given time many mills are shut down due to economic reasons. It is estimated that at present there is almost a 50 percent undercut of the annual growth.

This fact, combined with the government's move to encourage new planting, highlights the need for a greatly increased capacity to mill the current and projected growth in timber resources.

Management of forest sites vary according to species and location. The following table illustrates annual average rotations and production of the main plantation species.

Average Annual Growth Rate, Rotation and Production

Species	Annual Average Growth (m^3/ha./year)	Rotation Length (years)	Production (m^3/ha.)
Pinus	20 to 30	10 to 30	300 - 500
Eucalyptus	30 to 40	8 to 10	320 - 500
Salix	20 to 25	10 to 15	200 - 250
Populus	20 to 30	10 to 15	200 - 400

Source: Argentina Forestacion

For pines, plantation density ranges from 1,100 stems per hectare in hilly areas to 2,200 sph. In the Misiones forest area. The expected annual average yield of plantation forests range from 12 tons per hectare in the Atlantic coast belt to a maximum of 24 tons per hectare in the Tandilia system hills. When higher level technologies are introduced growth rates of pine can be raised to 40 m^3 per hectare per year in selected zones of the Andean-Patagonian region.

Plantation density for eucalyptus ranges from 1,100 sph. In Entre Rios province to 1,600 sph. In the Jujuy hills. Rotations are generally about 10 years, allowing up to two coppice harvests. (See background data 5.0)

4.2 Forest Resource

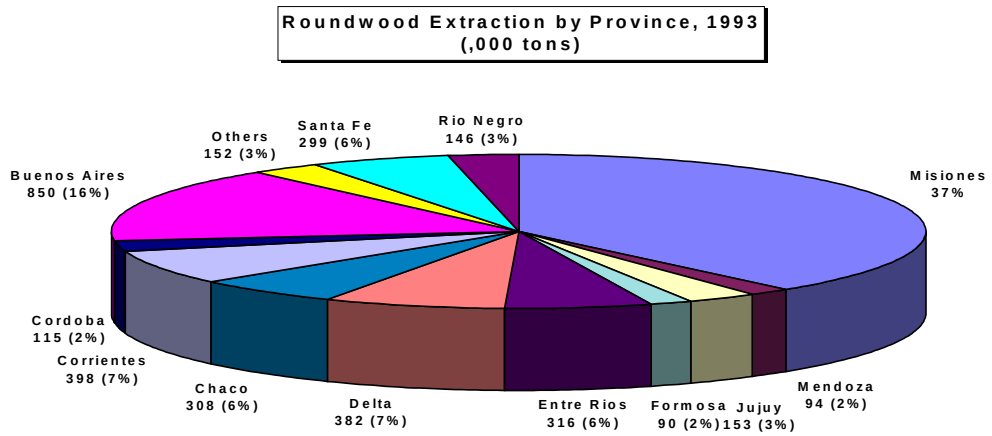
Argentina has 35 million hectares of native forests and close to 1 million hectares of cultivated plantations. This is strictly an estimate as the first step Argentina needs to take is an inventory of their national forests in order to have an official database to attract the necessary private capital for further development of this sector. Accordingly, the World Bank has granted a $US 26 million dollar loan to Argentina's National Institute of Agricultural Technology (INTA) in order to undertake an analysis of the forest plantation sector as well as strengthening of official institutions. This project, approved in January 1996 is for a five year period.

Of the 35 million hectares of natural forest it is estimated that 20 million acres are accessible for commercial use. These native forests are divided into seven general types: **Misiones rainforest** in Misiones province; **Tucaman-Bolivian rainforest,** near the Bolivian border; **Chaco Park forest**; **Pampa-San Luis forest**; **Mesopotamic forest**, in Entre Rios and Corrientes provinces; **Western woodlands**, in the Andean foothills; **Subantarctic forests;** southern Argentina.

With less than one million hectares of planted forest, Argentina is not yet a major player, even by Southern Hemisphere forest resource standards. Brazil is reported to have four million hectares of plantations and Chile 1.7 million hectares.

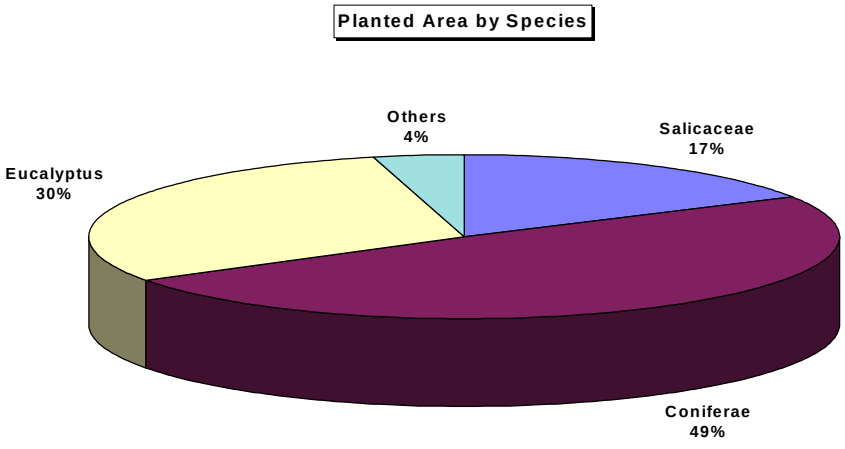
However, it is the size of the land mass suitable for plantation forest that makes Argentina such a significant factor. Government studies have shown that Argentina has 5 million hectares of bare land which is suitable for plantation forests without displacing agriculture or natural forests. The aforementioned government policies to increase yearly plantings to 200,000 hectares per year are designed to take advantage of that fact.

As well Argentine land prices have remained relatively stable, providing an economic environment suitable for the investment in long-term plantation development. Even with high growth rates in Misiones province land values are only $US 150-300 per hectare.



Source: Direccion de Producion Forestal

Recognizing the importance of the forest sector in job creation and import substitution the Argentine government has established a program to plant up to 5 million hectares of plantation forests in the next 25 years. This amounts to an annual average of 200,000 hectares per year. Given the fact that the current planting rate only approaches 25,000-30,000 hectares per year this is an ambitious program but does serve to illustrate the renewed focus on the forestry sector.



Source:Direccion de Produccion Forestal

4.3 Log Exports

Log exports consist primarily of eucalyptus for the pulp and paper market. The main markets are in Europe with the major port of exportation being Concepcion del Uruguy. This port, which is located in a duty free zone, handles 90 percent of the roundwood exports from Argentina.

Since this port is not a deep water port, having a draft of only 21 feet, it is necessary to carry out partial loading (approx. 2/3) here and top up the load further down river. To help alleviate this problem the federal government is implementing a dredging operation to increase the draught of the port.

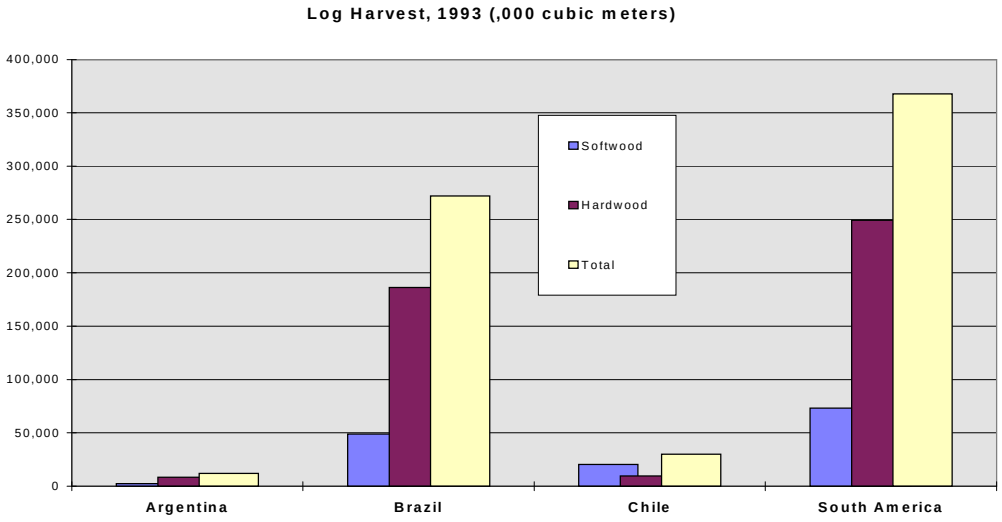
The volume of log exports is very dependent upon the price of pulp on the international market. In the early 1990's ,with high pulp prices, total exports of pulpwood approached the two million cubic meter mark. However, with slumping pulp prices and increased infrastructure costs, the volume in 1995 decreased to one million cubic meters.

There are indications that in order to increase the value-added content of wood exports the government will begin to introduce restrictions on the export of raw logs.

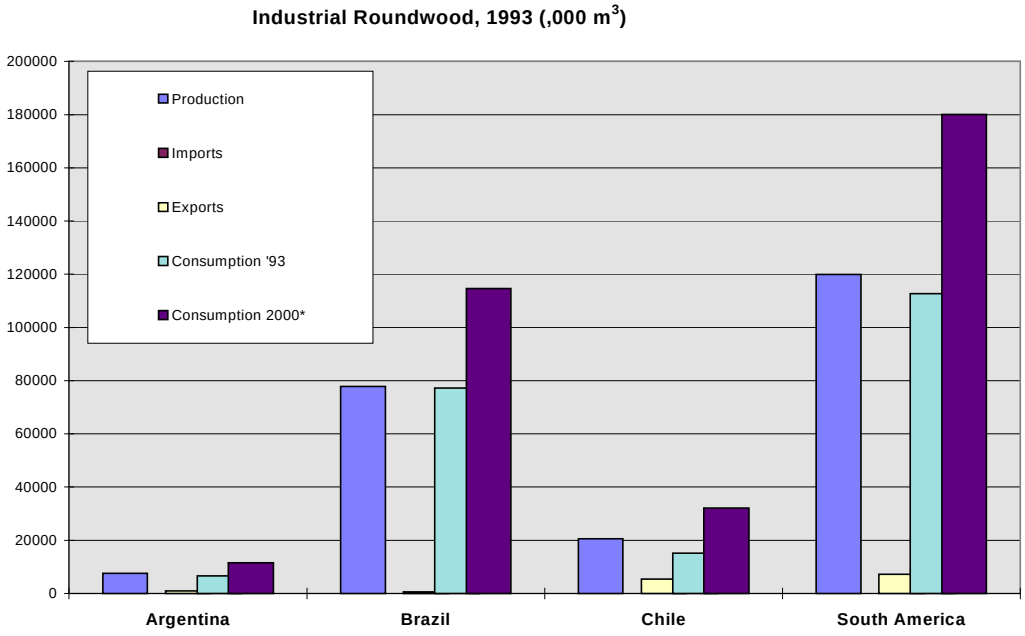
4.4 Structure of Wood Machinery Manufacturing Sector

The pulp and paper sector as well as the engineered wood product sector rely solely on the importation of processing machinery from abroad. The sawmill sector is supplied by local suppliers but the level of technology is very low. Harvesting equipment is primarily foreign with some local manufacture. Valmet is dominant in the supply of tractors which have been modified for use in the forest sector while Caterpillar and Timberjack both having a strong presence in the skidder/forwarder sector.

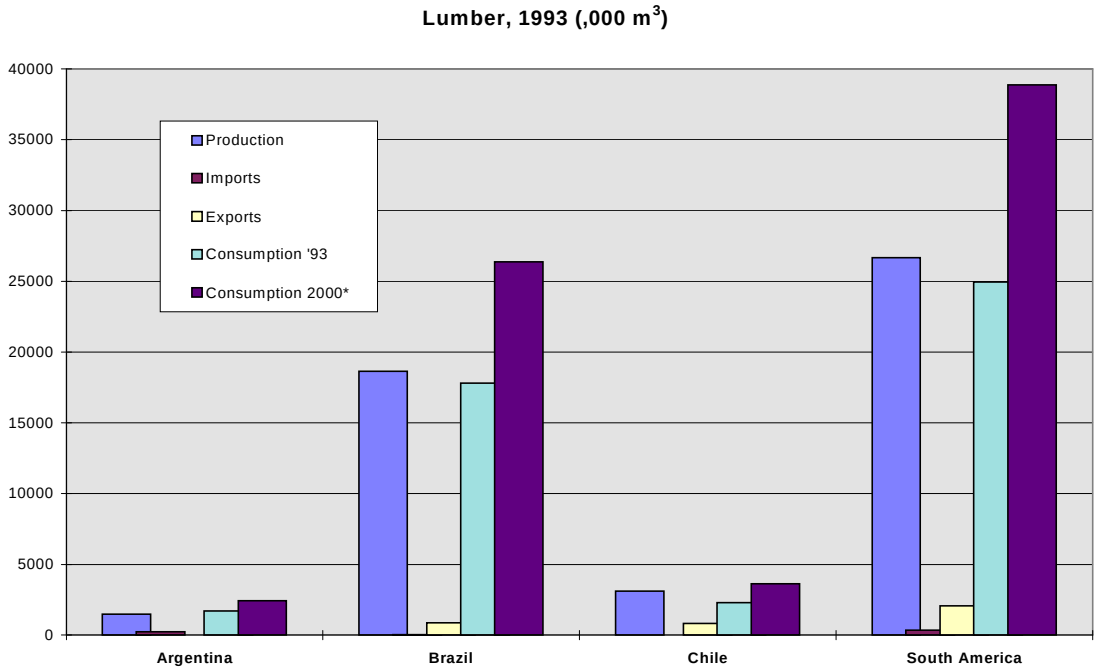
5.0 Background data on the Argentine and Brazilian Forest Industry



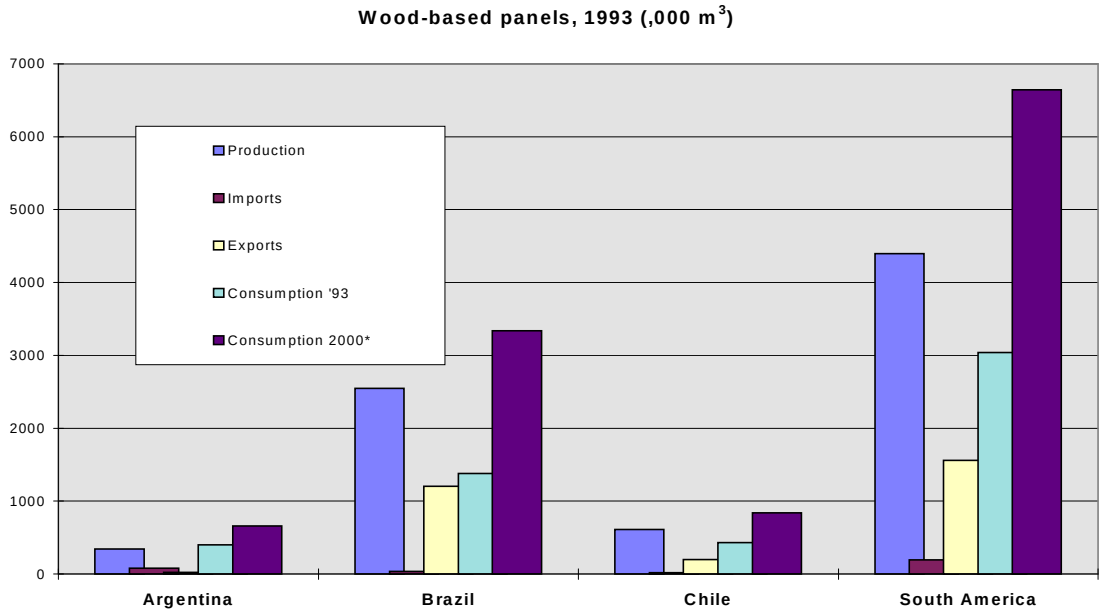
Source: 1993 FAO Yearbook of Forest Products



Source: 1993 FAO Yeabook of Forest Products



Source: 1993 FAO Yearbook of Forest Products



Source: 1993 FAO Yearbook of Forest Products

Production & Utilisation Models for Argentina

Species & Zone	Density planted (sph.)	Annual growth (ton/ha.)	Rotation length (years)	Thin & prune (years)	Production (ton/ha.)	Likely use
EUCALYPTUS						
Jujuy - hilly zone	1660	18	10	7	180	65% pulp 35% posts & poles
Entre Rios	1111	28	10	9	280	Lumber, posts & pulp
Buenos Aires	1330	32	10	8	320	Pulp, boards & posts.
Santa Fe	1660	N/A	12	10	180	60% pulp; 40% boards
PINES						
Jujuy - hilly zones	1111	17	22	16	376	46% pulp; 54% lumber
Corrientes	1660	18	20	14	360	40% pulp; 60% lumber
Misiones	2222	23	20	15	450	42% pulp; 58% lumber
Tandilia	2000	24	25	15	600	35% pulp; 65% lumber
Meuquen	1111	10	35	27	360	15% firewood; 85% lumber
Cordoba	1600	12	25	20	300	30% pulp; 70% lumber
Buenos Aires	2000	12	25	20	300	100% lumber
WILLOWS & POPLAR						
Delta Parana	833	23	13	N/A	300	Pulplog 37% Sawlogs 73%
Mendosa	833	19	10	N/A	190	50% Lumber; 30% pulp; 20% other
Rio Negro	833	22	13	N/A	280	Lumber & parquet

Source: Argentine Forest Owners Association

List Price of Forest Products, Province Entre Rios, Argentina

Source: Boletin de Precios, Tendencias, Rentabilidad y Comercio Forestal, No.9, Mayo de 1996, published by Ministerio de Economia y Obras y Servicios Publicos,
Secretaria de Agricultura, Pesca y Alimentacion,
INTA- Instituto Nacional de Tecnologia Agropecuaria

Item	Unit	Prices in US$ min.	max	medium.
Standing Tree				
Eucalyptus/w bark, min. diam. 12 cm	tonne+	9.00	11.50	14.00
Pine c/w bark diam. 12 cm plus	tonne	14.00	18.00	16.00
Saw Logs Delivered to Sawmill				
Eucalyptus c/w bark, min. diam. 12 cm	tonne	17.50	22.50	20.00
Pine c/w bark, min. diam. 12 cm	tonne	22.50	26.50	24.50
Poles and Posts				
Eucalyptus, standing, 7.5 to 9 meters long	per tree	6.00	7.00	6.50
Eucalyptus cut, delimbed	lineal meter	1.00	1.20	1.00
Saw Logs*	lineal meter	0.40	0.50	0.45
Fence Posts ** (loaded on truck)	per piece	0.35	0.45	0.40
Sawn Lumber				
Eucalyptus (domestic market), first Quality	square foot++	0.19	0.24	0.22
Pine, First Quality	square foot	0.30	0.33	0.31
Eucalyptus for Pallets and Squares*** (green)	m^3	100.00	105.00	102.50
Eucalyptus planed 3 sides (air dry)****	m^3	130.00	135.00	132.50
Tongue & Groove Boards				
Eucalyptus, 1/2 inch thick	m^2	2.00	2.30	2.20
Pine, 1/2 inch thick	m^2	2.60	3.00	2.80

* Debarked, length 3 to 7 meters, minimum tip diameter 10 cm.
** Debarked, length 2.5 meters, diameter 6 to 10 cm
*** Pallet lumber: 1100 x 75 x 34 mm; 1195 x 95 x 17 mm; 1195 x 115 x 17 mm; 1195 x 115 x 75 mm; Squares: 35 x 35 mm profile, all rough sawn.
**** 55 x 22 x 3000 mm
\+ 1 tone of freshly felled, green eucalyptus grandis and pine is roughly equivalent to 1 cubic meter
Note: Tongue & Groove boards were listed as 1/2 inch thickness

Principal Characteristics and Properties of Eucalyptus

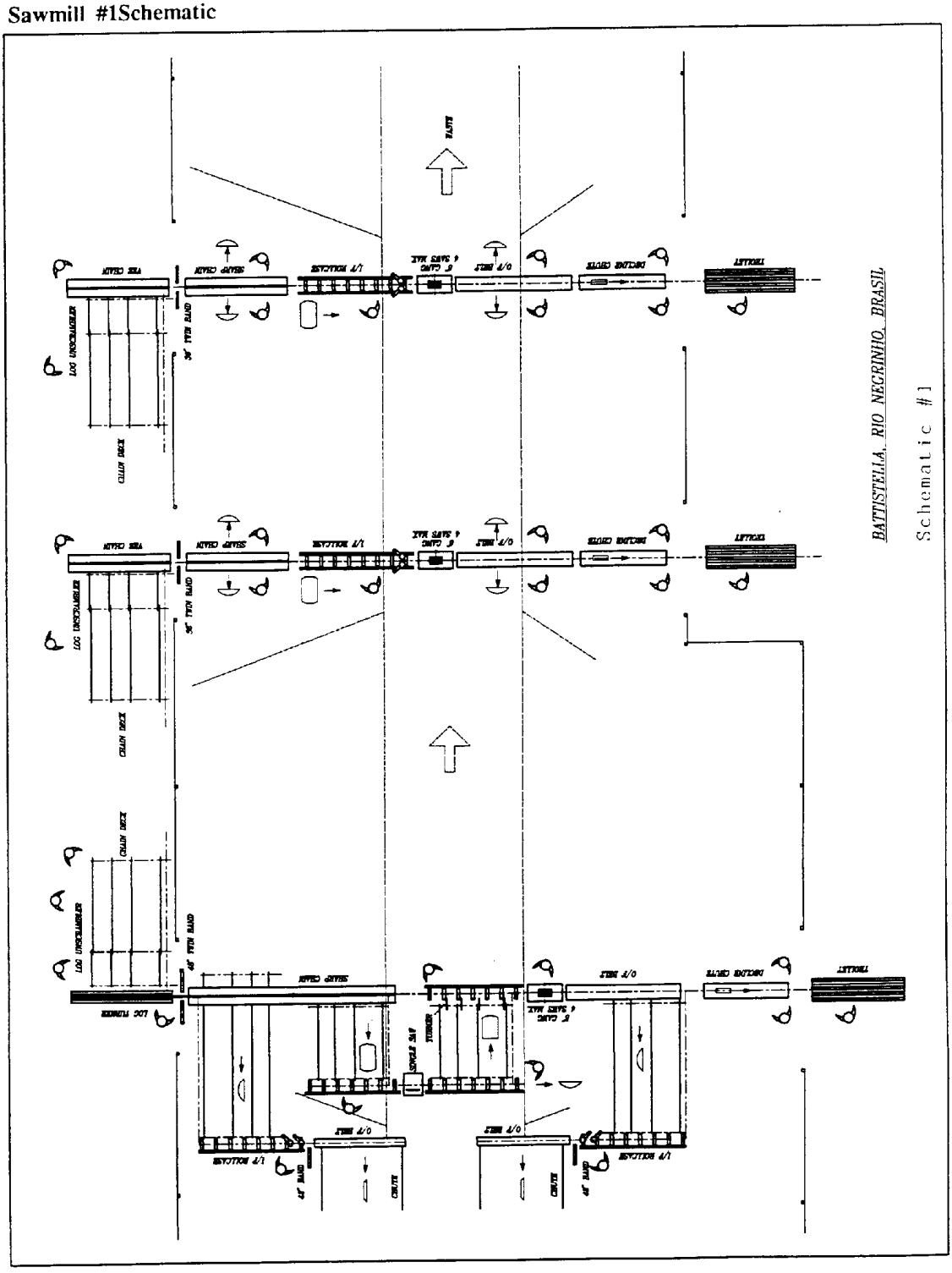
Source: Ministerio de Economia y Obras y Servicios Publicos,

		E. Globulus	E. Grandis	E. Tereticomis	E. Viminalis
Colour	Wood	creamy white	creamy white	creamy white	creamy white
	Core	clear brown	rosy brown	clear red	rosy brown
Texture		fine	medium	medium	medium
Grain		interlaced	straight/interl.	interlaced	straight/interl.
Sheen		medium	medium	medium	medium
Weight		heavy	light	heavy	medium
Hardness		semihard	soft	hard	semihard
Density (15% MC), kg/m3		810	560	950	700
Shrinkage, %					
	Radial	9.5	5.8	6.9	6.0
	Tangential	15.5	10.4	13.4	11.8
	Volumetric	21.0	18.9	23.0	18.5
Dimensional Stability		little	medium	little	medium
Porosity, %		48.0	62.7	35.7	48.6
Drying		difficult	normal	difficult	difficult
Sawing	Green	easy	easy	easy	easy
	Dry	hard	normal	hard	hard
Planing		good	good	good	good
Lathing		good	good	good	good
T&G Machining		hard	good	hard	good
Nailing		normal	normal	normal	normal
Painting		difficult	good	difficult	normal
Staining		good	good	normal	good
Varnishing		normal	good	normal	normal
Gluing		normal	good	normal	good
Combustibility		medium	fast	medium	fast

Properties of Eucalyptus Grandis, E. Dunii and E. Saligna

Property	Standard	Eucalyptus Grandis		E. Dunii	E. Saligna
All data in Kg/cm2		Air Dry	Green		
Static Bending	ASTM D 143				
Modulus of Rupture		731	582	854	866
Stress at Proportional Limit		519	340	467	547
Modulus of Elasticity		98345	69192	116093	117161
Compression					
Parallel to Grain	ASTM D143				
Maximum Crushing Stress		342	242	330	404
Stress at proportional Limit		257	181	239	301
Modulus of Elasticity		150534	118461	121555	149554
Perpendicular to Grain	ASTM D 143				
Maximum Crushing Stress		80.78	71.03	--	--

Sawmill #1Schematic



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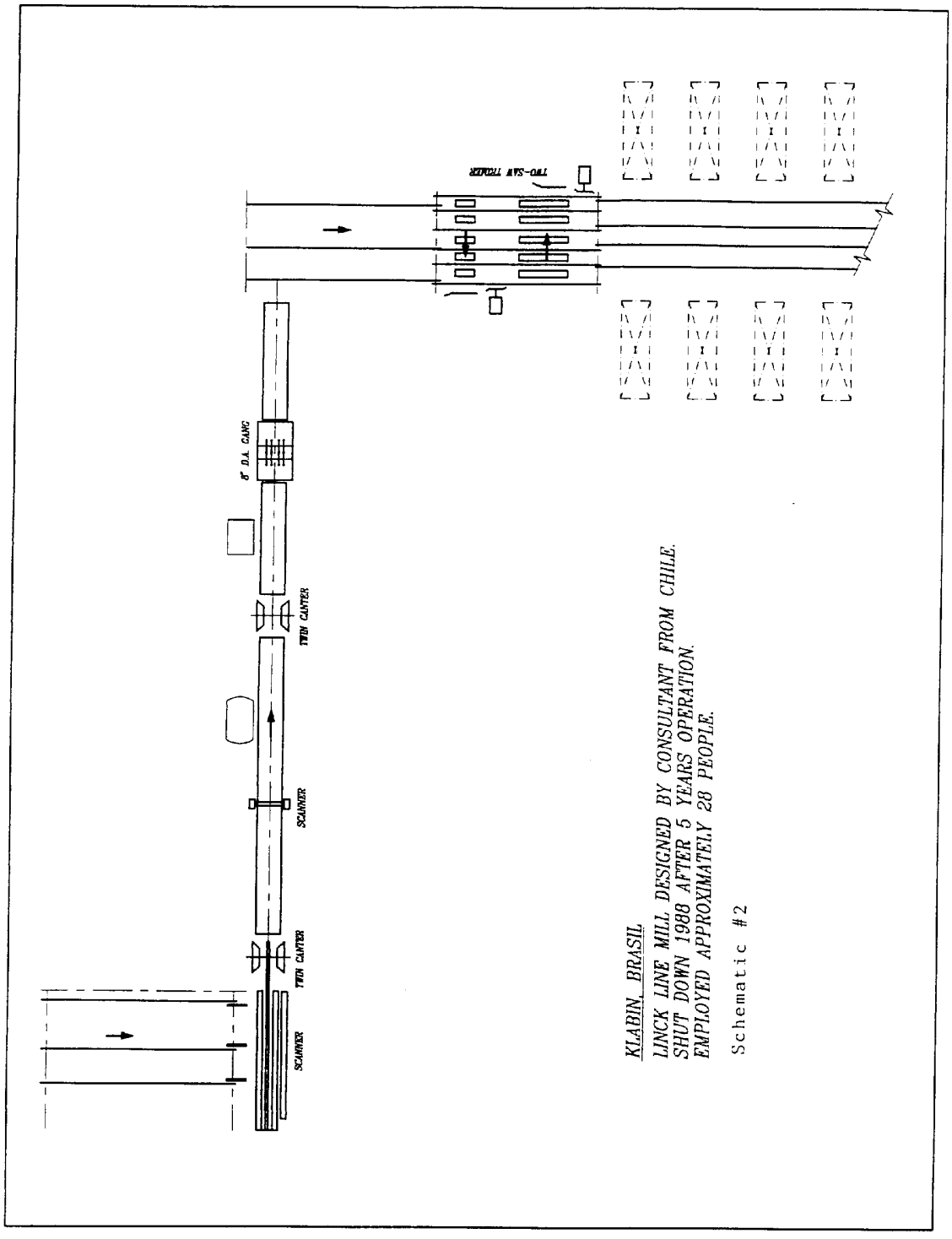
Sawmill Schematic #2



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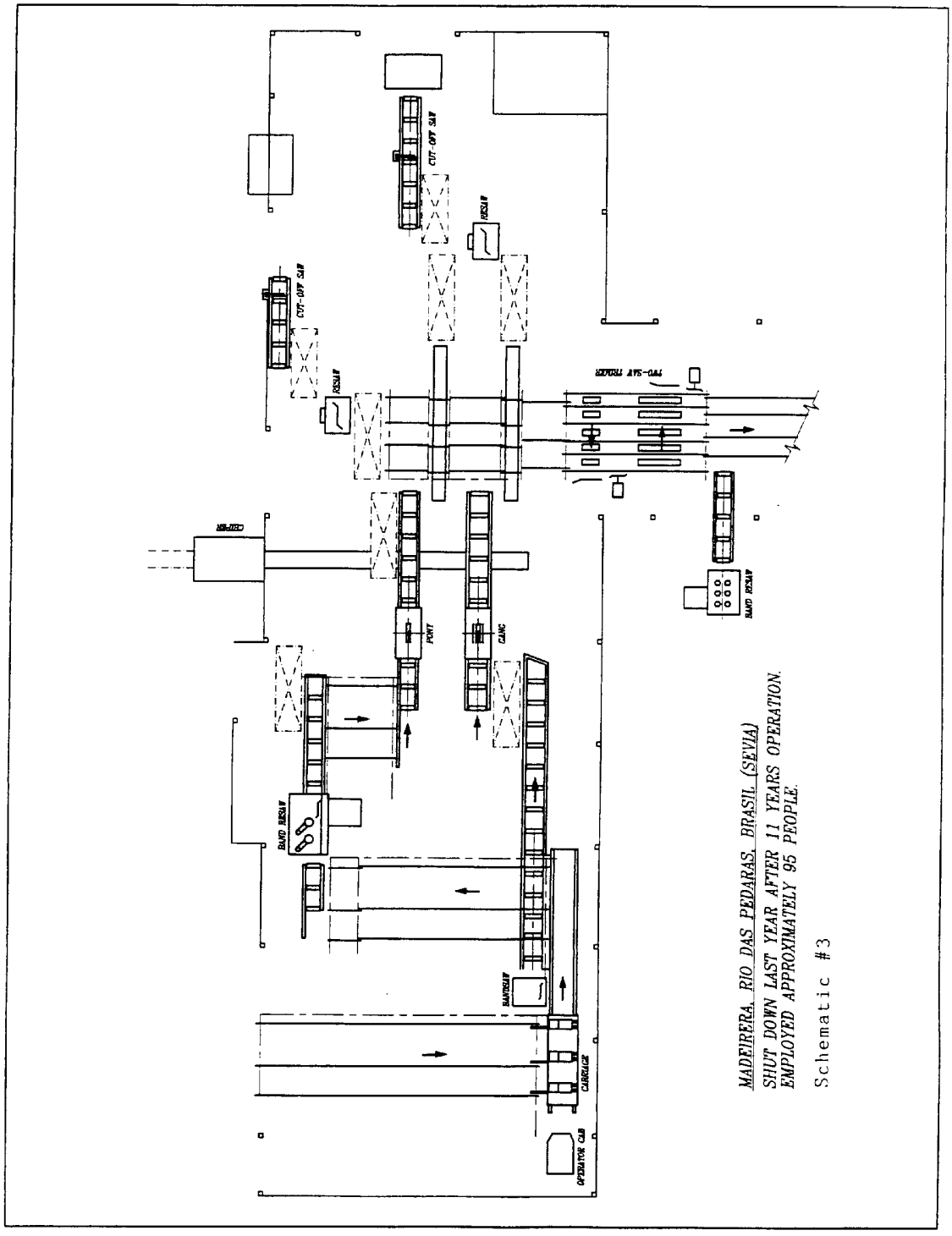
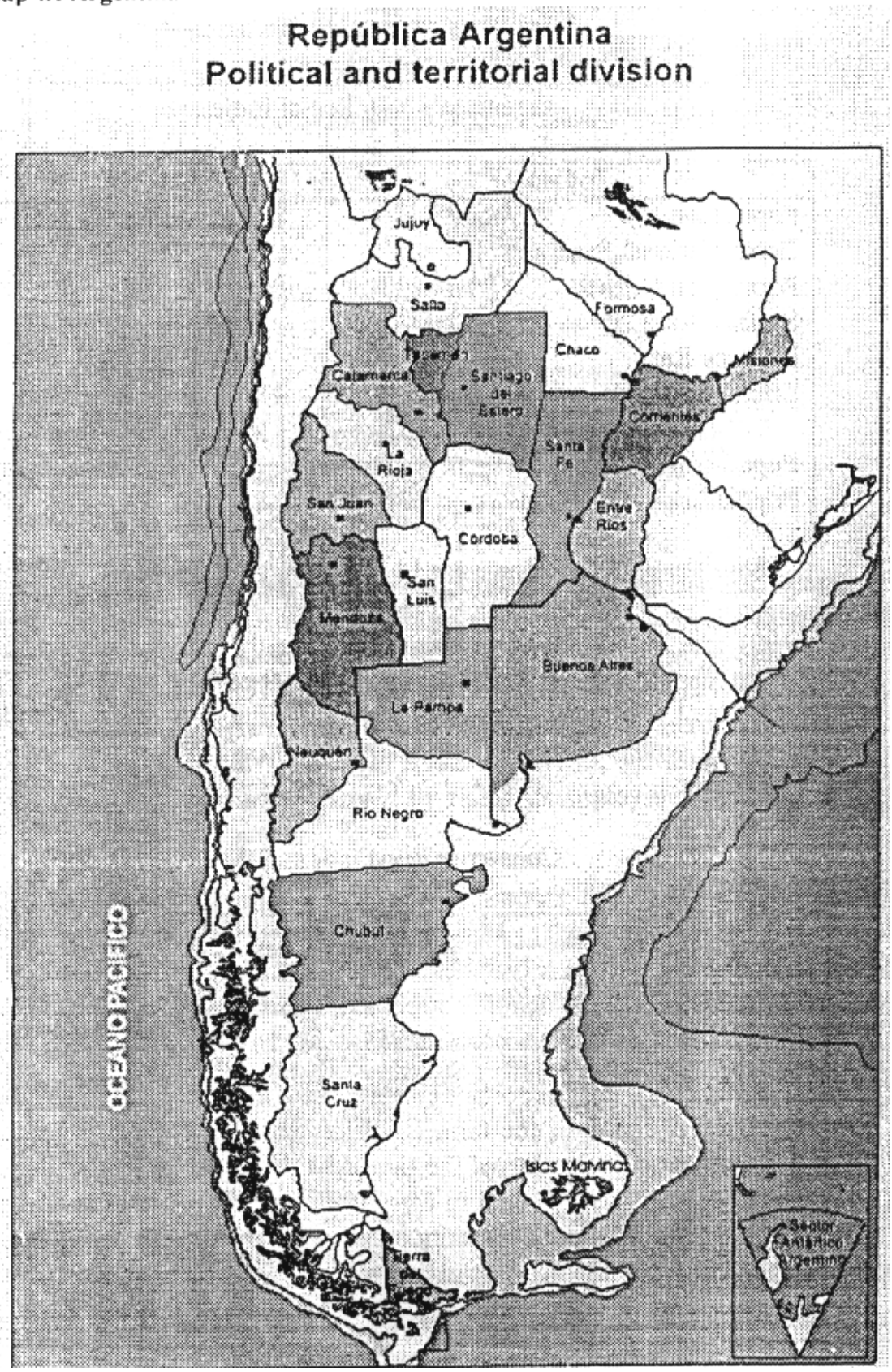
Sawmill Schematic #3

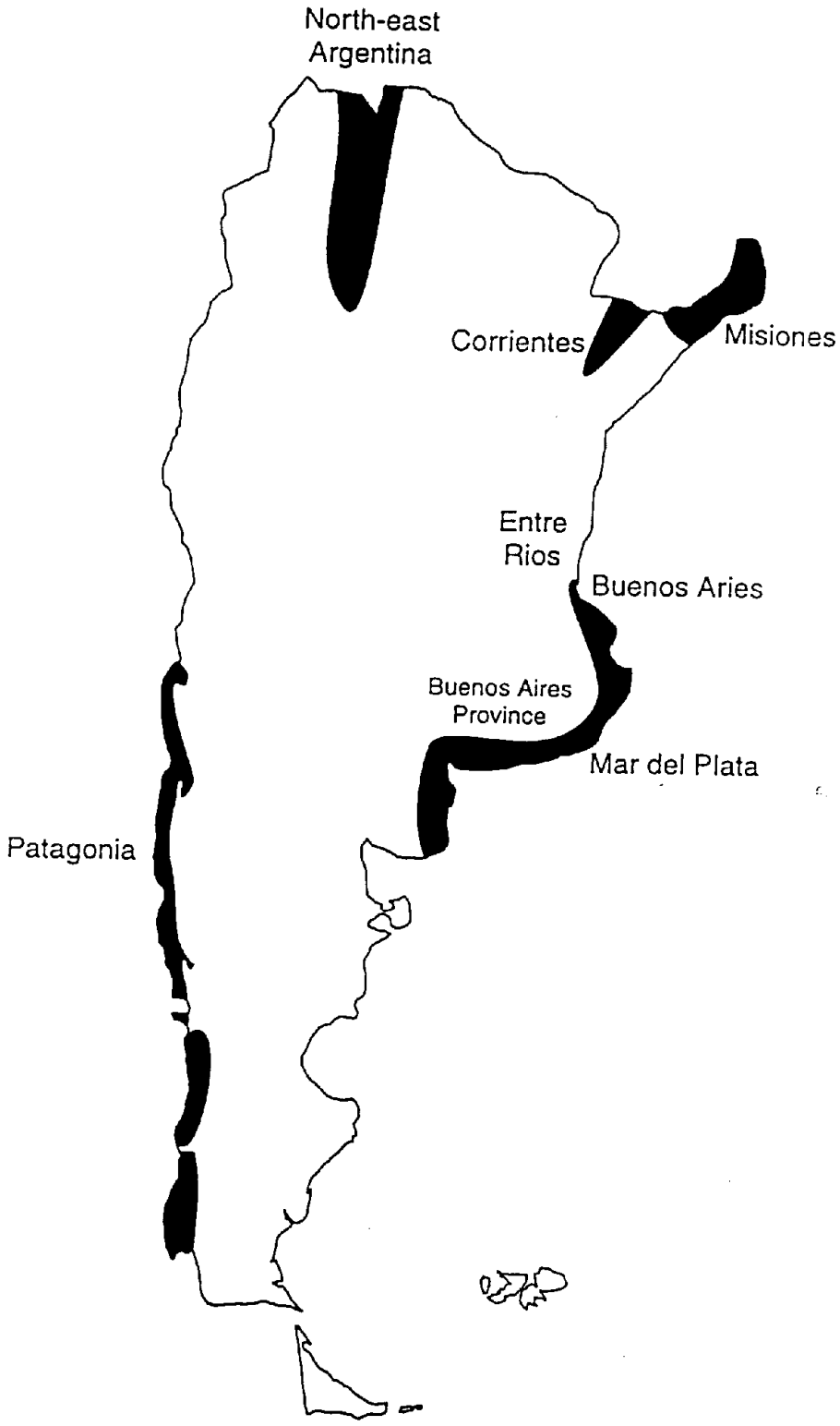


Map of Brazil - Forest growing regions

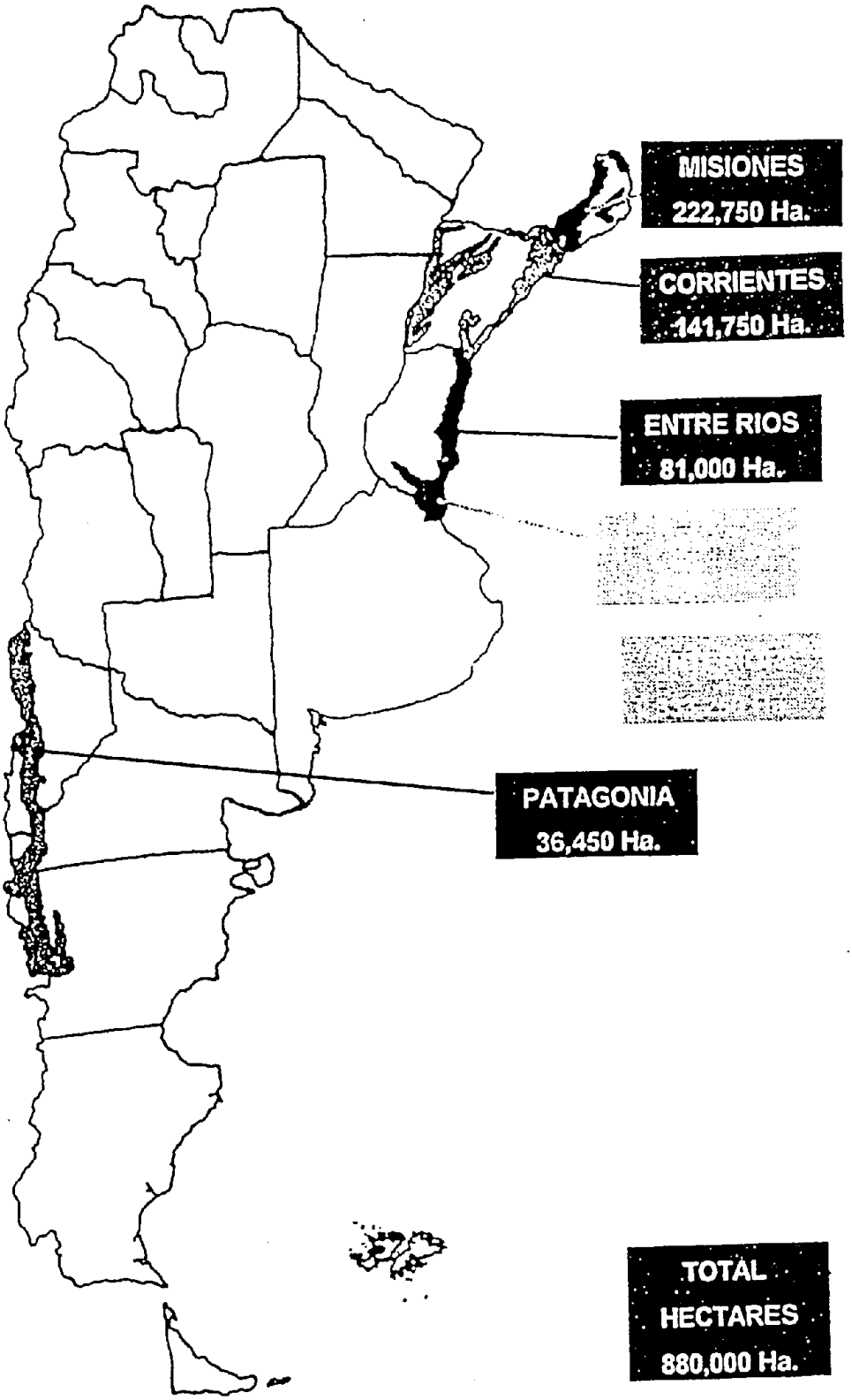
Map Of Argentina - Political division



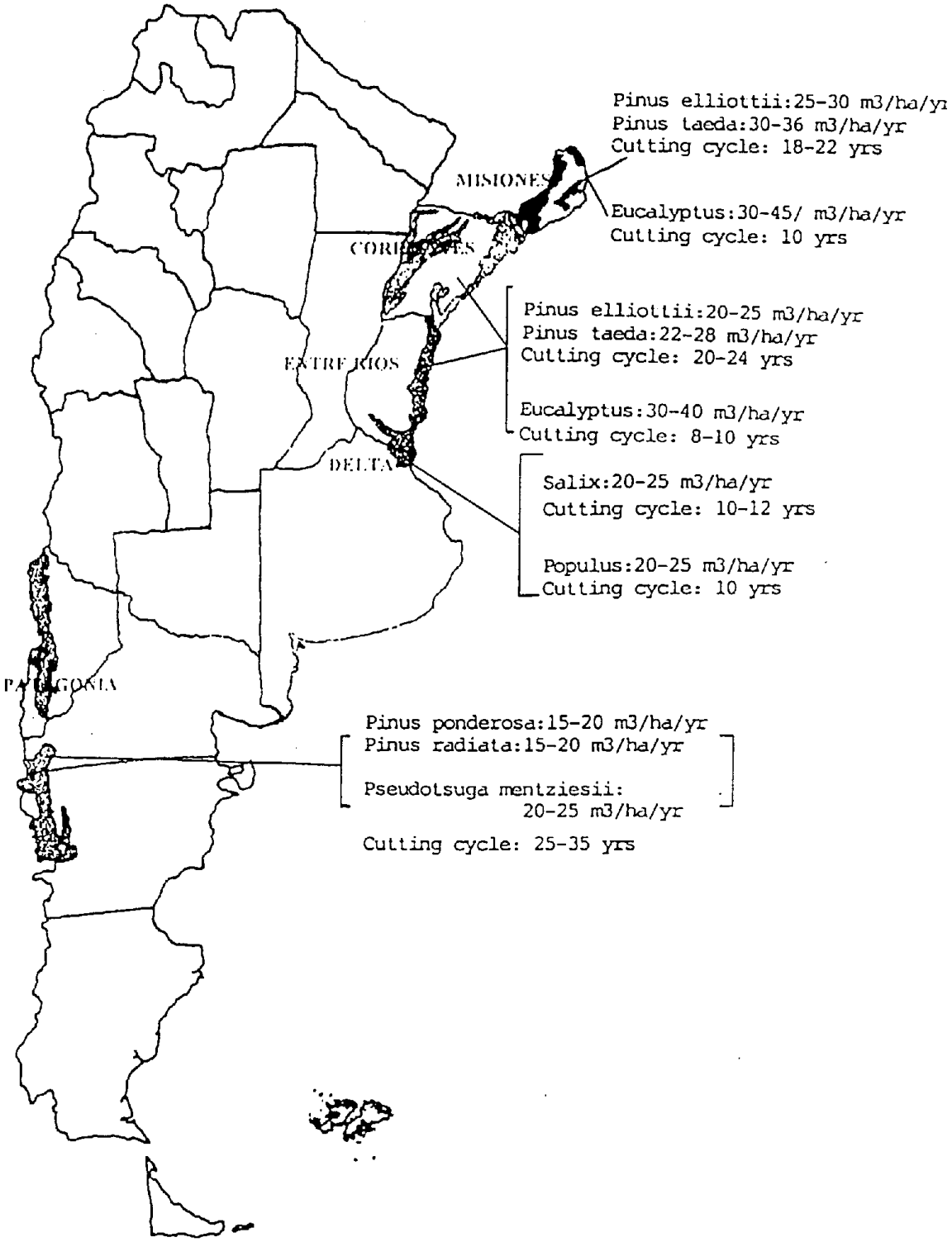
Argentina Land Suitable for Forestry



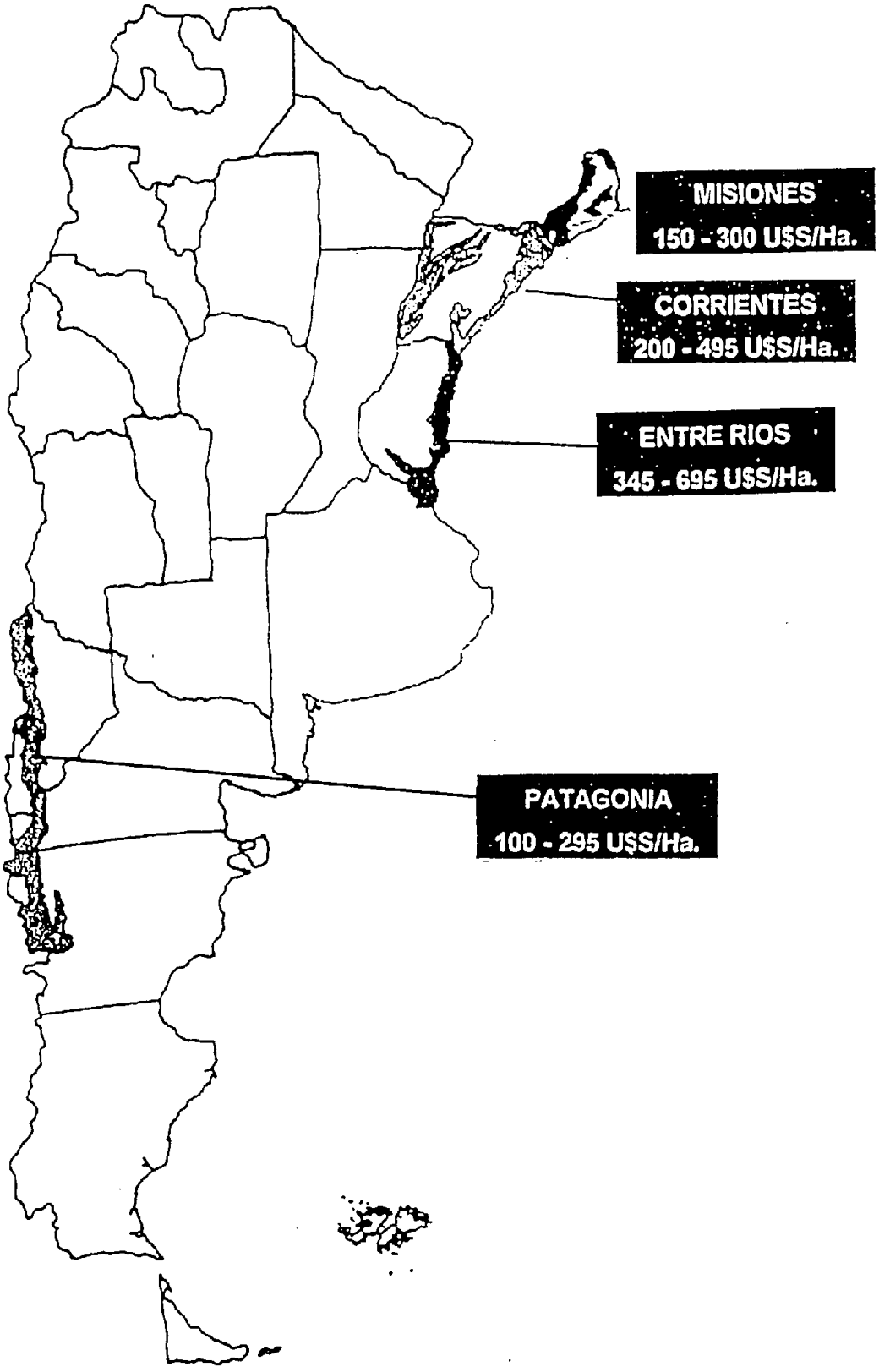
MAIN PRODUCTIVE REGIONS AND PLANTED AREAS



GROWTH RATES AND CUTTING CYCLES



LAND VALUES OF FORESTRY REGIONS



6.0 CONSULTING ENGINEERING SERVICES MARKET OVERVIEW

The Sawmill and Panelboard Consulting Industry in Brazil and Argentina is not developed at the present time. The consulting is being provided by some equipment manufacturers (see Metalurgica Schiffer), equipment suppliers (see Maderas Ecologicas) and by inter-relationship within the forestry related industries (see Imaribo). Most of the present sawmills and board plants were "engineered" by the owners with or without advice of the equipment manufacturers and suppliers. It should be noted here that neither Argentina nor Brazil have developed lumber standards and neither countries have national sawmilling associations which would spearhead development, acceptance and enforcement of such standards.

There does not, to our knowledge, exist a specialized consulting company. While Simons, Sandwell and some other European companies have been present in both countries for some time, their involvement has strictly been in the pulp and paper industry.

Large projects like Masisa are turn-key supplied, including engineering.

6.1 Market Opportunities for Canadians

The sawmills and small board plants present a virgin marketing opportunity for the Canadian consulting industry. The present situation of the sawmill structure cannot survive much longer and it is only a question of time before some of the small sawmills will specialize, the medium sized sawmills will start taking over the lumber market and the large automated sawmills will enter the scene targeting exports.

The board industry follows a different path in each country. The particle board industry in Brazil is well developed and is presently undergoing great expansion which will increase the production capacity from 1 million m^3 per year to 2.5 million m^3 per year by mid 1997. Very little expansion is planned for the Argentinean particleboard. Most of the particle board produced in Brazil and Argentina is used for furniture industry with some distinct value added products available to the domestic markets (see Bonplac). The market opportunity for the Canadian consultant is in the area of the specialty market of the particle board based value added products such as veneering, lamination, etc.

The MDF industry in Argentina is represented by Masisa's Concordia 120,000 m^3 per year facility, with no plans for expansion in the near future. In Brazil, Duratex is building a 180,000 m^3 per year MDF plant in the state of Sao Paulo and at least two more companies are entering into preliminary project development stages.

The Duratex plant which is a turn-key supply by Siempelkamp, including engineering, is scheduled to produce its first board in July 1997.

OSB in Brazil has not been yet developed but there are several companies seriously looking at the OSB market possibility. Berneck is planning to convert a small particle board plant into a very small (less than 50,000 m^3) "OSB" plant in 1977, to produce crating and packaging grade of board. The development of OSB in Argentina is still at least one or two years away. The market opportunity for the Canadian consultant is wide open in both the MDF and the OSB fields.

LVL and edge glued board are making first inroads into Brazil. Florestas Rio Doce is expanding its pine based edge glued board production to 5,000 m^3 per month and some sawmill companies are talking LVL. The edge glued board is natural replacement for the widely produced block board in both Brazil and Argentina. The market opportunity for the Canadian consultant is very real especially in the edge glued board field.

Log and material sorting, specialty processing and value added is being viewed by many of the small and medium sawmills in both countries (see Mar and Maderas Ecologicas) as one of the ways to survive and this is an area where the Canadian consultant may find a strong demand.

6.2 Market Approach

There are several aspects which have to be considered by a Canadian consultant with every marketing move:

- Argentina and Brazil have traditionally had strong ties to Europe and may not always view the North American technology as the best one.

- Gain trust of the client. Do not rush but be steady in your marketing approach. The North American "grand slam" approach does not work here. Gain the client's confidence in you first and then offer your services.

- Listen to the client's needs. Do not try to push for one step upgrade to the latest technology, when the upgrade can be economically realized in several steps.

- Both countries, especially Brazil are very industrialized with highly developed consulting services being offered by domestic companies in other industrial fields. While not a threat to Canadian consultants in the wood processing field, they play a significant role in educating your prospective clients, no matter how low technology their sawmills may be to sophisticated buyers.

- Be prepared to face and deal with requests to find a North American industry partners for larger projects.

- Establish your presence. Form an alliance, partnership or association with a local company which operates in a similar field to represent your company until you establish your office in the country.

- Speak the language. Even though your local South American agent is fluent in English, there needs to be persons in your company who can communicate in Spanish (Argentina) or Portuguese (Brazil). You do not need to be fluent, good communication is more than sufficient and the clients will appreciate it greatly. Capability to communicate in the client's language will break the ice in most cases.

6.3 Strength, Weaknesses, Opportunities and Threats (SWOT) Analysis for Canadian Engineering Consultants in Argentina and Brazil.

Canadian Strengths

The primary advantage of the Canadian engineering consultant is the fact that both countries do like Canada and appreciate its "no political muscle" approach to business. They are aware that Canadians do have forests and well developed related industries and do posses significant "know how" in the wood processing field.

Weakness

The primary weakness of the Canadian engineering consultant in the wood processing industry is the nearly non-existent, spotty at best, representation in Argentina and Brazil. The wood processing industry consultant needs exposure. Neither Simons nor Sandwell, established pulp and paper consultants in both countries, are active as engineering consultants in the wood processing field.

Opportunities

They are many, especially in the sawmilling field, which offers endless possibilities from a simple one step upgrade to sophisticated hard wood or soft wood sawmill, value added, niche market specialties, veneer and plywood plants, edge glued board, particle board, MDF and OSB.

Threats

The main threats come from two sources: Europe and Mercosul.

The European manufacturers of wood processing equipment have already been well represented and reasonably active in both countries and they offer not only the product but will "throw in" the related engineering and technology "know how" to support their sales and will not hesitate to offer low interest financing to close the sale.

Chile, who from the beginning of November 96 will join Mercosul (Argentina, Brazil, Paraguay, Uruguay) a trading block which has distinct advantages over any other trading countries, is aggressively marketing its wood processing consulting engineering expertise in Argentina and Brazil. Not only does Chile have a traditionally strong connection into Europe but it has been introduced to the Canadian and US technology as well. And they are just a short distance away. This makes them a formidable competition to the Canadian consultant trying to establish a foot hold in South America. But as the saying goes: "if you can't beat them, join them".

7.0 Brazil and Argentina Sawmilling Sector Overview

7.1 Sawmilling Operations

It would seem that no one really knows how many sawmills are operating in these two countries simply because most of the mills are very small and operate either without knowledge by the respective governments or at least without any care or consideration by them. Statistical information on numbers of mills, volume of timber processed, etc. is not readily available and the material that is available is likely outdated.

It is safe to say, however, that there are several hundred of these mills operating in the three Southern Brazilian states Parana, Santa Catarina and Rio Grande Do Sul and in the two Northern provinces of Argentina, Corrientes and Entre Rios. It is over this area that most of the pine and eucalyptus plantations are found and so most of the sawmill activities are located.

A typical small sawmill will process in the range of 300 cubic meters of finished product per month with a recovery of usually not more than 25 percent, while the largest sawmill visited, Battistella, in Rio Negrinho, S.C. Brazil, produced 10,000 cubic meters of finished product per month with a stated recovery rate of 45 percent.

It is interesting to note that most of the large companies claim to be losing money on their sawmill operations, while the smaller companies appear to be doing quite well. The general explanation given by the larger companies, when asked why this is the case, is that their labour costs are higher, in the range of $250.00 to $300.00 per month, and that this doubles when you add social costs (benefits).

It seems the smaller mills can hire labour on a casual basis, without any records and so can pay less without any social costs.

There are other factors, the large companies and the major forest owners are often involved in log exports. They often have other business activities such as truck dealerships, mechanical parts distributions, etc. which makes the running of a sawmill relatively less attractive.

Within the larger operations the mill managers often communicated scant enthusiasm and almost a tone of relief in one case where the sawmill had closed a year earlier.

Another contributing factor to the woes of the larger companies may be the lack of people with the knowledge and experience inside the operating area.

There appeared to be no one in the capacity of Mechanical Supervisors or Operations Managers that could identify areas that required change. In most mills, very small changes would produce better products and reduce costs.

All operations, large and small, had a very high labour content and while the cost of labour, by Canadian standards, is low, it was always singled out as the major factor in the cost of production.

7.2 Wood Based Panels

Almost all of the sawmills visited had some panel-board capacity. Even in many of the smaller sawmills there was activity in veneer, plywood and block-board.

It is not possible to provide statistical information regarding product quantities. However, an example may be Imaribo, S.A., a mill located in Monte Carlo, S.C., Brazil. The mill has 1,200 hectares of forest and intends to increase this to 2,000 hectares next year. They produce sawn timber, veneer and plywood.

At present, the break down is 5,800 cubic meters per month of sawn timber, 1,800 cubic meters per month of veneer and 700 cubic meters per month of panel-board, increasing to 850 cubic meters in three months. The mill produces a dried product, approximately 2,700 cubic meters oven dried and the rest is sold green.

Their market is mostly international which includes USA and Morocco with a small percentage going to secondary manufacturing in Brazil. Although they have access to Aracaria, they cut strictly Pine.

Their recovery numbers are:

Main line -	one cubic meter of finished products for 2.9 cubic meters input
Small line -	one cubic meter of finished products for 4 cubic meters input
Veneer line -	one cubic meter of finished products for 1.7 cubic meters input
Veneer export -	one cubic meter of finished products for 1.2 cubic meters input
Panelboard -	one cubic meter of finished products for 1.6 cubic meters input
	Average of 38 percent recovery.

Although Imaribo does not produce block-board, this product is very popular and is produced in thickness from 11mm up. The panels are produced from thin strips of Pine of various lengths, edge glued together or tied with a thin cord to form a core 4'-0" by 8'-0". A veneer cover is then applied to both sides and the panel is sanded. This product is sold to local furniture manufacturers as well as exported for the same purpose.

The methods of producing block-board vary from mill to mill with a very high labour content in some cases and a much leaner operation in others. Whatever the cost of production, the product was in great demand.

7.3 Sawmill Equipment: State-Of-The-Art-Review

In all of the operations visited during the tour only two, Imaribo in Monte Carlo, S.C., Brazil and Maderas Ecologicas in Concordia, Entre Rios, Argentina were using some form of scanning. In both cases, the scanning was in the log deck area. The equipment being used by Imaribo was designed and manufactured in-house with the help of some local control company. The equipment used by Maderas Ecologicas was somewhat more sophisticated and was manufactured and installed by Technologia Integral S.A. from Santiago, Chile.

Scanning and optimization has not yet moved into the material breakdown areas although Maderas Ecologicas was in the process of moving their sawmill operation and indicated their intent to use scanning in the primary breakdown areas.

It was also learned that Klabin Fabricadora de Papel e Celulose S.A., the largest Pulp and Paper Company in Brazil, operated a sawmill in the state of Rio Grande Do Sul which was considered state of the art technology for its time.

The sawmill was manufactured in Germany by Linck and produced sawn lumber solely for the domestic market. The equipment consisted of two chipper canters in line, reportedly both with scanning and some form of optimization. However, the mill shut down in 1988 after only five years of operation.

The sawmill operations of both Argentina and Brazil are using machinery which would have been considered old by North American standards even fifteen years ago. Almost all of the equipment is manufactured in South America and mostly in Brazil.

Probably the largest manufacturer of sawmill machinery is Metalurigico Schiffer S.A. located in Ponta Grossa, Parana, Brazil. This company has a large manufacturing plant, but very old and cumbersome machinery.

The equipment ranges from older engine lathes, milling machines and planers to gear hobbers and turret lathes, most of which are twenty to thirty years old. Only one modern piece of equipment was visible which was a small NC machining centre. Likewise the engineering department had about six people at drafting tables and only one C.A.D. operator.

Schiffer employs some 600 workers in five locations and manufactures over 200 different products. Most of the parts are made in-house from castings produced in their own foundry. Only belts, motors, bearings etc. are purchased items. The controls are also designed and produced by Schiffer, however, they now use a local company, at times, to provide some of the electrical.

Spare parts, rebuilding old equipment and service are all part of the company's offering. Some of the spare parts being made for machines are forty years old.

Schiffer estimates that they have about twenty competitors in Brazil and they know of two from Europe. Likely, the biggest competition will be Linck who have a manufacturing plant in Curitiba, a short distance east of Ponta Grossa.

Founded in 1938, the company has enjoyed steady growth, but they have not experienced large financial success, only having two good years in the last twenty. This is according to Roberto G. Schiffer, the present General Manager.

By comparison to the primary breakdown and secondary breakdown areas of the mills, the equipment used in added value operations, of which there were many, was

modern, high quality and of the latest design. Most of the equipment originated in Europe, however, there were some local manufacturers.

7.4 Sawmill Sector Opportunities for Canadian Companies

Opportunities for Canadian companies depend on:

- the ability to provide assurances to the buyers of commitment outside and beyond the selling of a product

- the ability to convince companies who traditionally look to Europe that Canada should be a choice

The timber base in both countries is substantial, with most of the large companies owning timber far in excess of what they are presently capable of using.

In Argentina, the development of more pine plantations is in progress and the export of logs from both countries is now under review. It is generally expected that some form of restriction will be implemented by the governments to force a value added component into the export of timber.

7.4.1 Sawmills

There are plans to build sawmills in Argentina and Brazil in the near future.

Klabin, whose mill failed in 1988, are planning a new operation. The information regarding this project was somewhat vague as the source was Mr. Manoel Francisco Moreua, a Forestry Operations Manager. He indicated that the site could be in the area of Harmonia, in Parana with a price tag of $30 million dollars.

Riocell S.A., located in Guaiba, Rio Grande Do Sul, are negotiating with a US company to build a new mill. Mr. Renato A. Rostirolla, Chipping Production Manager, stated that the mill will go ahead and that studies were already underway to determine a location, however, he declined to give any further information.

In general, it appears that there will be considerable activity in sawmilling in the next five to ten years. Preparation by would be suppliers, should begin as soon as possible. Willingness to be part of a joint venture or some similar arrangement could be a key factor to success.

7.4.2 Kilns

Insufficient data was gathered to make a detailed analysis of the demand for kilns. The majority of lumber is still dried by the open air method.

7.4.3 Market Implications for Association Companies

There will be considerable cost involved in doing business in these two countries. Staying-power must be carefully considered by a member company wishing to penetrate this market.

First the supplier must become familiar with the problems surrounding the industries. These problems include marketing, product definition, financing, joint ventures, etc.

Providing solutions to mechanical problems or control problems will likely not be sufficient.

Local manufacturing companies are well respected and mill personnel are proud to inform you that a particular machine was made by a neighbouring firm.

The number of operations that are suited to North American equipment, even without the sophisticated scanning technology, is very limited at present. In order to provide this equipment to a mill, the supplier must provide a reason for the buyer to want it.

7.4.4 Existing Competition

The level of technology and sawmilling methods used in Argentina and Brazil today are somewhat similar to what was being used in Chile about seven or eight years ago and we have already determined the need for change. It would be fair to assume that European competition will be strong and aggressive in this market. The US already have made some gain having been chosen for the new mill by Riocell.

South American manufacturers such as Schiffer will not be a significant factor in their present position but these companies could provide a means for a joint venture or dealer agreement which would be well considered.

7.4.5 Marketing Framework

The one key issue when talking about suppliers from Europe or North America was spare parts. The availability of spare parts is such a concern that manufacturers of a small timber harvester from Finland with a debarking head which is considered

superior by Klabin will not be given an opportunity to bid in future. The machine known as "Pica" did an excellent job, but spare parts were not readily available.

Already determined is the need to assist the potential customer in more than the usual ways. A complete new approach may be required here, one that will allow the supplier to take an active roll in a partnership venture with a timber resource company, a sawmill operator, and a marketing or exporting agency. Certainly conventional methods will be a long time in establishing.

7.4.6 Agents / Dealers

Agents or dealers may very well be a way for Canadian companies to establish a presence in Brazil and Argentina and no doubt will have an influence on prospective customers. Yet when asked as to the importance of local representation, the answers were almost always the same, the availability of spare parts was more important.

There is no doubt that among large and small companies alike, there is a desire for some form of joint venture.

The seemingly lack of knowledgeable people to provide advice on product marketing, mill flow design, operations management etc. may well be what is prompting the pleas for joint ventures.

7.5 Customer Service Training

Training of operators would almost certainly be of major importance in this market.

Modern equipment and practices are new and foreign to the operating personnel who will be expected to meet the performance guarantees.

Customer service may not be so important to begin with, having noted several times the spare parts concerns. The operations managers have a great deal of confidence in their people.

Changes to more modern sophisticated equipment, particularly electronic, may force a supplier to consider some form of customer service.

7.6 Project Financing

Most of the larger companies and forest owners appear to be in a healthy position and financing would likely not be required when dealing with such companies.

Smaller companies may require some assistance to purchase expensive Canadian machinery and at least two of our contacts showed interest in possible financial help.

It would be prudent for any association member entering into contracts in this market to investigate the financial implications thoroughly.

7.7 Strengths, Weaknesses, Opportunities and Threats (S.W.O.T.) Analysis for Canadian Sawmill Equipment Suppliers

Strengths

This market is on the brink of major change.

Neither country have realized a fraction of their export market and both have large forest resources.

Association member companies have the capacity to provide all the necessary services required and are in a position to take advantage of the situation.

Canadian sawmill machinery technology and in particular Western Canadian, is recognized as "State of the Art".

Services and equipment offered by association members appear to be a perfect match for the material being processed and for the finished product mix.

Weaknesses

There is an expression of dissatisfaction with American suppliers and Canadians are not sufficiently distinguished from the US.

The Canadian presence has not yet been established in this market and while the recognition is there that Canadians are leaders in the industry, our products and services are not widely known.

There is a lack of knowledge in cutting and processing techniques of commercial species, particularly in the difficult Eucalyptus and Araucaria.

Opportunities

There is a definite need for services, providing advice and knowledge either with the sale of equipment or as a consulting firm. Sales opportunities may very well be closely linked to the supplier who will provide the knowledge package.

Major forestry owners who have used the resource for tax shelters in the past, now find that the excess timber is a liability, hence the need to find a practical solution.

Threats

The Chilean market began expansion about eight years ago and while there is some Canadian presence now, the US and European suppliers have been very aggressive in securing a position there. The trend is likely to continue into Argentina and Brazil.

The traditional "eyes to Europe syndrome" for suppliers and service of just about anything is a factor.

8.0 Harvesting Sector Overview

8.1 Harvesting methods

When examining harvesting operations in Brazil and Argentina there are two distinct regions - the Amazon rainforest and the plantain forests of southern Brazil and Argentina. Both have their own unique demands. Unfortunately, the time frame for this study did not allow for travel into the Amazon area so this analysis will focus solely on the plantation forest region.

The two predominant species harvested in Argentina and southern Brazil are eucalyptus and pine (taeda and elliotti). Both species are planted on an approximate 3.0 X 3.0 meter grid, allowing for mechanical harvesting access to the forests. It was not possible to determine an average haul length to road access but there is no reason to believe that it is any different than the plantation forests of Chile.

The terrain is predominately flat with some rolling hills. On steeper terrain those fallen logs not accessible by skidders are winched to flat ground and then transported to the log bundles by skidders. Needless to say, this is a time consuming process.

Harvesting methods will vary depending upon the species and end use of the harvested timber.

If the final cut is to be used for sawn timber pine is usually harvested on a 22 year cycle, with as many as four thinnings. In the example of the Klabin plantation forest, which is one of the largest in Brazil, there were four thinnings of their pine forest at seven, ten, thirteen and sixteen years respectively. All of the thinnings went to their pulp mill while the final harvest was sold to the local sawmills.

Klabin thins their eucalyptus plantations at four and nine years with final cutting at 17 years. Forty percent of their wood resource goes to the pulp mill while the remaining 60 percent is used as saw logs for the furniture industry.

However, the Riocell operation in southern Brazil, which is predominately eucalyptus for pulp production, is harvested after only seven years with no thinning.

It is safe to say that mechanical harvesting is just beginning to become fashionable in Brazil and Argentina. There are several reasons for this.

Up until the early 1990's Brazil imposed fairly extensive restrictions on the import of foreign machinery in order to address their balance of payments problems and stimulate export substitution. Due to this, and the plentiful supply of unskilled workers, the harvesting methods in both Brazil and Argentina have become very labour intensive. The principal form of mechanization is the use of the "miniskidder" which is in reality an agricultural tractor with various attachments (i.e. winch, grapple, grapple crane, fork lift). The miniskidder is underpowered and requires a good deal of skill in order to minimize damage to the equipment through operations.

With the easing of import restrictions in Brazil the larger forest companies are now beginning to seriously examine the mechanization of the harvesting process. Klabin, which employs 2,800 people in its harvesting operations, realizes that with modern mechanical harvesting methods it could reduce this number to 250 people. It is recognized, however, that due to social obligations (Klabin has mini-villages in its forests composed entirely of harvesters and their families) this mechanization can not be carried out overnight.

It was reported by Klabin personnel that they lost less than 10 days a month due to rain delays, when the skiddders could not haul from the forest.

The falling of trees is carried out by chain saw gangs and then skidded to the haul road where they are bucked by hand and bundled for loading on the trucks by a miniskidder with a grapple-crane. The standard bucked length is 2.4 meters and the logs are carried cross-ways on the truck.

Most haul roads are very rough as road maintenance is not a high priority. The quality of the roads is often directly related to the quality of the plantation forests as those companies which make the effort to grow high quality timber also carry over the same attitude to road maintenance.

Debarking of eucalyptus in the forest is usually a necessity as this process is most easily carried out immediately after the tree is felled. Usually a small portable ring debarker is used.

8.2 Existing Competition

Competition comes from two sources. The present equipment, which is used in the existing labour-intensive harvesting methods and the new equipment which is being imported to mechanize the harvesting process.

The aforementioned miniskidder is the workhorse of the industry. This is primarily an agricultural tractor which has been modified for forestry operations. **Valmet** has by far the largest market share as they have been established in South America for many years and manufacture locally. **Massey-Ferguson** is also seen throughout the country. It is estimated that the base tractor costs $US 30,000 and the various attachments $US 30,000 each. Attachments range from front end loader, rear end grapple, grapple-crane, and winch assembly. It is a multi-purpose machine throughout the industry.

The miniskidder is underpowered and must be handled conservatively in order to minimize downtime. It has found its niche, though, with the Klabin operation operating close to 100 of the miniskidders for various applications. These tractors are not especially effective in wet conditions.

Falling of trees is still carried out by chain saws and will only be replaced with the adaptation to mechanical harvesters. Only one harvester was seen during this study and that was being used in a special case. Klabin was operating a “Pico” (manufactured by **Pinomaki Ky** - Finland) to carry out the first and second thinning of its eucalyptus forest. This machine was selected because its head did an excellent job of debarking the eucalyptus in the felling process. There were no plans, however, to purchase more due to problems in acquiring spare parts.

Their are a variety of modern skidders and forwarders working the Brazilian and Argentine plantation forests. **Caterpillar** and **Timberjack** are predominant in the skidder market. While Caterpillar has a major supply and service network throughout South America Timberjack was still supplying direct from the factory in Ontario. It was learned that Timberjack had hosted a delegation of approximately 30 Brazilian harvesters at Demo ’96 in Quebec.

Valmet and Timberjack are also supplying forwarders. Some of the plantation areas are so flat that skidders are not necessary. The trees can be felled by chain saw or harvester and picked up directly by the forwarder.

8.3 Market Opportunities

Significant opportunities exist for harvesters which can debark and buck eucalyptus in the felling process. Several operators informed us that they would immediately buy such a saw head. Future parts availability is a key element of any sale, however, as Klabin's dissatisfaction with the availability of parts for the Pico negated further sales opportunities.

Feller-bunchers that can effectively work in the confines of the thinning operations in the plantation forest's grid will also find excellent market opportunities in Brazil and Argentina.

There will be a strong demand in the future for both skidders and forwarders as operators move away from the present format of miniskidders, which work well in a labour intensive environment. Self-loading forwarders will be preferred in plantations with flat terrain while skidders which can minimize the downtime due to rain, increase the access to hilly terrain, and prove less destructive to the plantation environment will be seriously considered. A price-benefit comparison will always be made to the low cost of the miniskidders and their associated labour component.

Scania, Volvo and **Mercedes-Benz** dominate the truck market. Aftermarket products which can minimize the damage caused by trucking operations on rough roads will find a market here.

8.4 Distribution Channels

In order to enter the market for skidders, forwarders and harvesters initial sales will have to include large harvesting operations such as Klabin. The larger operators have the international expertise to select which products best suit the local environment. If the larger firms are operating a certain type of equipment this will be the best promotion for follow-up sales to smaller operators. There is not a wide breadth of knowledge of modern harvesting techniques so educating key potential customers is critical.

A reputable agent/distributor is essential.

8.5 Customer Service Expectations

Parts availability is the critical issue. Almost all operators had the mechanical ability to perform routine and heavy maintenance but purchases from foreign suppliers would be greatly influenced by the suppliers capability in providing spare parts in a timely and cost effective manner.

8.6 Customer Training Requirements

No unique training requirements were reported by harvesting operators.

8.7 Financing Expectations

Financing is a factor, but not necessarily significant. Some of the larger forestry firms (Riocell) have arrangements with their logging contractors in which they assist them in receiving bank financing for purchases of new equipment. The larger firms, through which initial market entry is recommended have the financial strength to buy based on the performance of the machine.

8.8 Strengths, Weaknesses, Opportunities & Threats for Canadian Harvesting Equipment Suppliers

Strengths

Good reputation for business practices

Known reputation for expertise in forestry sector.

Experience in Chilean forestry sector

Weaknesses

Specific products relatively unknown in local market.

European heritage dictates a European focus on imports

Existing market penetration by European suppliers

Distance of Western Canada from local market

Opportunities

In specific niches Canadian companies have the ideal equipment to complement the market's move to mechanization - debarking of eucalyptus (poplar), efficient harvesting of small logs, increased **access to hilly terrain.**

Threats

Existing presence of European suppliers.

9.0 Market Strategies for Argentina and Brazil

Although, not originally defined as a target market by WestCanEx, the successful entry by Association members into the Chilean market in the early 1990's has led to an increase in that country's neighbours to the east. One of the key considerations in carrying out the research was to determine if the conditions that led to the development of the Chilean forest industry existed in Argentina and Brazil and what, if any, were the differences.

This report has been structured somewhat differently than previous reports carried out by WestCanEx. The analysis of the various sectors of the forest industry have been grouped together for both countries. This was deemed feasible due to the realization that despite political and language differences the forestry sectors of both countries are in the same state of development and share many common characteristics; the key difference being Brazil's resource of tropical hardwoods in the Amazon region. This report, however, focuses solely on the plantations of southern Brazil and Argentina.

The forest resources of Brazil and Argentina share the same physical attributes as those of Chile. Due to Chile's overall greater level of political and economic stability, it has been able to provide the conditions necessary to attract foreign capital for the development of its natural resources. Argentina and Brazil are just now reaching a similar level of economic and political stability. It is safe to say that both of these countries are five to ten years behind Chile in the development of their forest resource.

Chile now has large corporations which have the necessary financial resources to commit to the long term development of that country's plantation forests. This has occurred in the sawmill, pulp and paper and engineered wood panel sectors. While both Brazil and Argentina have attracted foreign investment in the pulp and paper and wood panel sectors the sawmill sector, which is of great importance to WestCanEx members, remains largely an unregulated industry, dominated by

many small firms producing semi-processed lumber for the domestic market. The lumber which is exported is basically for re-processing overseas.

The key finding of this report is that there does not exist a “sawmill culture” at the international level in Brazil and Argentina. Despite an over capacity of wood resource and fluctuating pulp prices the sawmill sector is seen as the domain of small operators operating partially in the black market to avoid taxes. It was interesting to see such a large operation as the multinational Klabin selling the excess timber not used for its pulp mill to the small sawmills instead of processing the logs in their own sawmill.

While Klabin had operated a “modern” (by Brazilian standards) sawmill in the past the end product was primarily sold on the domestic market and could not compete with the smaller, local suppliers. Since there are no national standards for lumber, quality is not a key consideration. Operating on the black market gives the smaller firms a distinct advantage in the domestic market.

None of the larger sawmills visited reported making a profit. What was difficult to understand was their lack of a strategy to correct this situation. It became apparent that the managers of the mills were more like caretakers than actually being responsible for making a profit. One General Manager actually expressed relief that the sawmill under his control had finally been closed.

This situation is a result of many of the larger operations being part of a multinational company which is not forestry oriented - thus the lack of a “sawmill mentality”. To understand this it is important to realize that much of the development of the plantation forests in Brazil and Argentina in the last 20 years was due to a taxation policy which saw investors being able to claim significant tax breaks for the creation of plantation forests. Thus, it was not unusual to have a plantation forest owner who knew nothing about how to harvest the actual resource. It is only now, with so many of the plantations reaching maturity that they are facing the fact that they do not have the capacity to harvest what they have planted.

A further restriction to the development of a sawmill industry is the generally poor quality of the plantation forests. Despite excellent growing conditions these “tax break” forests were not properly maintained. While this may not be critical if the end product is going to be pulped or chipped it is an important consideration for the sawmill industry. Only now are some of the plantation forests being maintained at standards similar to Chile. There is however, overall, great room for improvement.

With these considerations in mind the following marketing strategies should be adopted.

9.1 Sawmill Equipment

The domestic market for lumber is the domain of the small, labour-intensive form so typical of both Argentina and Brazil. These companies do not have the financial resources or the desire to upgrade to a more capital intensive, high-quality production methods. They exist, if not prosper, on the fringe due to the lack of standards for the domestic lumber market. There is no short term market potential for the sale of the type of sawmill equipment found in WestCanEx.

The real market exists with the owners of large plantation forests that have an over capacity of wood resource without the necessary expertise to develop that resource. The market for this lumber is the international market which demands consistent standards and which will pay for quality. WestCanEx members can supply the necessary equipment and expertise to make this happen.

It is important to realize that it is not just equipment that is required. Expertise in both the processing of sawn timber and the marketing of the end product are both important elements in the development of the Argentine and Brazilian sawmill sectors.

This will require a partnership approach, both at the individual equipment supplier level, and among the owner of the wood resource and the group of suppliers. The immediate opportunity is for the development of a Build-Operate-Transfer arrangement which will allow the forestry sector to view the economics of developing its wood resource as high quality sawn timber for the international market.

This marketing approach is a major leap for Association members but is one which fits in well with the mandate of Association membership; namely to develop export opportunities by joint efforts in foreign markets.

Those companies approaching the market as individual equipment suppliers will not be well received because it is a piecemeal approach to a problem which requires an integrated solution. Both Argentine and Brazilian plantation owners require a combination of modern equipment, technical assistance and foreign capital to sell their end product to the international marketplace.

Both economies are open to foreign investment and provide incentives for the development of industries that increase exports. The environment is right for such a strategy and will allow the potentially superior forest resources of Argentina and Brazil to accelerate their development to Chilean levels.

9.2 Harvesting Equipment

There exists an immediate opportunity for suppliers of harvesting equipment. Due to a relaxation of import restrictions bot the Brazilian and Argentine markets are free to select the equipment suitable to their needs. T he increasing costs of labour, both directly and through greater social costs, coupled with easier management of capital intensive methods of harvesting, will accelerate the mechanization process.

The one-step mechanical felling and debarking of eucalyptus is the most obvious market opportunity. With the development of eucalyptus as a wood resource for the local furniture industry this species will see increased use.

With greater resources being dedicated to the maintenance of the plantation forests equipment which can minimize damage to the terrain during the harvesting process will also have significant market opportunities.

The poor infrastructure of the road network, more pronounced in Brazil than Argentina, will also create a market for products which focus on reducing the wear and tear of harvesting equipment.

After sales product support is a crucial factor in further developing the market after the initial sale.

9.3 Tactical Approaches to the Argentine/Brazilian Market

Teamwork will be the key for successful entry into this market. Lacking the necessary background and experience the local industry will need complete solutions, right down to an economic analysis of the market for the end product. With the understanding that local representation is always a necessity in foreign countries this will mean partnership with a local plantation owner.

10.0 Appendices

10.1 Trip Notes

BATISTELLA Facility,
Rio Negrinho, Santa Catarina
Contact: Michael A. Robinson, Marketing manager.

- This facility, consisting of veneer plant, sawmill and a block board plant is a flagship of Batistella.
- The fiber is pine (Taeda & Eliotte) and it comes, from forest plantations owned by Batistella, to the sawmill both as tree length and short logs.
- The sawn lumber was sorted as No.1 (clear) and No.2 (tight knots) and kiln dried.
- All the kilns (10) were made by COMECO company of Curitiba, Parana, Brazil.
- The drying temperature is 115 degrees Celsius and the resident time is 35 hours per 25 mm of thickness of the lumber.
- Some of the kiln dried lumber was further processed into random length (25 cm to 150 cm) clear blocks which were used to produce a block board (a kind of a precursor to the edge glued type of board).
- All cutting and forming of the blocks was by hand.
- There were 6 block ripping and cutting stations using Schiffer band saws and 3 panel forming lines.
- The wood blocks were hand aligned end to end and side to side to form a board, of roughly 130 x 260 cm in size, strapped mechanically by about four evenly spaced plastic twines and entered into a gluing station where a thermoset glue was applied to the top surface of the wood blocks and cured by high temperature in a continuous oven.
- Only small portion of the glue applied to the surface actually entered in between the wood blocks.
- The board was trimmed after the curing into 1250 x 2500 mm size and laminated on both sides with a thick pine veneer using a 16 opening hydraulic steam heated hot press (plywood type).
- The press infeed and outfeed were manual.
- The press was made by COMECO, same company which supplied the dry kilns. After 24 hour curing in a covered warehouse the panels were sanded and manually packed for export.
- Final product was a block board panel, veneered both sides, some apparently exported to US for furniture and door manufacturing.
- Compared to edge glue, the end to end joints of the particular blocks were no precise, the edges of the wood blocks were only marginally glued together and the

resulting panel was quite weak, structurally, in the crosswise direction even when laminated with the thick (3 mm) veneer on both sides.

- *I would like to add that this type of block board is fairly common type of panel in Brazil and the veneered block board product is quite commonly called "compensado" which may readily be confused with plywood (compensado = plywood). I have encountered this type of product several times previously and in one case I was invited to visit and review a "compensado" plant which, when visited, was found to produce veneered block board. The veneered product sells on the domestic market for $300 to $400 per cubic meter, depending on quality, and is used for furniture manufacturing.*
- The veneer plant peeled pine, using part of the veneer destined for export to US and part for the veneered block board production described above.
- The reject from the sawmill, veneer plant and the block board plant is chipped, including bark, and transported to the energy system which produces steam for the veneer plant, dry kilns and the block board plant. It produces 60 tonnes of steam at 40 atp pressure.
- It also generates 2.8 MW of electric energy.
- I was informed by the sawmill manager that the energy system was installed in 1993 for the total cost of US$2.5 million (supply only) by Zanini of Sao Paulo and the system is a license from Foster & Wheeler, which is a Canadian company.
- The system works apparently very well.
- What is interesting is the determination of the volume of the sawn lumber. For example:
  - the 2 x 4 is rough cut to 55 x 105 mm but the volume of the sawn lumber is calculated on the basis of 50 x 100 mm and
  - the 1 x 6 is rough cut to 28 x 155 mm with the volume of production being calculated on the basis of 25 x 150 profile.
- There does exist an association of the lumber producers. It is ABPM (Associacao Brasileira de Produtores de Madeira) and it is located in Curitiba, Parana.

BONPLAC,
Santa Cecilia, state of Santa Catarina

- The operation is a combination of a sawmill, veneer plant and particleboard plant.
- The sawmill is producing about 1,000 m3 of sawn lumber per month.
- There are 3 dry kilns as part of the operation.
- The lumber is sold for furniture industry.
- Fiber is pine.
- The veneer plant processes tropical hardwood from Northern Brazil.
- This is a high quality sliced veneer used for the laminating of the particleboard panels and for sale to the local furniture industry.

- The particleboard plant is very small, production about 36,000 m3 per year and it produces 1250 x 2500 x 12 mm thick panels faced with the tropical hardwood veneer.
- The panels looked very good, the particleboard was of good quality, the veneer as well.
- This facility apparently secured a very interesting niche of the market.
- The installation is about 8 years old.
- The particleboard line was a rebuilt used line and we could not identify either make of the forming line or of the press.
- The size of the press was 2,500 x 7,500 mm could not get more information on Bonplac.

IMARIBO Facility,
Monte Carlo, Santa Catarina
Contact: Ayres Nogeira Junior, General Manager

- The operation consisted of a forestry operation, sawmill, veneer mill and block board plant.
- The veneer production was 1,800 cubic meters per month, block board production 700 cubic meters per month.
- Ayres claimed that they were the only mill in Brazil using log scanning to sort and to merchandise the logs.
- The scanner is domestic, the system was designed by a company from Florianopolis.
- Cost of the scanning system was about $40,000.- and it was installed two years ago.
- The reason for installing the scanner was to increase productivity in the log sorting area.
- The sawmill equipment layout selection was by a Chilean sawmilling expert/operator, a friend of the original owners of Imaribo.
- The veneer plant operated two veneer lathes, producing 2.7 mm thick pine veneer.
- The lathes were made by Sezer of Santa Catarina.
- The steaming of the logs was done immediately in front of the infeed into the lathes under tarps.
- The logs enter the process complete with bark which is discarded during the first stage of the peeling process.
- The veneer is dried in two veneer Benecke dryers.
- The veneer is being sold on domestic market and exported to Israel and US.
- The equipment selection was by Imaribo and layout by the equipment suppliers to suit available space.
- The block board plant was very similar operation to the one encountered in Batistella.
- The block cutting and block board forming was quite identical.

- The board glueing was different - the formed board was literally tied together by a plastic twine spaced by about 5 to 6 cm apart.
- The plastic twine actually served as sort of thermoplastic glue which held the board together after heat chamber treatment.
- The resulting board was trimmed and veneered on both sides with pine veneer. Portion of the block board is being exported to US.

MARA,
Industrial De Madeiras Mara Popinhak Ltda., Curitibanos, SC
Contact: Antonio Cezar Popinhak, Director

- Sawmill operation produces about 800 m^3 of sawn lumber per month.
- Has one small dry kiln.
- Sawmill buys another 1,000 m^3 from other sources.
- All fiber was pine.
- The lumber is further processed (kiln dried, 1x4 T&G wall and ceiling plank paneling, formaldehyde dip, etc.) has some export to Morocco and other African countries.
- As a special value added the sawmill produces large quantities of broom handles for both domestic market and for export.
- The owners are well aware of the technology and would be ready to implement it as soon as it becomes feasible.
- The import of the technology was difficult in the past by import restrictions and at present is limited by high interest rates.
- Has tropical hardwood operation in Belem (state Para) where he dries hardwood for export to Europe, to be made into high quality flooring.
- Would like to install value added processing of the hardwood and to produce the flooring and parquets flooring himself.
- He was not happy with the quality of the product coming out of the T&G machinery in the sawmill.

MASISA,
Concordia, Prov. Entre Rios, Argentina
Contact: Gino Carro Dona, Subgerente Produccion

- One Sunds MDF line processing pine only, producing 10,000 m^3 per month.
- Two Particleboard lines processing mostly eucalyptus: one thinboard line processing eucalyptus and producing 3,000 m^3 per month, using cyclic press and one regular line producing 12,000 m^3 per month using continuous press.
- One laminating line for thin particleboard. 60% of the wood supply for the particleboard comes from local small sawmills.
- There are no present plans for expansion.

CAMPO EL ALAMBRADO,
Convenio INTA, Concordia, Prov. Entre Rios, Argentina
Contact: Ing. Martin Sanchez Acosta
Ing. Graciela Rembado

- This is a government research facility and Martin has long been a enthusiastic champion promoter of the use of eucalyptus.
- He said that problem was with end splitting.
- This can apparently be overcome by sawing the logs as soon as possible after harvesting, preferably within 24 hours of felling the tree.
- Martin said that Eucalyptus Grandis was easy to machine and that the internal tension of the eucalyptus is reduced by cutting it to short lengths, usually below 1500 mm.
- He thinks that eucalyptus has big a future especially in the panelboard (edge glue) field.
- Eucalyptus is presently the lowest priced lumber in Argentina and it is used for concrete forms, packaging, poles, pulp, pallets, some roof structures, moldings, etc.
- Some of the red (colorado) eucalyptus is used for manufacturing of flooring and parquets.
- The wood has good quality and good strength to stress ratio. Selling price is $100 to $120 per m^3 plus 21% VAT.
- A table of forest products applicable for the Province of Entre Rios is enclosed.
- Martin said that the best experience with drying eucalyptus is in South Africa where they do commercial large scale drying.
- Chileans dry eucalyptus globulis which is more difficult to dry than grandis.
- A table listing characteristics and properties of several eucalyptus species is enclosed.
- He showed us a laboratory sample of an insulation board made out of hogged eucalyptus bark.
- It looked good and it could have possibility in acoustic ceiling tile production.
- Because INTA is self -financed by lumber sales (own plantation) they have an intimate knowledge of lumber economics.
- Takes 3 days to harvest 1 hectare of forest for log exports.
- Takes 15 days to harvest 1 hectare for sawmill.
- Sawmills prefer to mill logs one day after harvest.
- Log exporters pay cash while sawmillers pay 30,60 or 90 days.
- Martin believes that Argentine plantations are not of sufficient quality to support high-tech sawmills - they need better pruning.
- Steps are being taken to improve quality of forests - 20-30,000 hectares of good young forest presently available in Entre Rios province.
- Soil of suitable quality to support 150,000 hectare forest in Entre Rios province.

- Eucalyptus hybrid (common in Brazil) is difficult to mill and dry - pure grandis is best.

INSTITUTO DE ZONA FRANCA,
Concepcion del Uruguay, Prov. Entre Rios
Contact: Oscar A. Colombo, Administrator

- The duty free zone was established close to the port to attract business development.
- There are number of incentives for the businesses operating within the duty free zone.
- The port itself is very small and with a basic equipment only and draft limited to 8 meters which facilitated only partial loading of the ocean going vessels.

SCHIFFER
Metalurgica Schiffer S/A
Ponta Grossa, Parana, Brazil
Mr. Roberto G. Schiffer, Director

- Possibly the longest manufacturer of sawmill machinery in South America.
- Over two hundred (200) products for sawmill industry logging trucks and metal cutting.
- Own a foundry which produces castings used in the companies products.
- Over six hundred (600) workers in five (5) locations.
- Main market is domestic, however, they have equipment in South Africa and one (1) piece in Switzerland.
- Company was established in 1938 by the father of Mr. Roberto G. Schiffer.
- They are priced somewhat higher than competitors, but do not feel adverse effects.
- Produce their own controls with outside help.
- They manufacture a portable mill and are aware of two (2) other manufacturers in Brazil.
- Claim to know of about twenty (20) competitors.
- Machinery is very old and methods of productions are slow and ineffective.
- Quite well recognized and respected in Brazil.

AGUIA
Ponta Grossa, Parana, Brazil

- A small sawmill operation with a finger jointing operation.
- Produce about 60 cubic meters per day.
- Species Pinus Taida (Southern Yellow Pine) all 2.4 meters long.

- One line cutting logs up to 240 mm diameter.
- One line cutting logs from 240 mm to 360 mm.
- Approximately 24 people in sawmill.
- 80% of products were for export, mostly in Asia
- Logs were loaded by grapple onto a chain conveyor, up a small incline and dropped into a chain moving perpendicular to the incline.
- The logs were kicked off by the operator at the #1 line and at the #2 line automatically, using a limit switch.
- The #1 line consisted of a log carriage with a 42' band saw, approximately 120'-0" per minute. The #2 line consisted of a sharp chain running between a double arbour twin scragg.
- The centre cants from both lines went to a 6" double arbour gang. Slabs went to a two saw pony edger.
- Other equipment included a circular horizontal resaw and a two saw rip machine.
- Most of the material was carried from station to station.
- The reman operation used mostly Italian equipment and had one clear line.
- The product was molding for sash and door which was stacked for export.
- Lower grade material was sold locally to manufacturers of block-board.
- There was approximately 30 people in this operation.

SMALL SAWMILL
Campo de Tenente, Santa Catarina, Brazil

- This was a roadside sawmill, typical for some 2,000 plus sawmills operating in the states of Parana, Santa Catarina and Rio Grande do Sul.
- The sawmill was small, equipment very basic.
- Fiber was pine.
- Very small log yard , estimated volume of logs at the time of the visit was about 150 cubic meters.
- No debarking.
- There were two separate lines utilizing band saws each with a resaw for the side slabs. Manufacturer of the equipment was not identified)Labour force was about 50 workers. One shift operation - all manual using a very low cost labour.
- Recovery estimated at 25% (4 meters of logs for 1 meter of sawn lumber).
- Production of the two saw lines was about 1,000 cubic meters per month.
- Air drying.
- The mill sells sawn lumber, clear & tight knot short blocks for block board production, sawdust and chips as bedding to the chicken farmers.

- The following is my rough estimate of one month cost of the sawmill operation :

Saw logs: 4 m3 @ $20.-* x 1000 m3 of sawn lumber =	$80,000.- (25% recovery)
Labour: 50 workers @ $250.-** per month =	$12,500.-
Energy: 200 kW x 8 hrs x 24 days/mo.x $0.08* per kWHr =	$ 3,072.-
Maintenance: assume $300.-* per day x 24 days =	$ 7,200.-
Depreciation (equipment & buildings) not considered due to its antiquity	
Production Cost Total	$102,772.-

Sales: Sawn Lumber 1,000 m3 @ $100.- per m3 =	$100,000.-
Sales: Chips and sawdust 2,000 m3 @ $15.-* per m3 =	$30,000.-
Sales Total	$130,000.-
Possible monthly gross profit before taxes:	US$ 27,228.-

* conservative ** minimum salary in Brazil was $140.- at the time of the visit

Comment:
This is a typical small sawmill operation in Southern Brazil. It is based on intensive use of cheap labour and (nearly non-existent) low automatization. These sawmill are the major competitors to the “large” and medium sized sawmills operating in the same area. It is estimated that there are about 30 to 40 medium to “large” sawmills (production of 1,500 to 10,000 m3 per month) and more than 2,000 small sawmills (production 300 to 1,000 m3 of sawn lumber per month) operating in Southern Brazil.

BATTISTELLA IND. E COM LTDA.
Rio Negrinho, Santa Catarina, Brazil

- Possibly the largest sawmill company in Brazil with one (1) operation at the above location and another in Lages, S.C.
- Combined production of 15,000 cubic meters per month.
- Rio Negrinho operation produces 10,000 cubic meters with three (3) lines.
- The company exports logs to Turkey which are debarked and selected for export about one (1) ship load every two (2) months.
- Other products are sawn lumber, veneer and block-board, all of which are exported.
- The company has just entered into a joint venture with Weyerhaeuser Co. to market their products.
- Average wage is $500.00 to $600.00 per month including social costs.

- The operation is very labour intense and very inefficient.
- The block-board plant must employ in the range of two hundred (200) people.
- Battistella claim that forest revenues account for 15% of total company revenue and the sawmill operation is losing money.
- A general basic mill flow plan is shown, schematic #1.

KLABIN SAWMILL
Larges, Brazil

- As noted in the report, this mill was considered state of the art when built in 1983.
- The equipment was built in Germany by Linck and has some form of scanning at the first chipper canter and at the second chipper canter.
- The mill only ran one shift and produced sawn lumber for the domestic market.
- There were 28 people employed in the operation with the bulk in the area of the pull-off chains.
- The material being processed was Aracaria and Pine.
- A basic sketch as it was described is shown in schematic #2.

KLABIN - HARVESTING
Ponto Grossa, Brazil

- Klabin has harvest area covering 219,000 hectares.
- 119,000 ha. is commercial forest; 75,000 ha. is nature reserve (along streams etc.).
- Remaining harvest area is leased from farmers on a 20 year contractual basis in which Klabin does all maintenance and then pays farmers 30% of harvest price.
- 70% is pine; 25% eucalyptus; 5% auracaria.
- No insect problems but wary of Australian wasp.
- Conifer plantations -
    - 2.5 X 3.0 meter grid
    - 1st thinning after 7 years
    - 2nd thinning after 10 years
    - 3rd thinning after 13 years
    - 4th thinning after 16 years
    - Final cut at apprx. 22 years - growth is 28 m^3 per hectare per year.
    - Thinnings go to pulp mill
    - Final result is 50% of harvest is saw logs (10” and bigger) and 50% is pulp

- Eucalyptus (grandis,saligra)
    - 1st thinning at 4 years
    - 2nd thinning at nine years
    - final cut at 16-17 years - 40% of wood resource to pulp mill; 60% is saw logs for furniture industry

- Klabin sells excess sawlogs to local sawmills due to unsuccessful operation of their own sawmill.
- Klabin is considering developing a new sawmill but does not feel comfortable with local industry due to competition from small local sawmillers which operate in the "black market" for sawn timber.
- Replant 7,000 hectares a year on own land; 1,800 hectares per year on private plots.
- Plant 17 million seedlings per year in own nursery; 85% are then planted in forest with 95% survival rate.
- Incubation period of 3 months for eucalyptus; 6 months for pine; auracaria is planted directly.
- Harvesting; have 2,800 employees for harvesting operations but realize with modern methods this can be carried out with 250 people.
- Two harvesting methods.
    - **CONIFERS**
    - trees felled and delimbed by chainsaws "Swedish system"
    - use miniskidders (Valmet tractors - $US 60,000 with attachments) for 1st and 2nd thinnings
    - final thinnings and harvesting are done by chainsaw and Timberjack skidders
    - final loading is done by Cat loaders (tracked) at roadside with Prentice loaders at main log sort
    - use 9 Cat skidders strictly as "tow truck" for steep sections of logging roads
    - also utilize 3 Bell feller/bunchers for preliminary thinnings

    - **EUCALYPTUS**
    - use one Pico (Pinomaki Ky)feller/buncher for 1st and 2nd thinning because it has the best head to debark eucalyptus - productivity is 8 m^3/per ha./per hour in thinning operations; has difficulty handling larger logs
    - will not buy another Pico due to problems with spare parts availability
    - excellent market for harvester which can debark eucalyptus effectively
    - eucalyptus must be debarked very soon after harvesting or debarking becomes very difficult
    - agricultural tractors (Valmet) pull out logs to roadside and use special grapple crane to load logs on trucks

- Klabin operates 21 Timberjack skidders (15 - 350s; 5 - 450s; and one 480).
- Utilize almost 100 of the "miniskidders" (Valmet tractors with special attachments).
- Klabin monitors mill demand to determine which species to plant.
- Eucalyptus requires better soils than pine but auracaria requires the best soil.

- Social pact with workers determines rate of modernization - they know that, fully mechanized, they can carry out harvesting operations with 250 people but this attrition must be carried out slowly.
- Plan on purchasing 6 harvesters and 4 forwarders next year.
- $US 300,000 is average selling price/budget for a harvester.
- Log transport - 60% contracted out; 40% by Klabin.
- Harvesting - 20% contracted out; 80% by Klabin.
- Silviculture - 100% contracted out (planting operations).
- Log Storage -
    - Pine - 3 months inventory in forest (cut and bundled); 15 days in mill log yard
    - Eucalyptus - 15 days in forest; 6 hours in log yard

IMARIBO S.A.
Monte Carlo, Santa Catarina, Brazil
Ayres Nogueira Junior, General Manager

- The company claimed to be the largest sawmill in Brazil until 1991 and was destined to be shut down until January 1996, when a decision was made to upgrade.
- The company has a pulp mill and a Volvo dealership, but claim that the sawmill is the mother company.
- Plans are underway to develop areas of the sawmill by December this year to increase productions from the present 5,800 cubic meters of sawn lumber to 7,000 cubic meters.
- Veneer production is at 1,800 cubic meters with no plans to expand while plywood is at 700 cubic meters and will be increased to 850 cubic meters within three (3) months.
- The company employs five hundred and forty (540) people at present down from seven hundred and forty (740) at the beginning of the year. Of the people employed, all but one hundred and sixty (160) who work in the forests, are employed in the sawmill. The two hundred (200) positions that have been removed are because of new equipment in the forest, education and general lay-off.
- Part of the upgrade to the sawmill is to include kilns which will be installed in October. The selection of suppliers was in progress at the time of our visit.
- A major concern of the company is their image. They are extremely concerned about satisfying their customers and Mr. Nogueira stated clearly that he had been hired specifically to improve the quality of the product and improve the company image.
- The company is working to achieve ISO 9002 status by September, 1997.

BROCHMANN POLIS
Curitibanos, Santa Catarina, Brazil
Wolney Cesar Felipe, General Manager

- This medium sized mill produces sawn lumber, veneer plywood and block-board.
- The company has two specific sides to the mill. One which processes Pine, veneer and block-board and an old section which works strictly with Aracaria.
- The Pine lumber, veneer and plywood is mostly exported to Europe, the Middle East and Africa.
- The Auracaria is sawn into clear boards and exported to England.
- The mill equipment is very old and very labour intensive, but the block-board operation appeared to be quite efficient.
- The large Auracaria logs, up to 48" diameter, were winched across timbers to a new log carriage which sat on ground level. A large bandmill was used to breakdown the log. The boards or cants from the cut landed on the floor and were picked up by four (4) to six (6) men and carried to a secondary cutting station.
- An older carriage on the other side of the floor was hand dogged with a rack type setworks and had two (2) operators ride the carriage.
- Strange as it seems, the manager claimed that the only part of the operation making money was the Auracarian mill.
- This mill intends to upgrade in the future, but first consideration is expansion of their co-generation plant.

SEIVA S.A. SAWMILL
Pont Alta, Santa Catarina, Brazil
Walmor Prandi, General Manager

- The Seiva operation shut down last year after operating for some eleven or twelve years.
- The company employed about ninety-five (95) people in the small mill and secondary manufacturing plant adjacent to the main plant.
- Typical of small South American mill, the equipment was all placed on a concrete slab with no waste removal or access for clean out.
- The equipment was a log carriage with a rebuilt Schiffer Bandmill. The boards were transferred to a band resaw and on to a pony edger. Cants from the headrig carried on through to a circular gangsaw. A lot of the material movement was by carrying from one station to another.
- The mill had dry kilns located outside of the main plant.
- The secondary manufacturing equipment had been removed but it was learned that the main product was block-board.
- Mr. Prandi seemed visibly relieved to have the sawmill shut down.
- A sketch showing the basic flow for Seiva Sawmill is shown on schematic #3.

SEIVA S/A - HARVESTING
Ponte Alte do Norte, Santa Catarina, Brazil
Contact: Evandro Luiz Cozer (Forestry manager)

- Logging carried out by Klabin under contact as well as various, smaller harvesting companies.
- 20,000 hectares of pine plantations.
- Harvesting 30,000 m^3 per month.
- Very rough logging roads.
- Logs are felled by chain saw gang and then skidded to log pile with either miniskidders or Cat skidders.
- Skidders must align butt ends so buckers can buck into even lengths (2.4 meters).
- 1^{st} (bottom) section is for veneer production which receives a higher price (70% higher) - this step adds 25% to process.
- Fallen logs on steep pitches are first winched by miniskidder with winch to level ground where skidders with grapples transport to bucking pile.
- Valmet tractors with grapple/crane attachment load bucked logs onto trucks
- Bucked logs then transported to two central log sorts (still in plantation forest) - one for veneer and second for remaining logs.

DEMUTH MAQUINAS INDUSTRIAIS LTDA.
Novo Hamburgo, Rio Grande Do Sul, Brazil
Mr. Pedro Rogerio Muller, Sales Manager

- The company manufacturers machinery for the sawmill industry.
- Their products are debarkers (portable and stationary), chippers, Hogs and a log splitter.
- The company employs about one hundred (100) people on a two (2) shift operation.
- They have around thirty (30) installation in Spain and Portugal and some in Africa and Malaysia but their main market is Brazil.
- Our hosts were somewhat apprehensive about discussing their business without the consent of the president or general manager, both of whom were in Europe trying to find partners for joint venture manufacturing projects.
- Their intent is to expand into the forestry sector and they are talking with the Finish company that manufactures the "Pica" harvester.
- They new little about the Canadian companies but knew of Nicholson Manufacturing.
- They expressed difficulties from past business deals with Canada regarding taxes imposed on Brazilian companies importing Canadian machinery.
- They believe that this has now changed.

ARGENTINA - SMALL SAWMILLS

Herman H. Burna e Hijos S.R.L.
Federacion, Entre Rios, Argentina
Mr. Herman Daniel Burna

C.D.R.eH
Federacion, Entre Rios , Argentina
Mr. Jorge G. Rigoni

- The owners of small sawmills operations in Northern Argentina, the two companies above, process up to 30 cubic meters of lumber per day.
- These companies belong to a local sawmillers association but it appears that this association is fragmented with no particular direction.
- There are about one hundred and seventy (170) such mills in the area which consume up to 1,500 cubic meters each per month. Some Pine, but mostly Eucalyptus, are the species which they claim is a better material for construction.
- The operations are all similar in layout and equipment, mainly small bandmills with dead rollcase in and out. Workers carry the cut boards and push them through the ripsaw or resaw.
- A major concern of these small mills is the export of logs. Each small company buys their logs independently and now have to truck them 200 to 300 kilometers.
- There was a strong desire to upgrade operations, but finances could be a factor.
- Joint ventures were suggested in the discussion regarding upgrading.

MELSA
Maderas Ecologicas Del Litoral S.A.
Concordia, Entre Rios, Argentina
Mr. Herman D. Gomez, President

- The company claims to be the biggest sawmill in Argentina stating production at 200,000 cubic meters per month with one shift and intending to increase this by adding a second shift.
- Products are 3/4" and 1/2" boards and Mr. Gomez claims that production would reach 300,000 cubic meters if the product was 2" or 3" material.
- The mill has scanning and a form of optimization on the log bucking system, sorting the logs into bins. The debarker and log deck is a Valon Kone system which evidentially had problems with Eucalyptus bark.
- Mr. Gomez decided to implement the scanning after visiting operations in Chile.
- The mill was in the process of being relocated at the time of our visit, but it appeared that there were two lines.
- The large log line had a carriage and band headrig with the cants going to a gang.
- The second line has a sharp chain and twin bandmill partly installed.
- Mr. Gomez stated his intentions to add scanning to both of these lines, but there was no evidence of such at that time.

- There are intentions to install dry kiln equipment in 1997 and an added value facility in 1998. Scanning for the added value to detect knots will be by Cadore, from Quebec.
- Finger jointing equipment will likely be Italian.
- The company is by far the most progressive sawmill visited during our tour.
- Fiber is eucalyptus only, production is 2,000 m^3 per month per shift.
- 58 employees.
- Recovery 45 to 50%.
- Planning to add another shift to double the production.
- Making little bit of 2 cm thick block board as well.
- Has infeed log scanning and classification system by Technology Integral of Chile and is installing saw infeed log scanning and classification.
- Debarking with Valon Kone debarker and chipping the debarked logs for pulp mill.
- 1,000 ha of forest plantation, logs delivered by independent loggers.
- Cost is $22.- per m^3 delivered.
- Planning to install 3 dry kilns in 97 (Nardi of Italy) and a fingerjoint line in '98. Herman said the Italians finance their equipment as well.
- One of the companies he is looking at as a possible supplier of clear cutting the knots from the fingerjoint blocks is Cadore of Quebec.
- He said Nardi has experience in drying eucalyptus from Australia and new Zealand and he has made a deal with them that they will get paid only when the drying works.
- He said Argentina does not have a consultant within the sawmilling or wood processing industry and he said he would use consultant if it would save him money.

RIOCELL S.A.
Guaiba, Rio Grande do Sul, Brazil
Contact: Renato Rostirolla

- Recent purchase of 51% of company by Klabin.
- 76,000 hectares of plantation forest - 56,000 hectares of eucalyptus used to supply adjacent pulp mill.
- 150,000 m^3 of logs per month consumed - have 100% excess growth rates
- Growth of 40 m^3 per hectare per year.
- Riocell has five year financing plan with harvesting contractors which allows them to buy new equipment - this plan expires soon.
- Under this plan Riocell provides financial guarantees to banks allowing contractors to purchase equipment - contractors decide on type of equipment.
- 100% of harvesting operations are contracted out
- Need for new forwarders and harvesters that will debark eucalyptus.
- Currently operating 28 Valmet forwarders (tractor with carriage).

- Land is very flat and easy to harvest.
- Currently debark eucalyptus with Valon Kone portable debarker.
- No thinning carried out - harvest after 7 years for pulp mill.
- Demuth manufactures new model debarker for approx. $US 30,000 but Riocell can rebuild Valon Kone at 1/3 the price.
- Currently negotiation with an American firm for sawmill to process excess eucalyptus capacity - do not export logs.
- Planning on 40,000 m^3 per month output with potential upgrade to 80,000.
- Rostirolla confident that Klabin will build sawmill in J/V with American firm, which specializes in excess wood supplies.
- Drying technology for eucalyptus seen as main problem.
- Also negotiating with Arracruz to build sawmill in north of Brazil.
- Rostirolla feels that Brazilian forestry firms will begin to invest in modern sawmills, especially as Amazon hardwoods become scarcer - feels that move to sawmill sector will be a tidal wave in order to offset dependence on pulp and its low, cyclical prices.

FORESTAL SAN JOSE S. A.
Concordia, Entre Rios province, Argentina
Contact: Matias de San Felix

- Largest harvesting contractor in Argentina.
- Employ 700-1,000 workers - looking to mechanize in future - less problematic.
- Owned by Glencore, a Swiss-based multinational trading firm.
- Major exporter of logs to overseas markets (pine).
- Rent or lease Timberjack skidders from owner/operators when necessary but see need for ownership of equipment in future.
- Good analysis of harvesting costs
    - chain saw fell and pile by hand - $US 5-6 per cubic meter
    - skid bundle to trucks - $US 1 per cubic meter
    - load trucks - $US 1 per cubic meter
    - trucking to sort yard at port - varies with distance from port
- To determine wood volume they sink wood bundle into water pond at port and measure displacement.
- Have sales agents in Scandinavia, Spain and Morocco.
- Have already exported over 250 vessel loads.
- Looking to chip all log exports in future in order to avoid predicted restrictions on log exports.

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