MARKET OPTIONS AND BARRIERS FOR TIMBER AND SAWNWOOD FROM MICHOACÁN, OAXACA, GUERRERO, CAMPECHE AND QUINTANA ROO, MEXICO

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FOREST TRENDS

PREFACE

Changes in forest resources, markets and governance offer new opportunities for low-income producers and have changed the paradigm regarding the role of forests in social and economic development. *A New Agenda for Forest Conservation and Poverty Reduction: Making Markets Work for Low-income Producers* presented a set of strategies for complementing the role of forests as safety nets for the poor through special niches where large numbers of low-income producers could develop a competitive advantage through partnering with the private sector and through strategies that recognize and reward forest conservation by local owners and users. Building upon this global analysis, Forest Trends has collaborated with local partners in Mexico to explore the opportunities for low-income producers, particularly *ejido* land reform blocks and indigenous communities who collectively own and manage the majority of the nation's forests. Mexico is a particularly important country because of its long history of communal forest ownership and because of the new challenges that community enterprises face in a rapidly changing marketplace.

At the end of the colonial period, what could be called the large-scale industrial approach in forest management dominated in most parts of the world. This was characterized by government-dominated forest industry and markets as well as industrial forest concessions. This model persists in many countries today, although it has been under increasing attack because of the numerous social, environmental and economic costs of public-led and subsidized industry and because of the widespread failure to recognize indigenous and other community rights. Public reaction to forest conversion and degradation in the 1970s and 1980s led to the establishment of new public protected areas in order to expand or rationalize government forest protection, adopting models from developed countries where rural populations are much lower. Growing concerns about rural poverty and the reliance of rural people on forests led to the 'social forestry' approach in the 1980s and 1990s which focused on forests as "safety nets" for low-income forest dwellers and emphasized access to forest resources for the poor to meet their subsistence needs. A variant of this approach, the integrated conservation and development approach, developed in the late 1980s to address both conservation and development goals. It encouraged local people to adopt livelihoods that do not harm the (usually publicly-owned) forest.

Thus far, these approaches have generally failed to reduce forest degradation or poverty on a significant scale. All have embodied the assumption that the state and other interest groups, rather than local indigenous and other communities, have the right to control use and arrange markets to suit their interests. Moreover, all have assumed that reaching national and global goals of meeting timber and other forest product demands while staying in synergy with conservation goals is possible without local people's active participation.

The many ongoing initiatives by local groups to gain recognition of their rights and market their forest products suggests that it is time to take a fresh look at the role of forests in local and national development and to address the question of who has the right to benefit from forests. This new forest agenda demands a more careful identification of the real market segments and niches where communities and smallholders have a competitive advantage. It calls for alternative regulatory models that eliminate burdensome, inappropriate policies and regulations in and outside the forest sector. Finally, it requires freeing up resources for technical and financial support to local communities and enterprises.

Forest Trends and the University of Quintana Roo, the Community Forestry Project (PROCYMAF), and the Rural Institute of Latin American Tropics in Mexico, the Amazon Working Group on Agroecology (GTNA) in Brazil and the University of British Columbia in Vancouver, have examined the situation of communities in the marketplace to improve the situation in Mexico and Brazil. Both countries are undergoing significant transitions in forest and trade policies, market demand, and tenure rights. Mexico's 1000 community forestry enterprises (CFEs) have evolved rapidly over the past few decades and include the most advanced community forest business models in the world, with 3-5% of these providing the main source of community income. The challenge for Mexican CFEs is to adapt to changing market conditions and to keep positive social returns while developing new relationships with an industry that has historically been the source of considerable distrust.

In contrast, Brazil has a large domestic market for timber and non-timber products in which poor producers play a pivotal role. There is an active community forestry working group, but in most states of the Amazon there are virtually no policies in place to provide ground rules or support for broad community participation in these markets. Interesting community-company partnerships are emerging in both countries, but in Brazil current policies make most arrangements still clandestine.

There are clear opportunities and competitive advantages for community enterprises in both countries. Most of the companies interviewed in this project planned to expand their supply from communities and small producers and welcomed formal collaboration. Mexican CFEs have a competitive advantage in a number of traditional niches that they could expand through strategic choices to modify their productive systems in order to improve quality and tailor products and their delivery to domestic markets. This requires changes in their own internal production and organization and their choice of business relationships. It requires a more conscious appropriation of market information and learning from one another. The participation of smallholders and community producers of timber and non-timber products has the potential to substantially increase local incomes, generate an improved supply of raw material to processors, and improve forest management, if regulations and forest allocation reflect local realities and capacity-building activities expand for small producers.

Governments can and should play a new role in both countries. Governments need to rethink regulations and policies for forestry and business enterprises to enable communities to operate legally. Governments and donors should reallocate financial and technical resources to build capacity and help communities tap global green markets, not to subsidize already viable commercial plantations. The task for industry is to look at the strategic opportunities for new relationships.

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INTRODUCTION

Mexico holds the second position in terms of percentage of community-owned forests in the world: 80% of the forests in this country are registered as ejido or communal property and more than 500 indigenous communities or ejidos have been organized as Community Forest Enterprises (CFE) also called community forestry enterprises. The CFE boom began in the early 1980s when various events coincided to promote and consolidate community forest development. At that time, many communities launched timber production and some also explored the industrial lumber and carpentry industry. (Bray et al. 2003). Probably the most important aspect of this development was that many community forest enterprises focused on the sustainable use of their forests. During the last twenty years, the competitive environment of these enterprises has changed dramatically.

This study focuses on the issue of sawnwood production chains. It describes market access barriers for Mexican sawnwood which requires the analysis of all previous stages in the production process. The study seeks to answer the following questions:

- What have been the basic trends in sawnwood production since free-market trading began?
- How do Mexican products compete with imported products and what are the weaknesses and strengths of each?
- Which main market segments demand timber and sawnwood? What structures and trends do these segments have? Which are the marketing channels for reaching these segments, and what opportunities are there for Mexican producers to remain within these channels in spite of imports?
- What are the main market access barriers that forest producers have to cope with, and what possible strategies could be outlined to reduce these barriers?
- How can ejidos and communal lands be defined and differentiated?

The objective of the study is to contribute to the development of strategies that could increase the competitiveness of the CFE-lumber sector. Hence, we will concentrate on the external aspects of these enterprises.

The study was conducted by a consulting team that extensively researched existing secondary information and interviewed representative members of chambers of commerce and government organizations, as well as more than fifty primary and secondary transformation enterprises in Campeche, Mexico City, Guerrero, Jalisco (Guadalajara), Michoacán, Oaxaca and Quintana Roo. In addition, two workshops were held to present and discuss the results in order to obtain better feedback.

The information presented here is organized around three wood groups: coniferous, temperate zone broadleaf and tropical broadleaf. The latter are subdivided where necessary, into precious woods and its direct substitutes, and common tropical wood. The situation of community sawmills was considered to the extent that data permitted. Nevertheless, throughout the study it became clear that distinguishing between community and non-community enterprises, in order to characterize market clusters, is not always useful.

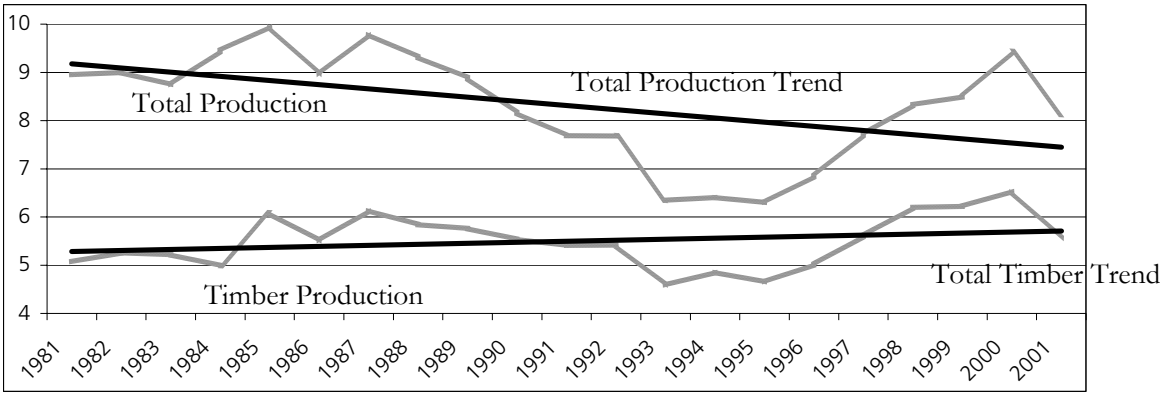
Community sawmills share a great quantity of problems with their private counterparts. Likewise, in the relationship with lumberyards and secondary transformation enterprises there are more similarities than differences. All of them, whether community sawmills, lumberyards, or secondary industries depend on what the other links of the chain do. As we will see in the problems many of the problems faced by the enterprises will have to be solved as a whole.

GLOBAL VISION OF THE MEXICAN FOREST SECTOR

CURRENT SITUATION AND TRENDS IN DOMESTIC LUMBER MARKETS

During the last two decades, there has been a general trend towards a decrease of forest production in Mexico. Whereas in 2001 forest production, according to official data, was 8.1 million cubic meters,[1] in 1989 production was 8.9 million (see **Figure 1**).

Figure 1: Logging Production in Mexico 1981-2001 (Million Cubic Meters of Round Logs)



Source: SARH, SEMARNAP and SEMARNAT, yearly statistics (1981 – 2001)

The main forest products in Mexico are sawnwood, pulp, board, posts and piles, firewood and charcoal, and railway ties/sleepers. The trends in these are:

- The most important type of forest product in Mexico is sawnwood. Its relative importance has increased in the last twenty years, with roundwood consumption going from 60 to 70%. Unlike the general trend, sawnwood is increasing slightly, increasing from a consumption of roundwood close to 5 million cubic meter rolls[2] to close to 6 million.

[1] SEMARNAT (sf)

[2] Three different measures are used in this text to describe the quantities of sawnwood, depending on how they are used. In this part the cubic meters roll (m^3 r) is used, which is the equivalent to the quantity of round wood used to produce each product. This is the only way to compare different forest products. Further on, in the country comparison, the

- Another product that has gained participation in the market is plywood, with production recovering after having collapsed when Mexico entered GATT in 1986, increasing from a consumption of 248 thousand m^3 of round wood (3% of the total consumption) in 1981 to 450,000 (1%) in 1989 and 518,000 (6%) in 2001.
- The types of products that lost participation are pulp and railway ties. Pulp fell from 2.5 million (30%) in 1981 to 1 million processed cubic roll meters in 2001 (15%), whereas railway ties fell from 5 to 1% of total roundwood consumption (from 408,000 m^3 to 102,000 m^3).

Table 1: Main Sawnwood Producing States

	State	Production (m^3 log)
Conifer	Durango	1,513,552
	Chihuahua	881,380
	Michoacán	753,363
	Oaxaca	409,519
	Jalisco	269,786
	Guerrero	280,439
Temperate Zone Broadleaf	Durango	102,715
	Michoacán	86,500
	Jalisco	8,604
	Puebla	6,745
	Veracruz	4,396
	Oaxaca	2,732
Tropical Wood	Quintana Roo	33,514
	Campeche	19,355
	Oaxaca	3,163
	Jalisco	120

Source: SEMARNAT 2002.

The annual production of sawnwood varies greatly (see **Figure 2**), clearly reflecting the macroeconomic situation of the country: after a visible decline in production in 1994, quantities grew constantly until they decreased again in the year 2000.

More than 90% of the volume processed by sawmills is coniferous, mainly from different pine species. If temperate zone broadleaf quantities are taken into account as well, it becomes evident that temperate zone wood dominates Mexican sawnwood production. Only 2% of the production of this segment comes from tropical wood.

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sawnwood cubic meter is used (m^3 ma). Finally the Board Foot (BF or PT Spanish acronym) is used as the most common measurement for quantities in Mexico and the United States. The conversion is: 1 m^3 r = 212 BF (depending on the coefficient of utilization used. In cases where supplementary information is not available, the basis is a utilization coefficient of 50%). The other conversion is 1 m^3ma = 424 PT.

There is a trend towards widening the gap between temperate zone wood and tropical wood:

- A general trend towards a rise in temperate zone wood production is visible. The trend is very slight in pine production, but there are large volumes involved so the aggregate amount is still significant. In the production of different species of oak, the increasing trend is much clearer. Indeed, it is in oak wood production where growth has been most visible in the last twenty years.
- Furthermore, there is a clear trend towards a decrease in tropical wood production. This trend is accentuated if one considers that the customary production of railroad ties from tropical wood decreased drastically during the 1990s. The production trends for each group of species are described in more detail below.

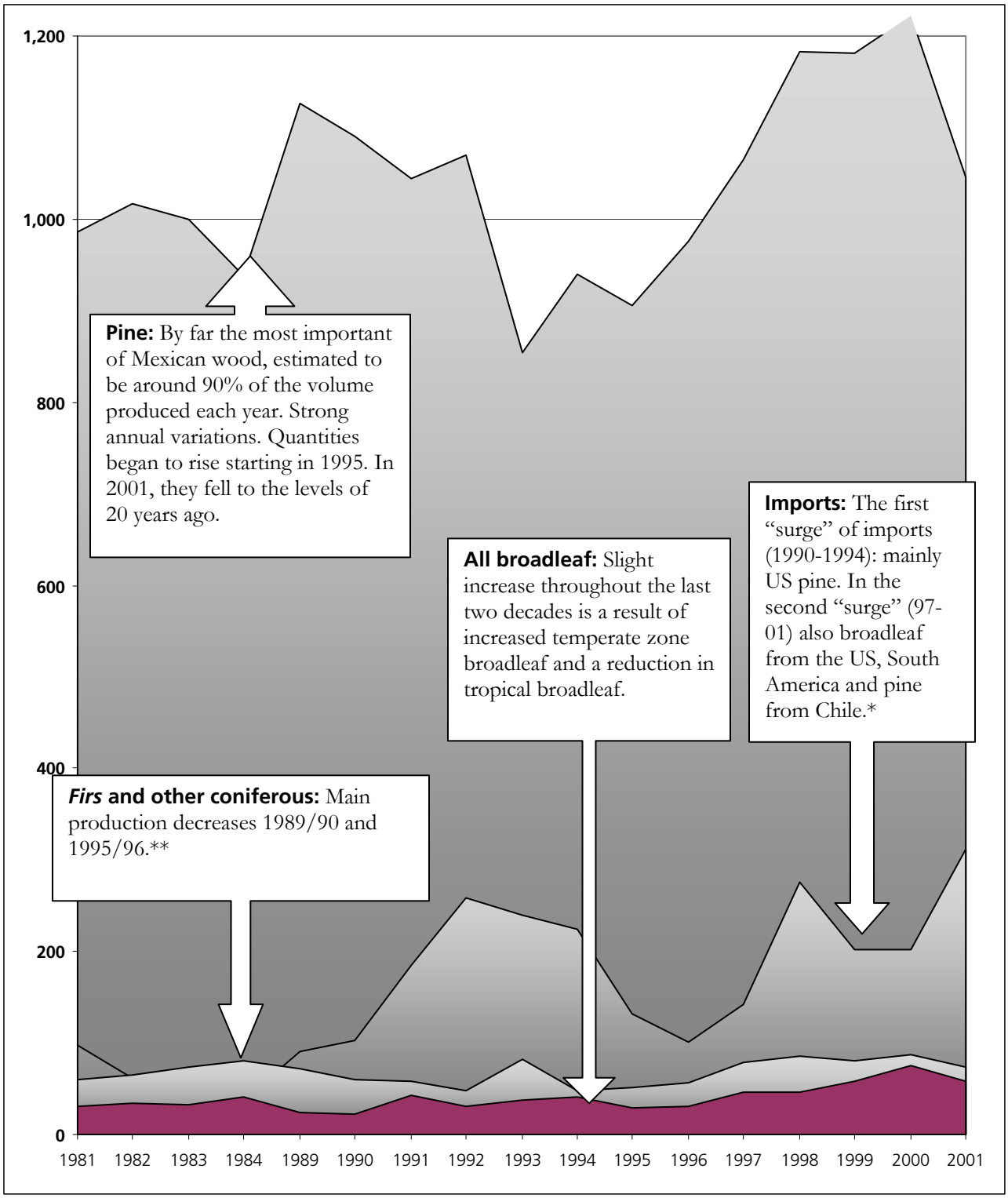
The most important timber producing states in Mexico are Durango, Chihuahua, Michoacán, Oaxaca, Jalisco and Guerrero. The main tropical wood producers are Quintana Roo and Campeche (see **Table 1)**.

As can be observed in **Figure 5**, the volume of coniferous wood produced changes every year, but the production ranking of each state does not vary. For two decades, Durango has been the most important pine producing state, followed by Chihuahua and Michoacán.

The broadleaf situation is different, where production in states that used to be important such as Veracruz or Jalisco is now practically insignificant.

Oaxaca is the only Mexican state that produces both important quantities of temperate zone wood as well as tropical wood.

Figure 2: Production and Import of Timber by Species Group 1981 – 2001 (Millions of BF)



Source: Authors' estimates based on CNIF, SARH, SEMARNAP, SEMARNAT and SIAVI data.
**Imported quantities between 1989 and 1995 have been estimated based on SIAVI and SEMARNAT data.*
*** Note: Data not available for the years 1985 to 88.*

INTERNATIONAL TRENDS

Mexico is a relatively small producer compared to the United States, which has a forest area four times the size and a production fifty times greater, or compared to Chile, where three times the amount of timber was produced on a forest area of a quarter the size of the one in Mexico.

Table 2: Forest Production in America: A Comparison (2002 Data)

Country	Forest Surface (million has.)	Quantities Produced (million of m^3)	
		Round Wood	Sawnwood
Brazil	543.0	102.6	23.1
Chile	15.5	25.6	5.9
United States	226.0	404.7	89.1
Mexico	55.0	7.4	3.4

Source: FAO (2003)

There are several trends at the international level that affect, or at least could affect, the sawnwood markets in Mexico:

- Forest overproduction in the United States and Canada: both trading partners in the NAFTA have a clear problem of forest overproduction, which they have had for years, mainly in coniferous wood production.[3] Also, competition between producers is becoming greater in the broadleaf wood markets greater every day. [4] Obviously, North American producers are very interested in accessing Mexican markets and have made great efforts towards achieving this goal.
- Increase in plantation production. In several countries, among them Chile, Costa Rica and Guatemala, great quantities of plantation wood are being harvested or are about to be harvested. These plantation wood enterprises are marketing their products aggressively.
- In the near future, Russia will enter the picture as a producer of gigantic quantities of boreal forest wood. Russian producers are already the main buyers of large German-made sawmills.
- Part of the American furniture production was relocated to Asia, especially China. Many American furniture manufacturers, in the USA as well as in Latin America, have been forced to reduce their production or even to close down due to the Asian product competition. This implies an important decrease in regional demand for sawnwood.

In contrast to increasing supply, the increases in demand for sawnwood will be slower, although there is a high likelihood that within a decade the demand from countries such as China, India, the Philippines and Korea will have increased significantly.

The most important trend in the increase of supply at the international level is surely the recovery of several US markets (among them the construction market) that had crashed in 2001 and 2002. At the end of 2003

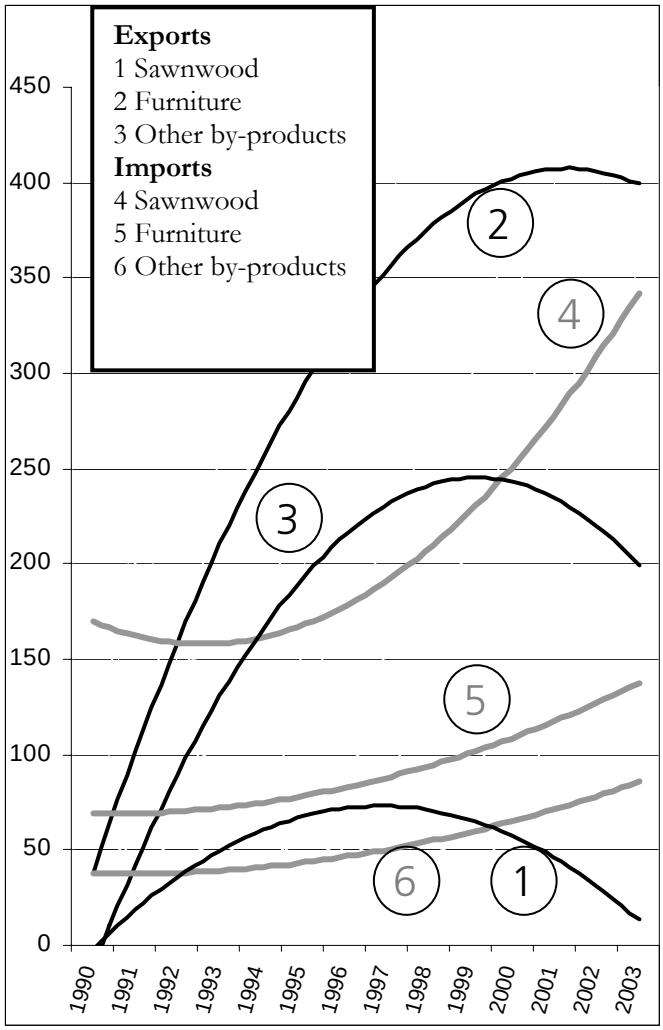
[3] Widman (2001) gives a very illuminating explanation of the conflict.
[4] Mayer (sf) presents a detailed perspective of the trends in broadleaf markets.

and at the beginning of 2004, the prices of a wide range of sawnwood products increased spectacularly. Unfortunately, Mexican forest producers cannot currently take advantage of this trend, since their present sawnwood classification systems do not meet North American classification standards.

There are indications that in the short and médium-term, competition in sawnwood markets will increase and force the weakest competitors out of production. In the medium and long-term, the situation will change and there will be different competitors. About US and European producers Widman (2001) states: "In a few years, the present oversupply of wood products may only remain as a painful memory. Meanwhile, constant and aggressive marketing is required to confront the problem of oversupply."

IMPORTS AND EXPORTS

Figure 3: Trends in the Export and Import of Sawnwood and Secondary Products (US$Million)



Note: The polymeric curves showing the trends are based on historic data of imports and exports.

As a result of the changes in the exchange rate and domestic inflation, changes in trends in imports and exports are even more abrupt than those in domestic production. During the last years, imported sawnwood showed a clear trend towards growth, going from a 9%-market participation in 1996 to 21% in 2001, and a threefold growth in absolute terms. Nevertheless, it should not be overlooked that this market participation may suffer a decrease if the economic situation changes. **Figure 6** shows that there have been previous spikes in imports (the wood import value in 2001 was only 13% above that of 1992). In 1996, after the devaluation of 1994, the situation favoured exports, but imports were restricted. In addition, the increase in wood imports is much less than the increase in other forest products. Panel wood imports increased 1,100% (one thousand one hundred %) during the same period. More detailed import data is provided below.

As can be seen in **Table 3**, the sawnwood exports have significantly declined in comparison to imports. They decreased from a 5%-production of 1996, to 1% in 2001 because inflation eroded the advantage created in the wake of the devaluation of 1994.

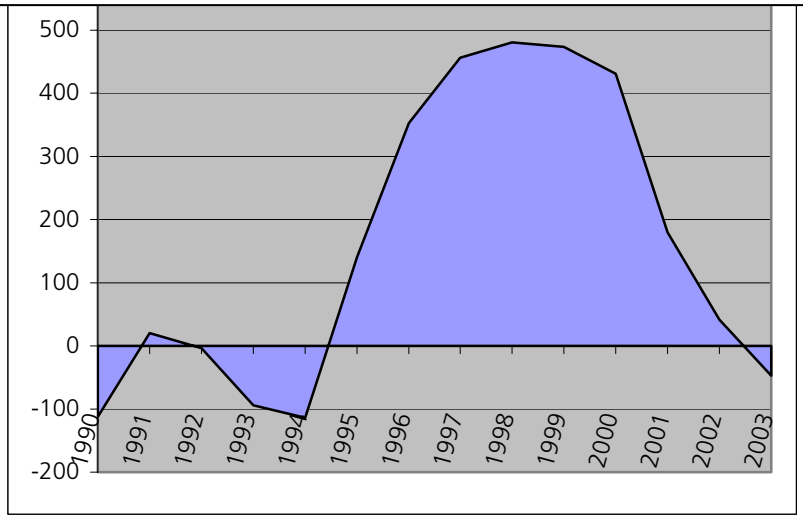
If sawnwood by-products are also considered, the panorama changes, although in the long run the general trend would continue. In exports as well as in imports, furniture is the main line of products. Since 1990, furniture exports have increased more than twenty-fold, going from 18 million USD (total furniture exports) in 1990 to more than 480 million USD in 2000, subsequently decreasing to 350 million USD in export value in 2003. Other important categories of exports are wood frames, platforms or pallets, table articles, doors and wood- flooring, all reaching export figures of above 10 million USD in 2003. All these products had the same trend as furniture and most of them declined. Picture frames, which had reached almost 120 million USD in 1998, fell to almost half in 2003. Pallets reached their zenith in 1999 and have now fallen to a fourth of the exports of that year. Table articles have fallen to a seventh of exports of the year 2000.

Table 3: Sawnwood Production (Million of BF)

Concept	1996	1997	1998	1999	2000	2001
Domestic production	1,062.8	1,189.1	1,314.4	1,318.8	1,385.3	1,177.9
Imports	101.4	142.5	275.1	202.8	201.4	312.3
Exports	49.2	48.7	27.6	22.9	13.3	10.7
Apparent use	1,115.0	1,282.9	1,561.9	1,498.6	1,573.4	1,479.5
Percentage of imports	9%	11%	18%	14%	13%	21%

Source: Authors' estimate based on SEMARNAT (1996- 2001) data. Converted into BF estimating a 50%-use coefficient. Percentage of imports = Imports/ apparent use.

Figure 4: Trade Balance in Sawnwood and Secondary Wood Products (US$Million)



Note: Exports minus imports of the following categories 4407 (sawnwood), 4414 (frames), 4415 (boxes and pallets), 4416 (barrels), 4417 (handles), 4418 (cabinetry), 4419 (table articles) and sub-categories 9403.30 to 60 (wooden furniture).
Source: authors estimate, based on SIAVI (2004) data.

Figure 3 shows export and import trends of these products. None of the export categories have been able to reverse their downward trend after the year 2000. In particular, the trend in sawnwood exports is not optimistic: it has practically fallen to the levels of the early 1990s.

In contrast, all import categories have a positive general trend, especially sawnwood, but also furniture and other secondary products and services: tool handles, wood floors. The most important import categories, besides furniture, are doors, tool handles and wood floors, all of them with figures above 5 million USD in the year 2003.

The United States continues to be the main trading partner in all export categories and in the majority of import categories, accounting generally for more than 50% of the total amount in each category. Exceptions are in sawnwood imports from China, wood floors from Germany, table articles from China and kitchen furniture Italy.

The result of these countervailing trends can be seen in **Figure 4** which represents the trade imbalance of exports and imports for sawnwood and secondary timber products. Starting in 1994, this imbalance grew steadily until reaching a peak in 1998. After the year 2000, there was a steep decline which created a suden deficit in 2003.

With these trends, it is difficult to establish future scenarios. Certainly, part of the fall in exports can be explained by related factors, such as the 2001 recession or the overvaluation of the peso after that date. The current trend towards devaluation surely will allow exports to increase and some imports to be restrained. Nevertheless, more structural elements need to be considered, such as the establishment of China as a world-level competitor. A category of products such as table or kitchen items, of which Mexico exported almost 71 million USD, probably will never attain the importance they had at the end of the nineties, because China as a competitive advantage in these products. Furthermore, certain categories of furniture, especially large pieces of furniture or those with hand-crafted elements, will continue to have good export potential.

EXISTING CAPACITY

More than 2,000 sawmills have operating permits in Mexico. Together, they have a processing capacity of more than 10 million m^3 of roundwood. The states with the greatest sawmill infrastructure are Chihuahua and Durango. The figures in **Table 4** show Mexican sawmill handcraft capacity. Although there are large sawmills, by international standards the majority of them is extraordinarily small. This fact is more striking when the number of sawmills is correlated with the quantity of sawnwood they produce. Even assuming that half of the sawmills were not functioning, which would double the production output per sawmill, the quantities produced in each unit would still be very small.

Overall, there has been an increase of businesses, but not an increase in the existing capacity. Nevertheless, the use of that capacity was far higher in 1985 (almost 4,000 m^3 per year compared to 2,700 m^3 today) which means an important reduction in the competitive advantages of each sawmill. The increase in the number of sawmills could be related to the disappearance of the large state forest enterprises that were dissolved or privatized in the eighties.

Table 4: Sawmill Installed Capacity by States

Domestic ranking	State	Amount of sawmills	Capacity of total existing consumption (m^3)	Existing capacity per sawmill (m^3)	Total consumption 2001 (m^3)	Sawmill/ consumption (m^3)	Use of existing capacity
1	Michoacán	536	452,179	844	839,863	1,567	186%
2	Chihuahua	306	2,771,933	9,059	887,524	2,900	32%
3	México City	202	837,953	4,148	250,572	1,240	30%
4	Durango	193	2,524,180	13,079	1,616,267	8,374	64%
6	Jalisco	118	154,140	1,306	287,061	2,433	186%
7	Oaxaca	105	702,126	6,687	412,978	3,933	59%
8	Guerrero	73	890,250	12,195	281,619	3,858	32%
11	Quintana Roo	38	169,184	4,452	33,514	882	20%
12	Campeche	37	191,662	5,180	19,355	523	10%
	TOTAL	**2,058**	**10,606,867**	**5,154**	**5,556,169**	**2,700**	**52%**

Source: Semarnat, Annual Statistics 2001, M.F.

COMPETITION BETWEEN WOOD PRODUCTS

WHAT IS A PRODUCT?

As a commercial product, wood is extraordinarily complex. There are multiple processing possibilities within an extraordinarily diverse raw material that predetermine the use clients will give the product. In order to understand the way wood competes in the market, it is important to understand how its very different characteristics interact (see **Box 1**).

Box 1 – Product Characteristics

THE BASIC PRODUCT: NATURAL CHARACTERISTIC OF WOOD

The basic characteristics of wood: color, the specific weight, hardness, grain, texture and workability are determined by the species and the way they grow in the forest and – with the exception of color – are difficult to modify. These characteristics determine the virtues of the wood for a specific use.

THE REAL PRODUCT: BASIC PRODUCT PLUS AGGREGATE VALUE

The wood supplied by sawmills or wood retailers has different supplementary characteristics that are as important for a client in making a decision to purchase as are the basic characteristics of wood:

- Dimensions of the boards and ring growth position: these are the result of the logs or cants used; they are also partly a result of sawmill handling. The importance of offering a large width or length is decreasing due to new materials and technologies. The position of the growth rings on the board (rings parallel to the edge are preferred) continues to be important for demanding buyers.
- Classification: good wood classification allows the buyer to obtain wood of the kind needed and closest to its needs and the assurance of receiving the same grade on each purchase, even when using different suppliers.
- Additional processing steps: kiln drying, edging and planning are processes that reduce transport costs and allow buyers to concentrate on the next production stages. For many secondary processors, installing a kiln is a large investment; therefore they prefer to buy their wood kiln dried.
- Wood appearance.

PRESENTATION OF WOOD

All these characteristics have a direct impact on the production costs of secondary enterprises and are therefore balanced with the other supplementary characteristics of the product, namely the price.

DELIVERY OF THE PRODUCT: SALES SERVICE

For buyers, the customer service they receive during the purchasing process is as important as the end product that arrives in their warehouses: speed and timeliness of delivery, variety, product quantities, payment facilities, sales service and the capacity to understand what the buyer really needs, as well as the capacity of the business to adjust to and address unforeseen circumstances and their response to customer complaints.

Box 2 – Pine Species in Mexico

Due to its location as a biological North to South corridor and the noticeable differences in altitude and rainfall in its mountain ranges, Mexico is home to the largest number of pine and oak species in the world. The great diversity of pine species can be divided into two large groups with certain common characteristics:

- White pine (sub-gender Strobus– haploxylon): the wood of this species is generally whiter and has a low specific weight (about 450 kg/m^3). Due to this low weight, its degree of hardness, resistance to impact, pressure, compression are relatively low. Some of the main pines that belong to this group in Mexico are: *P. strobus* (white pine), *P. ayacahuite* (ayacahuite) and *P. chiapensis*. The *piñones* (pinions) (for example *P. cembroides*) are also part of this group.
- Yellow pine (sub-gender Pinus – diploxylon): generally has darker wood (yellow) with more resin and with a greater specific weight (from 500 to 600 kg/m^3), which gives it greater resistance to impact, tension, and compression than that of white pine. Therefore, the construction industry prefers these species while furniture manufacturers usually tend to prefer whiter wood with less resin content. Examples of principal species in Mexico that belong to this group are *P. ponderosa, P. arizonica, P. engelmanii, P. durangensis, P. patula* (red Pine), *P. teocote* (pitch Pine), *P. cooperi, P. herrerae, P. oocarpa, P. montezumae, and P. pseudostrobus*. Also in this group is the radiata pine (*P. radiata*).

Belonging to a certain group of species is not the only factor that determines the basic characteristics of the species. Growth speed, relationship between quick growing wood and slower growing wood are elements that also determine the characteristics of the wood. Although there are significant differences among many pine species, in practice it is relatively difficult to establish which species a particular board belongs to, since the differences in the wood structure of the different pine species are very small.

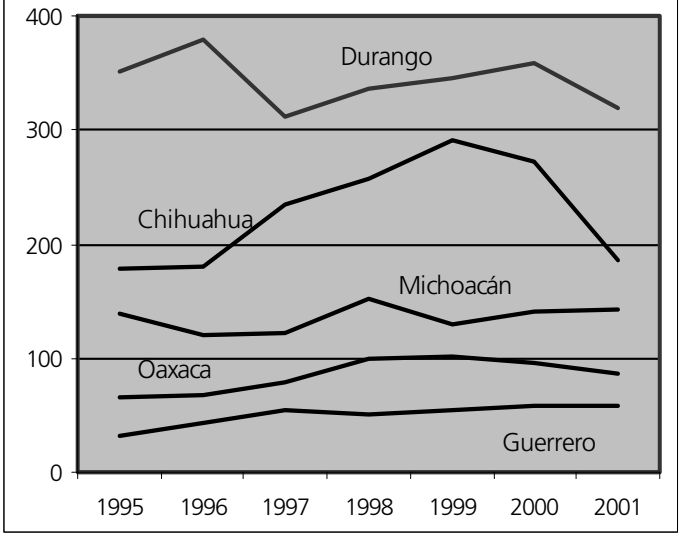
COMPETITION BETWEEN DOMESTIC AND IMPORTED PINE

Mexico has the largest number of native pine species in the world. Although there are no exact figures indicating the number of these species, many conservationists maintain that there are more than 60, of which two thirds have of commercial importance (see **Box 2**). Pines represent by far the most important species group for the forest industry in Mexico. As mentioned above, about 90% of the sawnwood produced come from this species. This percentage has remained constant in the last decades and more recently has increased.

It is not possible to discuss pines in Mexico without mentioning the differences between the producing states. Each Mexican state has a characteristic mix of pine species. Also, when processing and marketing lumber was a more regional type of activity than nowadays, certain particularities in extraction, transportation, classification and wood marketing were developed that continue to the present day.

Pine is generally supplied from natural forests, where diameter can well reach 70 cm. Sawnwood comes from trees with a high percentage of first and second class grades, often exceeding 20% of total production colyme. Another characteristic of domestic spine is the high percentage of wood from the wonder season increment, resulting in narrow growth rings that have a higher basic density, lateral hardness and high level of flexibility for woodworking and building purposes.

Figure 5: Production of Coniferous Sawnwood by State (millions of PT)



Source: SEMARNAT (1995-2001).

Figure 5 illustrates that the most important producer is Durango, followed by Chihuahua and Michoacán. Although there are noticeable shifts in annual production, these states maintain their relative positions. It is surprising that the production ups and downs in the states seem to be caused by different factors, that is, that the factors that at national level seem to determine the increase or decrease of production (for example the spike that occurred after 95) do not seem to be reflected in the state environment.

In general, wood from Northern Mexico has greater prestige among domestic buyers. The wood from the North, particularly *Pinus Ponderosa*, is mainly distributed to the industrial centers of the country. Buyers characterize the supply from Durango and Chihuahua as follows:

- Natural characteristics of the wood: very decorative, straight grain, slightly yellowish color, excellent workability, very good for furniture and framing. Uniform wood without aberrations. Main species: P. ponderosa.
- Added value: wood sizing is of 7/8 plus 1/8 reinforcement. In sum, the wood is sold at a slightly higher price than the wood from other regions.
- Service: the sawmills of the North of Mexico are considered reliable and relatively punctual suppliers.

Wood from the Centre of Mexico (Jalisco, Michoacán):

- Mainly distributed in Mexico City, Guadalajara and Michoacán. Buyers have more different opinions about wood from this region than about wood from the North. While some buyers prefer this to other wood, others consider it to be of lower quality.

Buyers commented on:

- Natural characteristics of the wood: very decorative, straight grain, white to yellow color, depending on the species, good workability, smooth, malleable, clear, in some cases very resinous, in some cases it splinters easily.
- Added value: the sizing is ¾ plus ¼ reinforcement. Prices and quality vary a lot from one sawmill to the next.
- Service: San Juan Nuevo has an excellent reputation as far as a consistent classification is concerned, but when other sawmills are involved it is important for buyers to know the sawmill and who is in charge at the time.

West, Southwest wood (Guerrero/Oaxaca). Distributed mainly in Mexico City and the Southwest:

- Natural characteristics of the wood: diverse; in Guerrero, wood is a little harder, more resinous, good for construction, yellowish. Species in Guerrero: *P. pseudostrobus, herrerai, teocote, ayacahuite, oocarpa.*
- Added value: sizing ¾ plus ¼, more diverse, great differences from one sawmill to another.
- Service: again there are great differences from one sawmill to another, it is important to know what is happening at each sawmill.

In spite of the great importance of pines in Mexico and in spite of the great differences that exist between the species, there are practically no commercial subcategories for pine. Very few lumberyards differentiate any species such as *ayacahuite* or *ponderosa* pine. The greater part of pine species are commercialized as a single species and as a result of this, the wood is not always given its best use.

On the other hand, domestic pine marketing presents serious deficiencies in the classification of the different quality levels of pine. The regional differences between classification systems make it difficult to compare the different origins of the wood. More serious is the fact that there are marked differences in wood classification from one sawmill to another in the same region, so that the buyer cannot buy from a number of sawmills without the possible consequences of receiving some very different types of wood.

Wood classification or grading in Mexico is almost exclusively based on visual elements, even when the wood usage is structural. Furthermore, there are noticeable differences between classification procedures in different sawmills. Attempts to unify and reform pine wood classification have never been accepted in practice, so the differences continue, causing the buyers to have a more difficult task and imposing often unnecessary obligations on the producers (see also **Box 3**).

Pine is classified in Mexico into four or five different grades, the two highest of which are generally used for framing and furniture, whereas the lesser grades are traditionally used in construction, mainly for centering (concrete pouring). The demand for this use has noticeably decreased, with the result that sawmills find it ever harder to sell the inferior grade wood. These inferior grades could be used after they are properly re-cut or assembled, but the present classification does not allow for this, since wood that could potentially be re-sawn is mixed with wood that could not (for example wood that is badly stained).

Box 3 – Thinking about Our Clients: The Importance of Wood Classification

There are three generic possibilities for sawnwood use:

1. Using the board as it is, for structural purposes (house construction, bridges, piers, etc.) In this situation, the most important aspects are the technical characteristics of wood, that is, its hardness, resistance and durability. In these cases the aesthetic characteristics of wood are of less importance.
2. Using the board as it is, as a whole, for production of furniture, doors and other products in which the board will cover large surfaces. This means that the board in its total surface will determine the final look of the product. In this situation, the aesthetic characteristics of wood become much more important than technical characteristics.
3. Dividing the board into much smaller pieces, to produce small parts of furniture, small parts of doors, etc. In this case, the aesthetic characteristics of wood are also important, but while in the second usage the complete board defines the final look of the product, in this use it is possible to by-pass any defects in the wood. How the board looks as a whole is not as important as how many useful parts can be obtained once the board is cut up.

Within these possible alternatives of usage, a certain board will be more suitable for one type of use than another. For example, a narrow board with two very close large knots in the centre of the board will not be adequate for the second use alternative and could be detrimental for the first, but it could be excellent for the third. On the other hand, a board with a blue stain could not be used as described in options two and three, but would be excellent for the first usage. A completely clean board will be useful for the three usages, but most likely will attain a higher price in the second one. Finally, a board full of small knots could be inadequate for first and the third use, but acceptable or even desirable for the second, (for example for rustic furniture).

Based on these elements, several wood classification systems have been developed in the United States, the purpose of which is to make classification adapt to the best needs of the clients: *appearance grade* (geared to the second use), *structural grade (*geared to the first use) and *industrialist grade* (geared to the third use). On the other hand, classification systems have also been adapted for certain species or group of species. The result is that clients receive wood that provides them the maximum benefit and for which they are willing to pay more.

The classification systems used in Mexico are directed towards grading and evaluating the entire board from an appearance point of view, that is to say, taking into account criteria such as aesthetic appearance more than the structural characteristics. Although different systems of structural classification of wood have been proposed, these have not been used widely, because in Mexico wood is hardly ever used for structural purposes (the few products that have to satisfy structural requirements are part of different categories). It is frequently mentioned that regional differences in classification systems confuse the buyers, but that is not completely true. The systems of the northern neighbors are much more complex than the domestic ones, since they allow classification to adapt to buyer needs. On the other hand, a constant control of norm application at sawmills and formalized personnel training would allow maintaining the same classification norms in all sawmills affiliated to a certain association.

Export of Mexican Coniferous Wood

While the greater part of the products of these states remains in Mexico, certain amounts, normally higher grades of wood, are exported to the United States. The quantities of wood exported depend directly on the possibility of offering certain grades of wood below United States market prices. At the present time, the

trend of exports has been a negative one. From exporting more than 100 million dollars in cut pine wood (FOB value) in 1997, these quantities have constantly decreased, reaching 26.6 million USD in 2002 and 21.5 million USD in 2003. Moreover, the exports in the first quarter of 2004 are below the exports in the same period of 2003. This means that the American market recovery during 2003 and that of 2004 has not been seized by the Mexican producers. This is surprising, since the exchange rate should be benefiting Mexico.

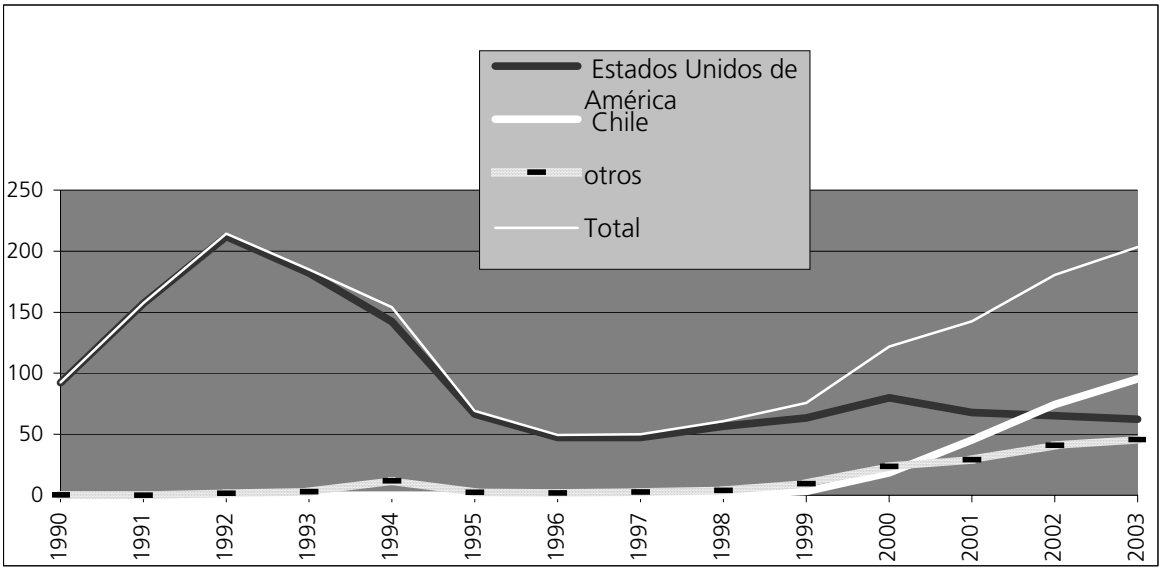
In order to increase exports, there needs to be a far more trustworthy relationship with a Mexican broker in the United States. In a negotiation, US wood (ponderosa, sugar, southern) most similar to Mexican supply is identified. Based on the this and price information, such as that published by the Random Lengths magazine, negotiations then begin with a broker. In general there is no problem marketing higher grade wood (which in Mexico would be first grade) outside of Mexico, which is generally used to produce high quality frames and furniture. Export possibilities for second grade wood are determined by factors such as the exchange rate, United States market prices and the question whether inflation has eaten away advantages caused by the last substantial devaluation. For the lower grades, export possibilities are much coger: not only is competition greater, but also reclassifying Mexican wood by grades, in order to meet the United States standards, is too expensive.

Coniferous Wood Imports

Pine wood imported nowadays comes mainly from Chile (the value of coniferous wood imports in 2003: 95.4 million USD) and from the United States (62.3 million USD). Other important countries are Canada (18 million USD), Brazil (17.4), Venezuela (7.5) and other Central and South American countries. The total amount imported in 2003 amounted to more than 203 million USD, that is to say, almost ten times the value of what was exported.

While wood has been imported from the United States for several years, imports from Chile first occurred in 1999, but have increased dramatically since then and still increasing during 2001, when all the other wood categories were decreasing, and surpassing United States imports in 2002. Many professionals maintain that the Chilean wood was tested by Mexican producers and rejected because of its reduced lateral hardness, problems of dimensional stability and reduced widths, but import data does not substantiate this conclusion (see **Figure 6**). With imports of more than 25 million USD from January to March 2004, Chilean sales to Mexico during these three months were higher than Mexico's exports during the whole year of 2003, and also surpass sales of the first quarter of 2003 by more than 20%.

Figure 6: Conifer Wood Imports (Millions of USD)



Source: Authors' own estimates based on SIAVI (2004) data. Custom import data 440710 (cut coniferous wood).

Word from Chile is mainly of the species *Pinus radiata* (pine insigne or radiata) from plantations. More than 2 million hectares of this species have been planted in Chile, obtaining growth of wood from 15 to 35 cubic meters per hectare year. [5] The characteristics of this wood compared to Mexican pine are presented in **Table 5**.

Generally, Chilean wood is inferior to domestic wood in its aesthetic and technological characteristics, but very superior in its price/added-value relationship, presentation and quality of sale service. Furthermore, wood from Chile is generally narrower than domestic wood.

Species mainly used for making furniture are primarily imported from the United States. The main imported species are the Ponderosa pine (480 PE kg/m ^{3}), with little over 42.000 m^3 ma in 2002, equivalent to almost 10 million USD. Following in volume is the Lodgepole pine (24.510 m^3 — *P. contorta* -PE 460 kg/m^3). Also eastern pine (commercial name for five species of pine, mainly *P. strobus* PE 400 kg/m^3) and southern pine (commercial name for four species of pine with PE around 600 kg/m^3: *echinata, palustris, taeda, caribaea*) are imported. In addition, other genders of coniferous that are imported are: *P. seudotsuga* (Douglas Fir), *Abies* (fir), and *Picea* (picea). Altogether, in 2002 more than 225 thousand m^3 of conifer wood were imported, two thirds of which were pine. The imported species that are most identified with the construction sector are the southern pine and Douglas fir (PE 530 kg/m^3). Imported wood does not differ greatly in its natural characteristics from Mexican wood, but the product itself is much more homogenous and has a greater added value than Mexican products.

[5] We sincerely thank Dr. Gustavo Chiang researcher of the Bio Bio University in Chile for the information on the insigne pine.

Table 5: Product Comparison between Chilean Insigne Pine and Mexican Pines

	Chilean *insigne* pine (fast growing)	Mexican pines
NATURAL CHARACTERISTICS	▪ Fast growing wood from young trees (20 to 30 years old). ▪ PE around 400kg/m^3. Young wood up to about 12 years of age has a noticeably inferior PE. ▪ Lateral hardness and resistant to breaking reduced, but acceptable for many uses. Chilean researchers are working on procedures for increasing lateral hardness of the species. ▪ Due to the age of the trees, hardly any wood is free of knots. However, pruning in the plantations has reduced the amount of knots significantly. ▪ Among Mexican timber merchants, there were different opinions on wood stability (ex. dimensional changes due to changes in the humidity of the wood).	▪ Natural forest wood, normal growth, frequently on hill sides (pressure wood), large diameters of logs allow wide boards. ▪ Because of the mixture of species the specific PE is very varied, from 450 to 600 kg/m^3. Because of this, all the other technical characteristics of the wood vary also. ▪ Important percentage of wood of very good quality, wide and without knots. ▪ Narrower growth rings.
ADDED VALUE	▪ The wood arrives in Mexico inch measurements, planed and canted (s4s) to 20 mm, 4 and 6 inches wide and 7 or 13 feet long (depending on the the length of the containers). ▪ Classification: furniture quality (that does not allow loose knots or stains or rough edges)	▪ The wood is sold in mixed widths and lengths, as wood of 3/4 or 7/8 of an inch plus 1/4 or 1/8 reinforcement, green and without planing. The lumberyards offer free planing services, but this planing is not good quality. Although the better sawmills do not have de-calibrated wood, the boards vary greatly in thickness, some measuring 24 mm, others up to 28 mm. ▪ The wood is rarely oven dried; it is generally expected to dry in the lumberyard. Generally, the wood is stacked in triangles or is not stacked at all, which frequently causes wood staining. ▪ Sawmills classify the wood according to the traditional classifying norms or sell the wood as mill-run, especially when it is wood of 6/4 or more.
SERVICE	▪ Chilean enterprises give credit to their buyers once they have established a certain relation of trust. The lumberyards partly transfer these credits to their own clients. ▪ Any amount is supplied during the whole year. The representatives in Mexico provide wholesale and retail service, Chilean enterprises directly ship relatively small orders (from one container on). ▪ Customer service.	▪ There are no clear credit policies. The enterprises do not have support from banks to guarantee liquidity. Preferably, strictly cash business. ▪ The majority of sawmills stop production during the rainy season. ▪ Limited quantities. ▪ There is a tradition of agreements being broken, by both buyers and vendors.

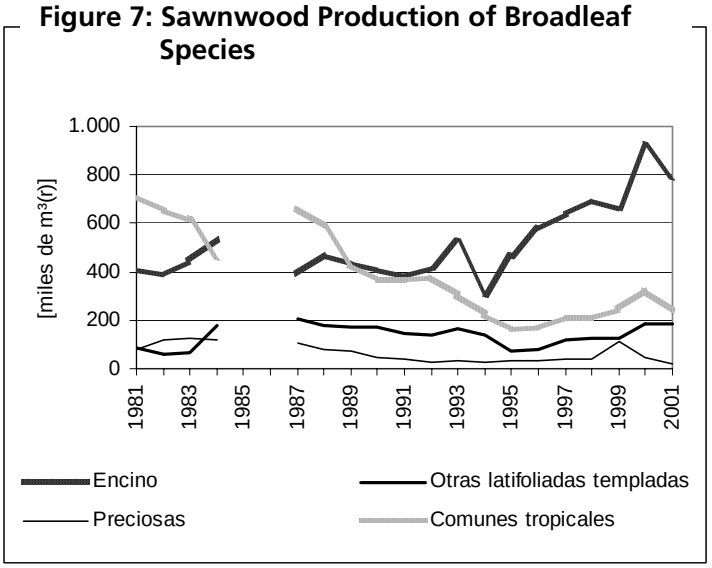
DOMESTIC BROADLEAF VS. IMPORTED BROADLEAF

There is a great diversity of broadleaf species in Mexico. Domestic broadleaf wood can be divided into two large groups: tropical and temperate zone wood.

a) Mahogany has a its own market among tropical wood species and is described in a separate chapter. The remaining tropical species are those known as common tropical species, which in general are of little commercial value, that is they are species with a demand clearly below their production potential. In Campeche and Quintana Roo, these species generally have a specific weight below 0,35 g/cm^3 or above 0,6 g/cm^3. There are few species with a specific volume weight between 0,35 and 0,6, which is the range expected for any mahogany substitute species and in general for any species used for furniture. Furthermore, substitution is even more difficult because there are practically no species that have the red coloring of mahogany. Thus, tropical sawnwood species fit into three very well specified types. Light wood (the "tropical soft Word"), used for making stained or painted furniture on which wood grain is not meant to be visible and can be achieved more easily using this kind of wood than through pine, which would be the alternate species. Heavy wood, used mainly for veneer, with the exception of *tzalam*, is the lightest in this group and is also used for furniture.

b) Among the temperate-zone wood species, one of the most important is oak (*Quercus spp.*), a genus represented by several species in Mexico (Mexico is the country that has the greatest variety of pine and oak species in the world). In Mexico the different species of oak are not differentiated when selling sawnwood, but there are clear differences among the different species, both regarding the specific weight, as well as the predominant shape of the shaft, ease of drying and workability. As can be seen in **Figure 7**, the oak market (encino) is the only one with a constant growth in the last 20 years. Presently this market is much greater than the tropical broadleaf species market. In Mexico, it is used mainly for veneers, tool handles and for finished work (kitchens, closets, doors).

Figure 7: Sawnwood Production of Broadleaf Species



Source: SARH, SEMARNAP; SEMARNAT (various years)

Challenges in the Process of Drying Oak

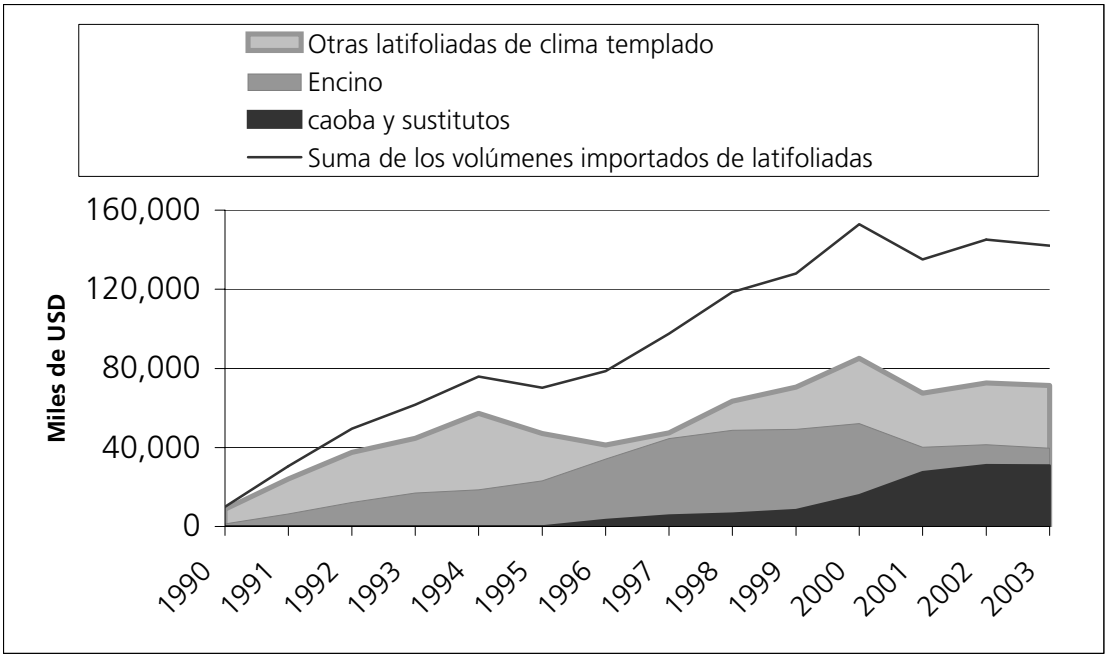
Nowadays heavy tropical wood competes both with imported oak and imported broadleaf wood, among which oak is also found.

Table 6: Competition in Broadleaf Wood

Uses	Tropical Wood	Temperate -Zone Wood	Imported Wood
Floors and Veneer	Heavy wood such as tzalam, machiche, pucté and katalox	Domestic oak	Imported oak
Export Furniture	---	Limited amounts of oak and aile	Many species such as alder, beech, etc.
Domestic Furniture	Mahogany, Tzalam	Oak and other temperate zone species	Several broadleaf species of the United States, also Virola
Kitchens and Closets	Light wood such as SacChacah and the Red Chacah, Santa Maria	Oak	Oak and tropical broadleaf

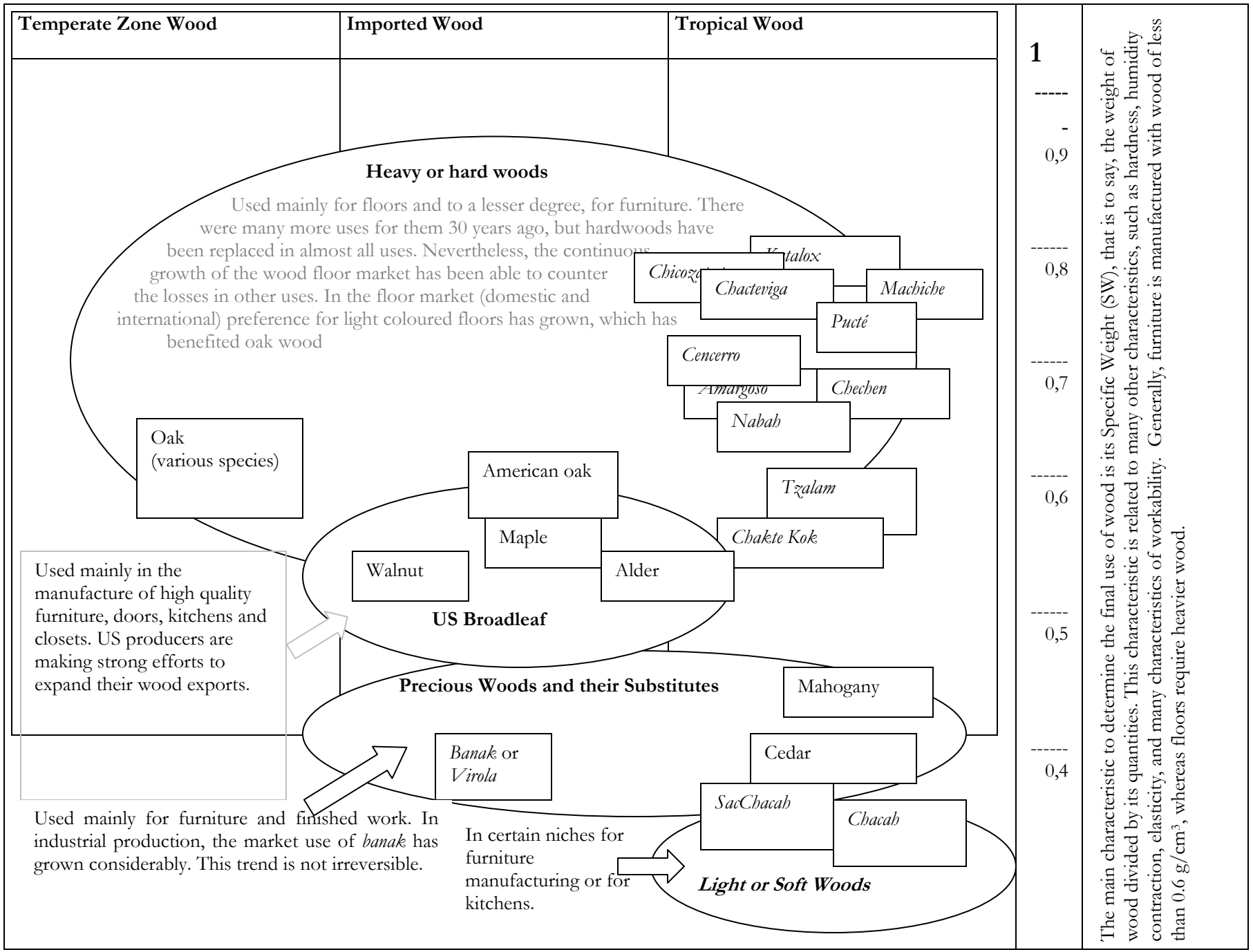
The total production for 2004 for all species (including all forest products) with the exception of the temperate zone broadleaf production was less than the total production twenty years ago. Coniferous production suffered ups and downs during these two decades, while tropical temperate zone broadleaf production increased and tropical broadleaf constantly decreased. In the case of less commercial tropical broadleaf wood, the so-called common tropical wood, the decrease can be explained by the dramatic reduction in the production of railway ties and plywood. In the case of precious woods, the decrease probably occurred as a result of the adjustment of the authorized quantities to the real productive potential of the forests. Oak gained as much in canted wood as other forest products, mainly charcoal.

Figure 8: Broadleaf Imports



Source: Authors' own estimates, based on SIAVI (2004) data.

Figure 9: Usage of Broadleaf Wood



DISTRIBUTION CHANNELS

LUMBERYARDS

Lumberyards are a main link in the distribution of sawnwood and other forest products in Mexico. The quantities managed by the lumberyards probably exceed 50% of the total volume (the rest is managed through direct contact between sawmills and secondary processing). Mostly, lumberyards are family businesses, many of them already into the third generation. The National Chamber of Timber Industry includes approximately 600 affiliates, but the number of lumberyards is much greater. The yellow pages of Mexico City telephone directory list 661 lumber yards, in Guadalajara 272 and in Oaxaca 73, which means that in all of Mexico there are probably more than 3,000 lumber yards.

The surface area of an average lumberyard is a little over 2,000 m^2 (INGO 2000), which is very small by international standards. The great majority (almost 90%) of the enterprises declare annual income below 3 million pesos,[6] and two thirds declare an annual income below one million pesos (SIEM 2003).

The lumberyards position themselves in the market according to their size, location, services and variety. Although price is an important purchase criterion, lumberyards are not positioned according to price. They simply try to maintain similar prices.

- In general, the larger lumberyards are in the centers of cities and in industrial areas. Some of these lumberyards can have inventories of more than five million BF and storage areas of more than 40,000 m^2. There are approximately 10 in Mexico City and 3 in Guadalajara. Although most lumber yards prefer certain groups of species or products (domestic pine, imported pine, broadleaf, plywood), most of them are able to provide any of these species and products. The larger lumberyards are not necessarily the most dynamic. There are many of them with large inventories, but with a small turn-over that sprang up during the seventies, thanks to tropical wood marketing. Most of the large lumberyards provide planing, sizing, kiln dying and delivery service.

- Medium-size lumberyards are scattered throughout the city. Several of these businesses specialize in one group of species or products (especially imported wood or boards). Within this group are the businesses that have promoted or have taken advantage of import growths and therefore have grown significantly. The greater part provides delivery service, but very few medium lumberyards have kiln-drying services, which is also partly unnecessary, since the wood they buy is already dry.

- The small lumberyards are distributed all over the city as well as in smaller cities. These concentrate their inventories mainly on domestic pine (when marketing imported pine, they depend on the larger lumberyards for their supply.) Unlike the large lumberyards, they have a great diversity of buyers; the small lumberyards focus on carpenters and construction. They usually do not provide delivery service or kiln-drying (nobody requests it), but all provide planing and sizing.

[6] 100 MXN = 8.9526 USD (UNIDO 2/11/05).

With the exception of the lumberyards that sell imported wood, there is a negative perception regarding the current market. Lumberyard managers say that the situation has changed from not having any wood to now not having any money. Some years ago, lumberyards and also secondary industry had to fill up their warehouses with stock in the dry season to survive during the rainy season. After the rainy season many enterprises had problems of wood supply. This has changed. Now sawmills have wood all year long, but there is no liquid cash available for buying the wood.

Previously, the lumberyards used to finance a great part of the sawmill production. Nowadays, their financing capacity has decreased. Lumberyards are now the bridge leading to secondary transformation enterprises that cannot or do not want to buy directly from sawmills. In general terms, three groups of enterprises can be mentioned:

- First, there are those businesses that are too small to manage the quantities needed for direct sawmill purchase in order to be profitable.
- Furthermore there are those that prefer to pay a higher price for the wood rather than being exposed to risks and additional work caused by direct purchases.
- Finally, there are enterprises that work with imported wood and do not want or cannot import directly.

Sawmills that are able to "skip" the lumberyards, selling directly to the secondary industry, are those that have good products, good service and good liquidity.

In general, lumberyard service is directed to carpentry shops. The planing and canting offering is of great help to the micro enterprises that do not have electric equipment, although normally the quality of the resulting surface is unacceptable to the more demanding enterprises (very uneven surface due to unsynchronized feeding speeds). Likewise, the sizing offered by the lumberyards is planned for sizing a reduced number of boards and not the major productions that a larger enterprise may require. Very few lumberyards have drying kilns. This is not important for carpentry shops, since they use the wood as it comes, but it is a handicap for a medium enterprise that does not have the capital to invest in kilns.

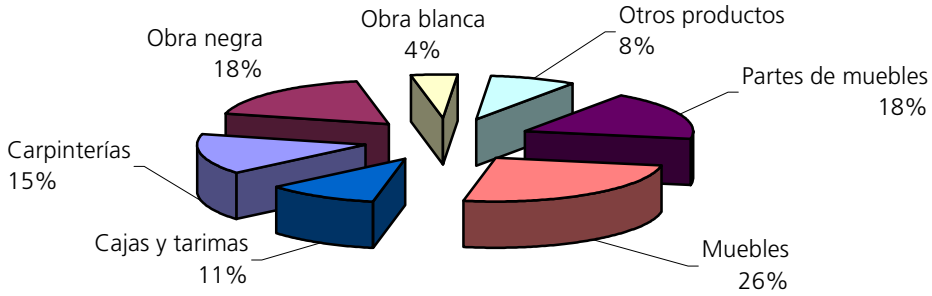
With no kilns along the productive chain, the wood runs a serious risk of degradation. Stacking in lumberyards is very deficient. Generally stacking is done in triangles or the wood is simply piled up, which, especially with pine, can cause serious problems of bluing. For a carpenter who has the luxury of selecting each board, this is not a major problem, but for an enterprise that buys greater quantities, the disparity of the boards can cause significant additional costs.

MARKET SEGMENTS OF SAWNWOOD

TOWARDS AN ESTIMATE OF SAWNWOOD CONSUMPTION BY MARKET SEGMENT

It is extremely difficult to determine the quantities of sawnwood consumed by the diverse segments of the Mexican market. A high percentage of enterprises that work in the informal sector use wood without official permits, which makes it difficult for the organizations in charge to establish the corresponding information. In the present case, the quantities of sawnwood that SEMARNAT (Secretaría Medio Ambiente y Recursos Naturales, *Ministry of the Environment*) reports as produced or imported (3.7 million m^3ma) almost double the amounts reported by INEGI (Instituto Nacional de Estadística, Geografía e Informática, *National Statistical Institute*) as demanded by different secondary transformation segments (2.1 million m^3ma). Because of the importance of having at least a rough estimate of the quantities consumed by the different market segments, it has been decided to integrate data from INEGI and Semarnat, taking into account the assumed bias of INEGI information. This bias stems from the INEGI method, which, for its industrial census, only surveys those enterprises with more than 50 employees or annual income over 1.6 million pesos. A significant number of processing enterprises and/or sawnwood businesses work in the informal sector and have not been considered within the INEGI statistics. It seems that the resulting bias is especially significant in construction and carpentry, as in these activities, the percentage of micro and small enterprises is very high.

Figure 10: Estimate of Sawnwood Consumption by Segment



Source: Estimate basde on INEGI data (1999) and authors' data.

In Mexico, the main sawnwood market segments are:

- Furniture enterprises: this is the most important segment. Consuming over 1.5 million cubic meters of sawnwood, this segment accounts for more than 40% of the demand in Mexico. Statistics make a distinction between furniture enterprises and enterprises that produce pieces for furniture, and data shows that this latter category practically does not use precious woods.
- Construction enterprises (rough work): this second segment is probably second in importance, although the available statistics do not reveal this importance.
- Enterprises that produce finished work products: doors, built-in kitchens, closets, jambs, moldings/staves and folding screens/gates.

- Enterprises that produce crates or pallets: according to existing information, platform producers account for 75% of total sales in this segment. Nevertheless, there could be a significant bias because more crate manufacturers work in the informal sector than pallet manufacturers.
- Carpentries: this segment produces both furniture and finished work products. This segment is not within INEGI statistics, due to the reduced size of the enterprises and their high percentage of informality.
- Other sawnwood consumers: picture or mirror frame producers, have 50% of the sales in this segment. Also, spool and tool handle producers are important.

Table 7: Estimate of Sawnwood Consumption per Segment (m^3ma)

Segment	INEGI Data			Total data INEGI	Integrated weighted data
	Conifers	Temperate Broadleaf	Tropical broadleaf		
Furniture	676,812	58,401	31,981	767,194	1,000,000
Furniture parts	530,619	4,854	0	535473	700,000
Rough work	ND	ND	ND	ND	600,000
Finished work	56,850	22,038	18,500	97388	200,000
Carpentries	SD	SD	SD	SD	600,000
Crate and pallets	215,455	72,778	4,904	293137	450,000
Household articles	114,136	44,277	606	159019	250,000
Industrial products*	74,631	1,407	4,313	80351	100,000
Total	1,668,503	203,755	60,304	1,932,562	3,900,000

**: Tool handles, broom sticks, spools, etc. The weighted estimate was made based on the following weighted indices: Furniture and furniture parts 1.3; finished work 2.0; pallets 1.6; household articles 1.5; industrial products 1.2. The value of construction demand (rough work) was calculated based on the construction census. The value for the carpentries is the result of the consolidation of the results from a regional level study in Quintana Roo. The estimated values have been rounded off to avoid appearing precise.*

Source: Author's estimate based on INEGI (1999) data, SEMARNAT (1999) and own data.

An important issue is the degree of direct commercial contact between community sawmills and sawnwood users or processors. Generally, the larger the buying enterprises are, the closer they are to establish direct contact with the sawmills (excluding lumberyards). However, there seem to be significant differences between these segments. Another important aspect is the proximity to the resource: while carpentries and small furniture manufacturers in Mexico City usually buy their supplies from lumberyards, the carpentries and small furniture manufacturers from Michoacán frequently seek a more direct supplier.

Finished work businesses are among the segments where direct commercial contacts are more frequent, especially the large furniture manufacturers and the large crate and pallet makers. As can be seen below, these are also segments in the chain that are buying more quantities of imported wood.

FURNITURE MANUFACTURERS

The furniture industry is the main destination for Mexican sawnwood. The businesses in this sector are very diverse indeed: after the great bankruptcy of furniture enterprises at the end of the eighties, a large part of the medium and large enterprises that survived or were created in the nineties have reached good competitive levels, while the micro enterprises continue to work with very low levels of technology.

The sales of furniture producers of the formal wood sector surpassed 750 million dollars in 2002.[7] We estimate that the informal sector sales were over 150 million dollars in this same year.[8] (Metal furniture sales were approximately 400 million USD in 2002). The wood purchases surpassed 250 million dollars.

The furniture makers have started to consume important quantities of imported wood. In the first semester of 2002, the investments in imported wood of the *tapatías* enterprises affiliated to CIMEJAL were almost 30% of the total wood investments. Nevertheless, great differences are seen from one segment to another.

Another common trend of furniture makers is to substitute sawnwood for other forest products, especially in MDF, but also in plywood. The great majority of the large furniture surfaces include one of these two products. Even in the most expensive furniture it is frequent to see MDF laminates. In these cases the need to have veneer and sawnwood from the same species becomes a barrier for decorative Mexican wood, since these are rarely produced as decorative veneer.

Rustic Furniture Manufacturers

At the beginning of the 1990s, there was a great demand for a Mexican style known as "Mexican rustic" and consequently, many enterprises started to manufacture this type of furniture with very different quality levels. While some enterprises with an export focus manufactured very high levels of quality and design, many enterprises directed to domestic markets took advantage of the "rustic" image to sell low-quality furniture. In recent years, the demand for Mexican rustic furniture has gone down drastically, forcing many enterprises to close down, basically due to two reasons:

- The "trendiness" of rustic furniture abroad has decreased.
- Heavy competition from China and Southeast of Asia has increased.

Currently, it is estimated that in Jalisco 10% of the furniture manufacturers produce rustic furniture. This includes approximately 120 enterprises (not including micro enterprises).

Many enterprises are substituting domestic wood with imported wood. The following reasons for this phenomenon have been mentioned:

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[7] This estimate, clearly above the INEGI data (monthly industrial surveys), is based on wood consumption in the furniture industry and the percentage of wood costs on the total costs.
[8] Estimates based on the following assumptions: total number of carpentries in Mexico equal 170.000 (see carpentry chapter); half of them are informal; average monthly sales of 20,000.pesos (based on payroll payment 7,000; wood 10,000; other expenses 3,000).

- Problems with domestic supply, such as low service and product quality.
- Chilean wood is adequate for manufacturing rustic furniture. While some of the interviewed think that the wood is too soft for furniture, others feel that good results can be obtained by working carefully.
- The price of Chilean wood, compared to its added value, is an important factor.

It is possible that a supplementary factor for the preference of imported wood is that third class wood, which is used in the first place for this type of manufacturing and which in Mexico includes stained wood, is not acceptable for rustic furniture.

Carpenter Shops

Carpentries are identified as micro-enterprises involved in manufacturing furniture and finished wood products (doors, kitchens and closets). Not included are micro-enterprises dedicated to producing handcrafts, in the narrow sense of the word.

A census in the city of Chetumal and its surroundings estimated that there were about 170 carpenter shops for a population of approximately 100,000 inhabitants, and an average wood consumption of 1,600 BF per year per carpenter shop. Extrapolating this number to include all of Mexico, we can estimate that there are about 170.000 carpentries with a total consumption of approximately 1.28 million cubic meters of equivalent round wood. This number is very conservative, since in other Mexican states carpenter shops manufacture in small series and therefore consume much greater quantities of wood.

Although specialized carpentries do exist (for example: luxury furniture or working with specific wood), it can be said that 90% of the carpenter shops are quite similar in regards to their market orientation, the type of products they offer and how they work. The differences among carpentries can be found in their legal incorporation (there are many informal carpenter shops), in the capacities and attitude shown by their owners, and in their equipment: while some still rely to a great extent on hand tools and a circular saw, others have managed to buy an edger, a band saw and an electric planer.

In general, the products offered by the carpentries are very simple and of low or medium quality. For the same reason these enterprises are exposed to intense price competition, implying that in Mexico carpentry is a badly paid profession (a bricklayer earns more than a carpenter). Products made at carpentries have also changed in the last three decades:

- While furniture production was previously dominant, nowadays most orders are related to household installations: doors, closets, kitchens. This is where carpentries have been able to maintain a competitive advantage, since making household installations is a task that cannot be rationalized greatly, therefore larger enterprises have not managed to penetrate into this area. In furniture manufacturing, carpenter shops have had to give way to larger and cheaper manufacturers on the one hand, and on the other to more sophisticated furniture manufacturers.

- While in the past solid wood furniture was predominant, today the carpentries have replaced this to a greater or smaller degree with other materials. For the lateral parts of shelves, dressers, bookshelves, beds and night tables and in closets shelves and closets, as well as table-tops, plywood is the most commonly utilized material. It is also frequent to find MDF (medium-density fiberboard) and plywood is also progressively being used for drawers. With exception of the frontal parts, kitchen furniture is practically all made of plywood or MDF. Solid wood has not been replaced by plywood or particle board in the manufacturing of door frames, closet shelves and for chair and table legs, as well as for table top edges.

Carpenter shops continue to mainly use domestic wood, at least as far as their pine consumption is concerned. They prefer domestic wood for several reasons:

a) Width: Carpenters prefer wide wood, because this way they need to make less joints when making a sheet. For example: for a bookshelf with a depth of 25 cm, they would have to make two joints, whereas with a board with a width of 25 cm, this is not necessary.

b) Thickness: Joining two pieces of 19 mm wood together edge to edge is more difficult than using 23 mm boards, because in the joining process performed with very simple tools (frequently using tourniquets made of cord), frequently the boards do not line up one with the other which may result in a joined board that is 16 or 17 mm thick, which is quite thin.

c) Quality: Carpenters generally prefer wood with fewer knots, unless they are explicitly making rustic furniture. They try to buy second-class wood. If they acquire third-class wood, they try to select the boards that have fewer knots because in doorframes, a knot is an important flaw. Chilean wood generally comes with a lot of knots.

d) The added value of imported wood is not such an important issue for carpenters, since carpenters traditionally have not given much value to kiln-dried wood, but have been accustomed to using air dried wood (and also have few scruples in using green wood). Furthermore, planing and edging of imported wood is not an advantage, as this is a service that the lumberyards traditionally offer free of cost to the carpenters when selling them domestic wood.

e) Among carpenters, especially those who live near the forests, illegal wood purchase is very common. This wood is cheaper than imported wood.

f) Carpenters generally buy their wood at medium or small lumberyards, who also buy domestic wood from sawmills, but have to buy imported wood from other lumberyards, that is, they would be adding another intermediary to the distribution channel of the imported wood, increasing the price of the product.

g) Many carpenters still do not know much about imported wood.

In the case of broadleaf wood, the situation is different. Whereas twenty years ago, practically all the fine furniture was made of mahogany, nowadays mahogany has been replaced pretty much by *banak* and broadleaf wood from the United States.

As a result, carpentries are an important group for domestic pine wood producers. Unfortunately, wood consumption in this group will very possibly decrease in the medium term. On the one hand, the substitution process of solid wood for composite wood and, furthermore, the general impression is that carpentries, as a group, are losing market shares to other competitors, because they lack strategies to modernize and improve their products (designs, qualities, timely delivery). The process of concentration has already started, (many carpenters leave the market) and, due to the growing dependency of carpentries on the construction sector, this will become more severe as the activity diminishes.

Export Furniture Manufacturers

In the last twenty years, the number of enterprises exporting furniture has increased considerably. These are both Mexican-owned enterprises as well as foreign enterprises, especially from the United States. Whereas the latter were already conceived to corner a certain segment of the market in the United States, the Mexican manufacturers had to go through a more or less painful process of seeking markets. In the category discussed here, the majority of the producers specialize in furniture higher-inome buyers in the United States, with models directed to sales in department stores and furniture stores with "classic" or "functional" designs. Competition with China and Southeast Asia has forced these enterprises to specialize in large dimension furniture (wardrobes, writing-desks, dressers, beds), where transport costs benefits Mexican products. The furniture design follows the trends in the United States, which favors the ues of US Word rather than imported wood. Therefore, these enterprises consume very small quantities of domestic wood: a small amount of very high quality pine, some mahogany which in this segment is rapidly being replaced by *banak* and some light tropical plywood species. The substitution possibilities depend to a great extent on the surface wanted for the furniture. In general, the furniture is heavily stained or painted, resulting in two types of surfaces, depending on the type of wood being utilized:

- When homogenously structured wood is being used, the finished surface is completely uniform. This would allow for testing with woods such as *sac chacah* that is easy to stain and provides a good finish.
- When wood is used in which the so-called pores form growth rings, the finishing color is uniform, but the surface exposes the original wood grain. In this case, it is practically impossible to substitute temperate zone broadleaf for domestic broadleaf, as there are practically no species with these growth rings.

In general, possibilities for Mexican wood in these enterprises are quite reduced. These businesses have established supply channels from the United States and are not willing to abandon these channels, partly because of the design element described and partly due to their high dependency on perfectly punctual delivery and well-defined quality.

Upholstered Furniture Manufacturers

Upholstered furniture is generally manufactured, structured on the pine "corpus", upon which fillings and diverse materials are mounted, mainly with foam rubber. In this category of enterprises, the battle between imported and domestic wood has yet to be defined. The advantages of imported wood regarding delivery facility, uniformity of the product and added value (planing and kiln drying) counteract the main flaw of the *radiata* pine, its reduced density. In the case of wood imported from the United States, its high cost reduces its competitiveness, yet still finds a market among some furniture manufacturers. Some of them have decided to modify their usual construction processes in order to work with Chilean wood, for example modifying the way they use joining staples. Others have attempted to use Chilean wood and have then returned to use Mexican wood.

Visible Wood Furniture Manufacturers for the Domestic Market

The enterprises discussed in this document are those who manufacture furniture for furniture shops or other stores that sell furniture, therefore carpentries are not included. This segment of the manufacturing market is extraordinarily wide and diverse. In general terms, the manufacturers of this type of furniture position themselves in two main groups. The first is the economic capacity of the target buyers, second is the style of the furniture. Three general alternatives can be differentiated: the rustic style, the "classic" style, which includes the manufacturing of reproductions and imitations of antique models, and the "contemporary" style. The majority of the enterprises are small and medium in size. In these enterprises, the differences in production technologies are smaller than could be expected. Only a reduced percentage has drying kilns and the transformation process generally takes place with non-specialized machinery. For the purpose of this study, this implies important advantages for imported pinewood, even though many of the arguments presented for the smallest enterprises are valid for the carpentries. There is another important factor for this sector: many of the enterprises are in rural areas, especially in Michoacán, where great amounts of chairs, beds, tables, etc. are manufactured, primarily with wood from forests without permits. In these types of enterprises, the danger of imported wood entering the market is reduced. The greater danger is that these enterprises, once formalized, may lose their competitive advantage.

CONSTRUCTION ENTERPRISES

Rough Construction Work

In Mexico, construction wood consumption is mainly about erecting roof and ceiling structures. The different products offered by the lumberyards are generally made from lower grade wood, which means that the wood used is difficult to sell in other segments. In this segment, imported wood has not penetrated the market significantly due to the following reasons:

- Low prices in this segment provide a disincentive to importing low-quality foreign wood.
- Plantation wood cannot compete in this segment due to its reduced specific weight, which implies a greater abrasion and makes it harder for repeated nailing and un-nailing boards. In addition, masons prefer wider boards.
- The lumber yards that handle imported wood do not usually participate in sales to the construction industry as their more developed accounting systems make it difficult to fit the more informal and generally only semi-legal transactions that characterize that market segment. .

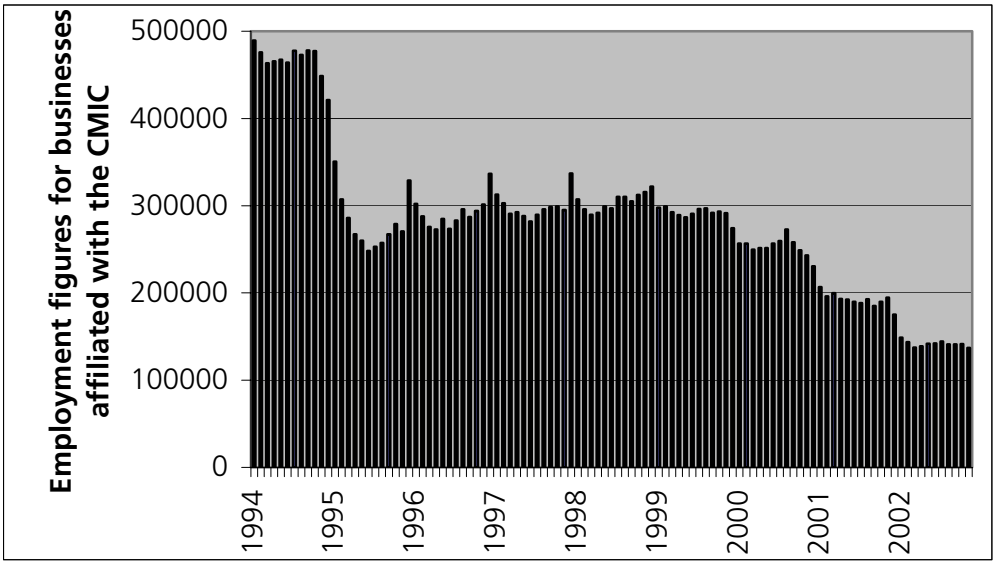
Unfortunately, the construction industry in Mexico has decreased during the last few years, both in government spending as well as in commercial and private construction. An indicator of this is the decrease in employees in this sector. This number fell by more than 70% from 1994 to 2002 (see **Figure 11**), and has not increased since.

Another negative trend is the continuous substitution of sawnwood for other materials. The main use of construction wood in Mexico is for concrete-pouring moulds, either for roofs, or for other structures (columns, beams etc.) Many products have started to include alternative materials. For example, the platform for centering that used to be made with cut pinewood has been partially replaced by plywood and partly by other construction materials such as pouring concrete on styrofoam. The small amount of wood used comes from discarded wood pallets. An expert consulted on the matter estimates that the average cost of construction wood has diminished at least by forty percent.[9] These processes of substitution are ongoing.

As a result, the demand for sawnwood in the construction industry has diminished drastically and will continue to do so, even if the future perspectives of the construction industry improve, because substitution of with other materials will continue.

[9] Ing. Inocente Bojorquez, personal comments.

Figure 11: Construction Industry Employment



Source: INEGI (2003).

Construction Site Carpentry

This includes doors and windows, kitchens, closets and stairway banisters. The modernization of this segment has not been an easy task, but it is making progress.

Generally, the size of a market determines, among other factors, the processes of concentration of the industry that serves that market. In the case of furniture, the larger market segments are in the hands of medium or large enterprises. In the case of carpentry work this is different, since many of the important steps in the construction chain of these products cannot be standardized and therefore the differences in sizes of these businesses are not so important. Because doors, integrated windows, kitchens and closets generally have to adapt to an already existing construction, the installation has to be made to measure. Furthermore, most of the supplies used by the large enterprises in this sector are already available to smaller enterprises. The exception is in the design, but as Mexicans in general have old fashioned tastes, this factor is not too important. Another advantage of large enterprises is being able to combine several materials such as stainless steel, aluminum or other non-wood surfaces. The result is that there are many small enterprises in this segment.

Unfortunately, having a large number of small enterprises in this segment does not guarantee the purchase of domestic wood. On the contrary, there are relatively few enterprises that use domestic wood. Generally the types of wood used are temperate zone broadleaf species such as alder or maple. Rubber tree wood kitchens (*Hevea guianensis*) are becoming more popular every day. The competition also comes from MDF, especially those that are decorated.

Domestic species that are utilized for this area include pine for doors and closets, especially for closet interiors, mahogany for visible parts, and as a very special niche, S*ac Chacah* for kitchens and closets that will be painted and where the panels are from MDF and the frames made of this species.

CARGO PALLET MANUFACTURERS

Many sawmills make pallets in order to utilize their by-products. Furthermore, in the main Mexican industrial centers there are many businesses that mainly manufacture pallets. In Mexico City there are probably more than one hundred of these businesses. The great majority of this type of enterprise has between 15 and 40 employees.

There is a wide range of products in pallet manufacturing. The specific uses and the requirements from these uses are so diverse that we are referring to different products with different production procedures and inputs. Therefore, the competitive relationship of domestic wood related to substitution materials changes.

a) The cheap "non-recovery" pallet is a platform used to export different products and is considered part of the packin, and therefore is discarded upon arrival. Here, the price is much more important than durability. Imported wood has definite advantages, as it has only to be cut in length to start the nailing procedure, thus saving the enterprises at least 3 production steps where labor costs are decisive. Another advantage is the precise classification of wood type; this improves lumber usage, as remnants are considerably reduced. A third advantage is credit made available by the Chilean suppliers. A medium pallet producer can order a container directly from Chile and get 90 days for payment, without needing to request and sign promissory notes or any other procedures. For these reasons, a large amount of these pallets are being made with Chilean wood.

b) Permanent pallets used by enterprises: for this type of ballet, durability is a much more important criterion than for the first category. Here, domestic pine has clear advantages. There is also a small niche for heavy tropical broadleaf wood pallets. However, in this category, there is a market increase in the use of plastic pallets.

c) Pallets that are stress and pressure resistant: this type of pallets is used for special products, for example for transporting heavy machinery or industrial production of adobe. Again, the durability and the retention capacity of screws, nails etc. is much more important than the price of the wood, which is also why domestic pine has held its position.

The production of wood pallets is mainly linked to exporting. For this reason the last two kinds have been bad for business. There has not been much demand in the domestic market either.

There is obviously a great discrepancy between buying domestic and imported wood. Many pallet manufacturers buy quality Mill Run and later use it for different purposes, transforming bad quality wood into centering forms. Those manufacturers that buy a certain quality complain about the variance in the quality of each shipment and the delays in permits.

MANUFACTURERS OF WOODEN COVERING PRODUCTS

Wooden coverings include flooring and jambs. There are two main groups of enterprises that make wooden coverings in Mexico:

- During the 1970s, many lumberyards in large cities acquired tongue and groove machinery to produce wooden coverings, mainly moldings and jambs, for their clients. These are not highest quality products, but in the past were good enough for the customers.
- There are ten large, floor-manufacturing enterprises in Mexico dedicated to both domestic and foreign markets. These enterprises frequently manufacture with the highest technology and are able to offer their products to high purchasing power market segments.

Both types of enterprises have experienced problems in the domestic markets, to the extent that a few years ago the Alfer enterprise, a market leader, went bankrupt (although it should be recognized that in this case mis-management was as an important factor in the failure, as was the adverse external context).

Difficulties at domestic level stem from the following causes:

- A decrease in jamb consumption. This product is "going out of fashion."
- Constant improvement of synthetic flooring. Today the neophyte is hard pressed to distinguish a synthetic floor from a real one. Replacing wood floors by imitation wood floors is a significant world phenomenon. In Mexico, there are few buyers that insist on paying twice as much for a floor made of real wood floor when synthetic floors are so similar.
- Other types of flooring, especially ceramic, are gaining market participation.

This means that in this case, competition does not come from imported sawnwood, but from substitute products. In many lumberyards, the molding machines remain idle most of the time. In the case of large businesses, their main focus is towards external markets, mainly the United States. Mexican species adequate for flooring are generally reddish or dark and therefore are generally found in special niches.

Generally, the species that are adequate for flooring do not present sales problems, although prices paid are not as high and barely cover the costs.

BARRIERS THAT CONSTRAIN CFE DEVELOPMENT

In Mexico, 80% of the forests are registered as communal or community lands, making it the country the second-most community forests (Bray et al. 2003). This situation has allowed for more than 500 cases of communities or communal lands to organize themselves as a Community Forest Enterprise (CFE), which are also known as Communal Forest Enterprises; therefore Mexico is considered to be one of the pioneering countries to encourage the harmonization of rural development with forest resource conservation.

The CFE boom manifested itself during the 1980s. The 1986 Mexican Forest Law created a legal frame that promoted and catapulted the process of community forest development. At that time, many communities began forest production and some even explored the sawmill industry and industrial carpentry. Nevertheless, during the last decade the trend towards forest development is changing; it seems that the great majority of communal lands and communities in the country prefer to continue as canted wood producers and there even seems to be a certain trend for communities and/or communal lands to abandon sawmills and go back to selling round wood.

This trend can be explained by the barriers that limit the development of communities and communal forest lands. There are internal organizational types of causes that impede community development, but there are also external causes that remain out of the control of the communities. This is why those interested in promoting community forest development ask themselves: What are the constraints limiting CFE development?

This chapter discusses the barriers or constraints that limit CFE development. The discussion of internal causes that impede community forest development was intentionally avoided. The assumption is that communities that have a genuine interest in developing their forest industry have the capacity to solve their differences and build internal agreements that sustain development.

According to the above, this chapter must be seen as an approach towards identifying the barriers that constrain CFE development, seeking an explanation to understand the present situation. Why are there so few cases of CFEs that successfully become industrially developed? This implies, examining the thought process of many academics and politicians who think that communities do not progress because they are immersed in their own internal problems, and that they therefore, do not have the capacity to address industrial development with entrepreneurial criteria.

Communities that try to develop their CFE industries face two types of external barriers: those that stem from the public management and those that are inherent to the forest sector itself. The policy of trade opening, fiscal and forest policy itself are part of the public administration. Among the constraints inherent to the forest sector itself, are: financial institution policies, forest industry policy and illegal forest operations.

BARRIERS STEMMING FROM PUBLIC POLICIES

Free Trade Policies

Free trade policies have allowed access to market niche opportunities for Word-roducing countries with whom Mexico has signed a Free Trade Agreement. These specific markets were previously forest community clients. It is important to note that in Mexico there is a continuously increasing demand for good natural forest resource management, in contrast to several countries that continue to be flexible regarding the practice of forest management.

The above implies that, Mexican forest production in natural forests is competing on the one hand with imported wood from forests that do not have forest management costs, and on the other with wood from forest plantations that do not have biodiversity conservation costs. A constraining factor here is that the production cost structure is very high for the CFEs, which in turn are subject to stricter management and conservation norms than imported wood. In summary, CFEs do not compete on equal terms with imported wood.

In order to find an incentive for the agro-cattle and fishing sector to help them become more competitive, the government has come up with some support mechanisms, such as agriculture and marine diesel. Also in the agricultural sector, the government has developed a regional road infrastructure. These support systems are not channeled towards the forest sector, which results in this sector being more vulnerable to product imports than the agricultural, cattle and fishing sectors.

Fiscal Policies

The 1980 ISR (Spanish acronym for Income Tax) Law in its Article 10b[10] exempted communities and communal forest lands from income-tax payments. This means that CFE profits were not taxed. This situation allowed forest communities in communal lands to dispose freely of forest enterprise profits. Generally, profits were used both for social works and reinvestment as well as for proportional distribution among the members of the community. CFE "profits" with forest industries managed both live-tree accounting as well as profits generated from the added value of sawnwood. In such fiscal policy conditions, the incentive towards maintaining forestland use was greatest and therefore the use that communities gave to wood profits went towards forest cover. This means that the profits that CFEs made were giving them a competitive advantage fostering forest usage, versus other uses of the land that implied clearing forests for cattle and agriculture in spite of the many subsidies offered to benefit farm-cattle development.

The fiscal situation of the CFEs changed in January 2002. The new ISR Law (Article 81) established that communal lands and communities dedicated strictly to forest activities will pay 50% income tax on their profits. This becomes critical for those communities that have integrated both forest and industry because the purchase value of live trees is included in their profits as well as the profits generated by industrial added value. Even though this has not been researched sufficiently, this seems to force communities to pay more

[10] Comments made by Israel Santiago, Manager of the Forest Enterprise at "Pueblos Mancomunados", Oaxaca Mexico.

taxes because raw material purchases are not accounted as cost but added to the profits. To solve this problem some communities are dividing the CFE into two enterprises: one dedicated to timber extraction and the other to timber processing, therefore the latter buys its raw material from former.

In addition, the problem is that few official receipts are issued that would be recognized by tax officials for accounting costs, which naturally increases the CFEs expenses because they incur in expenses that the state treasury does not accept as costs. Thus, from the point of view of some communities, sawmills are only good for generating employment and creating a series of fiscal complications; therefore many of them choose to abandon the sawmill business.

Furthermore, it should also be pointed out that the fiscal policy is counteracting the forest law objectives. On the one hand, the Sustainable Forest Development Law considers forest ecosystem conservation as public good, therefore it imposes restrictions on forest management to safeguard the ecosystems; on the other hand, the fiscal policy does not make any distinction between CFE enterprises that manage forest ecosystems with forest conservation criteria, and those that contaminate or destroy forest resources. This means that the same fiscal policy is applied to CFEs of communities that manage their forests sustainably as well as those enterprises that contaminate or destroy forest resources.

Public Forest Policies

Forest Legal Frame

The current Sustainable Forest Development Law,[11] in its Article 3 Section XXXI, establishes as one of its objectives: To encourage the development of forest and communal social enterprises by Indigenous Peoples and rural communities. It also defines (Article 7) the concept of Community Forest Enterprise (CFE) as a productive community or communal lands organization along with permanent forest areas and under a forest management plan, for production, diversification and transformation, with agrarian and enterprise capacities. In this same sense, in Article 30 Paragraph I, the law establishes as a forest policy principle: "To achieve sustainable advantage of forest ecosystems means to create a permanent source of income and improved living conditions, for their owners or possessors, generating sufficient supply for the social, industrial and export demand, as well as to strengthen the productive capacity of the ecosystems".

Similarly, Article 64 encourages forest management, and forest owners have the option to hire their own forest technical services. This allows communal lands and forest communities to be freed from the burden of having to hire only forest professionals accredited by SEMARNAT and opens a door for the communities that consider themselves sufficiently trained to assume the technical responsibility of their own forest management. In this same sense, Article 77 attempts to provide flexibility to forest management by establishing three categories for authorizing permits for natural forest use: simplified forest management programs (the Spanish acronym is PMF) for Forest Management Permits in areas under 20 hectares, intermediate level PMF programs for those between 20 and 250 hectares, and advanced level PMF programs for areas over 250 hectares.

[11] LDFS is the acronym in Spanish for Ley de Desarrollo Forestal Sustentable.

CFEs this appear to be priority according to the LDFS; however, the LDFS itself restricts natural forest management by requiring prior approval for any operation**.** Article 84 states: "In the case that the Ministry may not have given a resolution in the period provided by this law, it will be understood that the forest usage permit has been denied."

By contrast, in order to stimulate the establishment of commercial forest plantations in Article 87 the LDFS states: "Forest plantations in temporary forest lands from properties that are smaller or equal to 800 hectares will only require a written notification from the interested party to the Ministry." In the same sense, it concedes a **defacto affirmative** for commercial forest plantation management in areas larger than 800 hectares. Article 94, Paragraph III: "In the case that the Ministry has issued the resolution in the period provided by this law, it will be understood that commercial forest plantation is allowed." It is worth mentioning that the period of time mentioned in the above article is of 30 working days.

Forest Norms and Administrative Procedures

The amount of administrative procedures and research studies that need to be prepared from the time a community decides to use its forests until it is able to sell its wood becomes a Kafkaesque experience. Annex 1 includes a process flow chart that gives examples of forest administration procedures. The process can be divided into three parts: documents and administrative procedures for forest usage permits, forest control and administrative procedures of forest transport documentation and administrative procedures for wood exports.

i. Usage Permits

The process begins with the hiring of a professional, duly authorized by the Ministry of the Environment and Natural Resources (SEMARNAT) to prepare the forest management program. If it is in a tropical region, a MIA (Environmental Impact Assessment) has to be done as well. This process takes approximately one year, because there is no database where the interested party can obtain any data about the forest inventory of the forest area affected. In contrast, the data base is built upon communal inventories that are provided by the forest owners. This implies that any community intending to use its forests must finance or obtain resources for financing in order to prepare its own forest management program. In the opinion of environmental and forest associations the inventory is an inescapable task for good forest management. However, for communities it is an imposition they have to comply with. The same restrictions for using natural resources are not applied to cattle ranching and agriculture, for example.

Once the FMP (Forest Management Plan) is completed, an Agreement Record is required from the General Assembly in which the community adopts the FMP. Then, the community applies for the usage permit to SEMARNAT annexing the FMP - and EIA, in the case of the tropics. After receiving the application, SEMARNAT has a 30-day period to respond for temperate forests and 60 days for tropical forests. During that same period SEMARNAT needs to carry out the field inspection to issue the corresponding technical ruling and to obtain a second opinion from the Forest State Consultative Council. Once this process is completed, SEMARNAT issues a resolution for the usage permit. Nevertheless, it can be pointed out that generally, if any information is missing or if there are any doubts regarding the FMP before the period ends, SEMARNAT will request the FMP to make any necessary corrections to it; thus the term period for

authorizing the FMP is delayed and the process leaves the normal route in order to enter a process of revision and adjustments, until the applicant is able to complete the information required by SEMARNAT. [12]

ii. Usage Control and Administrative Procedures for Forest Transport Documentation

Before beginning their forest operations, the CFEs with use permits are obliged to formally inform the Attorney General's Office of Federal Environmental Protection (PROFEPA) about their intent to start forest operations in accordance to the authorized FMP. Likewise, before starting to harvest, the trees have to be marked by the professional forest technician responsible for the FMP. In order to proceed with the felling, trunk gathering and calculating the log-size, the CFE must apply to SEMARNAT for the forest product transport documentation based on the report called Technical Forest Marking Report. This administrative procedure takes about 10 working days. In order to be able to transport logs to the sawmill the CFE needs the authorization from SEMARNAT. Likewise, a control book must be kept of log species dispatched from the site to the sawmill. Also a bi-annual report on any log movement has to be sent to SEMARNAT.

iii. Administrative Procedure Documentation for Sawnwood

First the CFE sawmill has to have national forest registration to be authorized as a timber storage and transformation center. If the sawmill has everything in order, the CFE must request the forest transport documentation for sawnwood from SEMARNAT. For this purpose the application should include a partial report of the use coefficient with a copy of the timber transport permits proving the legal origin of the logs entering the sawmill. In addition, SEMARNAT issues the documentation according to the usage coefficient corresponding to each species and type of sawmill. This administrative procedure takes approximately 10 business days. Once the sawnwood transport documentation is obtained, the CFE is able to sell wood on the domestic market.

iv. Export Administrative Procedures

When exporting wood, normally a copy of the sales invoice with the fiscal registry and the forest transport permission for sawnwood is procided to the customs agency. Both documents are used as a certificate of origin. Also, the sanitary certificate and, if the species requires it, the CITES certification are submitted as well. SEMARNAT issues both the sanitary as well as the CITES certificate. Following is a detail of the administrative procedure for both documents:

- **Fito Sanitary.** This document is issued by the State Delegations of SEMARNAT. The only requirements are the CFE application, a payment of 294 pesos and the documentation that proves legal property of the wood, i.e. the forest permit by which the wood is authorized to enter the sawmill yards. Next SEMARNAT performs a technical inspection to verify the condition of the product to be exported. The procedure requires 10 working days.

[12] In Oaxaca, the community of San Andrés Cabecera Nueva handed in its forest management program in 1997 and did not obtain the forest usage permit until 2003. In addition, San Pedro Tepalcatepec handed in their forest management program in May 2003 and still had not obtained a forest usage permit as of January 18, 2004.

- **CITES Certificate.** With some species considered by CITES, such as the case of mahogany, the procedure at SEMARNAT also takes 10 working days. It must be noted that this administrative procedure is centralized in Mexico City, which delays its completion and causes it to take between 30 and 90 days.[13]

BARRIERS INHERENT TO THE FOREST SECTOR ITSELF

Financial Institutions Do Not Consider Communal Lands and Communities Creditworthy

The rural Mexican financial system entered a crisis several years ago. The majority of agrarian enterprises defaulted on their loans mainly because in mist cases they were political gifts rather than loans based on a business plan. The CFEs are now paying a high price for this because banks no longer consider forest communities and communal lands creditworthy.

Banks grant rural loans when enterprises are legally constituted and can prove their economic solvency. In order to become - de facto – creditworthy, communities are forced to form a legally constituted enterprise because communal lands or goods are not subject to embargo within the agrarian law; therefore, forest capital does not count as an asset that can be used as a guarantee of payment.

Furthermore, for a rural enterprise to be creditworthy, it must deposit a cash guarantee for 30% of the amount of the loan, apart from requiring the co-signature from the FIRA Bank of Mexico for 60% of the credit. This means that the bank only risks 10% of the capital that it loans to an CFE, an amount that can be obtained with the CFE's first payment. This situation clearly shows that the banking policy limits the development of CFEs,[14] because with the exceptions of communities that have their own working capital, the great majority depend on advance payments from wood sales from the network of regional and local intermediaries.

Private Enterprises Do Not Consider Communal Forest Lands to be Reliable for Forestry Business

Lumber enterprises do not perceive CFEs are not reliable business partners. They prefer to receive supplies from a network of medium and regional intermediaries linked to the CFE. The intermediary network has a practice of providing advances for future wood delivery and therefore has a broad margin for setting local and regional wood prices. In such conditions, the commercial chain is too long and there are high commercial

[13]In Quintana Roo, the communal forest enterprise Noh Bec SPR of RL has lost US clients because of the delay in the CITES certification procedure. This has meant that Noh Bec has had to sell its mahogany wood in the domestic market at the rate of 2.0 dollars per board foot instead of exporting it at 2.6 dollars per board foot.
[14]The Noh Bec community tried to obtain credit for two consecutive years for working capital. It was so complicated that they were convinced they would not get it. In order to solve the problem they established Noh Bec SPR, obtaining the credit, after depositing a cash guarantee for 30% of the total loan and getting the backing of the FIRA Bank of Mexico for 60% of the amount of the credit.

intermediary costs. This situation limits investment because profits disappear into multiple marketing steps. This situation becomes a barrier that separates private industry from CFE industry.

Part of the Market is Supplied by Illegal Wood

Illegal wood sellers is another strong competitor for wood coming from managed forests. They have no forest management costs and do not pay taxes and offer wood at lower prices. It is important to note that illegal wood was mentioned as a key issue in the last annual report given by the President of Mexico.

Finding a solution to the illegal wood problem will require structural changes. Communities with high levels of poverty see illegal logging as a final resort and solving this problem requires offering rural development alternatives for this population in the long and medium term. Until then, illegal wood logging will continue to be a competition for wood from well-managed natural forests.

Illegal wood undercuts both imported wood and native wood. As a result, high-quality local wood ende up being sold at the same price as coger-quality imports. Thus the commercial barrier becomes even greater for wood coming from legally used natural forests.

SOME ADDITIONAL CONSIDERATIONS ON MARKET BARRIERS

While the previous section discussed external barriers for communities that limit the development of CFEs, the following section will address the impact of these barriers:

Fiscal and Forest Policy: The Ministry of Finance is trying to increase tax collection in any possible way. In addition, CONAFOR is trying to stimulate forest resource conservation and the development of rural communities in woodland or forests. There is a disconnection between fiscal and forest policies are there is no fiscal incentive for good forest management. The tax authorities do not differentiate a community forest enterprise with good forest management from any other one in order to stimulate good forest resource management.

Commercial Policy - Illegal wood - Network of Intermediaries. Ever since Mexico entered GATT and later the WTO, it became necessary to invest in technological progress, so that the domestic industry could become competitive in this new economic context. Yet, this did not happen in the CFEs where now obsolete technology with high production costs prevails. Consequently, domestic wood is more expensive than imported wood. Furthermore, taken into account illegally logged wood and the fact that the network of intermediaries buys the material in advance at very low prices, it is easy to see that the business environment for CFEs is adverse.

Forest Legal Framework versus Rural Development Alternatives. Forest and environmental legislation forces forest communities to live under a stricter regulation than communities that work in farming and cattle development. This causes additional costs, for example the payment for forestry studies and technical services

and the costs for forest administrative procedures. By contrast, in order to start activities in farming or cattle development, no study is required nor are any technical studies or services; instead, these are offered as an optional subsidy to improve rural enterprises.

Natural Forest Management versus Forest Plantations. On the one hand, legislation restrains natural forest management and grants facilities to establish plantations as a way to substitute imported wood. This places forest communities at a disadvantage because in the medium term it causes them to compete not only against imported wood but also against commercial forest plantation wood from their own country. They also face ever more restrictive pro-conservation regulations.

For example, CONAFOR is leading several programs to stimulate forest sector development; the most relevant are PRODEFOR and PRODEPLAN. The first is the instrument for financing CFE development, and the second is the instrument to finance forest plantations. In 2002, 177.5 million pesos were invested in PRODEFOR and 503.5 million pesos in PRODEPLAN.

According to PRODEFOR's rules, the maximum forest project investment amount is 600,000 pesos per community or location, while PRODEPLAN has no limits. In 2001, the project with the greatest investment in forest plantation reached a total of 81.66 million pesos.[15] This does not mean that one should not invest in large forest plantation projectsto replace wood imports, but one should invest in the industrial re-conversion of CFEs. Therefore, since Mexico entered GATT and later the WTO, forest industrial plants had to be modernized in order to compete with imported forest products.

Norms for Exporting and Importing Wood. Importing wood is relatively easy. Documentation to introduce wood into the country can be obtained within 10 working days without having to go through the administrative procedures needed to obtain the usage permit. Transport documentation for logs and later for boards as well as the sanitary certificates and CITES all need to be obtained before being able to export. In summary, up to 135 days are needed for administrative procedures to obtain the permit to export wood. As a result, most of the time the CFEs do not deliver their products on time which leads to a lack of credibility and negative customer service in the international market.

Private Industry-Bank – State Policy. Due to the lack of financing as well as a lack of trust in the private sector and in fiscal policy, some communities have chosen to set up legally incorporated enterprises which meet the banks' requirements. This allows them to function as private enterprises and to separate the profits of forest production from the industrial added value for tax purposes.

A simple alternative could be to reach a General Assembly agreement to legally incorporate a rural enterprise, so that commercial relations between the forest-owner community and its own industrial enterprise can be established. Yet introducing organizational innovations in the communities is not a simple short-term task. On the contrary, it implies confronting long-term traditions of usage and customs held by the forest social groups with their own form of community government, including institutional agreements for forest resource management and usage.

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[15]Project authorized in favor of Silvicultora Saraya S.A. of C.V. the 2001. Source: Internet page of conafor.gob.mx. PRODEPLAN Report.

In summary, each barrier constitutes an obstacle to be overcome by the forest communities. Together, these have a magnified impact, because communities are being forced to face a series of problems. In most cases the problems exceed their capacity to respond, to adapt to a new political and economic context.

CONCLUSIONS AND RECOMMENDATIONS

MARKET OPPORTUNITIES

Although, in general, sawnwood consumption in Mexico has not increased, wood import increases yearly. This implies a constant loss of market participation for Mexican wood in the case of conifers, especially pine wood. Mexican products are being displaced by substitutes with similar or inferior natural characteristics, but with added value and sales service that adapt much better to the requirements of the main buyer groups. In the case of temperate zone broadleaf wood, the larger imports are species difficult to obtain in Mexico, often used for manufacturing furniture exported to the United States. In the case of tropical wood, the main import substitute is a mahogany substitute, which is offered at a price far below authentic mahogany. Common tropical wood, the most abundant species in the tropics, has been loosing sale value due to substitution by other materials.

Neither the sawmills nor the lumberyards have been able to adapt to the requirements of the more demanding market segments, thus opening the way for imported products. Both sawmills and lumberyard managers still believe that they can sell green wood, leaving the responsibility of the drying process to the buyers. Without the drying process, it is impossible to add other value steps, for example planing, canting or sizing. Another problem is the differences in the thickness of wood, which implies a significant effort for buyers at the time of the planing process. In addition, wood classification is deficient. In the end, medium and small lumberyards continue to focus on the construction industry and carpentries. The service that they offer is not attractive for larger enterprises.

In Mexico, wood classification lacks the necessary institutionalization, that is to say, there are no organizations that effectively oversee the compliance of classification norms in associated sawmills. The current classification systems also does not correspond to the new market conditions, characterized by a reduction on the demand for wood for rough work (lower grade wood) and the reluctance of furniture manufacturers to buy wood that is not classified for their needs. In the case of pine wood, there is a single wood category and buyers are obliged to purchase pine species that could be totally different in one same lot. In the case of tropical wood, there are no classification norms that allow buyers to foresee the amount of unusable wood when buying in a certain lot.

Wood production and wood marketing scales in Mexico are problematic. Many of the sawmills and lumberyards do not have the infrastructure or the investment capacity to offer a suitable service to clients. Eventually, they will be displaced by larger lumberyards, but it may take some time to do so. Little is known about concentration processes, which may surely be desirable in some cases.

Imported wood pentrates the more dynamic market segments of the country, especially the production of pallets and furniture. Mexican products have maintained their market participation in the segments that are being contracted: construction and carpentries. In general, every day fewer buyers are willing to accept the deficient relationship between added-value/price for Mexican wood in exchange for better natural characteristics of wood.

Recommendations

i. Sawmills need to improve their products' added value and service. This means sacrificing current gains to obtain future gains. It is important to abandon the concept that markets are like islands for the blessed, that they only have to be discovered in order to be conquered. Today, remaining in the market, even in the famous market niches, means constant effort for product and service improvement.

ii. Classification systems need to start improving in Mexico. This means working on several fronts at the same time. Furthermore knowledge about potential buyer requirements needs to improve to be able to offer adequate classification. This study concludes that there are an important number of furniture manufacturers that could be interested in lower qualities if they were classified according to industrial classifications or appearance of those of the United States. Furthermore, efforts must be made to establish a system of norms with the function of developing and promoting norms through controls and training. It is necessary to create an appropriate institution and then to address the issue of content and norms. With pine, efforts must be made to establish commercial pine sub-categories that would allow for selling more homogeneous wood as far as color and technical characteristics are concerned. Also in this regard, commercial and institutional questions need to be solved before analyzing technological aspects and defining relevant categories.

iii. It would be useful to establish market information channels for the enterprises. Currently there is no market intelligence service that provides adequate market information to managers.

iv. It will be necessary to gain a betther understanding of the needs of furniture manufacturers because in this segment losses are more painful. Mexican sawmills could have the opportunity to offer "many more customized products" than their foreign competitors if they were more aware of what furniture manufacturers want.

v. Sawmill access to many market segments is only possible through lumberyards. These should be included in any government investment progam.

MARKET BARRIERS

The Mexican government is placing all its bets on the establishment of forest plantations as a strategy to compete against wood coming from other countries. The fact that CFEs can become a competitive sector capable of supplying the domestic forest demand has not been included in the national development agenda. On the contrary, negative defacto regulations sem to restrict natural forest management. This policy is

justified with the argument that it is necessary to keep natural forests as environmental service providers because the Mexican society demands it, an argument that should be understood as political short-sightedness of the Mexican government who does not want to accept that community forest management is the best way to harmonize rural development with forest resource conservation and its environmental values.

The complexity stemming from the institutional barriers that CFEs are facing is mining the community forest development initiatives and communities are abandoning the forest industry. In this very adverse context, few communities will assume the risk to legally constitute as industrial enterprises in order to obtain credit, gain market credibility and adapt to the new fiscal situation. Legally constituting rural enterprises implies addressing communal decentralization processes that affect traditional uses and customs apart from the fact that building community organization agreements addresses social processes that, at best, would take from three to five years.

In summary, the most important task is to work on eliminating the external barriers that limit CFE development. For this, we propose the following actions:

i. Promote and support the design and preparation of a fiscal policy in agreement with the governmental statement that "Woodlands and forests are of public interest and even of national security." The fiscal policy should consider that CFEs with good forest management, should be allowed to show equivalent sales tax investments in forestry, industry and/or social work instead of paying taxes to the State Treasury.

ii. Communities need to evaluate and take part in the design and set-up of PRODEFOR and PROCYMAF so that they will support medium and long-term co-investment projects for forest development such as industrial re-conversion, regional forest roads,[16] accompanying enterprise development process and guaranteeing funds for backing CFE credit.

iii. Promote and establish a financial system with risk capital for the communities that legally constitute themselves as enterprises in order to assume the challenge of confronting the network of intermediaries and the risk of contracting banking credit.

iv. Analyze the feasibility of reducing and simplifying forest administrative procedures, particularly those related to transport and export of forest products. Also, decentralize all those administrative procedures that are carried out in Mexico City, such as in the case of CITES.

v. Communities need to take part in the design of an environmental service payment strategy so that good forest management is recognized as a way to compensate forest owners for absorbing the costs of environmental restrictions that are so prevalent in the use and management of natural forests.

Finally, it is necessary to deepen the understanding and debate of each of the identified barriers and to start promotional actions to design public policies that create favorable institutional environments for CFE development. Then community forest industry will be able to compete on a level playing field with domestic

[16] Construction and maintenance of regional forest roads that go through several communities are something that nobody is responsible for. This presents serious barriers for forest community the development.

or imported wood produced without environmental restrictions. This necessarily implies compensating communities for the the costs generated by environmental restrictions.

REFERENCES

Anonymous. 2003. Riesgo crecimiento sector-mueblero. El Universal (March 28, 2003). ISI Emerging Markets.

Anonymous. 2003. Pega la crisis a proveedores de muebleros. Terra Networks Mexico S.A. de C.V. (June 30, 2003). ISI Emerging Markets.

Anonymous. 2003. Buscan unir esfuerzos muebleros de Ocotlán. Terra Networks Mexico S.A. de C.V. (August 14, 2003). ISI Emerging Markets.

Anonymous. 2003. Carece ocotlán de diseño propio. Terra Networks Mexico S.A. de C.V. (September 3, 2003). ISI Emerging Markets.

Anonymous. 2003. Disminuyen en 12% las ventas al exterior. Terra Networks Mexico S.A. de C.V. (September 8, 2003). ISI Emerging Markets.

Ávila, B. 2002. The market for wood furniture. USAID Report. Draft.

Bray, D. 2004. Mexican community forests achievements and challenges. Ford Foundation. The William and Flora Hewlett Foundation, SEMARNAT, CONAFOR, FIU, CCMSS, Forest Trends, IIS, CIDE. Mexico.

General Congress of the United States of Mexico. 2002. Ley del impuesto sobre la renta. United States of Mexico. Presidency of the Republic. Mexico.

General Congress of the United States of Mexico. 2003. Ley general de desarrollo forestal sustentable. United States of Mexico. Presidency of the Republic. Mexico.

General Congress of the United States of Mexico. 2003. Ley general del equilibrio ecológico y la protección a la vida silvestre. United States of Mexico. Presidency of the Republic. Mexico.

Darling, J. R. 2001. Keys for success in exporting to the US market. Texas Tech University. Lubbock, Texas.

Flores Ricardez, J. H. 1992. Producción forestal y alternativas industriales en la sociedad de pueblos indígenas forestales de Quintana Roo. Thesis for the title of Agricultural Engineer., Chapingo Autonomous University.

Forster, R. et al. 2002. Comunidades forestales y el mercadeo de maderas tropicales poco comerciales de Mesoamérica. Mexico City.

Forster, René, y R. Briceño. 2000. Diagnóstico de las carpinterías del sur de Quintana Roo. Study for the Othon P. Blanco municipality. Draft.

Fuge, P. 1999. World Bank mission to Oaxaca. Draft.

García Peña, E. 2001. Análisis de la información sobre productos forestales madereros en los países de América Latina: México. Document for the European Union project No. GCP/RLA/133/EC. Santiago, Chile.

Howard, J. 2001. U.S. timber production, trade consumption and price statistics 1965 to 1999. U.S Department of Agriculture, Forest Service, Forest Products Laboratory.

INEGI. 2003. Encuesta industrial mensual.

International Tropical Timber Organization. 2003. Tropical timber market report.

INDUFOR y SEMARNAT. 2001. Plan estratégico forestal para México 2025. Mexico City.

Jenkins, M. B., y E. T. Smith. 1999. The business of sustainable forestry. Washington, D.C.

Juárez, B., y G. Hernández. 2002. Mexico solid wood products annual report (part 1, production and trade sections). Mexico.

Lovett, R. Classification of the genus pinus. http://lovett-pinetum.org/classification.htm

Lovett, R. Pine, bark and wood. http://lovett-pinetum.org/barkandwood.htm

Meyer, D., A. Johnson, y G. Barrett. Changing hardwood markets: impacts on production and marketing. http://www.forestprod.org/drying02_meyer.pdf

Molnar, A. 2004. Markets for communities: issues and opportunities for community forest-based enterprises (a two-part panel). USA. Draft.

National Ecology Institute. 2000. Ley general de vida silvestre. SEMARNAP, Mexico.

National Hardwood Lumber Association. 1994. An illustrated guide to hardwood lumber grades. Memphis, Tennessee.

Rafael Pérez, D. D. 2002. El sector industrial forestal de Oaxaca, una alternativa de mercado para la producción maderable. Oaxaca de Juárez, Oax.

Ross, J. 1996. Treasure of the Costa Grande: US timber companies open operations in Mexico. En Sierra, July-August 1996 v81 n4 p22.

Secretary of the Economy. 2001. Official Mexican Norm NOM-056-sct2-2000, Para durmientes de madera.

Segura, G. 1994. Second report of the study "Competitividad internacional de la unión nacional de organizaciones de forestería comunal". Draft.

SEIJAL, CIMEJAL, SEPROE. 2002. Industria mueblera, encuesta de coyuntura del primer semestre de 2002. Draft (results from the industrial survey taken among furniture makers in Jalisco).

Shoch, D., H. Page, S. Charchalac, y S. Paul (sf). Oportunidades para la comercialización de productos forestales provenientes de los bosques manejados por la organización de ejidos productores forestales de la zona Maya. Arlington, Virginia; Cambridge, Massachusetts.

SIAVI. Sistema de información arancelaria via Internet. Web page of the Secretary of the Economy: www.economia-snci.gob.mx

SIEM. Sistema de información empresarial méxicano. Web page of the Secretary of the Economy: www.siem.gob.mx/portalsiem

Sosa, V. 2002. Impacto en el sector forestal de otras políticas sectoriales externas y viceversa: estudio del caso de México con especial referencia al estado de Chihuahua. Forestry Department, FAO. Draft.

Standard & Poor's. 2003. Reporte sectorial: industria de productos forestales en América Latina.

The Wood Explorer. 2002. Información sobre especies maderables. CD.

Toivonen, R., y R. Laurila. 1997. Información sobre las especies arbóreas en el marketing de productos madereros sólidos. Texts from the XI World Forestry Congress, Antalya, Turquía.

White, T (sf). World Bank mission visits to four project-cooperating forested communities, Oaxaca México. Draft.

Web page of the INEGI: www.inegi.gob.mx

Web page of the Mexican Presidency. Government information section: www.presidencia.gob.mx

Web page of the National Forestry Commission: www.conafor.gob.mx

Web page of the Secretary of Property and Public Credit: www.shcp.gob.mx

Web page of the Secretary of the Environment and Natural Resources: www.semarnat.gob.mx

Widman, C. R. 2001. The future of softwood lumber imports into the U.S market. San Juan, Puerto Rico.

INTERVIEWS

Miguel Angel Cobián Gaviño. SEMARNAT Assistant Director of Sanitary Certification. Mexico City.

Adam Oliveras of ITA. CONABIO Office for Liaison and International Matters. Mexico City.

Alfredo Nolasco and Lino Martinez, SEMARNAT Delegation in Quintana Roo.

Esteban Mex. President of Noh Bec SPR, Quintana Roo.

Francisco Montalvo Rebolledo, Noh Bec SPR Marketing Commissioner. Quintana Roo.

Teofilo Ferral. Commercial Commissioner of the Communal Lands Forest Producers Society of Q.Roo, S.C.

Jose Luis Azuara, Forest Product President of South East and Central America SA of CV. Quintana Roo.

Jose Chan General Accountant of the Noh Bec Communal Land, Quintana Roo.

Ambrosio Rodriguez. General Manager of the Nuevo San Juan Forest Enterprise, Parangaricutiro. Michoacán.

Israel Santiago Forest Enterprise Manager of the Commonwealth Town Community. Oaxaca.

Jesus Garcia, Manager of the Communal Land Forest Enterprise, El Balcón. Tecpan de Galeana, Guerrero

Domingo Cauich Ake. President of the Xhazil Communal Land Commissary, Quintana Roo.

Albino Basilio Cruz. San Pedro Tepalcatepec Community, Municipality of San Carlos Yautepec, Oaxaca.

ANNEX 1: LIST OF INTERVIEWEES

Name	Company/Organization	Product	Location
Rafael Sánchez Hernández	Alexander and Mary SA de CV	Furniture	Mexico
José de Jesús Muñoz Chávez	Art Rust Muñoz SA de CV	Furniture	Guadalajara
Ing. Francisco Cosío Jazo	Cámara de la Industria Mueblera del Estado de Jalisco	Industrial Chamber	Guadalajara
Lic. Rafael Franco del Río	Cámara de la Industria Mueblera del Estado de Jalisco	Industrial Chamber	Guadalajara
Elmer Vázquez	Cámara Maderera	Industrial Chamber	Quintana Roo
Alejandro Sánchez Rosales	Cámara Nacional de la Industria Forestal	Industrial Chamber	Guadalajara
Martha Elba Blanco Barajas	Cámara Nacional de la Industria Forestal	Industrial Chamber	Guadalajara
Leopoldo Oliveros	Cámara Nacional de la Industria Maderera	Industrial Chamber	Mexico
Ing. Manuel Guardado González	Cámara Nacional de la Industria Maderera	Industrial Chamber	Guadalajara
Benjamín Baca R.	Carpicentro	Carpentry	México
Waldo Urza Jerez	Centro de Investigación y Asistencia en Tecnología y Diseño del estado de Jalisco, A.C.	Technical Assistance	Guadalajara
Lic. José Hermosillo García	Clásicos SYP SA de CV	Chairs	Tlaquepaque
Fernando Ramírez Rocha	Cocinas Integrales de la Torre SA de CV	Kitchen systems	Guadalajara
Ing. Daniel Fernández Díaz	Colchones Sleepcare	Mattresses	Tlaquepaque
Albino Basilio Cruz	Comunidad San Pedro Tepalcatepec	Sawmill/Forestry Production	Oaxaca
Ing. Rubuán Escalante Fdz.	CONAFOR	Government entity	Guadalajara
Ing. José Antonio Bernal E.	Coresa Muebles	Beds, cribs, office furniture	Tlaquepaque
Gustavo de Jesús Pinot Escobar	Coresa Muebles	Beds, cribs, office furniture	Tlaquepaque
Lic. Lorena Godoy Rodríguez	Creatividad Mueblera 2000 SA de CV	Living rooms and accessories	Mexico
Sr Galdino Cordova	Chicos de Madera SA	Bunks and beds	Guadalajara

Name	Company/Organization	Product	Location
Ing. Victor Díaz Gomez	Díaz Gomez	Consultant	Mexico
Adán Oliveras de Ita	Office for Liason and International Matters, CONABIO	Government entity	Mexico
Francisco Estrella Hoil	Ejido 20 de noviembre	Sawmill/Forestry production	Campeche
Luis Chuc Contreras	Ejido 20 de noviembre	Sawmill/Forestry production	Campeche
Esteban Mex	Ejido Noh Bec President	Sawmill/Forestry production	Quintana Roo
Francisco Montalvo Rebolledo	Ejido Noh Bec Marketing Commissioner	Sawmill/Forestry production	Quintana Roo
José Chan	Ejido Noh Bec General Accountant	Sawmill/Forestry production	Quintana Roo
Domingo Cauich Ake	Ejido Xhazil President	Sawmill/Forestry production	Quintana Roo
Hector Vázquez	El Marco de Oro	Frames and molding	Guadalajara
Francisco Echeverría	Empresa Forestal de Nuevo San Juan Parangaricutiro	Sawmill/Forestry production	Michoacán
Jesús Espinoza	Empresa Forestal de Nuevo San Juan Parangaricutiro	Sawmill/Forestry production	Michoacán
José Espinoza	Empresa Forestal de Nuevo San Juan Parangaricutiro	Sawmill/Forestry production	Michoacán
Ambrosio Rodríguez	Empresa Forestal de Nuevo San Juan Parangaricutiro General Manager	Sawmill/Forestry production	Michoacán
José de Jesús García G.	Empresa Forestal del Ejido El Balcón Manager	Sawmill/Forestry production	Tecpan de Galeana, Guerrero
Miguel Ángel Mejía Maldonado	Equipales Evelyn´s Artesanías	Mexican furniture	Guadalajara
Lic. Elsa Nuñez M.	Export Art Industrial SA	Furniture	Mexico
Guadalupe Toledo	Gar-Cocinas	Kitchen systems	Guadalajara
Reinaldo Paz Pablo	Grupo Tandemex SA	Doors and office furniture	Mexico City
María Eugenia García	Industrializadora de Maderas la	Carpentry	Mexico City

Name	Company/Organization	Product	Location
	Michoacana		
L.N.I. Humberto Castellanos	Industrias Munher SA de CV	Furniture	Tlaquepaque
LAF José A. Puente Cárdenas	Internacional Maderera y Triplayera	Carpentry	Guadalajara
Pedro Mendoza	La Asunción, Ferretería y Maderería	Carpentry	Oaxaca
Fco. Javier Sánchez Romero	La Cuna Encantada	Bedroom furniture	Mexico
Lic. Manuel Villalvazo	La Tapatía Maderas y Complementos	Carpentry	Guadalajara
Lic. Ener Eduardo Su Su	MACOPISA	Carpentry	Guadalajara
Leticia Partínez	Macosa Maderería	Carpentry	Oaxaca
Miguel A. Martínez Luna	Macosa Maderería	Carpentry	Oaxaca
Conrado Saucedo Calderon	Maderas El Sauce	Rustic furniture and molding	Mexico
Guillermo Rivera González	Maderas Procesadas de Occidente	Furniture	Tlaquepaque
Rodolfo Quiroz Arenaza	Maderería El bosque de Oaxaca SA de CV	Carpentry	Oaxaca
Pedro Perez Mendoza	Maderería San Lorenzo	Carpentry	Quintana Roo
José Gutiérrez	Maderería Xhito	Carpentry	Mexico State (Naucalpan)
Evangelina Reyes A.	Marcos y Novedades	Frames and molding	Tlaquepaque
Jesús Laureano C.	Moblar	Furniture	Guadalajara
Rigoberto Ramírez	Muebles Placencia	Furniture	Guadalajara
Ana Perez Rodríguez	Nómada	Furniture enterprise	
Dr. Gerardo Segura	PROCYMAF	Government entity	Mexico City
Ing. Juan Manuel Barrera	PROCYMAF	Government entity	Mexico City
Lic. Juan Rodríguez	PROCYMAF	Government entity	Mexico City
Ing. Ricardo Ramírez D.	PROCYMAF Oaxaca	Government entity	Oaxaca

Name	Company/Organization	Product	Location
Lic. José Luis Azuara	Productos Forestales del Sureste y Centroamérica SA de CV Forest Product President	Sawmill enterprise	Chetumal
Israel Santiago García	Pueblos Mancomunados Forest Enterprise Manager	Sawmill/Forestry Production	Oaxaca
Adolfo Riesenhuber	Riesenmobel	Furniture	Mexico
President	San Andrés Cabecera Nueva	timber	Oaxaca
Miguel Angel Cobián Gaviño	SEMARNAT Assistant Director of Sanitary Certification	Government entity	Mexico City
Biol. Esteban García	SEMARNAT/ Forest Statistics	Government entity	Mexico City
Ing. Alfredo Nolasco	SEMARNAT/ Delegation in Quintana Roo	Government entity	Quintana Roo
Ing. Lino Martínez	SEMARNAT/ Delegation in Quintana Roo	Government entity	Quintana Roo
Alberto Villaseñor	Servicios Técnicos Forestales	Technical assistance	Campeche
Teofilo Ferral	SPFEQROO; Communal Lands Forest Producers Society of Quintana Roo Commercial Commissioner	Technical assistance	Quintana Roo
Juan Carlos Martínez Mejía	Tarimas y maderas El Fénix	Platform production and carpentry	México
Ing. David Rafael Pérez	Unión de Productores e Industriales Forestales A.C.	Sawmill	Oaxaca

ANNEX 2: METHODOLOGY

From the methodological point of view, the following study can be seen as an exploratory investigation based on an intensive study of secondary sources, visits to companies and more than 60 qualitative interviews. The study takes its heed from Raymond Chambers' "Rapid Rural Appraisal" which proposes diverse techniques to elaborate diagnostics in situations where there is little formalized information. In sight of the diverse gaps of information that had to be closed to obtain an integral vision of the sawn wood market , representatives of diverse organizations and companies were interviewed. The interview followed flexible approaches with little structure since it was obvious that it was impossible to obtain an adequate sample of a quantitative evaluation of the results. Instead of this, a structured expert consensus was used in which the interviewed were treated as experts in their field. As a base for the initial interviews, a hypothesis over the market's characteristics was drafted and made available to some of the interviewed for their comments and their possible modification. In a second round researchers sought to close remaining gaps and open for discussion the preliminary conclusions.

The results were also presented in two workshops, one in Oaxaca City, Oaxaca and the other in Chetumal, Quintana Roo. Participants included, representatives from forests communities, government institutions, non-governmental institutions, forest technicians, wood companies, chamber representatives and research institutions, achieving a turn out rate of more than 80 people in Oaxaca and 50 people in Chetumal. The participants discussed the results of the study, providing feedback and identified "loose ends". Based on this second feedback the text was revised to include the complementary information.

The estimates used for this study, have mainly come from official available information; always emphasizing the explicit limitations or implicit biases of such data. The estimated volumes of production for each segment can only be seen as a preliminary attempt to calculate real volumes, which will have to be determined through a wider study. In this case, estimates are based on extrapolated figures, which means that the federal statistical institute's (INECH) market segment data has not been extrapolated in a linear fashion to match the declared volumes by the environmental ministry (SEMARNAT), instead we have assigned an extrapolation coefficient derived from an estimate on the foci of INEGI's data. This study in principle considers only the enterprises that meet the following characteristics:

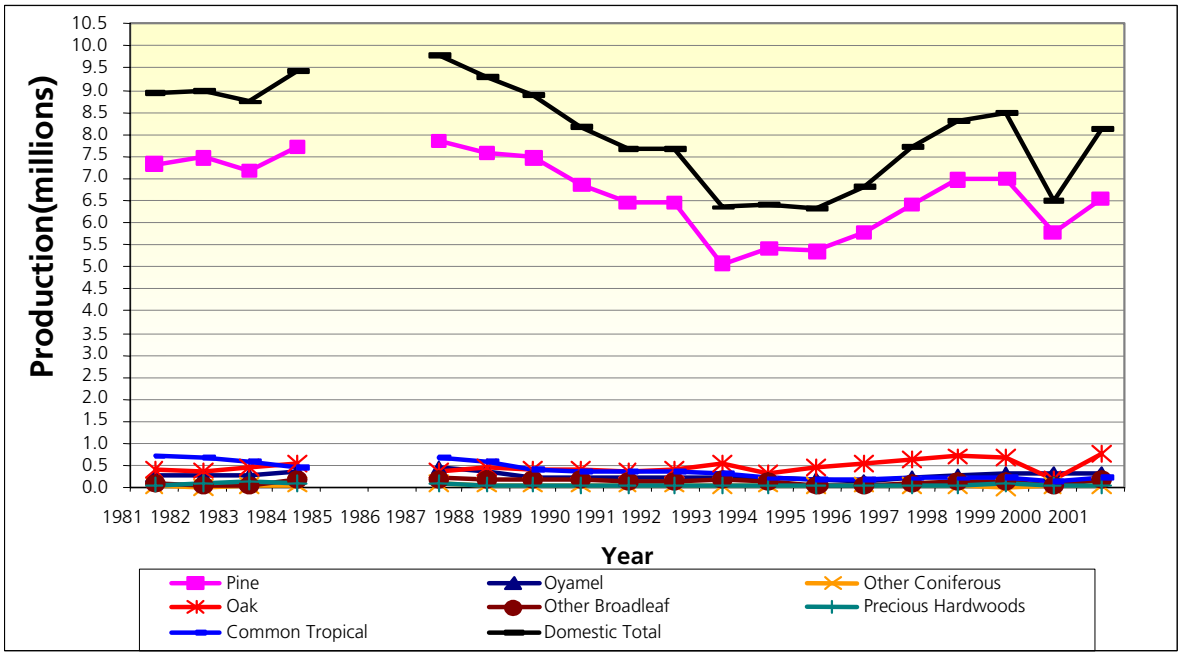
- More than 50 people employed
- Annual income above or equal to one million 600 thousand Pesos
- Be part of a company

Given the selection criteria used, the result is the underestimation of segments with a high parentage of small and informal enterprises. Certain sectors, like construction leads to substantial undercounting of consumed volumes of wood. In particular it is estimated that in the construction sector, the actual volume consumed is well above the declared volume. In this case, we had additional difficulties measuring the amount of wood consumed since sawn wood consumption is declared in monetary terms instead of volume. Thus, we had to develop an average price , based on the average price paid for coniferous sawn wood for generic industrial use. Subsequently, a coefficient of extrapolation of 4.5, derived from the relation of the workers employed in companies affiliated with the CNIC, which is where forest based enterprises are most likely to be registered

under the industrial census of 1998, along with the registered workers in the sector (the relation is approximately 3.5) and from a supplementary point to consider companies not considered in any series. In the other segments similar points were considered. In the case of the woodshops, a process of consolidation was used based on an unpublished study by the University of Quintana Roo, which is described in the following chapter (Forester 2000).

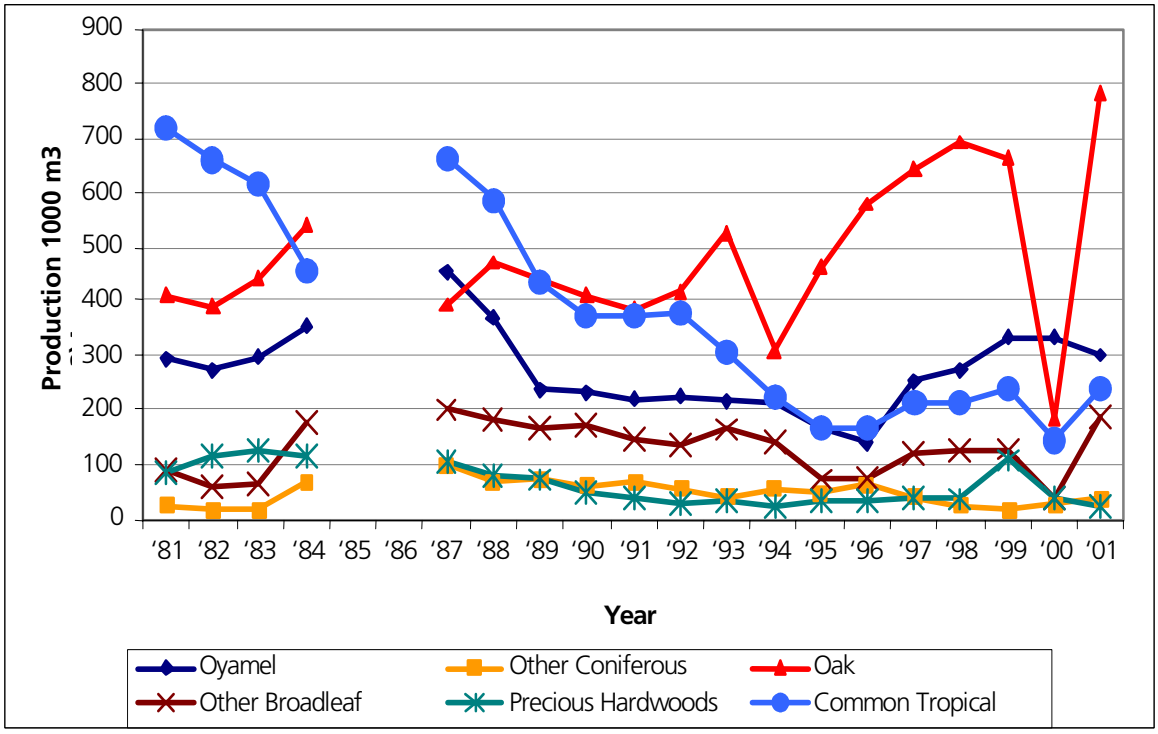
ANNEX 3: TIMBER PRODUCTION STATISTICS

Figure A3/1a: Timber Production per Species [m^3r]



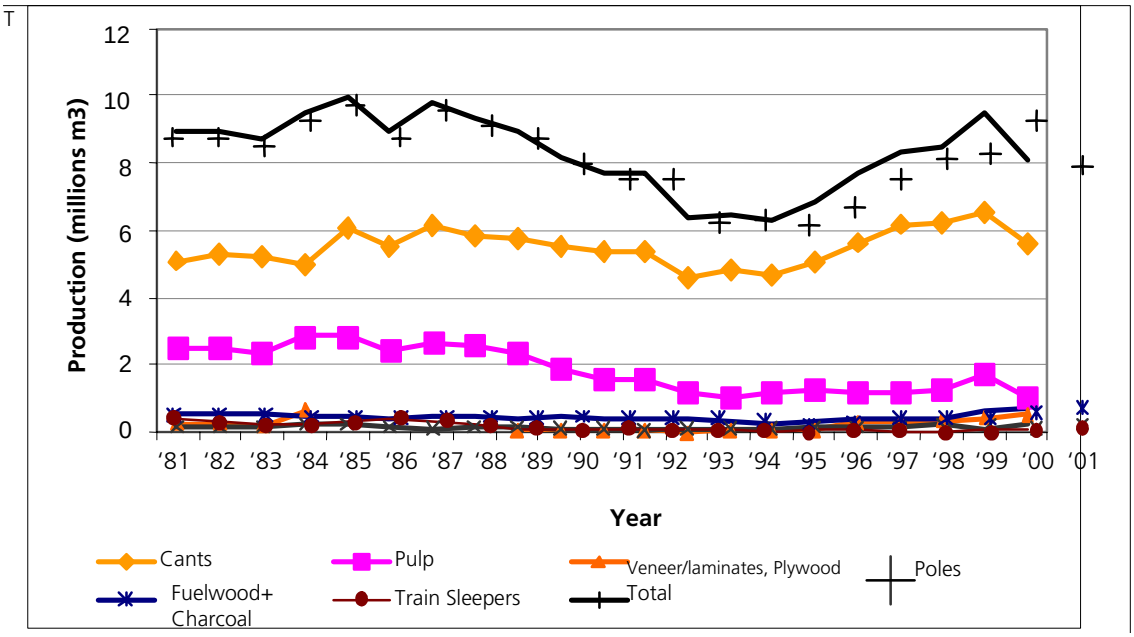
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/1b: Timber Production for Species Groups less Harvested [m^3r]



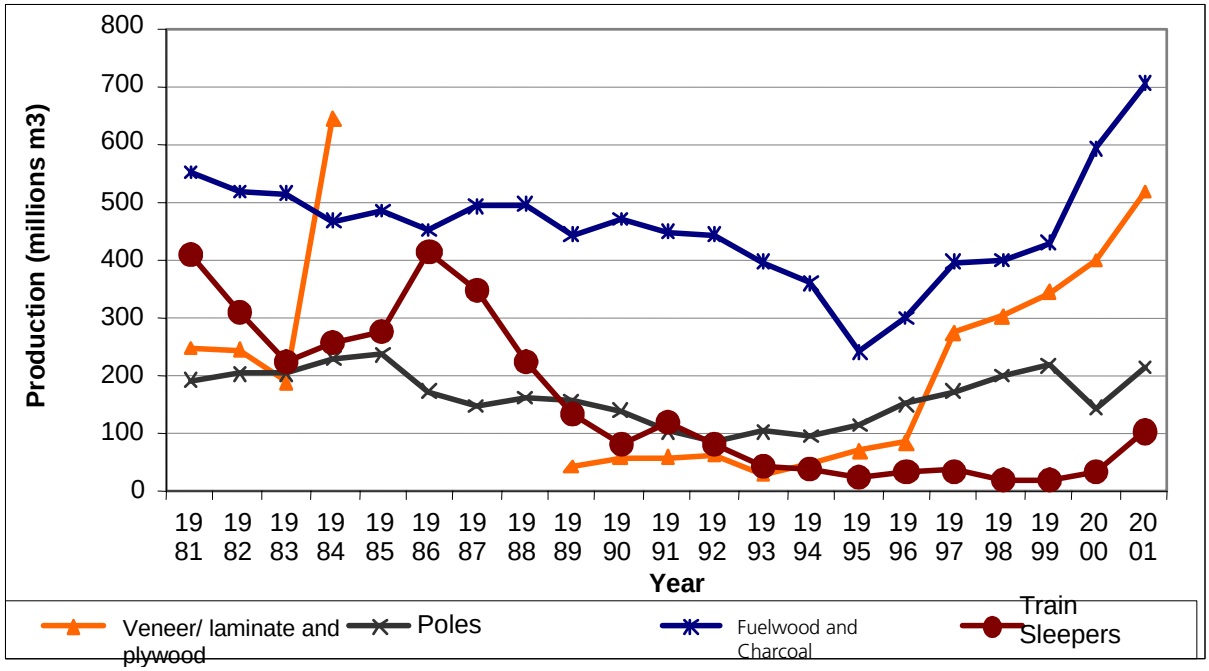
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/2a: Timber Production per Product Type [m³r]



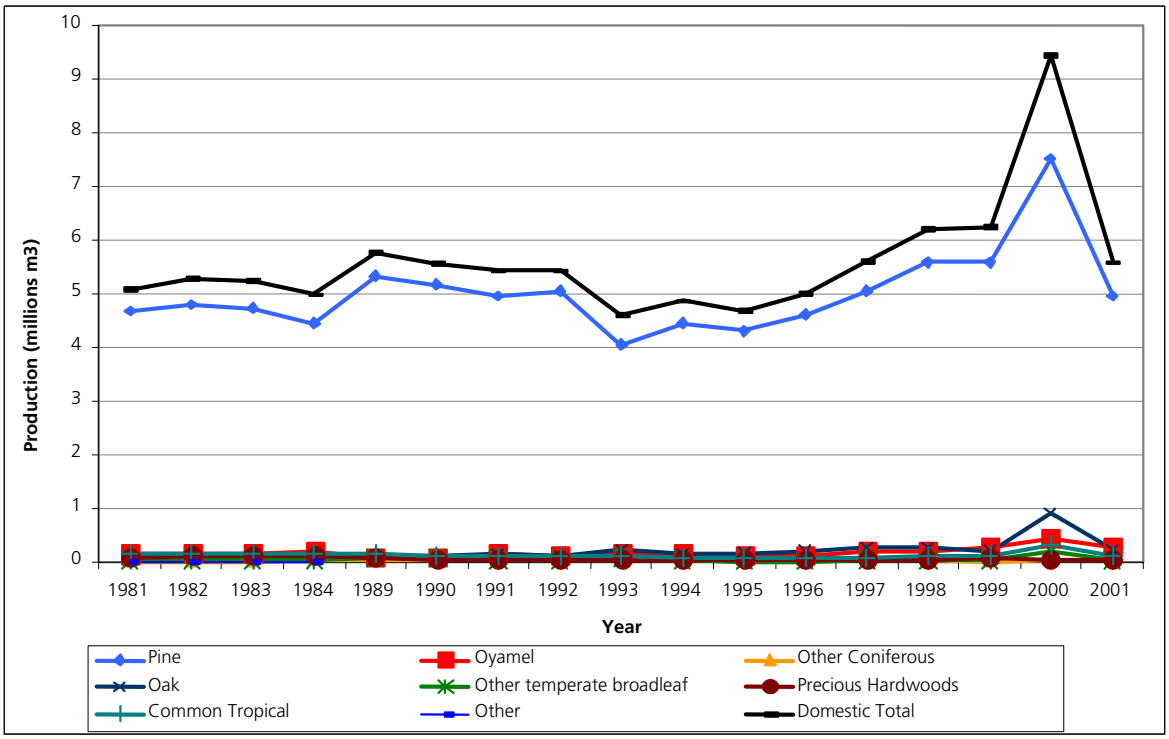
Note: The values for laminates from 1985-1988 include plywood and veneer
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/2b: Timber Production by Lesser Produced Products [m³r]



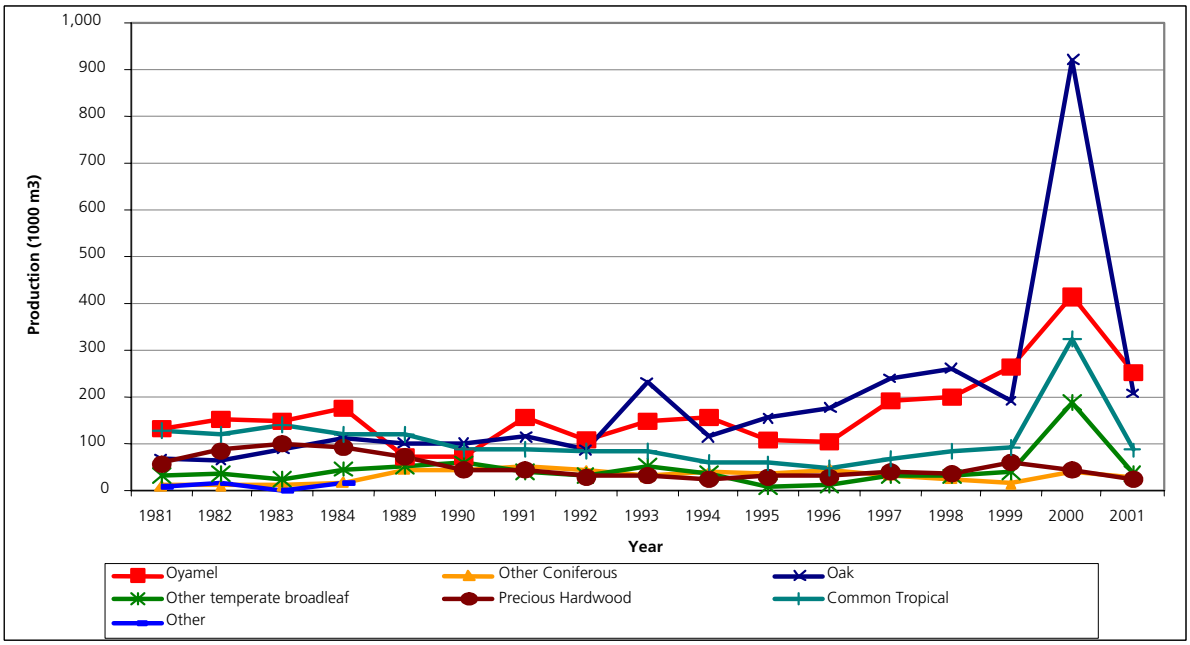
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/3a: Sawnwood Production by Species Group [m^3r]



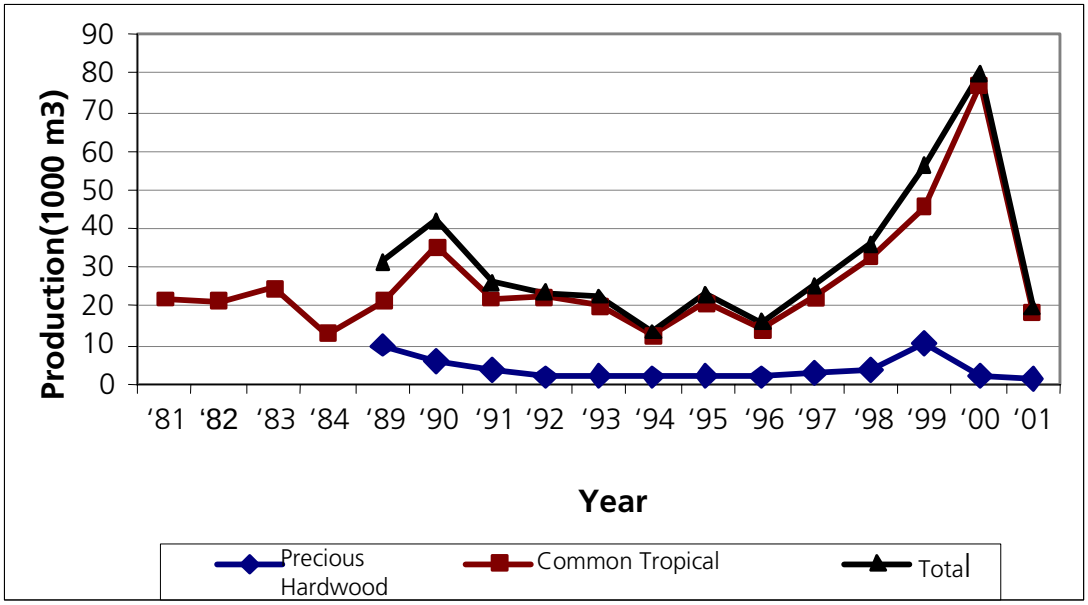
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/3b: Sawnwood Production by Lesser Produced Species [m^3r]



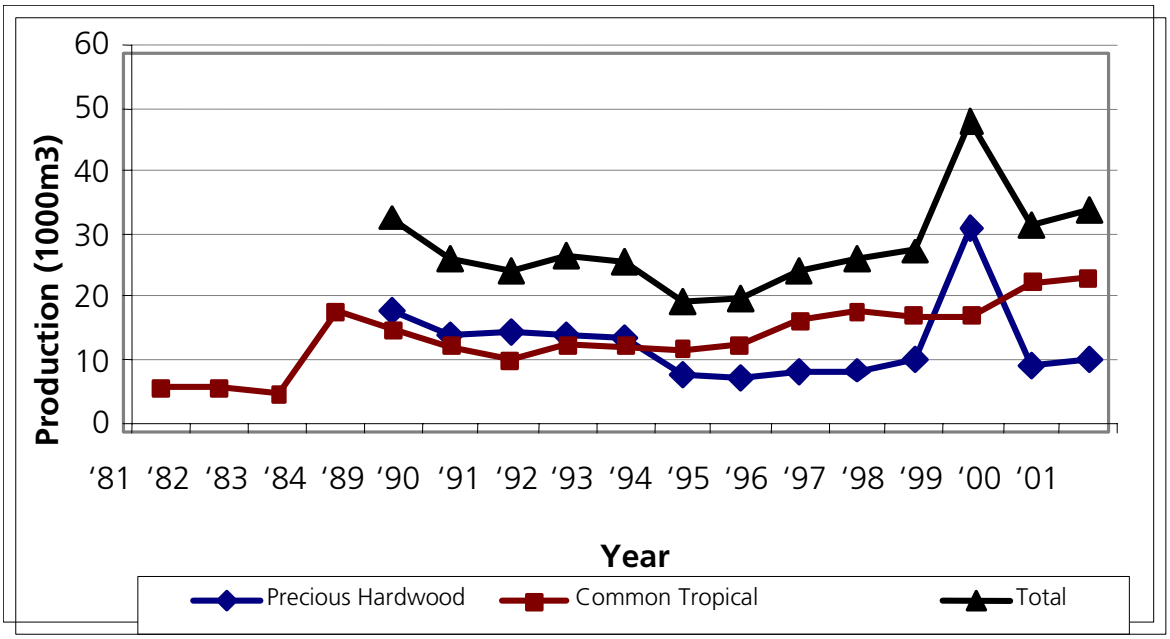
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/4a: Sawnwood Production by Species Group in the State of Campeche [m³r]



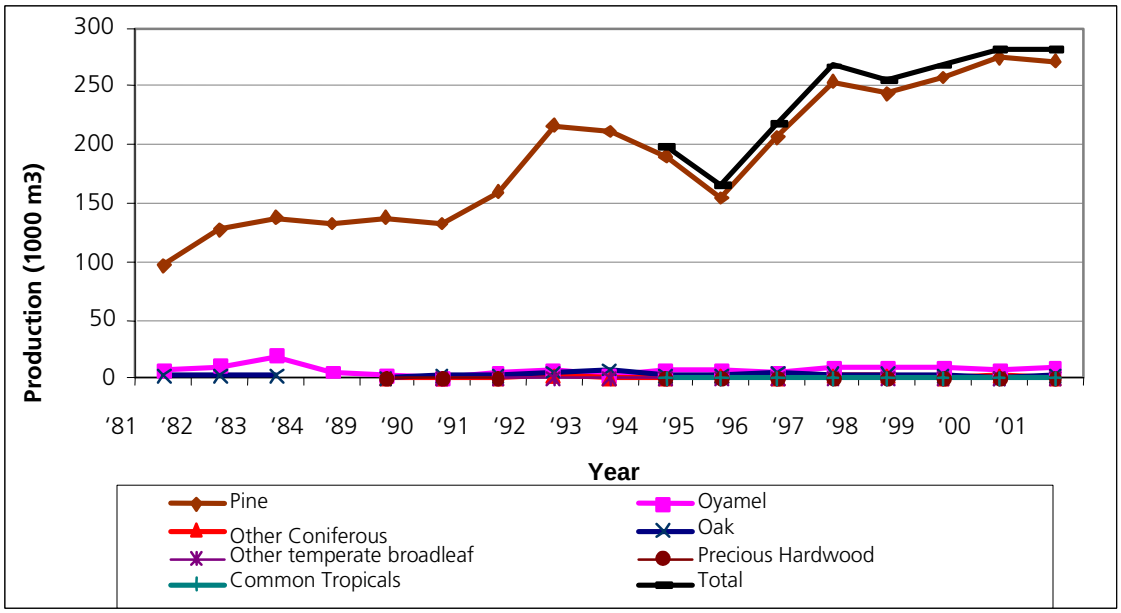
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/4b: Sawnwood Production by Species Groups in the State of Quintana Roo [m³r]



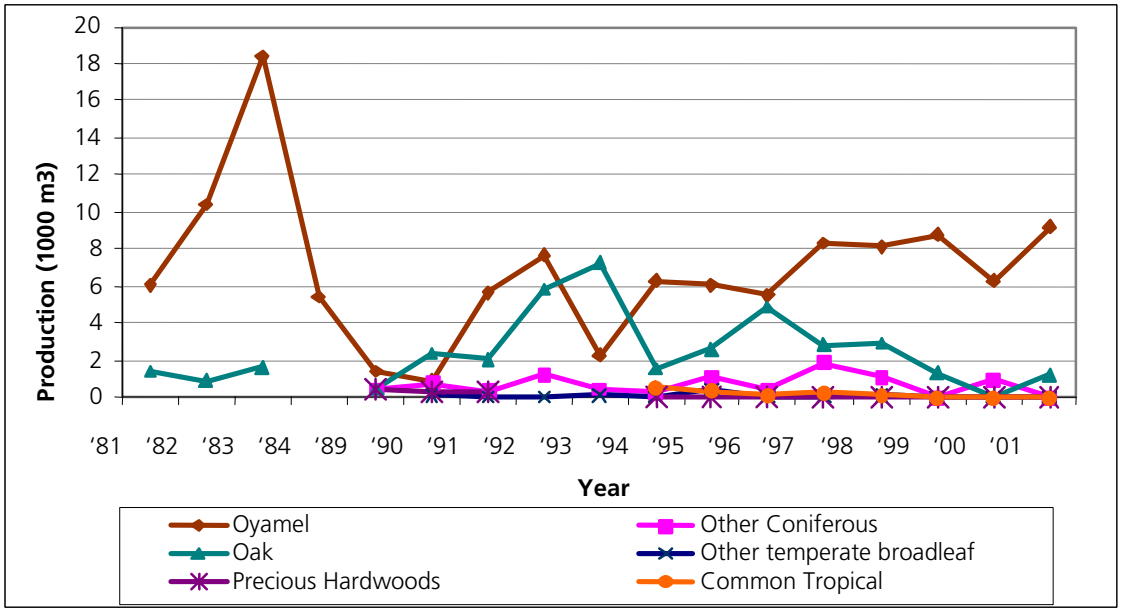
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/5a: Sawnwood Production by Species Group in the State of Guerrero [m³r]



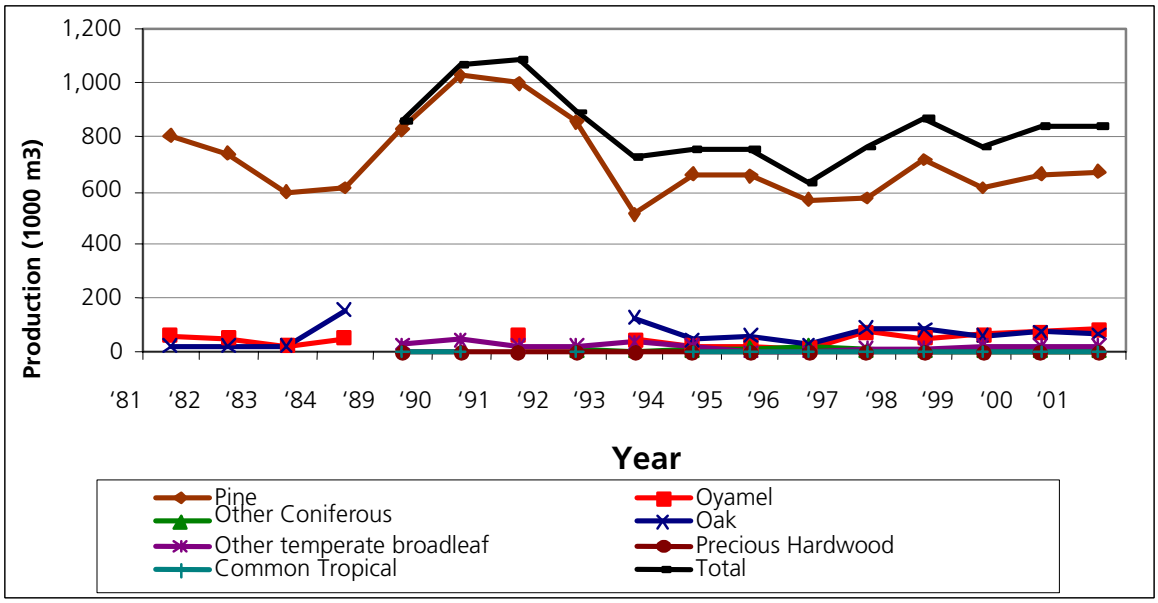
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/5b: Sawnwood Production by Lesser Used Species Groups in Guerrero [m³r]



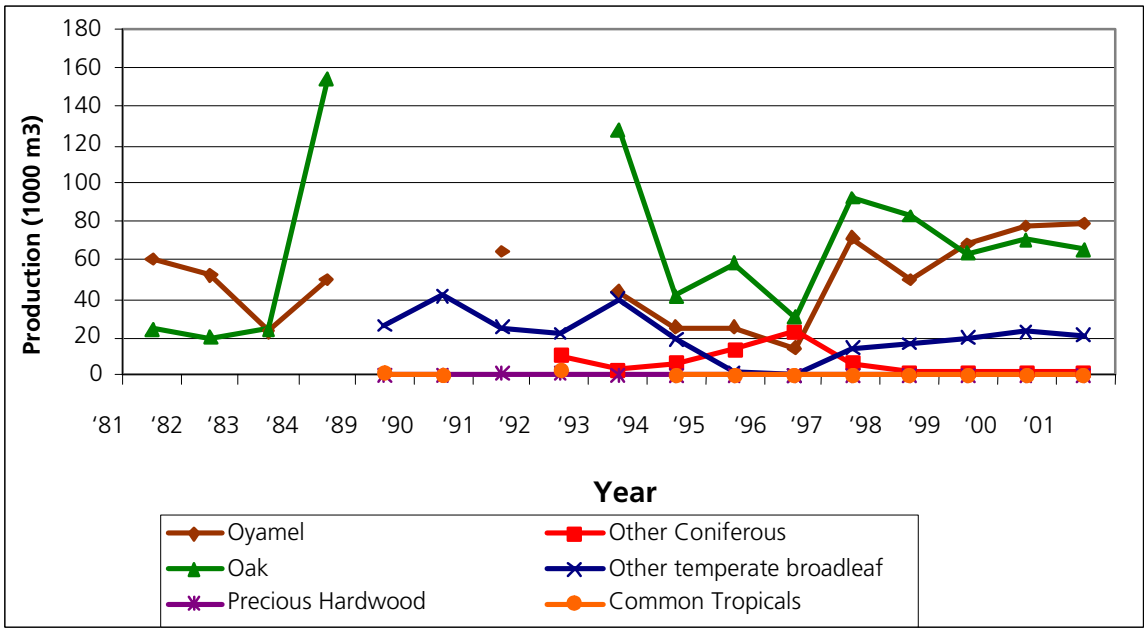
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/6a: Sawnwood Production by Species Groups in the State of Michoacán [m³r]



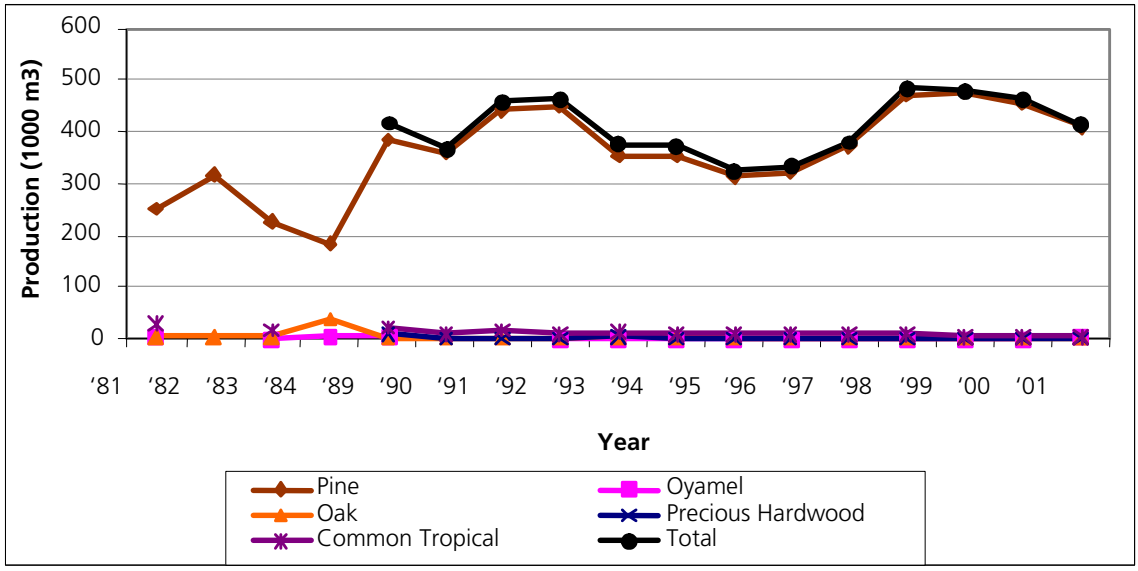
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/6b: Sawnwood Production by Lesser Used Species Groups in Michoacán [m³r]



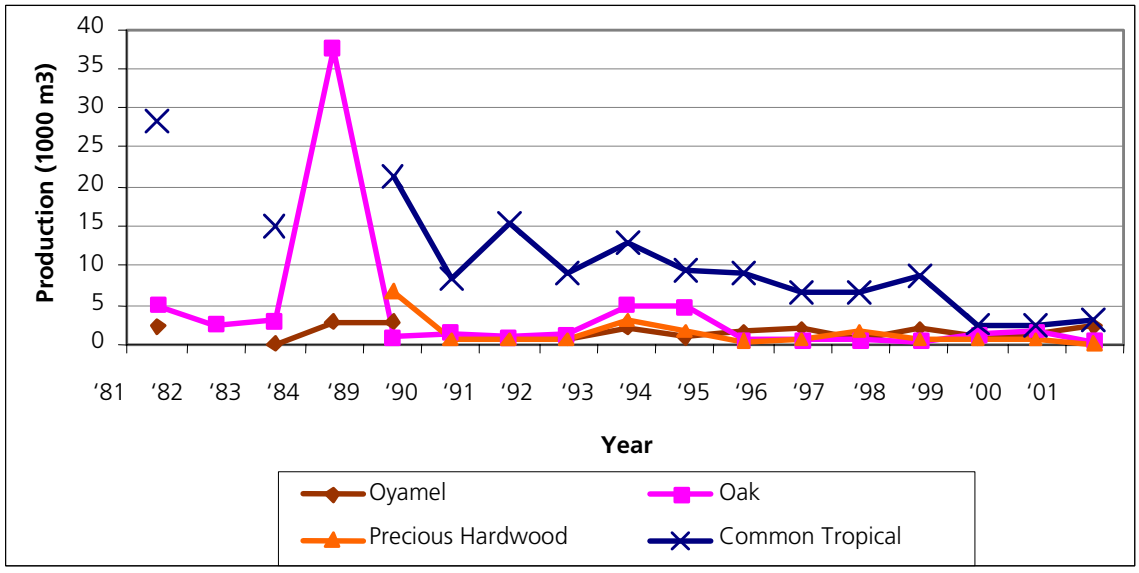
Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/7a: Sawnwood Production by Species Groups in the State of Oaxaca [m³r]



Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

Figure A3/7b: Sawnwood Production by Lesser Used Species Groups in Oaxaca [m³r]



Source: Dirección General de Política Forestal, SARH, SEMARNAP, SEMARNAT (1981- 2001).

ANNEX 4: IMPORT AND EXPORT STATISTICS

Figure A4/1a: Sawnwood Import per Fraction [Thousands of US Dollars]

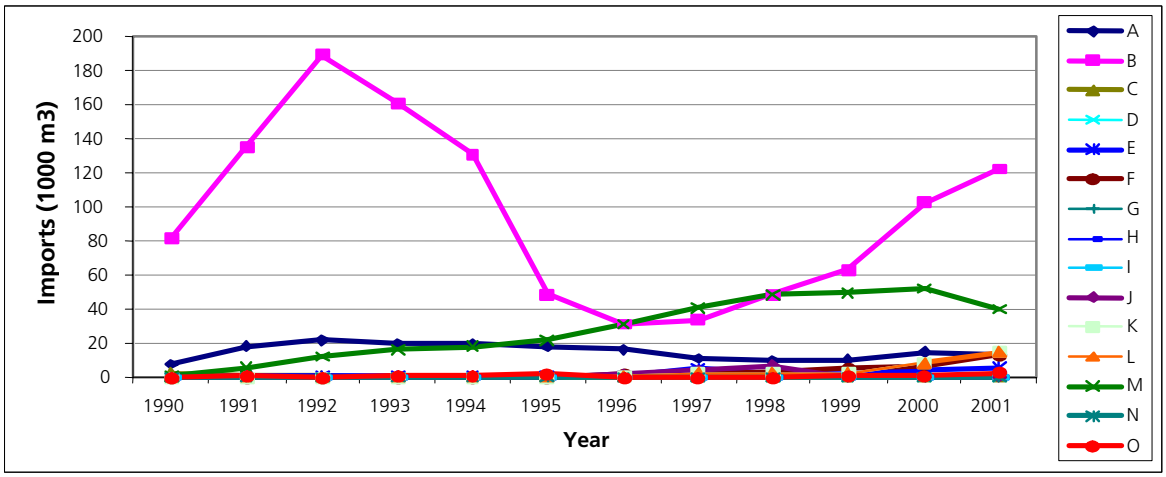


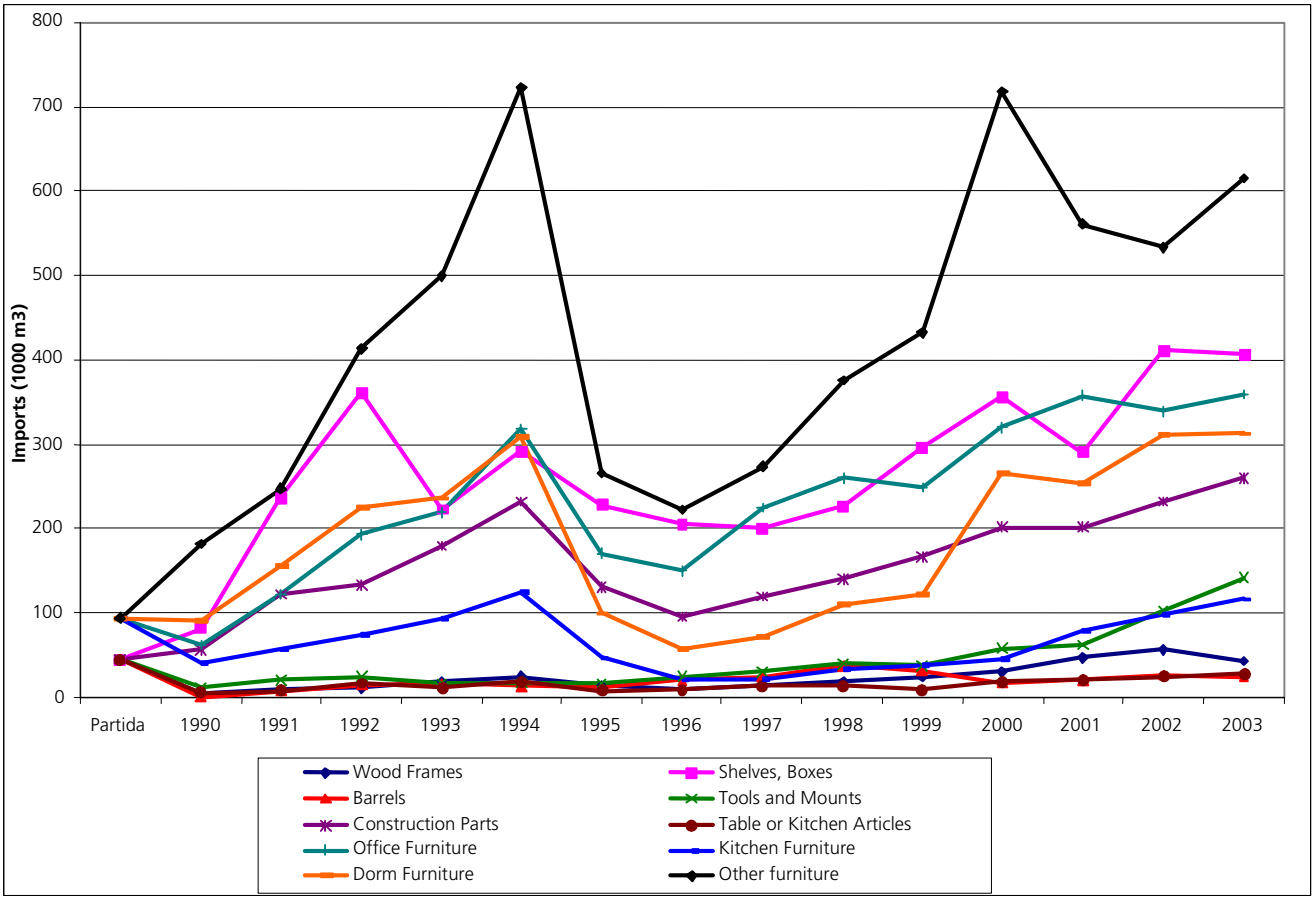
Figure A4/1b: Sawnwood Imports of Less Common Species per Fraction [Thousands of US Dollars]

Description of the Fractions

A a E - 440710: Coniferous sawnwood **A –** 44071001. Ocote or pinabete pine, or fir (oyamel) in tables, planks or beams **B -** 44071002: On tables, planks or beams, except that understood in the fraction 4407.10.01 **C -** 44071003: Slats of a width that do not exceed 10 cm in longitude less than or equal to 20 cm, for the fabrication of pencils **D -** 44071004: Planks of a width of ess than 10 cm in longitude ≤ 70 cm, of Western Red Cedar	**E -** 44071099: The rest **F y G -** 440724: Ferrule Sawnwood, Mahogany, Imbuya and Balsa wood. **F -** 44072401: On tables, planks or beams **G -** 44072499: The rest **H -** 44072501: Dark Red Meranti, Light Red Meranti y Meranti Bakau **I -** 44072601: White Lauan, White Meranti, White Seraya, Yellow Meranti and Alan **J -** 44072901: Diverse African and Asian Woods	**K -** 44072903: From Swietenia macrophylla, Royal Cedar or Spanish Cedar, sawn or in unrolled pages **L -** 44072999: The rest **M –** 44079101: From oaks (Quercus spp.), live oaks included. **N -** 44079201: When none of their sides exceed 18 cm and the longitude is equal to or superior to 18 cm, without exceeding 1 m	**O -** 44079299: The others (the rest?) spp., Liriodendron tulipifera, birch spp., Carya spp., Carya, illinoensis, carya pecan and walnut spp. 44079999: The rest

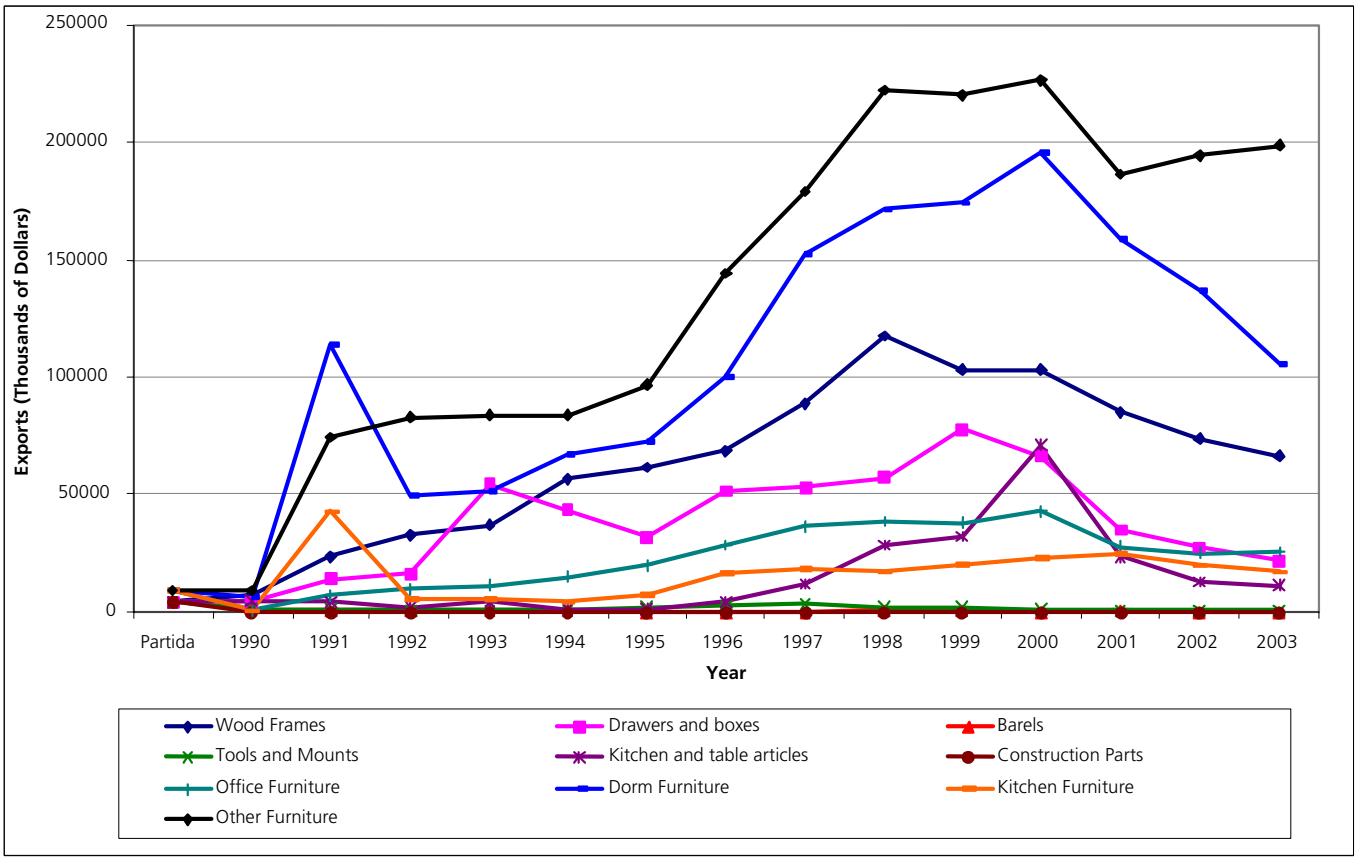
Source: SIAVI (2004).

Figure A4/2: Secondary Product Imports [Thousands of US Dollars]



Source: SLAVI (2004).

Figure A4/3: Secondary Product Exports [Thousands of Dollars]



Source: SIAVI (2004).