



**TOGETHER**  
*for a sustainable future*

## OCCASION

This publication has been made available to the public on the occasion of the 50<sup>th</sup> anniversary of the United Nations Industrial Development Organisation.



**TOGETHER**  
*for a sustainable future*

## DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

## FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

## CONTACT

Please contact [publications@unido.org](mailto:publications@unido.org) for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at [www.unido.org](http://www.unido.org)

20602

Distr.  
RESTRICTED

FMD/R.4  
4 March 1994

UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

*i, 27p.  
table*

AN ASSESSMENT OF PRECONDITIONS FOR INTEGRATED PROGRAMME  
DEVELOPMENT IN THE WOODEN FURNITURE INDUSTRIAL SYSTEM  
IN ECUADOR

XP/GL0/93/096

Technical report: Exploratory mission\*

Backstopping Officer: A. Nolan  
Funds Mobilization Division

---

\*This document has not been edited.

V.94 21471

Table of Contents

|  | <u>Page</u> |
|--|-------------|
| 1. Introduction  | 1           |
| 2. Raw Materials   | 2           |
| 3. Structure and Status of Woodworking Industries            | 4           |
| 3.1 Procurement and Use of Raw Materials                     | 4           |
| 3.2 The Location and Scale of Wood Processing Industries     | 6           |
| 3.3 Furniture Production                                     | 8           |
| 3.4 Paper Production   | 10          |
| 3.5 Employment in Wood Processing Industries                 | 10          |
| 3.6 Size and Growth of the Domestic Market for Wood Products | 11          |
| 3.7 Distribution of Wood Products                            | 11          |
| 3.8 Trade in Wood Products                                   | 13          |
| 3.9 Product Quality  | 14          |
| 4. Industrial Inputs   | 15          |
| 4.1 Woodworking Machinery                                    | 15          |
| 4.2 Other Industrial Inputs                                  | 15          |
| 5. Institutional Context                                     | 16          |
| 6. Problems and Constraints                                  | 18          |
| 7. Conclusions   | 24          |

Tables

|  |    |
|--|----|
| Table 1. Production of Key Wood Products by Firms of Different Scale 1992/93                       | 8  |
| Table 2. Employment in Different Wood Processing Activities 1992/93                                | 10 |
| Table 3. Size and Growth of Wood Products Output and the Domestic Market for Wood Products 1992/93 | 12 |
| Table 4. Imports and Exports of Key Wood Products 1982 and 1992                                    | 14 |

Annex

|                                    |    |
|------------------------------------|----|
| Annex 1. List of Persons Contacted | 26 |
|------------------------------------|----|

## 1. Introduction

The programme concept "Integrated Development Programme for the Wooden Furniture Industrial System" was developed jointly by UNIDO's Integrated Programme Support Unit and the Agro-based Industries Branch. The concept was endorsed by the Programme and Project Review Committee on the 27th of May 1993.

The programme concept proposed the development of an integrated package of technical assistance proposals, identified investment opportunities and policy analysis for the wooden furniture industry in selected countries. Such a programme would be based on a comprehensive analysis of the constraints affecting key linkages to wooden furniture manufacture and the manufacturing process itself. Analysis would thus cover issues ranging from the extraction and supply of wood, sawnwood, and other processed wood products, through to the supply of inputs from other subsectors of industry, the various stages of furniture manufacture and marketing of final products. The objective of an integrated programme would be to maximize the impact of assistance resources and achieve sustained development of the subsector. The programme concept also outlined the particular technical, ecological and social advantages to undertaking programme development in this industry.

Six countries were pre-selected as possessing good conditions for the development of such a programme. This selection was made using several criteria, including the availability of wood resources, government priorities, the investment climate and potential donor interest. Ecuador was one of the six pre-selected countries. Under the project XP/GLO/93/096, short missions were then undertaken to the pre-selected countries. The missions aimed to make a fuller assessment of whether the conditions required for an integrated programme were present, to confirm government and private sector interest in and commitment to the development of the subsector, to make a summary of the key constraints affecting the subsector and to establish initial contacts. The mission to Ecuador was carried out by the backstopping officer, from the Integrated Programme Support Unit, and Mr. Juan Arteaga, a consultant in wood processing. The mission visited Ecuador from the 2nd to the 12th of December 1993.

The mission met with furniture manufacturers associations representing all scales of production. The mission also visited plants and discussed the need for an integrated programme with numerous individual furniture manufacturers, as well as with the Ministry of Industry, academic bodies, staff of FAO and the Inter American Development Bank, and other relevant institutions.

Representatives of all of the main public and private sector agents active in this industry were approached and the mission is confident that the information presented below accurately reflects the current status of the industry and the conditions for programme development. Furthermore, the mission benefited from considerable analytic work on wood processing recently completed by the Instituto Ecuatoriano Forestal y de Areas Naturales y Vida Silvestre (INEFAN).

The mission concluded that conditions conducive to the successful development and implementation of an integrated programme exist at present, and that important industrial, social and ecological advances could be made through such a programme.

## 2. Raw Materials

The present area of natural forest is estimated to be 11.5 million ha, or some 40% of the national territory. 42% of the natural forest lies in the Amazon basin, 13% is found on the pacific ocean coast and 7% occurs in the Andean highlands (the Sierra). Ecuador's forest area is divided into four classifications: (1) State forest; (2) private forest; (3) protected forest, and (4) special and experimental forest. State and private forests account for some 70% of total forest area. Around one third of the natural forest has "protected zone" status, although the mission was informed that protection is often poorly enforced.

Due to its diverse microclimates and topography Ecuador possesses a wide variety of forest types, including swamp formations, rainforests in the northwest, dry forests on the central and southern coast, and sub-Andean coniferous forest.

Natural forest provides almost 90% of the wood consumed in Ecuador, or about 8.5 million m<sup>3</sup>, which when added to the 1.2 million m<sup>3</sup> produced by plantations, makes up the almost 9.7 million m<sup>3</sup> used nationally each year. Of this total, some 6 million m<sup>3</sup> is used as firewood. A recent study of the forest products industry by INEFAN estimated a current commercial wood stock of at least 510 million m<sup>3</sup><sup>1</sup>. According to INEFAN, the annual rate of loss of forest between 1962 and 1985 was 140,000 ha.. Government development plans estimate current annual loss of forest area at around 195,000 ha..<sup>2</sup> Deforestation has accentuated soil erosion, particularly in the Sierra.

The actual area of productive natural forest is approximately 6.6 million ha., of which some 3.5 million ha. is accessible given the existing infrastructure. According to INEFAN, the natural forests have the capacity to supply almost 4 million m<sup>3</sup> of wood annually for industrial purposes (of different species, dimensions and quality).

Some 3.75 million m<sup>3</sup> of wood are used annually by industry, of which 2.8 million m<sup>3</sup> comes from natural forest. Some 1.7 million m<sup>3</sup> of the wood used by industry originates in the northwest of the country, mainly in the region known as Esmeraldas. The Esmeraldas forest suffers significant over exploitation, with INEFAN estimating its sustainable annual production to be only 900,000 m<sup>3</sup>. Wood from the Esmeraldas region supplies much of the large markets in the cities of Guayaquil, Quito, Ambato and Cuenca.

About a third of the wood used by industry comes from the Amazon region, a figure which will rise if measures to reverse deforestation elsewhere are not put into effect. However, increased felling of the Amazon forest is largely a consequence of migration to this region, with most of the felled wood being burnt. Migration is made possible by the presence of roads opened by oil companies.

---

<sup>1</sup> "Estrategias Para la Industria Sostenida de la Madera en el Ecuador", Informe Final, INEFAN, July 1993 , p.14.

<sup>2</sup> Agenda Para el Desarrollo. Plan de Accion del Gobierno Nacional 1993-1996, Consejo Nacional de Desarrollo, p.40.

## Plantations

The area of forest plantation is around 78,000 ha, consisting mainly of eucalyptus and pine. These plantations are scattered over some 6,000 sites. Wood from plantations accounts for all log exports and a large part of sawnwood exports. INEFAN considers the present production of wood from plantations to be at its sustainable maximum. The mission was informed that plantation wood is not of high quality and that the management of plantations could be improved. Plantation wood from coniferous species, particularly cypress, is beginning to be used by the furniture industry.

In 1993 the Government created the Plan Nacional de Fomento de Plantaciones Forestales (PLANFOR). Under this scheme the State reimburses 75% of the costs of forestation to those engaged in replanting. The objective of PLANFOR is to reforest 600,000 ha. of land over the next 20 years.

### 3. Structure and Status of Woodworking Industries

#### 3.1 Procurement and Use of Raw Materials

Most tree felling occurs in natural forests, an operation undertaken largely by independent and untrained chainsaw operators. Much of the production of sawnwood is also the work of chainsaw operators, whose products are usually of irregular sizes and undried. There are around 10,000 chainsaw operators nationwide. The chainsaw operators do not replant. This wasteful method of harvesting is the key structural problem affecting Ecuador's forest-based industries. A large number of small sawmills also produce sawnwood using circular saws, a technique which creates great loss of raw material.

The price of sawnwood sold by chainsaw operators at the roadside is around US\$ 28 equivalent, while the final price paid by consumers of sawnwood at lumber yards is some US\$ 91.<sup>3</sup> In the chain of operations from felling to final sale of sawnwood the largest returns are had by intermediaries. These intermediaries sometimes transport wood to lumber yards and sometimes sell the wood to transporters. Like the chainsaw operators, the intermediaries usually

---

<sup>3</sup> INEFAN, July 1993, p.64.

work informally, and are untaxed. This arrangement provides considerable cost advantages by comparison with a formal harvest and collection system requiring sizeable investment on the part of sawmills, a fact which in part explains the persistence of this highly wasteful method of extraction. However, it is not clear that such cost advantages will continue, as, due to deforestation, the sites of extraction are becoming ever more distant from the points of processing. The additional costs this implies may make investment in managed forest areas a viable option for sawmills or other investors.

The extent of use of wood from chainsaw operators is considerable. Amongst plywood producers 33% procure directly from chainsaw operators, as do 50% of composite board manufacturers, 10% of furniture makers and 40% of the producers of construction materials.<sup>4</sup> Around three quarters of the wood used in industry comes from natural forest.

Small- and medium-scale firms use some 130 wood species in all, with the most widely used varieties being laurel, eucalyptus and cedar. In the small- and medium-scale firms wood is consumed mostly in the form of planks and boards. The larger firms use some 36 species.<sup>5</sup> Amongst larger firms, furniture makers and producers of construction materials make use of the widest variety of species. Half or more of the furniture manufacturers make use of anise (*Dacryodes cupularis*), capirona (*Capirona sp.*), and laurel (*Cordia alliodora*). Much use is also made of sande (*Brosimum utili*), copal (*Dacryodes peruviana*), teak (*Tectona grandis*), colorado (*Chrysocamys sp.*, *Pouteria sp.*), chanul (*Humiriastrum procerum*) and cedar (*Cedrela sp.*). Manufacturers of composite boards use pine and eucalyptus only.

Amongst woodworking industries, furniture makers use the widest variety of wood product types and specifications, including boards, staves, veneers, plywood and composite boards.

Medium- to large-scale furniture makers use the following volumes of processed wood inputs a year: Sawnwood (46,322 m<sup>3</sup>); plywood (70,000 m<sup>3</sup>), veneers (23,000 m<sup>3</sup>). Formica and melamine paper are consumed in the amounts

---

<sup>4</sup> INEFAN, July 1993.

<sup>5</sup> INEFAN, July 1993, p.33.



of 57,000 m<sup>3</sup> and 8,000 m<sup>3</sup> respectively.<sup>6</sup> Small-scale industry is particularly intensive in consumption of raw material.

With products embodying greater added value there is a trend to substitute less valuable species (pine, eucalyptus) for more valuable species (chanul, colorado, mascarey and others).<sup>7</sup>

### 3.2 The Location and Scale of Wood Processing Industries

Most of Ecuador's wood processing industry is found in two geographic areas: the Sierra, much of it around Quito, and the coastal region. Most furniture manufacturers are located in urban areas.

The number of plants producing different items is estimated to be as follows: Sawmills (566); plywood manufacturers (6); composite board producers (2); paper producers (13), and wooden furniture manufacturers (694). There is, in addition, an assortment of over 900 other firms which, as well as acting as lumber yards, produce parquet, construction materials, mouldings, pallets and other items.<sup>8</sup> The mission learned that there are around 9,000 artisanal workshops throughout the country producing artisanry and other wood products.

Nearly all of the sawmills, lumber yards, other wood industries and furniture plants are of small to medium scale (there was no single measure of firm size used by all information sources). All of the composite board, plywood and construction material plants, as well as 11 of the sawmills and 27 furniture producing plants can be described as medium scale and above. The larger establishments are generally affiliated to the Association of Industrial Woodworkers (AIMA). Firms belonging to AIMA have an average plant

---

<sup>6</sup> Diagnostico de las Empresas Afiliadas a la Asociacion de Industriales Madereros - AIMA-, "Estrategias Para la Industria Sostenida de la Madera en el Ecuador", ITTO/INEFAN May 1993, p.16.

<sup>7</sup> INEFAN, July 1993, p.76.

<sup>8</sup> INEFAN, July 1993, p.29.

area of just over 7,300 m<sup>2</sup>.<sup>9</sup>

Among large and medium-scale wooden furniture manufacturers the average value of investment in each enterprise in 1993 was the equivalent of US\$ 246,470, of which a little under half was accounted for by machinery and equipment.<sup>10</sup>

There is only limited product specialization amongst firms. So, for example, sawmills occasionally make furniture and furniture makers sometimes produce sawnwood. Veneers and boards are produced by both the plywood and composite board industries. A number of sawmills and other firms also produce boards. The main purchaser of veneers on the domestic market is the furniture industry.

Despite their large numbers, small- and medium-scale furniture makers are responsible for only 14% of national furniture production, while AIMA-associated firms account for some 70% of furniture output. Table 1. presents data on production of wood products by category of firm. The figures for sawnwood in table 1. do not include sawnwood produced by chainsaw operators.

Capacity utilization varies markedly between producers of different size. Small- and medium-scale sawmills and furniture makers operate at around 50% of installed capacity. By contrast, larger sawmills, furniture makers, and plywood producers operate at 70%, 58% and 77% of capacity respectively. Composite board producers operate at 100% capacity.<sup>11</sup>

Sawnwood production costs some US\$ 142 per m<sup>3</sup> in small-scale mills and US\$ 130 m<sup>3</sup> in large-scale mills. Sawnwood from the larger mills is sold for a net profit of around US\$ 26 per m<sup>3</sup>. Plywood production costs around US 346 per m<sup>3</sup>, with a net profit of US\$ 56 per m<sup>3</sup>.<sup>12</sup>

---

<sup>9</sup> INEFAN, *ibid*, p.31.

<sup>10</sup> ITTO/INEFAN, May 1993, p.7.

<sup>11</sup> INEFAN, July 1993, tables 4.8 and 4.9.

<sup>12</sup> INEFAN, July 1993, p49.

Table 1: Production of Key Wood Products by Firms of Different Scale  
1992/93

| <u>Product</u>                 | <u>Small and Medium Producers: Annual Output</u> | <u>AIMA Affiliated Producers: Annual Output</u> | <u>Total Annual Output</u> |
|--------------------------------|--|---|----------------------------|
| Sawnwood 000 m <sup>3</sup>    | 433  | 270   | 703                        |
| Boards 000 m <sup>3</sup>      |  | 85  | 85                         |
| Comp. Board 000 m <sup>3</sup> |  | 58  | 58                         |
| Furniture 000                  | 223  | 1,350   | 1,573                      |
| Doors 000                      | 74   | 249   | 323                        |
| Windows 000                    | 354  |   | 354                        |
| Parquet 000 m <sup>2</sup>     | 1,622  | 309   | 1,931                      |
| Mouldings 000 m <sup>3</sup>   | 29   | 8   | 37                         |
| Pallets 000                    | 1,600  |   | 1,600                      |
| Crates 000                     | 3,557  |   | 3,557                      |
| Other products 000             | 45,067   |   | 45,067                     |

Source: Adapted from INEFAN, July 1993, table 4.10.

### 3.3 Furniture Production

The main furniture products include items for bedrooms, dining rooms, kitchens, offices, living rooms, and bathrooms. There is virtually no production of either knock-down furniture or of furniture components.

The domestic market is largely supplied by small-scale producers. Small-scale producers do not generally have a product line (and much of their

production entails little value addition). Even in large firms there are often over 200 different models of furniture. Many small firms will produce doors, windows, mouldings and other items as well as furniture. These small firms use deficient equipment and the workforce rarely receives training, both of which give rise to low product quality and frequent loss of raw materials.

The following figures describe annual production of units of furniture of different types by AIMA-affiliated firms in 1992-93: Bathroom furniture (59,328); bedroom furniture (22,044); kitchen furniture (478,872); living-room furniture (226,356); office furniture (25,212), and other furniture items (508,560). Production of partitions was 1,440 units, and of doors 124,020 units. The number of AIMA-affiliated firms producing different product types is as follows: Bathroom furniture (6); bedroom furniture (11); kitchen furniture (27); living-room furniture (13); office furniture (11); other furniture items (13); partitions (1), and doors (5).<sup>13</sup>

Average prices in dollar equivalent terms for different furniture products in 1992-93 were as follows: Tables (US\$ 474); chairs (US\$ 110); writing desks (US\$ 404); wardrobes (US\$ 336); display cabinets (US\$ 603), and beds (US\$ 302).<sup>14</sup>

For larger firms, the difference between direct production costs and unit sales price was between 150% and 243% in 1992-93.<sup>15</sup> Even after taxation this is a high rate of return. One source was of the opinion that traditionally high margins for medium- to large-scale producers, combined with easy currency conversion and tariff protection against imports, had created a disincentive to export and increase productivity in the furniture subsector. The mission was informed however that these margins are rapidly diminishing on account of the combined effects of currency appreciation, import deregulation, tight monetary conditions and contraction of the domestic market.

---

<sup>13</sup> ITTO/INEFAN, May 1993, table 48.

<sup>14</sup> ITTO/INEFAN, May 1993, table 55.

<sup>15</sup> INEFAN, July 1993, p.68.

### 3.4 Paper Production

The paper industry produces a diverse range of products, including kraft paper (some 53% of the total), absorbent and hygienic products (36%), writing paper, and other packaging materials. There is some production of pulp using bagasse from sugar cane. However, total output of paper products supplies only a third of the domestic market.<sup>16</sup> Imports of kraft paper, largely for packaging in the banana industry, have led to a trade deficit of some US\$ 50 million annually for the forest products industries.

### 3.5 Employment in Wood Processing Industries

Amongst wood processing industries, furniture producers are the most intensive in the use of labour per firm. Table 2. provides information on the total number of employees, and the number of skilled employees, in different types of woodworking firm in 1992-93. The figure for the total number of

Table 2: Employment in Different Wood Processing Activities 1992-93

| <u>Type of Firm</u>     | <u>Unskilled Employees</u> | <u>Total Employees</u> |
|-------------------------|----------------------------|------------------------|
| Sawmills                | 2,419                      | 4,612                  |
| Plywood producers       | 663                        | 1,273                  |
| Comp.board producers    | 190                        | 263                    |
| Furniture producers     | 2,973                      | 5,666                  |
| Paper producers         | 2,361                      | 5,137                  |
| Other woodworking firms | 2,564                      | 5,774                  |
| TOTAL                   | 11,170                     | 22,725                 |

Source: Adapted from INEFAN, July 1993, table 4.7.

employees in wood processing is an underestimate if one also considers the large number of informal artisanal producers and chainsaw operators. The

<sup>16</sup> INEFAN, July 1993, p.37.

figure of almost 23,000 employees in wood processing in 1992-93, at least in the formal sector, should be viewed against a total manufacturing labour force in 1990 of some 370,000.

### 3.6 Size and Growth of the Domestic Market for Wood Products

Table 3. presents data on the size and growth of production and apparent consumption of wood products in Ecuador during the period 1982 to 1992. Of particular note in this table is the impressive growth of production of all main products, except composite board, over the 11 year period, as well as the degree of dependence on imports of paper and paper products. However, the inclusion of data for 1989 makes clear a slowdown in production and apparent consumption of some items in recent years.

### 3.7 Distribution of Wood Products

Distribution channels take different forms for different wood products, and sometimes differ for the same product type. For low value products marketing involves the simple public display of goods at roadsides (sawnwood) or other sites.

Vendors of sawnwood tend to compete on the basis of price. However, INEFAN reports that furniture manufacturers are now giving second place to the price of wood in the decision to buy, after quality. A major inefficiency in the supply of sawnwood is that it is not graded during distribution, while distributors provide no technical services, or other inputs, to purchasers. Marketing of plywood, composite boards and other products is usually carried out by distributors linked to the manufacturers. Communication channels used for marketing include all the principal mass media.

The larger furniture factories market actively, usually selling through a chain of warehouses and distributors, which sometimes belong to the factory itself. Marketing for medium and large producers makes use of the mass media, trade fairs, promotional sales, and product catalogues. In part, assertive marketing is required to counter competition from a large number of small-scale furniture producers. Smaller producers frequently enjoy some cost advantages through the fact of operating informally (although their low sales

volumes can add to unit costs).

Table 3: Size and Growth of Wood Products Output and the Domestic Market for Wood Products 1982-1992

| <u>Product Type</u>                     | <u>Production: Growth (%)</u><br><u>1982-1992</u> | <u>Apparent Consumption:</u><br><u>Growth (%) 1982-1992</u> |
|---|---|---|
| <u>Logs (m<sup>3</sup>)</u>             |   |   |
| 1982                                    | 2,290,963   | 2,290,000   |
| 1989                                    | 3,415,561   | 3,415,000   |
| 1992                                    | 3,770,000 (164.5)                                 | 3,710,000 (162)   |
| <u>Sawnwood (m<sup>3</sup>)</u>         |   |   |
| 1982                                    | 980,000   | 934,619   |
| 1989                                    | 1,492,000   | 1,420,613   |
| 1992                                    | 1,450,000 (147.9)                                 | 1,404,252 (135.2)   |
| <u>Composite Boards (m<sup>3</sup>)</u> |   |   |
| 1982                                    | 66,686  | 30,096  |
| 1989                                    | 68,000  | 51,671  |
| 1992                                    | 58,000 (-13.1)                                    | 40,684 (135.2)  |
| <u>Plywood (m<sup>3</sup>)</u>          |   |   |
| 1982                                    | 50,742  | 42,430  |
| 1989                                    | 76,000  | 60,243  |
| 1992                                    | 78,000 (153.7)                                    | 55,000 (129.6)  |
| <u>Pulp and paper</u>                   |   |   |
| 1982                                    | 34,000  | 234,695   |
| 1989                                    | 70,000  | 328,942   |
| 1992                                    | 90,000 (264.7)                                    | 337,600 (143.8)   |

Source: Adapted from INEFAN, July 1993, tables 5.1 to 5.5.

The mission heard the view that there is a need to organize export marketing collectively so as to reduce the costs to each manufacturer, although this is practised already to some extent by the Asociacion de Exportadores Madereros (ASEM). Export sales tend to go to a limited number of

clients, and there is a need to develop knowledge of and marketing in foreign markets. INEFAN maintains that the large-scale distribution channels used today are inappropriate on account of the small volume of exports, and that targeting small wholesalers, small- and medium-scale DIY chains and individual retailers may increase returns, especially in the USA and Europe.

### 3.8 Trade in Wood Products

Table 4. presents information on trade in key wood products for 1982 and 1992. The data for exports of logs and sawnwood may be underreported as the mission heard anecdotal reports of unregistered trade. Of note is the significant decline in composite board exports. Sawn balsa wood has been the principal wood export item during the 1980's, accounting for over half of the value of all wood exports. Ecuador is the source of some 80% of world balsa wood supply. There is some export of eucalyptus to Europe for use in pulp factories.

The main export destinations of Ecuadorian wood products are as follows: Sawnwood (1991), USA 80%, Europe 11%, Asia excluding Japan 3%, and Japan 2%; plywood (1980s), Latin America; composite boards (1983), Venezuela 81%, Panama 7%, and Peru 1%; wood having undergone secondary processing (1991), USA 50% (mainly mouldings), and Latin America 42% of which the most important Latin American markets were Panama, Venezuela, and Costa Rica.<sup>17</sup> Exports to Japan of composite board have become significant since 1987.

Only a tiny fraction of furniture production, perhaps 1% of the total, is exported. The main markets for Ecuadorian furniture are Mexico, U.S.A (mainly in the southern states), Colombia and Venezuela. As already noted, there is next to no production of knockdown furniture, for which Europe and Japan are potential markets. Production of knockdown furniture would have the added advantage of reducing transport costs per unit. Due to the low costs of Ecuadorian labour exported items tend to be those embodying most man hours. A number of the artisanal workshops were reported to export small quantities, probably through trade fairs held in Quito. There is very little import of wooden furniture, which was attributed to high transport costs, but may also

---

<sup>17</sup> INEFAN, July 1993, table 5.9.



reflect past trade protection and the small size of the domestic market.

Table 4: Imports and Exports of Key Wood Products, 1982 and 1992

| <u>Product</u>        |      | <u>Imports</u> | <u>Exports</u> |
|-----------------------|------|----------------|----------------|
| <u>Logs</u>           | 1982 | -              | 1              |
| (000 m <sup>3</sup> ) | 1992 | -              | 60             |
| <u>Sawnwood</u>       | 1982 | .4             | 46             |
| (000 m <sup>3</sup> ) | 1992 | .005           | 46             |
| <u>Comp. Boards</u>   | 1982 | -              | 37             |
| (000 m <sup>3</sup> ) | 1992 | .2             | 17             |
| <u>Plywood Boards</u> | 1982 | -              | 28             |
| (000 m <sup>3</sup> ) | 1992 | -              | 23             |
| <u>Pulp</u>           | 1982 | 57             |                |
| (000 mt)              | 1992 | 9              |                |
| <u>Paper</u>          | 1982 | 145            | 1              |
| (000 mt)              | 1992 | 248            | .7             |

Source: Adapted from INEFAN, July 1993, tables 5.1 to 5.4.

### 3.9 Product Quality

According to INEFAN, logs from native forest are of good quality, diameter and form. The quality of logs from reforested areas varies, with eucalyptus subject to internal stresses, which may later cause cracking, and with pines containing large numbers of knots.

As noted above, sawnwood is produced in numerous, unstandardized, dimensions. Sawnwood pieces are irregularly shaped, owing to their having been produced by chainsaw operators and sawmills using obsolete equipment. Further processing usually requires prior reprocessing of the low quality sawnwood and thus involves considerable waste of raw material. For this reason, purchasers of sawnwood usually have to buy oversized pieces. Most sawnwood is undried. Lumber yards often practice crude open-air stack drying, but kiln drying

appears to be uncommon. Much of the further processing of sawnwood - to windows, doors and even furniture - takes place without proper drying.

Plywood and composite boards are generally of high quality, reflecting the importance of both products in the export trade and the quality standards this demands. Much of the plant in these factories is also recently installed.

There is a tendency for larger firms, including furniture makers, to export and thus to give greater consideration to quality (although exports are usually a small share of total production). Amongst producers of floors, doors, windows and mouldings there is wide variation in product quality.

The quality of furniture is often quite high. However, on average, amongst the larger producers, more attention is required on finishing. Product quality is acceptable for regional markets, although export volumes have dropped in recent years in some instances (e.g. Venezuela), which may indicate quality shortcomings.

#### 4. Industrial Inputs

##### 4.1 Woodworking Machinery

The bulk of small- and medium-sized firms use rudimentary electric-powered machinery, with an average age of around eleven years<sup>10</sup>. Much of this machinery is built by the users themselves, from low-powered electric motors. The larger enterprises generally employ machinery of North American and European origin. The mission was informed that the machinery of such plants is often modern and efficient (in engineering terms).

##### 4.2 Other Industrial Inputs

Total annual consumption of other important industrial inputs by AIMA affiliates engaged in furniture making was as follows in 1992-93: Glue (529,369 gallons); nails (30,000 lbs); preservatives (384 gallons); leather (120,000 m); sponge (720 sheets); lacquer (557,928 gallons), and sandpaper

---

<sup>10</sup> ITTO/INEFAN, May 1993, p.7.

(12,223,116 sheets).<sup>19</sup> Most of these items are procured directly from local manufacturers. Furniture producers also use other inputs such as plastics and assorted hardware. Most fillings and textiles are made nationally, although, as described in section 5, much of this is not of the quality required in international markets. There are a number of affiliates of multinational companies established in Ecuador which supply chemical inputs to the woodworking subsector.

Imported inputs are subject to the following tariff schedules: Machinery 10%, or 5% if there is no domestic production; chemical products, 10%, or 5% in the absence of domestic production; metal products, 15%; textiles 20%. A duty drawback system operates for inputs used in exported goods.

#### 5. Institutional Context

There are a number of industry representative bodies and other institutions active in the wooden furniture and other wood processing industries. AIMA, already mentioned, was established 17 years ago and groups 80 firms, mostly of medium to large size. Some of these firms are engaged in forest management and reforestation. AIMA also organizes training projects, including a number sponsored by bilateral donors, and publishes the industry journal "El Maderero". AIMA is presently attempting to upgrade its collection of export market data.

The Asociacion de Exportadores Madereros (ASEM) was formed after 1988, and is also affiliated to AIMA. The principal aim of ASEM is to foster exports of wood products. Promotional expenditures to this end reached some US\$ 117,000 in 1992. ASEM has established a warehouse in Mexico and is actively looking for factories abroad to accept furniture components. ASEM also participates in quality control for the exports of its associates.

The Corporacion de Exportadores Madereros del Ecuador (MADEXPORT) is also associated with AIMA and aims to promote exports. MADEXPORT holds a wooden furniture industrial fair every two years and also engages in

---

<sup>19</sup> ITTO/INEFAN, May 1993, table 35.

managerial training and reforestation.

The Corporacion de Desarrollo para el Sector Forestal y Maderero del Ecuador (CORMADERA) has a wide brief, aiming to support the integrated development of forestry and woodworking throughout Ecuador. CORMADERA possesses a documentation centre concentrating on technical aspects of forest management (only limited information is held on markets, products and prices). This institution also provides training in a range of skills, with courses every 15 days, and operates a quality control project financed by the wood processing industry itself. A roster of technicians is also held at CORMADERA. CORMADERA will implement a project financed by Switzerland entitled "El Desarrollo de la Industria de Azuay" which is set to begin in April 1994. The project is designed to assist artisanal woodworkers and small-scale wood processing industries in the Azuay region.

The Asociacion Nacional de Emprendarios de la Pequeña Industria Maderera (ANEPI) represents small-scale producers (usually having an investment up to US\$ 20,000 equivalent), and publishes an industry journal, "La Polilla".

The Servicio Ecuatoriano de Capacitacion Profesional (SECAP) undertakes a wide range of training throughout Ecuadorian industry, in technical and managerial subjects. SECAP possesses 18 training centres throughout the country. SECAP is soon to participate in the implementation of a large human resources development programme funded by the World Bank, which would be relevant to some of the training needs of the woodworking subsector. Training is also carried out by the Escuela de Tecnologia de la Madera, part of the Escuela Politecnica del Litoral. This school has about 8 graduates a year. Some training at technical level is also given by the Universidad Central, although the mission was informed that degrees are not offered in forestry or forest products engineering.

Other important institutions, which should be consulted during the preparation of an integrated programme include the Centro de Comercializacion de Insumos y Servicios de la Industria Maderera (CENTRIMA), the Federacion Nacional de la Pequeña Industria (FENAPI), the Asociacion de Carpinteros, the Federacion de Artesanos, the Junta Nacional de Artesanos, and the Camara de la Pequeña Industria.

## 5. Problems and Constraints

The wooden furniture industry experiences a range of technical, financial and market difficulties, the most important of which are described below. However, the entire woodworking system is beset by the problem of raw material supply. The only segments of the industry not affected by the prospect of diminished raw material supply are those that are most financially prosperous, such as the exporters of sawn balsa wood, who have sufficient resources to invest in managed forest development. By extension, increased productivity and competitiveness in wood processing industries, including wooden furniture manufacture, is likely to have a positive effect on raw material availability, as a consequence of increased supply and more efficient use.

Ecuador's forest area is diminishing rapidly. However, the mission was informed that there is no national forest inventory, while supposedly protected forest (some 12%) is sometimes logged without control. Wood production from plantations is at its sustainable limit, and growth in plantation area is minimal. The main objective of deforestation is to make land available for cattle farming, with little value being given to the wood itself. Far more wood is burnt in the forest than is used in any other form. As forest resources in the coastal and Andean areas are depleted, pressure on the Amazon forest will increase, possibly causing relocation of parts of the wood processing subsector. Attenuating pressure on the forest requires, *inter alia*, that a range of socio-economic issues be addressed. These stem largely from poverty, and include scarce alternative employment opportunities and lack of the means and knowledge with which to exploit the forest in a viable manner. In this connection, an integrated programme to support the wooden furniture industry could explore means of coordinating with the various programmes supporting agro-forestry and community-based forest use undertaken by organizations such as the Union Mundial para la Naturaleza (UICN), FAO and others.<sup>20</sup>

---

<sup>20</sup> The mission learned of a number of ongoing activities in agro-forestry, including the "Programa Regional de Manejo del Bosque", financed by COTESU, of four years duration, and the "Proyecto de Desarrollo Forestal de las Regiones Andinas" supported by the Netherlands.

As regards the supply of material inputs to wood industries, the key constraint is the method of harvest and primary processing involving independent chainsaw operators and sawmills using rudimentary technology. As noted above, perhaps half or more of the wood used by industry comes from the chainsaw operators. The chainsaw operators and many of the sawmills do not, and, given their lack of training and technology, cannot, optimize the value of the wood they process. This system of extraction is also anarchic, with almost no Government control and no replanting, and no form of revenue collection. This form of harvesting has been a factor in the unabated deforestation of some coastal and Andean areas.

While the present method of wood extraction and primary processing has provided cheap wood for industry, this arrangement is recognized by the industry to be untenable. It involves great waste of raw material, requires reworking of low quality sawnwood, and jeopardizes long-term raw material supply. The mission was informed that, on average, operators using chainsaws and circular saws require 5 units of roundwood to produce 1 unit of sawnwood. After reshaping and planing, perhaps only 65% of this 1 unit of sawnwood is used by industrial consumers of sawnwood. Furthermore, the distance between the source of the raw material and wood processing plants is increasing, adding to transport costs (much of which is in fact incurred for the transport of water contained in the undried wood). Points of extraction are now sometimes 50 km from main roads. Most industrialists interviewed by the mission emphasized the need for increased supplies of cheap wood of higher quality. Furthermore, Ecuador is failing to earn the price premium which could be had for wood exports from managed forests.<sup>21</sup>

---

<sup>21</sup> It should be noted that a number of ideas and proposals exist aimed at addressing the problems associated with the present system of wood extraction and primary processing. As such ideas - some of which stem from past UNIDO experience in Ecuador - could be a central part of an integrated programme, their general objectives are described here. INEFAN, for example, proposes cooperative organization of chainsaw operators and small sawmills in production and marketing to reduce the role of middlemen, to begin rationalizing extraction and to generate collective resources which could be used in forest development. ANEPIM has proposed the creation of "centros de acopio", or wood depots, which might also be organized from among the chainsaw operators, or by sawmills or independent investors. Small-scale centres of

The mission was also informed that the list of species for which a repayment of reforestation costs are made, under the PLANFOR scheme, is considered too restrictive by some manufacturers. However, it was not clear to the mission whether expanding the list of species eligible for rebate would, for agronomic reasons, lead to increased planting. The quality of wood from plantations is also low, as described in section 3.9.

The system by which sawnwood is distributed is very inefficient. There is little or no grading of lumber and very little in the way of specific technical services and advice for purchasers of wood used for different purposes.

The quality of finishing on some wooden furniture, especially for small-scale producers, is sometimes inadequate for overseas markets. Amongst some small and many medium and larger plants the quality of furniture appears to be adequate for regional markets, and some of the larger firms do export to markets such as the U.S.. The mission heard that a number of producers need training in the application of finishes. ASEM reported that a number of

---

this sort could have a distribution function and/or be closely linked to the extractive process, being located near the harvest sites. Such centres could invest in wood drying technology, and in band saws, which would help reduce the waste inevitable in the use of chainsaws and circular saws. With the creation of such centres the delivery of training in primary processing technology, such as the use, sharpening and maintenance of band saws, would become practicable. Training could also be given in lumber grading (most of the lumber used in small- to medium-scale enterprises is not graded at present). Consequently, primary processing would be rationalized and the unit price of efficiently sawn, dried and graded sawnwood could rise. Transport costs for dried wood would also be lowered. The resources generated in these ways could eventually be channelled into reforestation, forest management and technology such as extra-light skidders. Ideas of a similar sort have been proposed by UNIDO, with emphasis added on the services which such depots could provide to end users of wood products and to loggers. The provision of such services could have positive knock-on effects throughout the chain of wood related industries, leading for example to higher quality and less costly construction, furniture etc.. Such proposals would need to go hand in hand with an appropriate legislative framework and controls on land ownership and logging. Their implementation however could represent an important step in addressing the major problem facing the forest products industry in Ecuador.

complaints had been received from overseas customers concerning the quality of finishes and the tendency of some lacquers to blister. These and other quality problems relate to the broader issue, raised with the mission, of there being no formal and common system of quality control for furniture, despite the existence of the Instituto Ecuatoriano de Normas.

There is no design school in Ecuador and the need for a design centre, or at least a greater dissemination of design skills, was frequently repeated. The need for appropriate designs for knock-down furniture for export was often stressed. On another level, many producers considered that the creation of distinctive design traits particular to Ecuadorian furniture would assist marketing.

There is a shortage of trained manpower generally. The scarcity of persons with managerial training was often noted. Most of the small producers have very little formal business training. A lack of business awareness seems to have hampered the search for appropriate financing, including joint ventures, as well as arrangements to make use of the marketing and design capabilities of foreign firms. This may also go some way to explaining the absence of production of knock down furniture and components. The mission was informed that ITTO/SECAP are trying to promote a project among the donor community entitled "Centro de Tecnologia para Pequeños Industriales de Muebles de Madera". This project would address aspects of business management.

There are a number of constraints on furniture manufacture caused by the inadequate quality of some industrial inputs from domestic suppliers. For example, some of the textile and filling materials produced locally are not of the standard demanded by the international market. The mission was informed that some foams contain a resin prohibited in the USA while textiles are not sufficiently fire retardant. The toxic content of some glues was said not to comply with international norms and the lead content of some paints was reported to be high. A number of interviewees complained about the quality and/or price of lacquers, some of which were said to have blistered. Hardware of local origin was reported to be of deficient quality. These problems have placed some furniture manufacturers in a disadvantageous position when competing with imports. For the same reason, much exported furniture has to be made using imported industrial inputs. There were also numerous complaints



about expensive and low quality packaging for furniture exports.

A further difficulty is the general lack of knowledge of export markets. The mission heard reports of past problems in exporting to Mexico and elsewhere on account of insufficient information on product types and qualities demanded by these markets. There are no agreements with foreign firms which cover the marketing function.

Many producers, but especially the smaller ones, face significant financial constraints. Some noted difficulties in the provision of export credits. The security needed for export credits was said to be too great for small-scale producers, with credit from Government sources mainly provided for the purchase of raw materials. Commercial loans for various purposes carry double digit real interest rates, with nominal rates of between 30% to 40%. Security requirements for commercial loans are excessive for micro-enterprises, sometimes being in the ratio of 3/1 against the value of the loan. At the same time, financial resources are needed to open new markets and increase penetration of established markets, which implies expenditure on missions, publicity campaigns, use of warehouses etc.. Such initiatives are difficult to finance as the industry is composed mainly of medium-scale producers with limited financial resources (although MADEXPORT and ASEM are attempting to address this problem). The opinion expressed by many small-scale producers was that appropriate policy is lacking on financing requirements, and on the needs of small- and medium-scale enterprises generally.

An additional problem was noted in the complex and time-consuming administrative procedures required for exports. Clear norms and simplified paperwork are needed for exporters. The mission was informed that the current arrangement involves acquisition of an import permit, for which registry with the Central Bank is necessary, followed by an elaborate series of steps involving communication with the Intendencia de Companias, and the Ministries of Finance, Agriculture and Industry.

The mission also noted an apparent lack of co-operation between the two industry bodies representing large- and small-scale producers, namely AIMA and ANEPIM. Complementarities between small-scale and large-scale enterprises can be achieved. Any integrated programme would work with firms of different sizes

and would require that organizations representing such firms communicate with each other effectively and constructively.

A further difficulty facing the wood products industry is the small and amorphous character of the domestic market. A severe reduction in banana exports has caused a fall in demand for wooden pallets and construction is at present in decline. The current economic stagnation has dampened demand generally, a situation which is likely to be aggravated by downward adjustments in government spending following falls in the price of crude petroleum (Ecuador's principal export). Consequently, many manufacturers of wood products are under pressure to reduce dependence on the domestic market and export, a challenge which is made more difficult by the appreciation of the domestic currency. The mission learned that the International Trade Centre (ITC) has prepared a project concept to assist production for export with the title "Perfil de Proyecto de Asistencia Tecnica para Manufactureros de Articulos de Madera de Exportacion". Nevertheless, the domestic market for some wood products might be stimulated through proper promotional measures. For example, very little use is made of wood in the construction of housing. This would be appropriate as Ecuador produces no steel and relies on imported gypsum in the manufacture of cement. Furthermore, the cost of wooden housing can be only a fraction of the cost of housing based on cement and brick.

Finally, and in more general terms, the impression was frequently had that the furniture industry is subject to competitive pressures, both from abroad and in its need to increase exports, with which it is perhaps unfamiliar. The volume of sales and levels of return on the domestic market have fallen, or are falling, for many producers, and this, coupled with the need to export, will require increases in productivity. While this exploratory mission did not have time to investigate all technical problems at the plant level, the new competitive pressures will probably require numerous forms of support to upgrade factory level operations if an effective response is to be made. Without support for such change, the continued operation of a number of producers is likely to be threatened, and inefficiency in raw material use will likely continue.

Indeed, solely in the technical assistance component of any programme, a range of project activities at plant level might be necessary, including

projects in basic areas such as plant lay out, materials management, inventory control, production planning, quality control and cost accounting, furniture design and dimensioning, furniture surfacing and finishing techniques, use and maintenance of woodworking tools, as well as lumber grading, wood bonding, drying and preserving, wood use in construction and others.

## 7. Conclusions

The conclusion drawn from the findings of this mission is that the wooden furniture industry in Ecuador possesses good conditions for the preparation of an integrated development programme. There are a range of problems to be addressed, the resolution of which would have important positive effects on exports and employment (especially by working through small- and medium-scale production units), as well as on the environment. Important environmental gains from an integrated programme could arise from less wasteful use of raw material and the generation of greater financial resources within the industry for investment in managed forest development.

The types of problems faced include technical, policy and investment promotion considerations, which could be addressed in a comprehensive and mutually reinforcing way through an integrated programme. Scope also exists for assisting a range of producer types, from artisanal and small-scale producers based in rural communities, to larger urban firms attempting to gain a foothold in foreign markets. In fact, complementarities and linkages could be achieved in cases such as this, with, for example, smaller firms being supported to become providers of high quality wood product inputs to larger companies.

The design stage of an integrated programme would also benefit from considerable analytic work already done by ITTO/INEFAN and others, as well as from UNIDO's accumulated experience in Ecuador. A further important factor supportive of programme development is the existence of well established institutions in this industry, with effective and enthusiastic potential counterparts. The suggestion to develop an integrated programme was welcomed by the private sector. Strong support was also expressed at government level (a request for development of such a programme from the Vice-minister for

Industry is attached).

The integrated programme will be a package of technical assistance projects, investment proposals and policy related activities. Achieving balanced development of the overall system comprising forestry, sawmilling, secondary wood processing and furniture making, as well as the supply of industrial inputs, would be the goal of the programme. Attention would likewise be given to the policy context within which all of the above operate. Furthermore, the programme should consider the use of wood in construction.

Developing an integrated programme would require approximately two to three months of analytical and preparatory work by a small multi-disciplinary team. Proposals stemming from this work would be considered with all parties concerned at a programme workshop. Finalization of the programme would occur when agreement had been reached on the proposals and implementation modalities with all major actors in this subsector.

It should be noted that a joint FAO/UNIDO project (UC/RLA/92/C43) attempted unsuccessfully to formulate a comprehensive integrated programme covering three countries within the Amazon Cooperation Treaty, including Ecuador. As a result, considerable background material and proposals for action exist for Ecuador that could be incorporated in a national programme such as is proposed here.

Co-operation would be sought from FAO in the design of programme elements related to FAO's mandate, especially in the management of forest resources. ITC would also be called upon to provide information/assistance in trade and market related issues.

## Annex 1.

List of Persons Contacted

|                          |  |
|--------------------------|--|
| Fausto Idrovo Arcentales | Vice-minister for Industry, Ministerio de Industrias, Comercio, Integración y Pesca        |
| Jaime Bogná S.           | La Casa de la Madera   |
| Hugo Bravo Burneo        | Dean of the Faculty of Engineering, Sciences, Physics and Mathematics, Universidad Central |
| José Guillermo Coloma S. | Lawyer, Asesoría Legal Administrativa Tributaria   |
| Pablo Contreras P.       | National Director of Operations, SECAP   |
| Mario Miranda F.         | Executive Director, SECAP  |
| Hernan Carrera Andrade   | President, Maderas del Ecuador   |
| Alberto Robalino F.      | Executive president, CORMADERA   |
| Elena Carrera S.         | Director, Documentation Centre, CORMADERA  |
| Rene Cruz Silva          | Manager, Magnaforma  |
| Manuel Francisco Durini  | General Manager, ENDESA  |
| Jose Franco              | Executive Director, AIMA   |
| Fernando García C.       | Manager, MAEXPORT  |
| Forestal Luis Castello   | Regional representative, UICN  |
| Xavier Izko              | National coordinator, UICN   |
| Sven Wunder              | Economist, UICN  |
| Normando López V.        | General Manager, Heritage  |
| Lucila Lozano de Kubes   | Vice-presidente of Industrial Development and  |

Promotion, Camara de Industriales de Pichincha

Rodrigo Lucio Paredes

Consultant, Proyecto de Educacion de Adultos  
y Formacion Profesional

Eduardo Mansur

Advisor in Rural Economics to the project  
"Desarrollo Forestal Participativo en los  
Andes", FAO.

Peter Meier

Representative in Ecuador, COTESU

Rodrigo Moreno

General Manager, CENTRIMA

Tomas Muñoz Martin

Sectoral specialist, Banco Interamericano de  
Desarrollo

Angel I. Pazmiño

Muebles de Estilo

Gustavo Perez Angel

Manager, Chapel

Roberto Samanez Mercado

Principal technical advisor, Tratado de  
Cooperación Amazonica, FAO

Luc Sanders

First secretary, Chief of the Cooperation  
Section, Belgium Embassy