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16883

Distr.
RESTRICTED

IO/R.61
6 April 1988

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ENGLISH

PROSPECTS FOR INTEGRATION IN THE WOODWORKING
INDUSTRY OF THE CARIBBEAN COMMUNITY

UC/CAR/86/201

Technical report: The situation in Saint Lucia*

Prepared for the CARICOM Secretariat
by the United Nations Industrial Development Organization

Based on the work of Pietro Borretti, woodworking consultant

Backstopping officer: A. V. Bassili
Industrial Management and Rehabilitation Branch

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1. Introduction

1.1 Title and number of project under which this country report has been prepared:

Development of Integrated Industry Programme for the Woodworking and Furniture Industry Sector in CARICOM - UC/CAR/86/201

1.2 Cooperating Agency:

Caribbean Community Secretariat, Georgetown, Guyana

1.3 UNIDO consultant:

Pietro Borretti, Consultant in Woodworking Industries Sector

1.4 CARICOM counterpart:

Ivor Carryl, Industrial Economist, Economics and Industry Division

1.5 Main institutional contact in Saint Lucia:

Forest and Land Department, Ministry of Agriculture

1.6 UNIDO Backstopping officer:

Antoine V. Bassili, Senior Industrial Development Officer, Industrial Management and Rehabilitation Branch, Department of Industrial Operations

1.7 Period of mission in Saint Lucia:

16 to 19 May 1987

1.8 Terms of reference:

To survey selected furniture plants in order to establish their requirements for imported lumber and evaluate the efficiency of those plants in the utilization of timber inputs.

1.9 Main activities:

- (a) Visits to selected furniture plants;
- (b) Review of shipping links with Guyana, Belize and Dominica;
- (c) Review of lumber and furniture import trends;
- (d) Providing lumber importers and furniture manufacturers with lumber export contacts in Guyana, Belize and Dominica.
- (e) Making known to the Guyana Forestry Commission, the Belize Forestry Department and Dominican Lumber suppliers Saint Lucia's requirements for furniture lumber.

1.10 Background

Among the primary aims of the Caribbean Community Secretariat (CARICOM), established in 1973, are the coordination of economic policies and development planning, and setting up of a special regime for its less developed members. In line with these aims, the CARICOM has developed an industrial programme for the industrial development of its thirteen member states. The emphasis is on the production of goods and services for the regional market with a view to minimizing costly imports.

The development of the timber industries sector - and in particular, the promotion of the supply of wood products from within the Region - has been assigned a priority role by the CARICOM Secretariat, since the Caribbean Community as a whole is heavily dependent on extra regional sources of supply to meet its lumber demand.

A regional project of assistance to CARICOM - entitled Development of Integrated Industry Programme for the Woodworking and Furniture Industry Sector in the CARICOM - was undertaken in this connection in 1987 by the UNIDO consultant, Pietro Borretti, who visited nine of the twelve CARICOM countries together with his counterpart, Ivor Carryl.

As a result of the missions, the consultant prepared eleven reports to highlight to the CARICOM secretariat and the authorities of the member states the situation of the sector and its potential. He also recommended certain immediate measures for the development of the sector. This report concerns the mission undertaken by the consultant in Saint Lucia.

1.11 Related reports prepared under project UC/CAR/86/201:

The eleven reports prepared under the project include the following:

- (a) The project's terminal report (reference No. IO/R.52) entitled Prospects for Integration in the Woodworking industry of the Caribbean Community dealing with the situation in the Region as a whole. The report proposes, inter alia, the implementation of three projects of a regional scope:
- i) Study on the establishment of a Timber Distribution Centre in Barbados or Trinidad to facilitate the supply of lumber from within CARICOM;
 - ii) Holding a regional WOODTECH course/exhibition of woodworking machinery in Barbados in order to promote the transfer of technology for the small-scale furniture and joinery industry in the Caribbean;
 - iii) Intra-regional tool maintenance training programme for the furniture/joinery industry.
- (b) Nine country reports covering the CARICOM member states ^{1/} visited by the consultant and his counterpart in the course of the project; and

1/ Antigua, Barbados, Belize, Dominica, Guyana, Jamaica, St. Lucia, St. Vincent, Trinidad and Tobago.

- (c) A technical report on the selection of woodworking equipment for the small-scale furniture/joinery industry in the Caribbean Community (report No. IO/R. 53)/

The report covers both wood processing and tool maintenance equipment. It also includes sawdoctoring equipment for the maintenance of inserted teeth of circular saw blades, gang saw blades and band resaw blades.

2. Summary

Saint Lucia's primary rain forest covers an area of about 6,800 hectares. The standing volume of merchantable timber of the protection/production area within the forest reserve has been estimated at 141,800 m³.

Because of the heavy exploitation of forest resources since the time of the first settlements, the major role of the natural forest is now one of protection. An area of about 236 hectares of timber plantation is under management to provide raw material for minor forest products.

The main indigenous timber species are Laurier, Bois Blanc, Gommier (also available in Dominica), White Cedar, Bois Pain Marron and Bois d'Amande; while the predominant plantation species include Blue Mahoe, Mahogany, Teak and Caribbean Pine.

The bulk of the sawmilling work is done with a recovery rate as low as 20 percent by chain sawmillers who cut logs into squares or boards right at the felling site. The total volume of lumber produced locally is estimated at 455 m³ or 193,000 BM.

Lumber imports in 1985 amounted to 3.8 million BM (9,000 m³) which represents about 95 percent of the country's apparent consumption. Some 50 percent of lumber imported consists of coniferous species. The only lumber imported by Saint Lucia from within CARICOM is Greenheart supplied by Guyana (144,000 BM or 339 m³). The main obstacle in the promotion of a closer lumber trade relationship between St. Lucia and Guyana is the precarious status of shipping links between the two countries.

The furniture/joinery industry consists of 60 small-scale enterprises of which only 4 employ 10 to 18 workers and the rest average 4 workers. The sector as a whole is in its initial stage of development, the main constraints being lack of modern woodworking machinery and the almost total absence of tool maintenance equipment.

Recommendations

- (a) To provide short-term expertise to the Saint Lucia Furniture Manufacturing Association for the establishment of a tool maintenance centre for the benefit of the furniture/joinery industry as a whole in order to: (1) extend the serviceable life of expensive, imported cutting tools such as carbide-tipped circular saw blades, (2) contribute towards reducing occurrence of equipment breakdown; and (3) contribute towards improving the quality of finished products. A draft project document in this respect is given in Annex III.

- (b) To study the feasibility of establishing a timber distribution centre in Barbados to allow frequent delivery of limited volumes of furniture-type lumber from Guyana and Belize to Saint Lucia as well as to the other Windward and Leeward Islands. A draft project document has been prepared by the consultant in this respect. See Annex VII of the project's terminal report (reference No. IO/R 52).
- (c) To introduce modern yet appropriate woodworking machinery in the furniture/joinery industries sector towards attaining a meaningful transition from artisanal methods to the industrial system. A separate report has been prepared by the consultant in this respect as listed in paragraph 1.11 (c) of this report.
- (d) To provide demonstration in the use of jigs in connection with the operation of standard woodworking machines as a means of increasing productivity, accuracy and safety in wood processing.

This activity has been included in a Caribbean regional project proposed for implementation in Barbados. It would consist of a training course combined with an exhibition of modern woodworking equipment for the benefit of the small-scale furniture/joinery industry. A draft project document has been prepared in this context and attached as Annex VI to the project's terminal report (reference No. IO/R. 52).

3. Forest Resources^{2/}

The major role of the natural forests of Saint Lucia is one of protection - protection of water supplies, soil resources and indigenous species of flora and fauna. The primary rain forest - including reserve forests and forests outside reserve - covers an area of 6,786 hectares. Of this, however, only 669 hectares are placed into the category of exploitation forest, while 1,610 hectares are classified as protection/production forest and 4,507 hectares as protection forest. Results from the forest inventory of the protection/production area within the forest reserve show a total standing volume of 312,693 m³ of which 141,798 m³ is merchantable^{2/}.

Saint Lucia's original forest resource has been steadily exploited since the time of the first settlements and forests gradually disappeared from the coast towards the interior. The remaining forests owe their survival to the country's rugged mountainous terrain. Considerable damage to this resource was also caused by recent hurricanes.

Plantation of various species are presently under management to provide raw material for minor forest products for the domestic market such as fence posts, fencing poles, broom handles and furniture. The plantations consist of an area of 236 hectares.

^{2/} Source of forest resources data: Forest Management Plan for St. Lucia, 1984-1994, Forest and Lands Department.

4. Local Commercial Timber Species

The main indigenous timber species in demand are Laurier Mabre (Endibicheira serrea); Bois Blanc (Simarouba amara) also available in Guyana; Gommier (Dacryodes excelsa) also available in Dominica; White Cedar (Tabebuia pollida); Bois Pain Marron (Talauma dodecapetala); Bois d'Amande (Hyeronima laciflora).

Timber species from plantation forest are: Blue Mahoe (Hibiscus elatus); Mahogany (Switenia macrophylla); Teak (Tectona grandis); and Caribbean Pine (Pinus caribaia).

5. Sawmilling Industry

There are two sawmills in Saint Lucia but neither is engaged in regular sawmilling work. One of the sawmills is equipped with a circular saw headrig and general-purpose woodworking machinery, but only produces wood turnings and dresses for resale rough lumber purchased from "chain sawmills". The second sawmill is equipped with a band headrig which is hardly used for production work. The main cause of this situation is the problem of extracting logs from the forest through difficult mountainous terrain. There are plans to install a cable line to deliver logs from plantation areas. However, for the foreseeable future, the bulk of the sawmilling work will continue to be undertaken by teams of "chain sawmillers" who cut the logs into squares or boards right at the felling site. The end result of this sawmilling practice is that a recovery rate only of 20 per cent, at most, is attained in the conversion of logs into saw timber.

Based on the timber removal permits issued by the Forest and Land Department, a total of 52,867 cu. ft. (1,497 m³) of logs were felled in 1985. This, added to 27,563 cu. ft. (781 m³) plantation thinnings, brings the volume of logs extracted in 1985 to a total of 2,278 m³. At a rate of 20 per cent recovery, the total lumber production per year can be estimated at only 455 m³ or 193,083 BM.

6. Lumber Imports

As much as 95 per cent of sawn wood consumed in Saint Lucia is imported. This amounted to about 3.8 million BM (9,000 m³) in 1985. Thus the apparent consumption of lumber per year is estimated at about 4 million BM (9,500 m³). Saint Lucia's lumber import trends for the period 1983-1985 are shown in the following table:

Table 1: Saint Lucia's Lumber Imports, 1983-1985 - Total figures:

Volume	1983	1984	1985
m ³	8,040	9,746	9,024
BM	3.4 million	4.1 million	3.8 million
Value			
EC\$	5.6 million	5.9 million	5.4 million
US\$	2 million	2.2 million	2 million

Source: Saint Lucia Customs Records

The majority of imported lumber consists of coniferous species such as Pitch Pine from Honduras, Southern Yellow Pine from the USA and White Pine from Canada. However, the share of coniferous species declined from 85 per cent in 1983 to 73 per cent in 1984 and 59.4 per cent in 1985. The trend for the imports of the various species in the period 1983 to 1985 is shown in the table hereunder.

Table 2: Saint Lucia Lumber Imports, 1983-1985 - Figures by main species

Species	1983	1984	1985
Coniferous	6,844 m ³ 2.9 mil BM	7,151 m ³ 3 mil BM	5,360 m ³ 2.3 mil BM
Mahogany	25 m ³ 10,596 BM	39 m ³ 16,528 BM	106 m ³ 44,923 BM
Greenheart	279 m ³ 118,240 BM	239 m ³ 101,288 BM	339 m ³ 143,668 BM
Other non- Coniferous	892 m ³ 378,029 BM	2,317 m ³ 981,944 BM	3,219 m ³ 1.3 mil BM

Source: Saint Lucia Customs Records

The majority of imported lumber - as much as 80.4 per cent in 1985 - was in dressed, planed or tongued-and-grooved form. The major source of imported lumber in 1985 was Honduras with 1.9 million BM or 4,536 m³ (50.4 percent of total imports) followed by the USA with 1.6 million BM or 3,690 m³ (41 percent), Guyana with 87,726 BM or 207m³ (2.3 percent) and Canada with 109,340 BM or 258m³ (2.8 percent). The almost totality of lumber supplied by Guyana consisted of planed Greenheart.

7. Furniture Imports

Saint Lucia is a net importer of furniture, although the import volume has declined since 1981 - an indication of increased self-sufficiency in the supply of this consumer product. The furniture import trend in the period 1981-1984 is shown hereunder:

Table 3: Saint Lucia Furniture Imports, 1981-1984

	1981	1982	1983	1984
Total imports EC\$	390,820	232,439	352,546	325,438
US\$	144,768	86,088	130,572	120,532
Imports from EC\$	200,385	91,900	113,158	22,149
CARICOM US\$	74,216	34,037	41,910	9,203

Source: Saint Lucia Customs Records

The table indicates a considerable decline in furniture imports from CARICOM sources. The main overseas suppliers of furniture to Saint Lucia are France, the United States of America, the United Kingdom and the Taiwan Province of China, while the main sources from CARICOM are Barbados and Jamaica.

8. The Furniture Industry

Saint Lucia's furniture manufacturing sector consists of some 60 small enterprises with only four of them employing 10 to 18 workers and the rest averaging 4 workers. The following furniture/joinery workshops were visited in the course of the mission:

- (a) Gillo Alexander Workshop
- (b) Benjamin's Furniture Workshop
- (c) Modern Furniture Enterprises
- (d) Wilson's Furnishing Ltd.
- (e) Francis Flavius Workshop
- (f) Leroy Lords Workshop

It is evident that furniture manufacturing is in its initial stage of development in Saint Lucia. The main drawbacks of the sector can be listed as follows:

- lack of heavy-duty industrial-type machinery;
- lack of equipment for producing proper wood jointings (tenons and/or dowel joints) resulting in the failure to attain interchangeability of parts;
- low productivity due to limited utilization of existing equipment;
- lack of proper tool maintenance equipment which obliges the workshops to send tools to Martinique for sharpening.

Of all the workshops visited, the Gillo Alexander was found to have the more comprehensive range of equipment. However, the management of most of the workshops, particularly the one operated by Wilson Furnishing, displayed a remarkable degree of dynamism and ambition.

Fortyfive of the sixty furniture workshops have recently formed the Saint Lucia Furniture Manufacture Association with the objective of spearheading the development of the sector through common efforts and services. One of the Association's plans consists of setting up a trading company, having the objectives, among others, of pooling the purchase of lumber and other production materials (glues, upholstery materials, hardware, etc.). The total lumber consumption of the members of the Association is estimated to be 161,044 BM (380 m³) per year.

9. Technical Assistance Requirements of the Furniture Industry Sector

- (a) Provision of short-term expertise in the establishment of a tool maintenance servicing centre by the Saint Lucia Furniture Manufacturers' Association. See draft project document in Annex III 3/.
- (b) Guidance in the selection of modern yet appropriate woodworking equipment for the small-scale furniture/joinery industry 3/.
- (c) Demonstration in the design and use of jigs to promote optimum and efficient utilization of basic woodworking equipment. This activity has been included in a Caribbean regional project proposed for implementation in Barbados. See annex VI to main report of this project (report reference No. IO/R. 52).

10. Timber Prices, Import Duty and Landing Charges

Prices of Imported Lumber (C.I.F)

- Pitch Pine - US\$ 0.60 to 0.65/BM
- Southern Yellow Pine - US\$ 0.45 to 0.50/BM
- Mahogany - US\$ 1.85 to 1.95/BM

An extra charge of 10% is paid for kiln-dried imported lumber.

Price of Local Lumber

- Various species - EC\$ 2.50/BM (US\$ 0.92)

A consumption tax of 17 per cent is paid on the C.I.F cost of imported lumber plus a stamp duty charge of 7 per cent on the duty paid price.

The port handling charge - involving landing, stacking and delivery of lumber (LSD charge) is US\$ 350 per 20 ft. container or US\$ 25 per ton in the case of break bulk cargos.

3/ Purchase specifications of selected woodworking machines and tool maintenance equipment are given in the separate technical report listed in paragraph 1.11(c).

11. Shipping Links

The shipping links between Saint Lucia and the timber exporting countries Guyana, Belize and Dominica are shown hereunder:

(a) Belize-Saint-Lucia (Tropical Shipping -Belize)

Weekly service Belize-Saint Lucia via West Palm Beach, with a freight charge of US\$ 3,412 per 40 ft. container, excluding loading and unloading charges.

(b) Dominica-Saint Lucia (TMT Shipping)

8-day frequency service with roll on/roll off trailers with a freight rate of US\$ 1,445 and US\$ 1,950 for 20 and 40 ft. containers, respectively. Rates include loading and unloading charges.

(c) Dominica-Saint Lucia (RMC Lines Ltd. Shipping)

Monthly service.

(d) Georgetown-Saint Lucia (WISCO)

Monthly service with a freight rate of US\$ 1,488 and US\$ 2,628 for 20 and 40 ft. containers, respectively.

The regularity of the monthly shipping service between Guyana and Saint Lucia, as well as between Guyana and most of the other CARICOM destinations, has been affected by the drastic decline in intra-CARICOM trade since 1980. Thus at present shipment of lumber from Guyana depends almost entirely on ad hoc charter vessel arrangements, which prevents serving on a regular basis the needs of the Leeward and Windward Islands for shipment of small lumber loads.

12. Potential for Lumber Imports from Belize, Dominica and Guyana

Unlike most other CARICOM markets where Mahogany is a dominant hardwood species, Saint Lucia's yearly Mahogany imports are very limited (1985 figures: 44,923 BM or 103m³), whereas the imports of other non-coniferous species have increased steadily from 378,029 BM (892 m³) in 1983 to 1.3 million BM (3,291 m³) in 1985. Therefore, there should be a good potential for importing hardwood species other than Mahogany, such as Determa from Guyana, Santa Maria from Belize and Gommier from Dominica.

As for developing the potential of importing Pitch and Yellow Pine substitutes such as Caribbean Pine from Belize and Simarupa from Guyana, a lot will depend on the capability on the part of the two CARICOM suppliers to match the current CIF price of imported Pitch and Yellow Pine (US\$ 0.50 to US\$ 0.65/BM).

Lumber importers to contact are:

- (a) Saint Lucia Furniture Manufacturers' Assoc.
P.O.Box 744, 59 Brazil Street
Castries, Saint Lucia, W.I.
Tel: 22221. Cable: SLFMA

- (b) A.F. Valmont & Co. Ltd.
(Importers of lumber, panels, doors and plywood)
P.O. Box 172, Castries, Saint Lucia, W.I.

ANNEX I

Persons met in St. Lucia

Mr. A. Severin	Chief Economist, Central Planning Unit, Ministry of Finance and Planning, P. O. Box 709, Castries
Mr. G. Charles	Chief Officer, Forest and Land Department, Ministry of Agriculture, Castries
Mr. P. St. Clair	Managing Director, Modern Furniture Enterprises, Ltd., P. O. Box 744, Castries
Mr. D. J. Wilson	Managing Director, Wilson's Furnishing Ltd., P.O. Box 1728, Castries
Mr. G. Alexander	Manager, Alexander Furniture Workshop, Castries
Mr. L. Lords	Manager, Lords Furniture Workshop, Castries
Mr. F. Flavius	Manager, Flavius Furniture Workshop, Castries
Mr. G. Eugene	Manager, Soft Furnishing Ltd., P.O.Box 954, Castries
Mr. R. St. Brice	Manager, Self-Help Furniture Manufacturers Ltd., P. O. Box 275, Castries
Mr. V. Clifford	Managing Director, Benjamin's Furniture Workshop, Vide Bouteille Rd., Castries
Mr. A. Valmont	Manager, A. F. Valmont Co. Ltd., Lumber Importers, P. O. Box 172, Castries

ANNEX II

PROPERTIES OF SELECTED GUYANESE, BELIZEAN AND DOMINICAN
TIMBER SPECIES SUITABLE FOR FURNITURE MANUFACTURING

Contents

- A. Guyana Species
 - 1. Andiroba (Crabwood)
 - 2. Courbaril (Locust)
 - 3. Determa
 - 4. Hububalli
 - 5. Purpleheart
 - 6. Silverballi
 - 7. Simarupa

- B. Belize Species
 - 8. Santa Maria

- C. Dominica Species
 - 9. Gommier

- D. Exporting contacts

1. Andiroba (Crabwood)

- Scientific name:** Carapa guianensis (family: Meliaceae)
- Other names:** Krapa, Guino, Figueroa, Tangare, Carapa, Crappo
- Wood appearance:** Heartwood varies from pale pink to rich red-brown when freshly sawn, darkening to a fairly uniform dull reddish-brown.
- Sapwood pale brown or oatmeal coloured, not always sharply defined. Wood resembles a plain mahogany in appearance, but lacks its natural lustre. Texture medium to coarse; grain generally straight but sometimes interlocked.
- Bole 50-80 feet long; diameter 16-20 inches.
- Physical and mechanical properties:** Comparable in strength to European Beech (Fagus spp.). Density about 610 kg/m³ (39 lb/ft³) seasoned. Small movement. Moderately hard with good mechanical properties and is fairly stable in use.
- Natural durability:** Heartwood is moderately durable and fire resistant. Logs liable to attack by ambrosia (pinhole-borer) beetles.
- Timber processing:**
- Drying: Dries fairly well but rather slowly with a tendency to split in the initial stages. Kiln schedule C.
- Working: Saws without difficulty. Interlocked grain makes planing difficult. Works easily and turns well, finishing smoothly.
- Assembly: Glues and holds nails well. Tendency to split on nailing.
- Finishing: Takes stain and polishes satisfactorily.
- Uses:** Suitable for general carpentry, furniture, cabinet work, turnery and interior joinery.
- Supplies:** Occurs in reasonable quantities in Guyana. Regular supplies possible.

Source: Guyana Forestry Commission.

2. Courbaril (Locust)

- Scientific name:** Hymenaea courbaril (family: Caesalpinaceae)
- Other names:** Copalier, Algarrobo, Gaupinal, Jatoba.
- Wood appearance:** Heartwood light brown to brown often with dark streaks and with a subdued golden glow. Sapwood of whitish grey colour is sharply defined. Texture medium coarse.
- Grain straight, lustre medium, uniform vessel lines distinct.
- Bole 60-80 feet long, diameter 24-36 inches.
- Physical and mechanical properties:** Very hard and strong. Density varies from 910 to 1000 kg/m³ (57-62 lb/ft³) seasoned. Moderate shrinkage, relatively stable once dry. Good mechanical properties, especially elasticity.
- Natural durability:** Very resistant to decay.
- Timber processing:** **Drying:** dries readily without distortion or splitting.
- Working:** moderately difficult to work but finishes smoothly. Planes and turns without difficulty. Good bending to steaming process.
- Assembly:** glues well, but difficult to nail. Fastenings are held well.
- Finishing:** Finishes smoothly. Polishes and varnishes without difficulty
- Uses:** A wood of decorative appearance suitable for use in the manufacture of high grade furniture, cabinet work, decorative joinery and veneer. Also used for ship-building, general construction, and the making of tool handles and croquet mallets.
- Supplies:** Occurs widely but not abundantly in the Guyana forests. Regular supplies in modest quantities are available.

Source: Guyana Forestry Commission.

3. Determa

Scientific name:

Ocotea rubra (family: Daumecae)

A.T.I.B.T. standard name:

Louro Vermelho

Other names:

Wana, Grignon Franc, Red Louro

Wood appearance:

Pale reddish-brown with subdued golden lustre. Grain straight to irregular, texture rather coarse. Bears some similarity to a dense grade of African Mahogany. Bole 60-80 feet long, cylindrical; diameter 24-36 inches.

Physical and mechanical properties:

Average density about 620 kg/m³ (39 lb/ft³). Hardness - soft to medium. Strength class 5/4, generally below the average for its density. Movement low to moderate. Determa responds extremely slowly to atmospheric changes and is, thus very stable in use.

Natural durability:

Determa heartwood is rated durable in graveyard and pure culture tests. The wood equals Honduras Mahogany in its resistance to termites, and is also fairly resistant to marine borers.

Determa is highly resistant to moisture absorption and has excellent weathering characteristics.

Timber processing

Drying: kiln schedule E. Because of the slow diffusion rate of the moisture in the wood Determa is difficult to season.

Working: saws well, works easily with all tools; turns and carves well.

Finishing: stains and polishes well after filling.

Uses:

A general utility timber, widely used for all kinds of indoor and outdoor work. Uses include boat and ship building (keelframe, planking and decking); carriage and waggon building; building construction both interior and exterior (framing, stairs, windows, sash frames, flooring strips, interior trim); cooperage, furniture and cabinet work. The wood is suitable for bending to a moderate radius of curvature.

Supplies:

Available in considerable quantities.
Supplies adequate to meet all likely
requirements, both in quality and quantity.
The timber is available in large sizes.

Source: Guyana Forestry Commission.

4. Hububalli

- Scientific name: Loxopterygium sagotii (fam.: Anacardiaceae)
- A.T.I.B.T. Standard name: Slangenbout
- Other names: Koika, Onotillo, Kooel pialli
- Wood appearance: The wood is brown to reddish-brown, attractively figured; contains numerous narrow to rather wide darker stripes and streaks. Lustre medium. Texture medium, uniform. Grain straight, sometimes interlocked or wavy.
- Physical and mechanical properties: Density about 800 kg/m^3 (50 lb/ft^3). Strength class 4, moderately hard; toughness medium to rather brittle. Movement rather low. Air dry Hububalli compares closely with Burma Teak in all strength properties except compression and tension perpendicular to grain.
- Natural durability: Resistant to decay; moderately resistant to termites. The wood is highly resistant to moisture absorption.
- Uses: Because of its attractive figuring and relative scarcity the wood is best suited for panelling, high-grade furniture and cabinet work.
- Supplies: The wood is frequently found in the far interior. Moderate quantities are available for export.

5. Purpleheart

- Scientific name:** Peltogyne pubescens and P. venosa (family: caesalpinaceae)
- A.T.I.B.T. Standard name:** Amarante
- Other names:** Amaranth, Morado, Pau Roxo, Bois Violet, Barabu.
- Wood appearance:** Dull brown when freshly cut, rapidly oxidizes to violet-purple on exposure to light and gradually toning down in course of time to dark purplish-brown. Sapwood whitish or cream coloured. Grain generally straight, sometimes wavy or interlocked. Texture moderate to fine. Bole 50-90 feet long, cylindrical; diameter 20-44 inches.
- Physical and mechanical properties:** Wood is very tough, strong and resilient. Density about 860 kg/m^3 (54 lb/ft^3) seasoned. Movement small, bending strength 147 N/mm^3 (21399 lbf/in^2) modulus of elasticity 1600 N/mm^2 ($242,000 \text{ lbf/in}^2$) compression parallel to grain 78.5 N/mm^2 (11380 lbf/in^2). Shock resistance medium.
- Natural:** Highly resistant to decay, termites and fire. Heartwood very durable and extremely resistant to preservative treatment, but sapwood is permeable.
- Timber processing:**
- Drying:** Dries well and fairly rapidly with little degrade. Kiln Schedule E.
- Working:** Not difficult to work. Saws, planes and turns well, finishing smoothly; takes a high polish.
- Assembly:** It takes glue well and holds nails and screws satisfactorily.
- Finishing:** Gives good results when lacquered or polished.
- Uses:** Possess high strength and very good durability and is an excellent structural timber suitable for heavy outdoor constructional work such as bridges, dock work and park benches. As flooring it has high wearing qualities

and is suitable for most conditions of traffic. Has been used successfully in chemical plants for vats, filter press plates and frames. Suitable for high-grade furniture and turnings. Also used for making billiard cue butts, tool handles, interior and exterior joinery. A valuable wood for its attractive appearance and its strength.

Supplies:

Regular supplies are available.

6. Silverballi (Group)

Family: Lauraceae

Scientific names: Brown Silverballi (Canella): Licaria canella
Kereti Silverballi: Ocotea puberula, Ocotea wachenheimii, Ocotea oblonga
Kurahara: Ocotea g'omerata
Swizzlestick: Ocotea schomburgkiana
White Silverballi: Ocotea canaliculata
Yellow Silverballi: Aniba ovalifolia

A.T.I.B.T. standard name: Canela

Other names: Pisie, Caralou, Canelo, Louro Branco, Inamui, Preto

Wood appearance: In Guyana the Silverballi group is divided into 'hard' and 'soft', with the dividing line being put at an air dry density of 585 kg/m³ (37 lb/ft³).

The heartwood ranges from greyish through yellowish buff to light brown and darkens on exposure. Lustre medium to high. Texture rather fine to moderately coarse. Grain straight. The wood usually has a pleasant aromatic odor.

Bole 60-70 feet long; diameter 16-24 inches.

Physical and mechanical properties:

The 'hard' Silverballi is rather light to heavy with densities above 37 lb per cubic foot. The group is generally in strength class 2.

Movement rather low; the lighter species shrink less than the heavier types.

Natural durability:

Moderately resistant to insects and decay, but susceptible to termites. Highly resistant marine borers. Difficult to impregnate.

Timber processing:

Drying: kiln schedule G. Silverballi air dries well with little degrade.

Working: saws well and works easily.

Assembly: holds nails, screws and glue well.

Finishing: Finishes smoothly unless grain is severely interlocked. Paints well.

Uses:

'Hard' Silverballi: General carpentry, boat building (planking), suitable for both interior and exterior work in house building; furniture and cabinet work; suitable for veneer and plywood.

'Soft' Silverballi: general carpentry, interior work, light furniture; suitable for utility plywood.

Supplies:

Occurs frequently in the Guyana forests. Regular supplies are available for orders placed in the Silverballi group.

7. Simarupa

- Scientific name: Simaruba amara (family: Simarubaceae)
- A.T.I.B.T. Standard name: Marupa
- Other names: Aceituno, Acajou blanc, Scemardepa, Bitterwood.
- Wood appearance: Heartwood whitish, not differentiated from the whitish or straw coloured sapwood. Wood has a slightly bitter taste, but is odourless. Grain straight. Texture is medium, uniform and lustrous. Pole 70-90 feet long; diameter 20-24 inches.
- Physical and mechanical properties: A very light, soft timber. Density about 430 kg/m³ (27 lb/ft³) seasoned. In several respects very similar to Obeche (Triplochiton scleroxylon). Movement small. Low in bending strength stiffness, crushing strength and shock resistance.
- Natural durability: Timber of low durability, blue stains easily. Timber converted while still green can easily be treated by short dipping and diffusion.
- Timber processing: Drying: dries very rapidly and very well. Kiln schedule L
- Working qualities: Easy to work with both manual and machine tools.
- Assembly: glues well. Can be easily nailed with good holding qualities.
- Finishing: easy to paint, stain or varnish.
- Uses: Suitable for use where a light, easily worked hardwood is required and where its lack of durability and low strength are not important. Examples are in furniture for interior use, drawer slides, and some types of cabinet framing; interior joinery and shoe heels. Excellent qualities for model making, utility woodware and toy manufacture. Simarupa peels well and makes attractive plywood.
- Supplies: Adequate supplies available in commercial quantities.

8. Properties of a Belizean Timber Species suitable as a substitute to Mahogany in furniture production

Names

Trade name: Santa Maria
Botanical name: Calophyllum brasiliense
var. Rekoi Standl. Guttiferae.
Local name: Santa Maria, Leche Maria,
Jacareuba (Brazil).

Range

Mexico to Brazil and through the West Indies.

Description of Wood:

Sapwood - pale pink, 1-2 inches wide.
Heart - light pinkish to reddish brown.
Odour and taste - not distinctive.
Grain - generally interlocked. Texture -
medium.
Growth rings - indistinct, usually limited
by a fine line of parenchyma.
Pores - medium, visible, in diagonal to
radial chains and in irregular groups,
rather numerous.
Vessel lines - distinct, darker than
background.
Rays - very fine, invisible to naked eye on
cross section; fine but distinct on radial
surface, darker than background; faintly
visible on tangential.
Gum Veins - often associated with calcium
carbonate deposits, rather frequent.
Parenchyma - in concentric or broken
tangential lines, indistinct on cross
section; distinct because of darker colour
than background on longitudinal surfaces,
where an irregular pattern is produced.

Physical properties

Density: 540-715 kg/m³ (34-45 lb. per cubic
foot) at 15 per cent moisture content.
Hardness: moderate, about equal to that of
English Oak.
Shrinkage - above average. From green state
to about 11 per cent moisture content:
tangentially 5/8 inch per foot, radially 3/8
inch per foot.
Distortion: There is some tendency towards
distortion in seasoning unless the logs are
suitably converted, preferably by the
semi-quartered method. But given this, and
careful seasoning, the wood has been
observed to give satisfactory results in
good class joinery trials over a period of
eight years.

Durability:

Resistance to fungal and insect attack
moderately high. Heartwood moderately
durable in contact with the ground.
Constructional material in exposed
situations very durable. Not readily

attacked by termites. Not resistant to marine borers. Resistance to impregnation with preservatives: Sapwood readily amenable to impregnation, but heartwood extremely resistant.

Mechanical properties

In resistance to static bending, shock load and splitting, the timber is slightly superior to English Oak. It has poor bending qualities and cannot be compressed without buckling.

Working qualities

Works with moderate ease in most operations with both hand and power tools and is comparable with medium quality English Oak in resistance to cutting. Saws: Flat-sawn green wood may cast off the saw. Planing: For the dressing of seasoned stock cutter knives require to be kept in good condition while the rate feed should be relatively low in order to obtain the best results. Unless this care is taken pronounced pick-up may occur in the stripe figure of fully quartered stock, thus necessitating extra sanding prior to finishing and polishing. If obtainable, a cutting angle of less than 20 degrees materially improves the finished surface. Drilling: The wood tends to tear at the exit hole and the wood must be carefully supported to minimize damage. Turns: readily to a reasonably good finish. Stains and finishes: well but quarter-sawn stock requires much sanding to remove 'picked-up' grain. Nailing: The wood is rather hard to nail and, in dimension stock, nails once driven are very difficult to pull. Where the darker coloured gum streaks are present the associated calcium carbonate tends to dull the cutter edges.

Laboratory tests:

- (a) One small log of Santa Maria was tested at Imperial Institute, London in 1922.
- (b) A preliminary test on 5 logs was made at the U.K. Forest Products Research Laboratory in 1932 and a major test on some 1400 cubic feet in 1933.
- (c) Four bolts from different parts of the same tree were tested at Yale School of Forestry in 1932.

Trade trials:

Material from the major test was tried by woodworking firms.

(a)

Veneer and plywood: The interlocked grain persisting throughout the wood caused tearing of rotary cut-stock. Gum streaks were present. Veneers showed a tendency to buckle and in drying the interlocked grain caused splitting both at the ends and middle of the sheets. Plywood showed open end-split, torn grain and gum streaks while distortion was pronounced.

(b)

Plywood

A short log taken from the parcel described in laboratory test (b) above was examined by a firm of decorative veneer manufacturers, who stated that interlocked grain was present and caused tearing of rotary cut veneer, and that gum streaks were present, thus causing a tendency towards splitting and buckling in the veneer when drying. Nevertheless plywood made up from these veneers and kept under observation for some years has remained flat and shows a fairly decorative appearance. For future plywood manufacture care should be taken to select at source logs which are the most suitable in size and shape, and as far as possible free of the defects mentioned.

(c)

Trials as general purpose furniture

A favourable report was made on a parcel of about 500 cubic feet by a furniture manufacturer. The wood was used for turnings, light articles of furniture, small tables, chairs, mattress sides, couches. It was noted that the condition was very fair and comparable with other commercial British Commonwealth timbers. Defects and distortion after resawing were not more than 5 percent, which is reasonable. The timber had good 'standing' qualities during manufacture and final assembly.

Source:

Notes on Forty Two Secondary Hardwood Timbers of British Honduras, 1946, Forest Department of British Honduras.

9. Properties of a Dominican Timber Species suitable
for Furniture/Joinery Making

Gommier

Scientific name: Dacryodes excelsa Vahl. D. hexandra (Hamilt. Griseb), family: Burseraceae.

Other names: Gommier blanc, Gommier montagne (Guadeloupe and Martinique); Tabonuco (Puerto Rico)

Distribution Gommier occurs in Puerto Rico and the Lesser Antilles, generally in small groups along ridge-tops and upper slopes of the rain forests in Dominica, Saint Lucia, St. Vincent, Grenada, Guadeloupe and St. Kitts.

The tree: Gommier is a large to very large evergreen tree reaching a height of 3.0 m and a diameter of 1.0 m to 1.5 m although mature trees are more commonly 18.0 to 24.0 m tall and 0.5 to 0.75 m in diameter. They are deep rooted, without buttresses, and able to stand up well to the numerous hurricanes of the Caribbean. The boles are straight and well formed.

The timber: Gommier is variously reported to resemble birch (Betula, mahogany, and sometimes yellow poplar (Liriodendron). It is perhaps closer in appearance to the botanically associated gaboon or okoume (Aucoumea), but harder, heavier and much finer textured.

The sapwood is narrow, greyish in colour and not clearly demarcated from the heartwood which is uniform pale brown with a purplish cast when freshly cut, turning a pinkish brown when dried, and a lustrous brown on exposure. The grain is sometimes interlocked, producing an attractive ribbon stripe. The lustre is high and often satiny in appearance. The texture is fine to medium and uniform, and in general is somewhat finer textured than mahogany.

The wood weighs about 640 kg/m³ when dried.

Drying: It dries easily with no appreciable distortion or other defects. Its volumetric shrinkage from green to oven dry is 10.5 percent; tangentially it is 6.4 percent and radially 4.1 percent, which is superior in terms of drying to those values for African and Honduran mahogany.

Durability:

Moderate.

Working qualities:

The timber is easy to work but with a tendency to dull cutting edges due to the high silica content of the wood. When sharp cutting edges are maintained, the wood finishes smoothly and takes glue and all finishes effectively. It is good wood for turning and for holding nails.

Uses:

Gommier is used extensively in the Caribbean area for furniture and cabinet making, and in Puerto Rico is often stained and sold as 'mahogany'. It is also used for boat-building, shingles and crates. In the Caribbean, it is considered very susceptible to termite attack, and for exacting purposes not as good as mahogany with its known resistance to termites. Gommier also produces very good veneer. Tests made at the Centre Technique du Bois indicate that gommier is suitable for plywood, with selected stock suitable for decorative veneer. This was substantiated by other tests carried out in Canada with the recommendation that eccentric peeling produced better quality veneer.

Exporting Contacts

Guyana Mr. H. E. Cort, Marketing Manager, Guyana Forestry Commission, 1 Water Street, Kingston, Georgetown, Guyana, Telex: 2262 WALABA GY, Tel.: 02-54191

Belize Mr. H. Flower, Chief Forest Officer, Forestry Department, Ministry of Natural Resources, P. O. Box 148, Belmopan, Belize, Telex: 102 FOREIGN BZE, Telephone: (08) 2415

Dominica Mr. E. W. B. Jerome, Manager, North Eastern Timbers Sawmill, Palm Tree, Woodford Hill, Dominica, Tel.: 809-449-7042

Mr. D. Southwell, Managing Director, Dominica Timbers Ltd., (Portsmouth) Sawmill, P. O. Box 198, Roseau, Dominica

ANNEX III

Draft Project Document

Country: Santa Lucia

Title of project	Assistance to the Santa Lucia Furniture Manufacturing Association in setting up a tool maintenance servicing centre.
Address of Association and contact	Furniture Manufacturing Association, c/o Modern Furniture Enterprises Ltd., P.O.Box 744, Castries, St. Lucia, Tel.: 22221, Cable: SLFMA (Mr. P. St. Clair, Executive Secretary)
Government implementing agency	Forest and Land Department, Ministry of Agriculture and Timber Industry Development Board, Conway, Castries, Saint Lucia, W.I.
Executing agency	United Nations Industrial Development Organization (UNIDO) or other Organization as selected by the Government
Duration	3 months
Estimated starting date	
External inputs	US\$ 25,000
Government inputs	In kind

PART I - LEGAL CONTEXT

To be indicated in the final project document.

PART II - THE PROJECT

PART II A - Development Objective

To promote the operative efficiency of the Furniture and Joinery Industries of Saint Lucia.

PART II B - Immediate Objective

To enable the Saint Lucia Furniture Manufacturers' Association to acquire the necessary know-how for providing tool maintenance service to the Saint Lucia's furniture and joinery industries.

PART II C - Background and Justification

The local furniture/joinery industries consists of some 60 small-scale enterprises with only four of them employing 10 to 18 workers and the rest averaging about 4 workers.

The sector, as a whole, is in its initial stage of development. The main constraint being the lack of modern and yet appropriate woodworking and tool maintenance equipment. However, the management of most of the workshops visited in the course of a UNIDO/CARICOM mission to the island was found to possess a remarkable degree of dynamism and ambition.

The majority of the existing furniture making enterprises, totalling 45 workshops, have recently formed the Saint Lucia Furniture Manufacturers' Association with the objective of spearheading the developing of the sector through common efforts and services.

This project proposes to provide the Furniture Association with short-term expertise to help establish a Tool Maintenance Servicing Centre for the benefit of the furniture and joinery industries as a whole.

PART II D - Outputs

1. The tool maintenance equipment purchased for the tool maintenance servicing centre commissioned and operational.
2. Three technicians trained in the operation of the equipment.

PART II E - Activities

1. Preparation of the plant layout of the maintenance centre;
2. Supervision of the installation and trial operation of the equipment;
3. Calculation of appropriate servicing charges for standard maintenance work;

4. Setting up a simplified costing system to monitor the Centre's expenditure and income; and
5. Training in the operation of the equipment in the process of providing maintenance services.

PART II F - Inputs

<u>1. External inputs</u>	<u>man/months</u>	<u>US\$</u>
11-01 Tool maintenance expert (split mission)	3	24,000
51-00 Miscellaneous expenses		1,000
Total external inputs		25,000

2. Government inputs

- 2.1 Local transport
- 2.2 Secretarial services
- 2.3 Counterparts

3. Inputs by the Santa Lucia Furniture Manufacturers' Association

- Cost of the tool maintenance equipment.
- Cost of the auxilliary equipment consumed.

PART II G - Related Activities

Selection of tool maintenance equipment

The selection of the equipment is provided in the ad-hoc report prepared under the UNIDO project UC/CAR/86/201 and entitled 'Guidelines on the Selection of Woodworking Equipment for the Small-scale Furniture/Joinery Industries in the Caribbean Community' (report reference no. IO/R.53).

Prior Obligations

The equipment must be purchased before the final approval of this technical assistance project.