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16785

Distr.
RESTRICTED

IO/R.52
6 April 1988

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ENGLISH

**PROSPECTS FOR INTEGRATION IN THE WOODWORKING
INDUSTRY OF THE CARIBBEAN COMMUNITY**

UC/CAR/86/201

Terminal report*

**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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Abbreviations

BM: Foot board measure
CFT: Cubic foot (or feet)
DWT Deadweight ton (shipping)
grt Gross register tons (shipping)
OECS Organization of Eastern Caribbean States
WISCO: West Indies shipping Corporation
LSD: Landing, storage and delivery charges

Conversion ratios

$1\text{m}^3 = 423.80 \text{ BM} = 35.31 \text{ CFT}$
 $1\text{CFT} = 12 \text{ BM} = 0,02832 \text{ m}^3$

ABSTRACT

**UC/CAR/86/201 - Prospects for Integration in the
Woodworking Industry of the Caribbean Community (CARICOM)
By Pietro Borretti, Georgetown, July 1987**

The project was jointly initiated and carried out by UNIDO and the CARICOM Secretariat with the objective of promoting regional integration in the development of the woodworking sector and, in particular, in the supply of wood products from within CARICOM.

The report provides an overview of timber resources and sawmilling capabilities in the forest-endowed countries Guyana and Belize, and of the status and timber requirements of the furniture/joinery industry in the lumber-importing CARICOM countries. Constraints in intra-CARICOM shipment of lumber are also reviewed.

The report reveals that a good opportunity exists for Guyana and Belize to supply CARICOM member states with furniture timber species as substitutes for Brazilian Mahogany whose supply is becoming increasingly scarce.

Three areas of activities are identified in the report for inter-CARICOM cooperation in the development of trade and technology in the timber industry sector:

- (a) Possible establishment of a timber distribution centre in either Barbados or Trinidad to promote the supply of timber from within the region;
- (b) Holding a regional course/exhibition in order to (1) help transfer essential technology for the development of the small-scale furniture/joinery industry in the Caribbean, and (2) promote the exchange of wood products in the region;
- (c) Interregional tool maintenance training programme for the furniture:joinery industry by utilizing training facilities being established in Guyana with UNIDO assistance.

Detailed findings and recommendations concerning the timber industries of the nine CARICOM countries visited in the course of the mission are contained in the respective country technical reports.

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A. Introduction

- A 1. Title and number of the 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

- A 2. Date of request:

17 June 1986.

- A 3. Cooperating Agency:

Caribbean Community Secretariat, Georgetown, Guyana

- A 4. Name and function of UNIDO consultant:

Pietro Borretti, Consultant in Woodworking Industry Sector.

- A 5. CARICOM counterpart:

Ivor Carryl, Industrial Economist, Economics and Industry Division.

- A 6. UNIDO Backstopping officer:

Antoine V. Bassili, Senior Industrial Development Officer, Industrial Management and Rehabilitation Branch, IIS

- A 7. Duration of mission in the field and countries visited:

16 March to 3 July 1987. Countries visited: Antigua and Barbuda, Barbados, Belize, Dominica, Guyana, Jamaica, St. Lucia, St. Vincent, Trinidad and Tobago; Itinerary given in Annex II.

- A 8. Terms of reference:

To assist the Caribbean Community Secretariat (CARICOM) to develop an integrated industry programme for the development of the woodworking and furniture industries of its member states (job description given in Annex I).

- A 9. Method of work:

The mission consisted of two main activities: (a) survey of selected sawmills in the main forest-endowed countries of Guyana, Belize and Dominica to determine their ability to produce and supply sawn timber to the timber-importing CARICOM countries; and (b) survey of the furniture and joinery industries of the timber-importing countries to assess their exact needs for raw and semi-processed timber.

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 13 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 so as to promote the supply of wood products within the region, has been assigned a priority role in this respect in that the CARICOM as a whole is heavily dependent on extra-regional sources of supply to meet its lumber demand.

B. SUMMARY

B.1 Objective

1.1 The project was jointly initiated by the Caribbean Community Secretariat (CARICOM) and the United Nations Industrial Development Organization (UNIDO) with the objective of promoting integration in the development of the woodworking sector and, in particular, in intra-CARICOM supply of wood products. The project involved travel to nine CARICOM countries by a UNIDO consultant and his CARICOM counterpart.

B.2 Main activities

2.1 The project included two main activities:

- (i) survey of selected sawmills in the forest-endowed member states of Guyana, Belize and Dominica to review lumber production capabilities; and
- (ii) survey of selected furniture and joinery plants to establish requirements for furniture and joinery type lumber in the Community and to evaluate the efficiency of these plants in the utilization of timber inputs.

2.2 Other aspects analyzed were forest resources, shipping facilities, lumber and furniture export trends and current lumber prices. Detailed findings are grouped under individual country reports, a list of which is drawn in Annex XI.

B.3 Main findings

3.1 According to the 1985 data, the annual lumber consumption of the member states amounts to approximately 15.4 million CFT (436,000 m³).

3.2 Of this volume, only 4.5 million CFT (129,000 m³) or 29.6 percent is supplied from the Community's own forest resources; while the balance is made up of lumber imported from outside CARICOM, mainly from the USA, Honduras and Brazil.

3.3 The import of lumber from within CARICOM amounts to about 94,800 CFT (2,500 m³) or about 0.78 percent of the total volume of lumber imported annually by the Community.

3.4 The bulk of the 304,500 m³ of lumber imported from outside CARICOM consists of Pine (Pitch Pine, White Pine and Southern Yellow Pine). It is unlikely that either Guyana or Belize would be able to compete in price in the supply of Pine substitutes (Caribbean Pine in the case of Belize), nor would they be able to supply the required volume, as the total lumber output of Guyana and Belize in 1985 was 1.9 million CFT (53,298 m³) and 765,873 CFT (21,690 m³), respectively.

3.5 However, a very keen interest was expressed on the part of furniture manufacturers and lumber importers, visited in the course of project travel, on importing from Guyana and Belize furniture timber such as Determa (Ocotea rubra), Crabwood (Carapa guianensis Aubé), Santa Maria (Calophyllum brasiliense), etc. as substitutes to Brazilian Mahogany whose supply (estimated at over 6,000 m³ per year) is becoming increasingly scarce. Specific requests for quotations in this respect are listed in the respective country reports of the project.

3.6 Selected mills having the capability of exporting furniture-grade lumber and or blanks to the CARICOM markets were identified in Guyana, Belize and Dominica, although the need exists for the sawmilling sector, as a whole, to renovate and expand production and logging equipment.

3.7 The secondary wood processing sector, furniture and joinery making, has yet to attain the efficiency and productivity typical of the industrial system. As for the sawmilling sector, furniture and joinery plants were identified which could serve as demonstration units for the rest of the woodworking industry in the Community.

3.8 The existing shipping and distribution methods are inadequate with respect to the capability of serving the needs of a highly fragmented market for small volumes of lumber at a high regular frequency of delivery.

3.9 There are no significant prospects of promoting trade of wooden furniture and furniture parts from within the CARICOM because the major regional market, Trinidad, has virtually dried up due to the post-oil-boom recession bringing about substantial non-tariff barriers in intra-CARICOM furniture trade, designed to protect Trinidad's own battered furniture industry. Antigua, however, still offers a good potential in the import of selected types of furniture on account of its thriving tourism industry (its current building activities are valued at over US\$ 150 million).

B.4 Main recommendations

4.1 The report recommends that a number of activities be carried out in order to improve the efficiency of the woodworking sector and its potential for intra-CARICOM wood products trade.

- 4.1.1 To investigate the feasibility of centralizing in Barbados or Trinidad the distribution and marketing of lumber from Guyana and Belize to ensure a speedy and regular delivery to all the Leeward and Windward Islands^{2/};
- 4.1.2 To provide exposure, as a regional endeavour, to modern furniture-making technologies designed to increase efficiency and productivity, with particular emphasis on the needs of the small-scale industry;
- 4.1.3 To provide regional training opportunities by utilizing tool maintenance, solar kiln and wood preservation facilities established in Guyana with UNIDO's assistance;
- 4.1.4 To provide technical assistance for improvement and/or expansion of selected, existing woodworking plants and the establishment of tool maintenance servicing units; and
- 4.1.5 To provide feasibility studies on the expansion of selected existing sawmills, as a basis for access to credit facilities.

C. OVERALL FINDINGS AND CONCLUSIONS

C.1 The potential of supplying lumber from within CARICOM

1.1 Considerable commercial forest resources are available in Guyana and, to a lesser extent, Belize - the only two CARICOM countries which are net lumber exporters. Of the other countries, only Dominica is nearly self-sufficient in lumber supply.

1.2 Although the sawmill industry in both Guyana and Belize is far from being highly developed, it does offer a selection of sawmills having a good potential to deliver the type and quality of lumber required by CARICOM's furniture industry.

1.3 Currently, CARICOM as a whole is heavily dependent on extra-regional sources of supply to meet its lumber demand. Based on 1985 data^{3/}, the apparent lumber consumption of the CARICOM member states amounts to 436,000 m³ (15.4 million CFT) per year. Of this volume, however, only 129,000 m³ (4.5 million CFT) or 29.6 percent is supplied from regional forest resources; while 304,646 m³ (10.7 million CFT) or nearly 70 percent is imported from outside CARICOM mainly from the USA, Honduras and Brazil.

1.4 The supply of sawn and dressed lumber from within CARICOM in 1985 amounted to only 2,402 (84,814 CFT) - or 0.55 percent of the total apparent consumption - and accounted for only 0.78 percent of the total volume of lumber imported by the member states. The supply consists mainly of Greenheart and Purpleheart from Guyana and Mahogany from Belize. The share of lumber exports to CARICOM destinations by Guyana and Belize was 2,000 m³ (70,620 CFT) and 402 m³ (14,194 CFT), respectively^{4/}.

^{2/} Jamaica is already linked with regular shipping services to Belize. As for timber supply from Guyana to Jamaica bulk shipment would be justified on account of the high volume of timber imported by the latter (Jamaica is the second largest timber importer in CARICOM).

^{3/} See table 1

^{4/} Figures based on the export records of Guyana and Belize.

1.5 It is unlikely that either Guyana or Belize would be able to compete in price with the USA and Honduras in the supply of Pine - a timber which accounts for the bulk of the 305,000 m³ of lumber imported annually by CARICOM, mostly for building construction end-uses. In fact Pine imported from the USA and Honduras is landed in Trinidad and Jamaica for US\$ 0,50/BM. Softwood being landed in Puerto Rico from Canada is even cheaper. A very large Canadian export consortium is reported to have acquired a wharf and storage site in San Juan with a view to servicing the Caribbean islands from there. It would appear that large ships provide cheap freight to San Juan. In any case, neither Guyana nor Belize would have the necessary sawmilling capacity to supply anywhere near the required volume of Pine or Pine substitutes ^{5/}. In fact, in 1983, the lumber output of Guyana and Belize was 53,298 m³ (1.9 million CFT) and 21,690 m³ (765,873 CFT) respectively.

The following table summarizes the status of the lumber market in CARICOM member states in terms of production, imports, exports and apparent consumption. Detailed data is provided in the respective country technical reports prepared as part of the project.

^{5/} Possible Pine substitutes from Guyana are: Kereti Silverballi (Nectandra and Ocotea spp.), Simarupa (Simarupa amara). Substitute from Belize: Caribbean Pine.

Table 1: Status of the lumber market in CARICOM, 1985, - production, imports, exports and apparent consumption.

	Production	Total imports (a)	Exports	Apparent consumption	of which imported Mahogany
Antigua	m ³ ---	27,000	--	27,000	191
(b)	BM ---	11,442,600	--	11,442,600	159,600
Barbados	m ³ ---	45,782	--	45,782	2,000
	BM ---	19,402,411	--	19,402,411	847,600
Belize	m ³ (b) 21,690	--	1,741	19,949	--
	BM 9,189,000	--	737,835	9,189,000	--
Dominica	m ³ 14,000	(c) 2,000	--	16,000	--
	BM 6,000,000	847,600	--	6,847,600	--
Grenada	m ³ n.a.	12,900	--	12,900	116
	BM ---	5,467,020	--	5,467,020	49,160
Guyana	m ³ 53,298	--	(d) 8,676	44,622	--
	BM 22,588,000	--	3,676,888	18,911,112	--
Jamaica	m ³ (e) 31,621	50,155	--	81,779	1,367
	BM 13,400,979	21,256,960	--	34,657,940	579,334
Montserrat	m ³ n.a.	n.a.	--	n.a.	n.a.
	BM ---	---	---	---	---
St. Kitts	m ³ n.a.	112	--	n.a.	n.a.
	BM ---	47,465	--	---	---
St. Lucia	m ³ 455	9,000	--	9,455	106
	BM 192,829	3,814,200	--	4,007,029	44,923
St. Vincent	m ³ 304	5,787	--	6,091	309
	BM 129,000	2,402,530	--	2,581,365	130,530
Trinidad	m ³ 18,000	154,309	--	172,309	2,256
	BM 7,628,490	65,396,154	--	73,024,554	956,092
Totals	m ³ 139,368	(a) 307,048	10,417	435,887	6,554
	BM 59 million	130 million	4.4 million	184.7 million	2.778 million

Source: Country missions, statistics Unit of CARICOM Secretariat, Guyana Forestry Commission

- Notes:
- (a) Including imports from within CARICOM
 - (b) Including 5000 m³ (2 million BM) Mahogany lumber
 - (c) Average figures 1981 and 1985
 - (d) 1986 figures as provided by the Guyana Forestry Commission
 - (e) 1984 figures

1.6 Based on the response received from furniture manufacturers and lumber importers in the course of project travel in CARICOM, both Guyana and Belize stand a unique opportunity to promote lumber exports to CARICOM member states in terms of supplying Mahogany substitutes, in the wake of the increasing scarcity and higher cost in the supply of Brazilian Mahogany, the main type of furniture timber used in the region. CARICOM's imports of Mahogany lumber amounted to 6,500 m³ (229,515 CFT) in 1985, a volume which is well within the existing sawmilling capacity of Guyana and Belize.

1.7 The Mahogany substitutes identified are Crabwood (Andiroba), Determa and Courbaril/Locust^{6/} (*Hymenea courbaril*) (though the latter is denser than Mahogany from Guyana, and Santa Maria from Belize). Limited volumes of

6/ Latin name: *Hymenea courbaril*

Mahogany proper (*Swietenia macrophylla*) can also be supplied by Belize. Although not a substitute to Mahogany, Guyana's Hububalli also raised considerable interest on the part of furniture manufacturers and lumber importers on account of its attractive grain pattern and similarity to Teak.

1.8 A potential also exists in increasing Guyana's exports of Greenheart, Purpleheart and other construction-type hardwoods to the region depending, among other factors, on the capability of the sawmilling industry to upgrade its existing planing mill facilities and possibly introduce more efficient moulding machinery. This is necessary in view of the fact that in CARICOM, as in world markets in general, roughly saw timber, required for building construction end-uses, is increasingly being replaced by dressed lumber.

1.9 Specific requests for CIF quotations on lumber supply from Belize and Guyana are detailed in the individual country reports under the heading: Lumber Imports Potential from Belize and Guyana.

1.10 Market prices of lumber available in the various CARICOM countries visited in the course of project travel are listed in the respective country reports under the heading: Lumber prices.

C.2 The potential of supplying furniture and joinery from within CARICOM

2.1 In the current situation of drastically underutilized capacity of the furniture industry in the largest CARICOM markets - Barbados, Jamaica and Trinidad and Tobago - there are no prospects for developing a meaningful intra-CARICOM trade in wooden furniture. In fact, in the case of Trinidad and Tobago, furniture has been included in the import 'negative list' and the Government equally discourages the imports of furniture parts for assembly in Trinidad as this would deprive the local furniture industry of badly-needed value-added opportunities.

2.2 One exception in this respect is Antigua where the very high wage rate for skilled workers - US\$ 2.30 per hour - prevents the local furniture sector from catering for the furniture requirements of the lower-income groups. In fact, the Plastic Foam and Furniture Company in Antigua is presently importing badly-made, low-cost furniture to fill this gap and expressed interest in quotations from CARICOM suppliers, as detailed in the Antigua and Barbuda country reports. Moreover, in view of Antigua's considerable tourism-related building activities (estimated at US\$ 150 million in 1987), there might also be the possibility of importing panel doors from manufacturers in Dominica, Jamaica and Barbados.

2.3 A furniture export programme directed to Antigua could be combined in terms of shipping arrangements with a similar export drive aimed at close, non-CARICOM destination such as Puerto Rico (which imports some US\$ 70 million worth of furniture a year), Guadeloupe and Martinique.

2.4 Specific opportunities were identified, as listed in the country reports on Jamaica and Barbados, for the supply by Belize and Guyana of the following semi-finished components:

- (a) panel door components, pre-dried and cut to size;
- (b) chair turnings.

2.5 However, the potential for a regular supply of furniture component parts (dimension stock) is very limited, in view of the fact that the local markets pattern is such as not to enable furniture producers to predict well in advance demand for product mix - making it uneconomical to maintain an extended inventory of parts.

C.3 The Forest Resources

3.1 According to the Regional Forestry Sector Study prepared in 1984 by the DFS (Deutsche Forstinventur Service) for the Caribbean Development Bank, about 75 percent of 20.8 million ha of the total land area in the region is covered by forests. However, only 60 percent of this, or 16.3 million ha can be classified as commercial forests, that is forest where timber production is possible. Details on commercial forests in the Caribbean are given in Annex V.

3.2 The bulk of commercial forests is concentrated in Guyana (14,000 ha) and Belize (1,784 ha). The rest of the region has less than 5 percent of the total area covered with industrial forests.

3.3 The mixed tropical hardwood forests occupy 98 percent of the total woodland. They may be subdivided into different types according to their species composition. The remaining part is covered with Caribbean Pine stands (335,000 ha) of which 50 percent are in the Bahamas and 45 percent in Belize.

3.4 The total roundwood harvest in the 16 Caribbean countries^{7/} covered by the study of the Deutsche Forstinventur Service amounts to about 335,000 m³ per year, representing less than 0.1 percent of the growing stock. This low exploitation rate is due to the limited harvesting in the two continental Caribbean countries, Guyana and Belize, which produce about 75 percent of the total roundwood in the region. In fact, only 5 percent of Guyana's forest area is surveyed and assigned for utilization, with an annual roundwood input on the part of the sawmilling sector which decreased from 256,000 m³ in 1975 to 85,300 m³ in 1984. The roundwood removals in Belize (about 43,000 m³ per year) is estimated to be less than 5 percent of the amount that could be harvested on a sustained basis. The relatively low deforestation rate in Guyana and Belize is explained by the low population density and the difficulty of access to virgin forest areas.

3.5 The plantation forests in the region cover an area of 37,250 ha which represents less than 1 percent of the industrial forests. The only relatively large plantations have been established in Jamaica (14,500 ha) and Trinidad and Tobago (18,000 ha). About 55 percent of the plantations consist

^{7/} The study covered the following Caribbean countries in addition to the thirteen CARICOM member states: Anguilla, British Virgin Islands and the Turks and Caicos Islands.

of Caribbean Pine, 45 percent of various hardwood species among which is Teak in Trinidad. The volume increment of hardwood can be estimated at 6-12 m³/ha per year, while Pine can reach a volume increment of up to 10-15 m³/ha per year. However many plantations are still too young for exploitation.

C.4 The Sawmill Industry

4.1 Taken as a whole, the sawmill sector in CARICOM has yet to attain an appropriate level of efficiency and productivity. The bulk of existing sawmills in Guyana and Belize consists of small plants equipped with obsolete circular saw headrigs, and in the case of Guyana, with gangsaws, whose working conditions generally result in a low log-recovery rate and in sawn lumber of poor quality and, in particular, uneven cut.

4.2 On the other hand, in both countries there is a number of more efficient, larger sawmills - mostly those already engaged in exports - which hold the key to developing a meaningful growth in lumber exports to CARICOM member states and overseas.

4.3 In Guyana, the sawmilling sector as a whole is experiencing a considerable drop in the utilization of installed capacity - from 38.7 percent in the period of 1982-84 to 30 percent in 1985 due to the following factors.

- (a) lack of foreign exchange and credit lines for renovating and maintaining production, logging and log-transportation equipment; and
- (b) lack of proper preventive maintenance of machines and tools leading to machine breakdown and costly replacement of blades, cutters and machine parts.

Guyana's leading sawmill, Demerara Woods is possibly the largest and most modern plant based on the utilization of band headrigs in CARICOM.

4.5 Problems resulting from obsolete equipment and lack of appropriate maintenance are equally recurrent in most of Belize's small sawmills where the need is also present to expand the output capacity of the sector through the introduction of more modern equipment. Two of Belize's main sawmills, the Belize Timber Ltd. and the Harold Whitney Ltd., are among the most modern ones based on the utilization of circular headrigs in CARICOM. The latter, moreover is in the processing of installing a modern line for the manufacture of mosaic parquet - possibly the only one of its kind in CARICOM.

4.6 The situation of the sawmill industry in Dominica - a country with a possible, even if modest, lumber export perspective based on the utilization of Gommier timber - is entirely different from Guyana and Belize, in that the sector consists of two sawmills and 50 to 60 chain-saw and pit-saw millers. Here, the need was identified for the upgrading of one of the mills having an interest in exporting lumber to CARICOM. The other of the two mills, Dominica Timbers, is possibly the most integrated and efficiently-run mill in CARICOM based on the utilization of modern, yet unsophisticated machinery. The mill is fully operational in all its aspects of integration - sawmilling, kiln drying and planing and moulding.

4.7 Finally, main constraint in the promotion of lumber exports from within CARICOM is the lack of adequate kiln drying facilities on the part of sawmills and furniture plants. A pilot solar kiln has been established with the assistance of UNIDO at the Guyana Forestry Commission in Georgetown. Guyana's experience in this respect could be shared by other countries in the region as a component in the integration of industrial development. Equally, an opportunity could be developed on the longer term, to utilize for the purpose of regional training, the sawdoctoring training centre now being established by the same organization in Guyana, also with UNIDO assistance.

C.5 The furniture and joinery industry

5.1 The furniture industry in CARICOM consists of:

- (a) a large number of small, family-type enterprises operating on a semi-artisanal basis, even where machinery is available;
- (b) a number of medium size plants equipped with a full range of basic woodworking machinery; and
- (c) a few large size factories equipped with relatively sophisticated equipment.

The larger plants are located in Jamaica, Barbados and Trinidad and Tobago, whereas of the nine CARICOM countries visited in the course of project travel, Belize appeared to have the least developed furniture manufacturing sector.

5.2 The modern furniture manufacturing sector in both Barbados and Jamaica, developed in late 1970 early 1980 to serve the furniture market of the then oil-booming Trinidad and Tobago. The two countries' furniture exports to Trinidad amounted to TT\$ 10 million (US\$ 4.2 million) and TT\$ 5.2 million (US\$ 2.2 million) in 1983, respectively. The collapse of oil prices in the resulting severe economic recession in Trinidad, severely hit the export-dependent furniture industry of Barbados and Jamaica, causing the closing of several plants in both countries and a drastic reduction in its employment level.

5.3 Barbados and Jamaica have since endeavoured to develop a furniture export potential directed to the USA markets. So far however, only Jamaica has succeeded in developing a regular furniture-export flow to the USA, since the establishment in Kingston of the Kingston Heirlooms Furniture factory - which might well be considered as a model export-oriented plant for the rest of CARICOM.

5.4 The hardest hit by the economic down-trend in Trinidad has been the local furniture industry itself. Having expanded into a sizeable manufacturing sector in the boom years, with the aim of developing self-sufficiency in furniture supply, the Trinidad furniture industry will find it problematic to explore extra-CARICOM furniture export possibilities in view of the very high wages it pays for skilled labour - approximately US\$ 3.32 per hour ^{8/}, the highest in the CARICOM.

^{8/} Source: Survey of manufacturing costs, Barbados Industrial Development Corporation, 1985.

5.5 In the wake of the down-trend in furniture trade in the Region, smaller furniture and joinery plants have displayed a much greater resilience than the larger ones. Taking into account the limited size of local markets and the fact that building construction activities are bound to remain dormant for the foreseeable future in most CARICOM countries, except Antigua, the market demand for furniture seems to call for lower prices and production batches of limited sizes. Smaller furniture plants might have a wide role to play in this context.

5.6 Only very few plants in CARICOM are engaged in the proper industrial production of joinery items such as panel doors and flush doors. In fact, panel doors are imported by countries such as Trinidad and Tobago and Barbados from as far away as the Taiwan Province of China. However, two efficiently-run door manufacturing plants were identified in the course of project travel. The first one, the Caribbean Woodcraft Manufacturing Co., located in Jamaica, is a medium size plant exporting annually a total of 8,000 panel doors in Mahogany and Pine, and, in addition, producing 30,000 flush doors. The second one, Charles and Company, located in Dominica, can be considered as a model small-scale door manufacturing plant.

5.7 Many of the small and medium-size furniture and joinery plants visited by the consultant were found either to be equipped with inappropriate woodworking equipment or having serious gaps in the range of machinery in use such as:

- (1) an over-dependency on hobby-type power tools which do not stand up under heavy working loads;
- (2) tenoning machines without a matching mortising machine;
- (3) lack of essential machines such as spindle moulders;
- (4) lack of appropriate range of cutting tools and attachments to allow a full utilization of versatility and functions of given machines;
- (5) lack of tool sharpening equipment resulting in shortened serviceable life of tools, damage to machine bearings (due to unbalanced tools) and poor quality of processed timber;
- (6) unnecessarily sophisticated machines, difficult to operate and maintain and with capacity out of balance with other equipment.

5.8 Some of the above problem areas appeared to apply to some of the larger plants visited as well. A major problem was also identified as being the lack of preventive maintenance of equipment leading to a too rapid wear of parts, frequent machine break-downs and production stoppages.

5.9 However, two particular constraints emerged as being the most critical ones with respect to promoting a full transition of the CARICOM furniture and joinery manufacturing sector from artisanal methods to the economics of industrialized production:

- (1) Lack of proper wood-jointing equipment resulting in poor fitting of parts and considerable remedial handwork, thus negating the productivity gain of the industrial system which is based on the interchangeability of parts;

- (c) Lack of heavy-duty multi-purpose woodworking machines enabling smaller woodworking units to undertake small series production of wood products based on a minimum of capital investment.

5.10 In the course of the missions to Belize and Jamaica, the consultant was impressed with the high standard of wood carving skills available in those countries. In Jamaica, this asset is being utilized by the Kingston Heirlooms factory in the production of period furniture for the USA markets. In Belize, wood carvers take inspiration from design patterns derived from the Maya heritage. However, in Belize there appeared to be no capability to tap these skills for the purpose of developing a furniture export potential, based on the utilization of local Mahogany timber.

C.6 Shipping and marketing distribution

6.1 Available shipping links and current market distribution methods present major constraints in the promotion of lumber exports from within CARICOM.

6.2 Shipment of lumber to CARICOM/Caribbean states from Guyana are presently undertaken by WISCO (West Indies Shipping Corporation) vessels and a number of privately owned shipping lines. WISCO operates from Guyana with large containerized vessels of 3,650 DWT category, whereas the privately owned vessels of about 500 tons grt operate irregularly. The Guyana Forestry Commission and main sawmilling enterprises, eg. Willem's Timber, would also charter regionally registered small vessels for their lumber shipments. Extra-regionally owned lines do not usually accept lumber for discharge - the main reason being that their vessels sailing from Guyana would seldom call again at CARICOM ports which usually were called upon prior to arriving at the southern-most point - Guyana.

6.3 Originally, WISCO's northbound sailing schedules included fortnightly calls at each CARICOM port, Miami and other Caribbean ports - though these latter ports only on an inducement basis. This type of service continued even in the face of declining intra-regional tonnage and severely reduced revenue ^{9/}. However the resulting precarious financial situation which is now affecting the Corporation has forced it to restrict its service to the less profitable routes. Thus some CARICOM ports in the Windward and Leeward islands are no longer served, while the service to others has been drastically curtailed.

6.4 On the other hand, the current position with the small vessel operators is that due to the economic recession affecting Guyana's export and

^{9/} The value of intra-CARICOM imports and exports halved from EC\$ 1,561,014 and EC\$ 1,341,237 in 1980 to EC\$ 783,716 and EC\$ 716,450 in 1986, respectively, Intra-regional trade declined a record 33 percent in 1986.

import flow^{10/}, many operate amongst other Caribbean ports and only occasionally ship lumber on their return journey when they have brought imports into Guyana.

6.5 Thus, lumber shipment from Guyana depends almost entirely on ad hoc charter vessel arrangements. This means lack of flexibility in marketing and, in particular, no chance of serving on a regular basis the needs of the Windward and Leeward islands for shipment of small lumber loads. This explains, in part, the current complaints on the part of lumber importers in the small islands on deliveries of lumber from Guyana.

6.6 The importance of strengthening shipping links with that particular market target is highlighted by the fact that since 1983, islands such as St. Vincent and the Grenadines, Grenada and Antigua and Barbuda have imported individually more lumber from Guyana than Trinidad and Tobago. Currently, furniture timber is partly supplied to the states of the organization of Eastern Caribbean (OECs) by a timber depot in Puerto Rico and delivered on a two-week notice by utilizing the weekly shipping service of the Trailer Maritime Transport Corporation (TMT).

6.7 Even more problematic are shipping links between Belize and the rest of CARICOM. In fact, Jamaica is the only CARICOM destination having a direct, regular, shipping service to Belize. With the exception of this particular destination, Belize's intra-CARICOM trade is handled via USA ports, by transshipment at San Juan, Puerto Rico, or by charter vessels. Moreover, the regular shipping services through Palm Beach add extra freight cost and provide links (about fortnightly) only with four CARICOM destinations: Trinidad and Tobago, Barbados, Antigua and Barbuda and Saint Lucia.

6.8 Under the circumstances, if the aim for Guyana and Belize is to deliver small lumber loads with a high frequency of services, then both their current marketing and shipping methods ought to be reconsidered. In particular, the alternative should be explored of distributing lumber to CARICOM destinations through a central depot point (located either at Barbados or Trinidad) close to the OECs member states. From the depot, lumber would be shipped to the various islands by 'plugging in' to an existing, regular shipping service, thus allowing prompt lumber delivery on short notice.

6.9 In the medium term, such a 'plug-in' shipping service could be provided by the new OECs Small Vessel Shipping Service which the Organization of the Eastern Caribbean States (OECs) are planning to introduce, with the assistance of WISCO, in order to 'fill the needs for an efficient transportation service which WISCO, in its present situation can no longer provide'^{11/}. The service would operate vessels in the class of 300-400 deadweight tons (DWT) and possibly be able to operate in both lift-on/lift-off (LO/LO) and roll-on/roll-off (RO/RO) modes.

^{10/} Guyana's intra-CARICOM imports and exports declined from EC\$ 403,069 and EC\$ 143,784 in 1980 to EC\$ 74,937 and EC\$ 30,424 in 1986 respectively.

^{11/} Quotation from the project document prepared by the OECs for funding the Small Vessel Shipping Service under the Home III Programme.

6.10 The OECS project has been proposed also on the grounds of the unsatisfactory service provided by the existing small vessel fleet which currently move the larger proportion of cargo in the area. The unscheduled nature of the operation of this fleet, the reported high incidence of lost and damaged cargo and the unsuitability of several of the vessels for the trade, have caused this particular service to be held in quite low esteem by shippers.^{12/}

6.11 In the short term, however, the required 'plug-in' shipping link could be provided by the regular weekly service provided to the OECS and contiguous states by the RO/RO vessels of the Trailer Marine Transport Corporation (TMT).

The TMT Eastern Caribbean Service has Puerto Rico as its base. Its two vessels serve all the OECS states, Trinidad and Tobago, Barbados and, in addition, Guadeloupe, Martinique and Saint Maarten. Thus the utilization of this shipping service would provide the opportunity for the promotion of lumber and other wood product exports from Guyana and Belize to non-CARICOM markets.

The high frequency and regularity of service provided by TMT in this respect is made possible by the fact that sailing southbound from Puerto Rico, its vessels bring down goods hauled to San Juan from the USA - CARICOM's largest overseas trading partner. Details of the TMT route are given in Annex IX.

6.12 Details on the current shipping links (and related freight rates) between Guyana and Belize, and the other CARICOM states, are given in the respective country reports under the heading: Shipping Links.

D. RECOMMENDATIONS

Two distinct sets of recommendations are made towards improving the efficiency of the woodworking industry and promoting the supply of wood products from within the community.

- (a) Recommendations on activities to be undertaken on an intra-CARICOM basis for the development of selected marketing and technical aspects of the community woodworking sector as a whole; and
- (b) Recommendations on activities to be carried out for the benefit of the woodworking industry of individual member states.

D.1 Recommended Intra-CARICOM activities

Activity 1.1

Provision of CIF quotations to CARICOM buyers of lumber, furniture and furniture parts as per specifications given in the respective country reports.

^{12/} Quotation from the project document prepared by the OECS for funding the Small Vessel Shipping Service under the Home III Programme.

Activity to be undertaken:

- in Guyana by the Forestry Commission and Precision Woodworking Ltd.;
- in Belize by individual sawmills;
- in Dominica by furniture factories and the North Eastern Timbers Sawmill;
- in Jamaica by the Fairway Furniture Factory Ltd.

Activity 1.2

Preparation of a feasibility study on the establishment of a Timber Distribution Centre in either Barbados or Trinidad and Tobago (in association with an established lumber importer) so as to facilitate the regular supply of lumber produced in Guyana and Belize to all the CARICOM states of the Windward and Leeward islands, as well as to Guadeloupe, Martinique and possibly Puerto Rico. For detailed project document see Annex VII.

Activity to be undertaken by an ITC/CARICOM marketing consultant (2 months)

The tentative modus operandi of the Centre would be as follows:

- (a) The centre would receive bulk shipment of lumber from Guyana and Belize, store it in its timber yard and distribute it in small loads and on short notice to clients in the individual islands.
- (b) The Centre would initially handle the current Guyanese export species (Greenheart and Purpleheart) and the Mahogany substitutes identified by this project as being acceptable to the furniture industry in the Community.
- (c) In the short-term, the inter-island lumber distribution would be handled through the existing weekly shipping service provided by the TMT shipping line and linking all the CARICOM states in the Windward and Leeward islands. In the longer term, the distribution would be effected by the ORCS Small Vessel Shipping Service expected to be established under the Lome III programme.
- (d) The Timber Distribution Centre would be responsible, among others, for sales promotion activities in the target area concerning lumber as well as other wood products manufactured in the Community such as plywood and shingles, furniture and joinery parts, etc. Sales promotion would be extended to non-CARICOM Caribbean islands.

Activity 1.3

Holding a course/exhibition in Barbados on the transfer of woodworking technology for the small scale furniture and joinery industry (see Annex VI for detailed project document).

Activity to be carried out by:

UNIDO in cooperation with the CARICOM Secretariat, Barbados Furniture Trading Co. Ltd; Caribbean Furniture Manufacturing Task Force of the Caribbean Association of Industry and Commerce; Barbados Industrial Development Corporation; Caribbean Development Bank.

The course/exhibition would include the following:

- (c) Lectures on selected woodworking technology subjects relevant for the development of the small scale furniture and joinery industry;
- (b) Exhibits of commercial timber species from Guyana, Belize and Dominica, with emphasis on furniture timbers. The timber samples would be shown in a wide range and type of wood finishes. As part of the exhibit, a descriptive pamphlet on the characteristics of the various species would be made available for distribution.
- (c) Exhibits of heavy-duty multi-purpose woodworking machinery suitable for the small-scale furniture and joinery industry.
- (d) Exhibits of modern types of wood-jointing machinery suitable for the small and medium scale woodworking industry.
- (e) Exhibition and demonstration of machine attachments and cutting tools designed to extend the versatility of basic woodworking machines.
- (f) Exhibition and demonstration of production aids (jigs) to promote optimum utilization of basic woodworking machinery and improve productivity as well as safety conditions.
- (g) Exhibition and demonstration of tool maintenance equipment suitable for:
 - (i) small scale furniture and joinery plants;
 - (ii) tool maintenance servicing centres.
- (h) Exhibits of modern types of moulding cutters of easy maintenance.
- (i) Exhibits of a selected of wooden furniture and joinery manufactured in CARICOM, with emphasis on items already being exported overseas, to promote intra-CARICOM export of finished wood products.
- (j) Exhibit of a selection of 'IKEA-type' contemporary furniture - engineered for mechanized production and shipment completely knocked-down - to serve as a guideline on the manufacture of simple yet attractive furniture which can be manufactured with a minimum of capital investment.

Activity 1.4

Short-term intra-regional tool maintenance training programme for the furniture and joinery industry (see Annex VIII for detailed project document).

Activity to be carried out by:

UNIDO Tool maintenance expert (9 man/months in 9 missions of one month each over a period of three years).

Place of training:

Tool maintenance centre of the Guyana Forestry Commission being established with the assistance of UNIDO.

Number of Trainees:

A total of 54 trainees over a period of three years.

Duration of the Training:

Three one-month courses per year with six trainees each.

D.2 Recommended country activities

Recommendations addressed to the nine countries visited by the INTDO consultant and his CARICOM counterpart are given in the respective country technical reports. For easy reference a list of draft project documents is given in Annex X of this report. The list of the technical reports in which these are referred to are given in Annex XI.

ANNEX I

JOB DESCRIPTION

UC/CAR/86/201/11-51

- Post title:** Consultant in woodworking industries sector
- Duration:** Three months
- Date required:** As soon as possible.
- Duty station:** Georgetown, Guyana, with travel in the CARICOM region.
- Purpose of project:** To assist the Caribbean Community Secretariat (CARICOM) to develop an integrated industry programme for the development of the woodworking and furniture industries of its member states.
- Duties:** The expert will be assigned to the CARICOM secretariat in Georgetown and in close cooperation with the counterpart staff will develop a system for the coordination of wood raw material supplies from timber rich CARICOM member states to the timber deficit ones, will study possibilities of developing specialized wood processing and furniture industries including the development of an integrated joint venture programme between member states and finally to assist and give technical advice on an ad hoc basis to individual companies. Specifically, he is expected to:
1. Survey the selected sawmills in Guyana to determine their ability to produce and supply the sawn timber requirements of woodworking and furniture industries of other CARICOM member states bearing in mind the size, grade, quantity and quality required by the various products (weeks 1 and 2)
 2. Survey the selected sawmills in Dominica with the same objectives as above (week 3).
 3. Survey the woodworking and furniture industries in Trinidad and Tobago, Barbados and other CARICOM member states in the Eastern Caribbean to assess their exact needs for raw and semi-processed timber (weeks 4 to 6).
 4. Survey the selected sawmills in Belize with the same objectives as in (1) and (2) above, but with a view to supply the Jamaican market (weeks 7 and 8).
 5. Survey the woodworking and furniture industries in Jamaica to assess their exact needs for raw and semi processed timber which can be supplied from Belize (weeks 9 and 10).

6. Assess the transport situation of timber (throughout his trips to various CARICOM member states) with a view to the development of a speedy and regular service between timber suppliers and receivers (weeks 1 to 10).
7. Analyze the data collected through above activities and prepare a technical report setting out his findings and recommendations to the CARICOM secretariat and its member states (weeks 11 and 12).

ANNEX II

MISSION ITINERARY
(Field travel)

Guyana	16 to 28 March 1987
Trinidad and Tobago	29 March to 3 April 1987
Barbados	4 to 10 April 1987
Jamaica	11 to 17 April 1987
Belize	19 to 28 April 1987
Jamaica	29 April to 1 May 1987
Antigua	2 to 8 May 1987
Dominica	9 to 15 May 1987
St. Lucia	16 to 19 May 1987
St. Vincent	20 to 23 May 1987
Trinidad	24 to 27 May 1987
Guyana	28 May to 2 July 1987
Jamaica	3 to 7 July 1987

ANNEX III

MAIN INSTITUTIONAL CONTACTS MADE IN COUNTRIES VISITED

Antigua and Barbuda

Mr. C. A. Edwards Permanent Secretary, Ministry of Foreign Affairs,
Economic Development, Tourism and Energy

Ms. A. Aflak Marketing officer, Ministry of Foreign Affairs
and Development

Mr. E. Western Senior Industrial Development Adviser, Industrial
Development Board

Barbados

Mr. P. Ryan Senior Industrial Development Field Adviser, UNIDO

Mr. E. Douglas Economist, Caribbean Association of Industry and
Commerce

Mr. S. Frederick Economist, Ministry of Trade

Mr. O. Forde Production Manager, Barbados Furniture Trading
Co. Ltd (BFTC)

Belize

Mr. R. Leslie Permanent Secretary, Ministry of Foreign Affairs
and Development, Belmopan

Mr. H. Flower Chief Forest Officer, Forestry Department,
Belmopan

Ms. Y. S. Hyde Director, Office of Economic Planning, Ministry
of Foreign Affairs, Belmopan

Dominica

Mr. C. A. Harris Development Coordinator, Economic Development
Unit, Prime Minister's Office

Mr. A. Ebe-Arthur Project Officer, Dominica Industrial Development
Corporation

Ms. C. Rolle Executive Secretary, Dominica Association of
Industry and Commerce

Guyana

Mr. D. Sash Minister of Forestry

Ms. C. Davis Resident Representative of the United Nations
Development Programme (UNDP)

Mr. B. W. Blake Director, Economic and Industry Division, CARICOM
Secretariat

Mr. C. A. Hall Works Manager, Guyana Forestry Commission

Jamaica

Mr. W. G. Woodham Managing Director, Jamaica Industrial Corporation
(JIDC)

Mr. S. dello Strologo Senior Industrial Development Field Adviser, UNIDO

Mr. W. Ridgard Programme Director, Furniture and Wooden Products
Sub-sector, JIDC

St. Lucia

Mr. A. Severin Chief Economist, Central Planning Unit, Ministry of
Finance and Planning

Mr. G. Charles Chief Forest and Lands Officer, Ministry of
Agriculture

Mr. P. St. Clair Secretary, St. Lucia Furniture Manufacturers'
Association

St. Vincent and The Grenadines

Ms. J. Glasgow Assistant Secretary, Central Planning Division,
Ministry of Finance

Mr. C. M. Leach Manager, The Development Corporation (DEVCO)

Mr. Nichols Chief Forestry Officer

Mr. H. Williams Vice President for Manufacturing, Chamber of
Commerce

Trinidad and Tobago

Ms. Annisa Abu Bakr Manager, Promotion Division, Trinidad and Tobago
Industrial Development Corporation (TTIDC)

Mr. Selwyn Dardaine Deputy Conservator of Forest, Forestry Division

Mr. M. Moniquette Director Economic Studies and Planning Division,
TTIDC

CARICOM SELECTED ECONOMIC INDICATORS

Countries	Area km ²	Mid year population 1985 ('000)	GDP† 1984 (US\$ mn)	GDP/CAP† 1984 (US\$)	Current a/c Balance 1984 (US\$ mn)	Tourist Income 1984 (US\$ mn)	Imports 1985 (US\$ mn)		Domestic Exports 1987 (US\$ mn)	
							Tot. imports	I. C.	Tot. exports	I. C.
Antigua & Barbuda	440	79.2	161.0	2,037	- 13.7	65.1	142.6	33.0	7.3	4.3
Bahamas	13,942	228.0	1,610.0	7,061	- 46.8	810.0	n.a.		n.a.	
Barbados	437	253.0	1,151.0	4,549	+ 31.4	284.2	610.8	88.4	248.2	35.3
Belize	22,962	166.2	157.2	945	+ 7.5	7.5	128.1	2.3	64.4	3.3
Dominica	751	83.2	85.4	1,106	- 10.7	4.5	55.3	13.7	26.3	10.1
Grenada	344	94.1	86.9	923	- 22.2	17.2	69.6	18.2	21.6	7.3
Guyana	214,970	790.4	443.7	561	- 70.6	n.a.	228.2	82.5	206.0	15.1
Jamaica	10,999	2,325.5	2,253.7	969	-312.1	406.6	1,139.9	45.8	535.1	40.1
Montserrat	104	11.8	** 33.6	2,847	n.a.	n.a.	18.4	5.0	1.0	0.3
St. Chris/Nevis	269	45.0	** 57.6	1,280	n.a.	11.3	50.9	7.7	15.6	3.1
St. Lucia	616	136.9	151.2	1,104	- 22	42.4	125.0	23.9	47.5	9.4
St. Vincent & the Grenadines	389	108.2	99.6	920	- 7.2	29.0	79.3	14.5	62.1	38.4
Trinidad & Tobago	5,128	1,176.	8,066.7	6,858	-577.5	197.9	1,526.8	97.9	2,103.3	232.6
TOTALS	271,346	5,497.6					4,171.9	432.9	3,338.4	399.3
							10% of total		12% of total	

† At current prices 1984

** 1985 figures

I.C. Intra-CARICOM trade

Sources: CARICOM Secretariat and UNIDO

ANNEX V

COMMERCIAL FOREST AREAS IN THE CARIBBEAN

	Area 1,000 ha	Commercial Forests	
		Volume/hectare m ³	Total volume 1,000 m ³
Antigua and Barbuda (?)	4	80	320
Anguilla	-	-	-
Bahamas	180	45	8,100
Barbados	4	80	320
Belize	1,784	24	42,816
British Virgin Islands	.5	100	500
Dominica	39	200	7,800
Grenada and the Grenadines	5.5	100	550
Guyana	14,000	130	1,820,000
Jamaica	92	110	10,120
Montserrat	2.5	90	200
St. Christoph-Nevis	4.5	120	540
St. Lucia	8	190	1,520
St. Vincent and the Grenadines	10.5	120	1,260
Trinidad and Tobago	202.0	83	16,766
Turks and Caicas Islands	2.5	45	112
Total	16,339.0	117	1,910,924

Source: Regional Forestry Sector Study, 1984, by DFS Deutsche Forstinventur Service G.m.b.H.

ANNEX VI

Draft Project Document

Country: Caribbean Regional

Title of Project	Transfer of Woodworking Technology for the Small-scale Furniture and Joinery Industry of the Caribbean.
Government Coordinating Agencies of participating countries	Ministries of Industry or of Forestry.
Government Implementing Agency in host country:	Barbados Furniture Trading Co. *
Executing Agency	United Nations Industrial Development Organization (UNIDO)
Duration	7 months**
Estimating starting date:	
External inputs:	US\$ 183,643
Government inputs:	

* In cooperation with the Barbados Industrial Development Corporation, the CARICOM Secretariat, the Caribbean Furniture Manufacturing Task Force of the Caribbean Association of Industry and Commerce and the Caribbean Development Bank (CDB)

** Actual duration of course/exhibition: 8 days.

PART I - LEGAL CONTEXT

To be elaborated in the final project document.

PART II - THE PROJECT

PART II A - Development Objective

To help foster the contribution of the forest industries and in particular of the small-scale woodworking industry to the socio-economic development of the countries in the Caribbean Region and in particular those of the Caribbean Community (CARICOM).

PART II B - Immediate Objectives:

1. To enable entrepreneurs, managers and technicians of the small-scale furniture and joinery industry to:
 - (a) Acquire a first hand knowledge of selected, innovative wood processing techniques and of essential types of modern, yet appropriate woodworking machinery; and
 - (b) Gain an appreciation of selected aspects of plant design and design of standard furniture.
2. To promote the export of wood and wood products from within the Caribbean region and in particular from within the Caribbean Community (CARICOM)

As a direct result of the project a basis will have been laid towards more rational capital investment and increased operating efficiency on the part of the small-scale furniture and joinery industry.

PART II C - Special considerations:

The project will contribute towards promoting joint endeavour in the development of CARICOM'S woodworking industry and intra-regional exchange of wood products.

PART II D - Background and justifications:

The furniture industry in the Caribbean Community consists of:

- (a) a large number of small, family type enterprises operating on a semi-artisanal basis, even where machinery is available;
- (b) a number of medium size plants equipped with a full range of basic woodworking machinery; and
- (c) a few large size factories equipped with relatively sophisticated equipment

The larger plants are located in Jamaica, Barbados and Trinidad and Tobago, whereas, of the nine CARICOM countries visited in the course of project travel (UC/CAR/86/201) Belize appeared to have the least developed furniture manufacturing sector.

The modern furniture manufacturing sector in both Barbados and Jamaica, developed in late 1970 early 1980 to serve the furniture market of the then oil-booming Trinidad and Tobago. The two countries' furniture exports to Trinidad amounted to TT\$ 10 million (US\$ 4.2 million) and TT\$ 5.2 million (US\$ 2.2 million) in 1983 respectively. The collapse of oil prices and the resulting severe economic recession in Trinidad, severely hit the export-dependent furniture industries of Barbados and Jamaica, causing the closing of several plants in both countries and a drastic reduction in employment levels.

The hardest hit by the economic recession have been the larger furniture plants in Trinidad itself, which had emerged in the boom year with the aim of developing self-sufficiency in furniture supply.

In the wake of the down-trend in furniture trade in the region, smaller furniture and joinery plants have displayed a much greater resilience than the larger ones. Taking into account the limited size of the local markets and the fact that building construction activities are bound to remain dormant for the foreseeable future in most CARICOM countries, except Antigua, the market demand for furniture seems to call for lower prices and production batches of limited sizes. Smaller furniture plants might have a wide role to play in this context.

Only very few plants in CARICOM are engaged in the proper industrial production of joinery items such as panel doors and flush doors. In fact, panel doors are imported by countries such as Trinidad and Tobago and Barbados from as far away as the Taiwan Province of China.

Many of the small and medium-size furniture and joinery plants visited by the consultant were found either to be equipped with inappropriate woodworking equipment or having serious gaps in the range of machinery in use such as:

- (a) an overdependency on hobby-type power tools which do not stand up under heavy working loads;
- (b) production cycle affected by the lack of matching equipment;
- (c) lack of essential machines such as spindle moulders;
- (d) lack of appropriate range of cutting tools and attachments to allow a full utilization of versatility and functions of given machines;
- (e) lack of tool sharpening equipment resulting in shortened serviceable life of tools, damage to machine bearings (due to unbalanced tools) and poor quality of processed timber;
- (f) unnecessarily sophisticated machines, difficult to operate and maintain and with capacity out of balance with other equipment.

Some of the above problem areas appeared to apply to some of the larger plants visited as well. A major problem was also identified as being the lack of preventive maintenance of equipment leading to a too rapid wear of parts, frequent machine break-downs and production stoppages.

However, two particular constraints emerged as being the most critical ones with respect to promoting a full transition of the CARICOM furniture and joinery manufacturing sector from artisanal methods to the economics of industrialized production.

- (a) Lack of proper wood-jointing equipment resulting in poor fitting of parts and considerable remedial handwork, thus negating the productivity gain of the industrial system which is based on the interchangeability of parts;
- (b) Lack of heavy-duty multi-purpose woodworking machines enabling smaller woodworking units to undertake small-series production of wood products based on a minimum of capital investment.

This project aims at fostering a meaningful transition of the small-scale furniture industry from artisanal to industrial methods through direct exposure (with appropriate technical explanations) to the utilization of basic woodworking machinery, and to contemporary type of furniture specifically engineered for industrialized production.

Moreover, the project will provide an opportunity to promote trade in wood and wood products within the region.

PART II E - Outputs

1. An 8-day WOODTECH course/exhibition on: selected woodworking technologies and wood products to serve as a guideline in the development of the small-scale furniture and joinery industry in the Caribbean region.
2. Trained 10 factory supervisors from CARICOM member states, through actual demonstration and lectures, on the following know-how:
 - (a) Utilization of modern wood-jointing machines of the type suitable for small-scale plants, with a view to streamlining production, ensuring interchangeability of wood components, and attaining high productivity;
 - (b) Utilization of modern basic woodworking machines with emphasis on heavy-duty, multi-purpose equipment to allow the introduction of a basic level of mechanization with a minimum of capital investment;
 - (c) Utilization of a wide selection of machine accessories and appropriate cutting tools designed to extend the versatility of basic woodworking equipment;
 - (d) Utilization of production aids (jigs) on basic woodworking machines, designed to maximize productivity and improve industrial safety;
 - (e) Utilization of basic tool maintenance equipment with the aim of extending the serviceable life of cutting tools, reducing occurrence of damage to bearings of cutting spindles, and contributing to higher quality of processed parts;
 - (f) Utilization of tool maintenance equipment of the type required for the operation of tool maintenance servicing centres.

3. Provided a direct exposure to the above know-how to upto 200 Caribbean woodworking entrepreneurs and technicians attending the exhibition as observers at no cost to the project.
4. Provided direct exposure to the 40 trainees and those attending as observers the exhibition to samples of simple, modern knock-down furniture (of the 'IKEA' type) suitable for manufacture by the small-scale industry with equipment involving the least capital investment.
5. Existence of an appreciation on the part of 40 trainees of critical aspects of plant design such as:
 - (a) dust extraction;
 - (b) compressed air system, and
 - (c) spare requirement for the operation of standard woodworking machines.
6. Generated an appreciation on the part of 40 trainees of criteria involved in the choice of kiln drying equipment and in the design and performance limitations of solar kilns.
7. Direct exposure for Caribbean exporters and importers of lumber, furniture and joinery to wood products available for intra-regional exchange.

PART II F - Activities

	<u>Schedule</u>	<u>By whom</u>
1. Discussion of details on the implementation of the project with parties concerned in the field 1/	Month 1 (one week)	Coordinator in Barbados
2. Preparation of final work plan and assignment of responsibilities regarding the execution of the project.	Month 1 (one week)	Coordinator at UNIDO HQ
3. Finalization and distribution of specifications of required equipment to suppliers of machinery and cutting tools.	Month 1 (one week)	Coordinator at UNIDO HQ
4. Establishment of institutional contacts in each Caribbean country to organize and coordinate attendance to the training course, and exhibition by the industry	Month 2 (2 weeks)	UNIDO (SIDFA), & Carib. Furn. Task Force
5. Invitation to respective CARICOM countries to submit candidates for the course	Month 2 (one week)	Coordinator at UNIDO HQ
<hr/>		
1/	- Representative of CARICOM Secretariat - Caribbean Furniture Manufacturing Task Force - Barbados Furniture Trading Co (BFTC) - Barbados Industrial Development Corporation - Caribbean Development Bank	

6.	Supply to UNIDO of layout of building and yard facilities available at the Barbados Furniture Trading Co. for the course/exhibition	Month 2	Barbados Government through SIDPA
7.	Preparation of plant layout of the equipment - exhibition's space	Month 3 (one week)	
8.	Preparation of electrical power scheme re the operation of the equipment to be demonstrated	Month 3 (one week)	National expert in Barbados
7.	Selection of candidates	Month 4	UNIDO HQ
8.	Preparation of demonstration jigs for the machinery selected for the exhibition (based on examples in the UNIDO publication selected by the coordinator)	Months 3 & 4	Donor country
9.	Preparation of advertising material (poster, pamphlets and exhibition catalogue) designed to promote attendance to the exhibition by the industry.	Month 4	Counterpart in donor country
10.	Preparation and airfreighting of samples of timber species from Guyana, Belize and Dominica to selected manufacturers of wood finishes in Donor country.	Month 4	National Forest Departments.
11.	Surface finishing of timber samples in various types of lacquers and stains suitable for utilization by small-scale woodworking plants	Months 4 & 5	Suppliers in donor country
12.	Purchase and airfreighting to Barbados of demonstration furniture of simple design of knock-down furniture (IKEA-type) for display at the WOODTECH course/exhibition	Month 4	Donor country
13.	Selection and shipping to Barbados of typical furniture manufactured for export in the Caribbean countries	Month 4	CARICOM member states
14.	Fabrication in Barbados of a solar kiln structure - for display at the WOODTECH course/exhibition - of the type introduced with UNIDO's assistance at the Development Unit of the Guyana Forestry Commission in Georgetown (specifications of kiln to be provided by UNIDO).	Months 4 & 5	Barbados Furniture Trading Co.

15.	Preparation for distribution at the exhibition of information sheets on the following topics: (a) space requirements on the operation of woodworking machines, as a basis for rational plant layout; (b) selection of cutting tools; (c) dimensioning of standard furniture.	Month 5 (2 weeks)	Coordinator at HQ
16.	Shipment of equipment samples and machining jigs to Barbados	Month 5	Relevant firms in donor country
17.	Finalization of travel arrangements for the 40 trainees from CARICOM member states	Month 5	UNIDO HQ
18.	Installation of the equipment at the exhibition site and carrying out trial operation of both production and tool maintenance machinery	Month 6 (2 weeks)	UNIDO coordinator + 2 national experts
19.	Supervision and coordination of all the activities during the actual implementation of the course/exhibition programme	Month 6 (8 days)	UNIDO coordinator
20.	Demonstration in the use of production machinery, jigs, accessories and cutting tools	Month 6 (6 days)	UNIDO coordinator + 2 national experts
23.	Lecture and distribution of Information sheets on choices of kiln drying technologies with emphasis on solar kiln wood seasoning	Month 6 (6 days)	UNIDO consultant in wood seasoning
24.	Demonstration of tool maintenance equipment. Lecture and distribution of information sheets on basic principles of maintenance of standard cutting tools	Month 6 (6 days)	UNIDO consultant in tool maintenance + one national expert
25.	Demonstration and distribution of information sheets on choices of wood finishes as applicable in the small-scale woodworking industry	Month 6 (6 days)	UNIDO consultant in wood surface finishes
26.	Lecture and distribution of information sheets on basic principles of dust extraction systems, with particular emphasis on the needs of small scale wood working plants.	Month 6 (6 days)	UNIDO consultant

27.	Lecture and distribution of information sheets on basic principles of design and maintenance of compressed air systems, with particular emphasis on the needs of small-scale woodworking plants.	Month 6 (6 days)	UNIDO consultant
28.	Disposal of equipment, furniture samples and other exhibits brought in for the exhibition, once it is over	Month 7 (one month)	UNIDO coordinator + local experts.

PART II G - Inputs

I. <u>External inputs</u>		<u>Duration m/m</u>	<u>US\$</u>
10.	<u>Personnel</u>		
11.	<u>Expatriate personnel</u>		
11-01	Project coordinator (3 months in region, 2 at UNIDO and donor country)	5	40,000
11-02	Tool maintenance expert	1.5	12,000
11-51	Wood seasoning consultant 1/	1	8,000
11-52	Wood surface finishing consultant 1/	1	8,000
11-53)			
11-54)	Four machine operators/mechanics		
11-55)	(two weeks each) 2/	2	p.m.
11-56)			
11-57	Dust extraction consultant 1/ (tentative input)	1	8,000
11-58	Pneumatic systems consultant 1/ (tentative input)	1	8,000
13.	<u>Support personnel (local staff)</u>		
13-01	Secretary/typist	3	4,725
14.	<u>National experts</u>		
14-01	Electrical engineer	1 week	572
14-02	Machine fitter	2 weeks	787
14-03	Electrician	3 weeks	1,179
16.	Incentive stipend for full-time Counterpart provided to the project coordinator by BFTC	3	500
19	Total cost of personnel component		<u>91,763</u>

1/ Including 10 days in Barbados, preparation of information sheets, travel and briefing at UNIDO.

2/ To be provided by the machine manufacturers.

30.	<u>Training</u> 10 fellows from CARICOM member states (one week stay in Barbados)	10 weeks	51,890
39.	Total cost of training component		<u>51,890</u>
40.	<u>Equipment provided by donor country</u>		
41.	<u>Expendable material</u>		
41-01	Demonstration wood finishing material		3,000
41-02	Supplies for temporary installation of equipment (power cables, switches, etc.)		2,500
41-03	Samples of knock-down furniture fittings and other hardware		2,500
41-04	Miscellaneous tools and supplies (including office supplies)		3,000
41-05	10 m ³ sawnwood for demonstration		2,000
41-06	Jigs		1,000
	Total cost of expendable equipment		<u>14,000</u>
42.	<u>Non-expendable equipment</u> (provided on loan by the donor country)		
42-01	Woodworking machines and accessories)	
42-02	Tool maintenance machines)	
42-03	Spray equipment)	pro memoria
42-04	Cutting tools)	
42-05	Display stand for cutting tools)	
42-06	Solar kiln structure and equipment (to be handed over to BFTC at completion of programme))	10,000
49-00	Total cost of non-expendable equipment		10,000
	Total cost of equipment component		<u>24,000</u>
51-00	<u>Miscellaneous cost</u>		
51-01	Insurance and shipping of non-expendable equipment from donor country to Barbados and back to the supplier upon closing of the exhibition (unless equipment is disposed of locally)		7,000
51-01	Cost of duplicating/printing information sheets on industrial technology topics for distribution at the exhibition		2,500
51-02	Mailing and telex costs incurred by the project in Barbados		1,500
51-03	Other miscellaneous costs		2,000
59.	Total cost of miscellaneous component		<u>13,000</u>
99.	Grand total of external contribution		<u>183,643</u>

1/ Including transportation from Barbados Port to exhibition site.

2.	<u>Inputs by the Barbados Furniture Trading Co. (BFTC)</u>	<u>Duration m/m</u>	<u>EST</u>
2.1	<u>Personnel</u>		
2.1.1	Counterpart to project coordinator (full-time)	3	p.m.
2.1.2	One clerical staff (full time)	2	p.m.
2.1.3	Housekeeping and security staff (as required)		p.m.
2.2	<u>Equipment</u>		
2.2.1	Transportation for project travel in Barbados		p.m.
2.2.2	Typewriter, photocopier, slide and overhead projectors and screen (made available for the duration of the course)		p.m.
2.2.3	Material required for sound preparation in the installation of the demonstration solar kiln		p.m.
2.3	<u>Miscellaneous costs</u>		
2.3.1	Power supply required for the duration of the programme		p.m.
2.3.2	Labour cost for the fabrication of the demonstration solar kiln		p.m.
3.	<u>Inputs by the Caribbean Furniture Manufacturing Task force and the CARICOM Secretariat</u>		
3.1	Staff advice in finalizing work programme once the project is approved for funding by the Donor Country and UNIDO	1 week	p.m.
3.2	Staff assistance in selecting and establishing working contacts with CARICOM Member States concerning participation to the Course/Exhibition programme	3 weeks	p.m.
4.	<u>Inputs by Guyana, Belize and Dominica</u>		
4.1	Cost of shipping wood samples to supplier(s) of wood finishes in Donor Country to demonstrate the application of various types of finishes on selected Caribbean timber species		p.m.
4.2	Preparation of descriptive pamphlets on commercial timber species available for export (in 500 copies)		p.m.
5.	<u>Inputs by CARICOM Member States</u>		
	Cost of shipping to Barbados, for display at the Exhibition, samples of furniture available for export within the Region		p.m.
6.	<u>Inputs by the Caribbean Development Bank</u>		
	Cost of reproducing descriptive pamphlets on commercial timber species available for export from Guyana, Belize and Dominica. Cost estimate to be provided in final project document.		

ANNEX VII

Draft project document

Country: Caribbean Regional

Title of Project	Study on the establishment of a Timber Distribution Centre to promote the supply of lumber from within the CARICOM region.
Government Counterpart Agencies	- Guyana Forestry Commission - Belize Forest Department
Executing Agency:	UNIDO/ITC/CARICOM
Duration	6 months
Estimated starting date:	
External inputs	US\$ 20,000
Government inputs	

PART I - LEGAL CONTEXT

To be elaborated as part of the final project document.

PART II - THE PROJECT

PART II A - Development Objective

To promote the supply of timber and timber products from within the Caribbean Community.

PART II B - Immediate Objective

To enable the CARICOM countries net exporters of sawnwood (Guyana and Belize) to assess the possibility of centralizing market distribution so as to facilitate frequent and prompt deliveries to the Windward and Leeward islands.

PART II C - Special Considerations

The project is expected to promote trade cooperation in the Caribbean and in particular among the Member States of the Caribbean Community (CARICOM).

PART II D - Background and Justifications

Currently, CARICOM as a whole is heavily dependent on extraregional sources of supply to meet its lumber demand. Based on 1985 data, ^{1/} the apparent lumber consumption of the CARICOM Member States amounts to 435,000 m³ (15.4 million CFT) per year. Of this volume, however, only 129,000 m³ (4.5 million CFT) or 29.6 percent is supplied from regional forest resources; while 304,646 m³ (10.7 million CFT) or nearly 70 percent is imported from outside CARICOM mainly from the USA, Honduras and Brazil.

The supply of sawn and dressed lumber from within CARICOM in 1985 amounted to only 2,402m³ (84,814 CFT) - or 0.55 percent of the total apparent consumption - and accounted for only 0.78 percent of the total volume of lumber imported by the Member States. The supply consists mainly of Greenheart and Purpleheart from Guyana and Mahogany from Belize. The share of lumber exports to CARICOM destinations by Guyana and Belize was 2,000 m³ (70,620 CFT) and 402 m³ (14,194 CFT), respectively.^{2/}

Available shipping links and current market distribution methods present major constraints to the promotion of lumber exports from within CARICOM.

At present, shipment of lumber from Guyana depends almost entirely on ad hoc charter vessel arrangements. This means lack of flexibility in marketing and, in particular, no chance of serving on a regular basis the needs of the Windward and Leeward Islands for shipment of small lumber loads. This explains, in part, the current complaints on the part of lumber importers in the small islands on deliveries of lumber from Guyana.

^{1/} See annexed table

^{2/} Figures based on the export records of Guyana and Belize.

Even more problematic are shipping links between Belize and the rest of CARICOM. In fact, Jamaica is the only CARICOM destination having a direct, regular, shipping service to Belize. With the exception of this particular destination, Belize's intra-CARICOM trade is handled via charter vessels. Moreover, the regular shipping services through Palm Beach add extra freight cost and provide links (about fortnightly) only with four CARICOM destinations: Trinidad and Tobago, Barbados, Antigua and Barbuda and Saint Lucia.

Under the circumstances, if the aim for Guyana and Belize is to deliver small lumber loads with a high frequency of services, then both their current marketing and shipping methods ought to be reconsidered. In particular, the alternative should be explored of distributing lumber to CARICOM destinations through a central depot point (located either at Barbados or Trinidad) close to the OECS Member States. From the depot, lumber would be shipped to the various islands by 'plugging in' to an existing regular shipping service, thus allowing prompt lumber delivery at short notice.

In the medium term, such a 'plug-in' shipping service could be provided by the new OECS Small Vessel Shipping Service which the Organization of the Eastern Caribbean States (OECS) are planning to introduce in order to 'fill the need for an efficient transportation service which WISCO, in its present situation can no longer provide'.*

In the short term, however, the required 'plug-in' shipping link could be provided by the regular weekly service provided to the OECS and contiguous States by the RO/RO vessels of the Trailer Marine Transport Corporation (TMT).

The TMT Eastern Caribbean Service has Puerto Rico as its base. Its two vessels serve all of the OECS states, Trinidad and Tobago, Barbados and, in addition, Guadeloupe, Martinique and Saint Maarten. Thus the utilization of this shipping service would provide the opportunity for the promotion of lumber and other wood product exports from Guyana and Belize to non-CARICOM markets.

The high frequency and regularity of service provided by TMT in this respect is made possible by the fact that sailing Southbound from Puerto Rico, its vessels bring down goods hauled to San Juan from the USA - CARICOM's largest overseas trading partner.

The proposed central timber depot (Timber Distribution Centre) would possibly be responsible, among others, for sales promotion activities in the target area concerning lumber as well as other wood products manufactured in the Community such as plywood, shingles, furniture and joinery parts, etc. Sales promotion would be extended to non-CARICOM Caribbean islands.

* Quotation from the project document prepared by the OECS for funding of the Small Vessel Shipping Service under the Lome III Programme. WISCO (West Indies Shipping Corporation) was established specifically to promote intra-CARICOM trade.

PART II E - Outputs

A study assessing the viability of supplying sawnwood from Guyana and Belize to the Windward and Leeward Islands (including non-CARICOM Caribbean islands such as Puerto Rico, Guadeloupe, Martinique, etc.) through a Timber Distribution Centre located at Barbados or Trinidad.

PART II F - Activities

1. Identification of volumes of given timber species, with emphasis on furniture timbers, which could be allocated yearly to the Caribbean markets by leading sawmills in Guyana and Belize.
2. Selection of the most appropriate location (Barbados or Trinidad) for the establishment of the proposed Center on the basis of factors such as:
 - (a) Shipping rates and frequency of shipping links with Guyana and Belize;
 - (b) Port charges and efficiency of port facilities;
 - (c) Import duties and/or other taxes;
 - (d) Facilities and legislation for goods in transit;
 - (e) Which of the two countries is currently importing the most volume of lumber from Guyana and Belize;
 - (f) The interest on the part of existing, leading lumber importers with timber yard facilities to operate the proposed centre - possibly in association with parties from Guyana and Belize.
3. Estimation of the total yearly volume of sawn and/or dressed lumber which could be handled by the Timber Distribution Centre taking into account the capabilities of the lumber importers short-listed for the management of the enterprise.
4. Identification of timber import trends in Puerto Rico and other non-CARICOM Caribbean countries in the Windward and Leeward islands.
5. Identification of the following cost factors:
 - (a) Up-dated quotations, according to specifications and grades, of selected sawnwood species from Guyana and Belize;
 - (b) Rates of bulk shipment of sawnwood from Guyana and Belize;
 - (c) Cost of shipping sawnwood from the Timber Distribution Centre to individual islands by utilizing the weekly TMT Eastern Caribbean Shipping Service;
 - (d) Cost of operating the Distribution Centre, including cost of renting additional yard space, if so required;
 - (e) Sales promotion costs.
6. Determination of tentative profit levels and selling prices to lumber importers of individual islands.

7. Elaboration of a draft structure of the proposed Timber Distribution Centre and of a draft agreement on the operation of the Centre between the selected lumber importer in Barbados or Trinidad and lumber exporters in Guyana and Belize.

PART II G - Inputs

	man/months	US\$
1. <u>External inputs</u>		
11-01 Timber marketing consultant	2	16,000
15-00 Local travel		3,000
51-00 Miscellaneous expenses		1,000
99-00 Total external inputs	2	20,000
2. <u>Government inputs</u>		
(To be detailed in final project document)		

Appendix I

Table I: Status of the lumber market in CARICOM, 1985, - production, imports, exports and apparent consumption.

	Production	Total imports (a)	Exports	Apparent consumption	of which imported Mahogany
Antigua	m ³ --	27,000	--	27,000	101
(b)	BM --	11,442,600	--	11,442,600	160,600
Barbados	m ³ --	45,782	--	45,782	2,000
	BM --	19,402,411	--	19,402,411	347,600
Belize	m ³ (b)21,690	--	1,741	19,949	--
	BM 9,189,000	--	737,835	9,189,000	--
Dominica	m ³ 14,000	(c) 2,000	--	16,000	--
	BM 6,000,000	847,600	--	6,847,600	--
Grenada	m ³ n.a.	12,900	--	12,900	116
	BM --	5,467,020	--	5,467,020	49,160
Guyana	m ³ 53,298	--	(d) 8,676	44,622	--
	BM 22,588,000	--	3,676,888	18,911,112	--
Jamaica	m ³ (e) 31,621	50,158	--	81,779	1,367
	BM 13,400,979	21,256,960	--	34,657,940	579,334
Montserrat	m ³ n.a.	n.a.	--	n.a.	n.a.
	BM --	--	--	--	--
St. Kitts	m ³ n.a.	112	--	n.a.	n.a.
	BM --	47,465	--	--	--
St. Lucia	m ³ 455	9,000	--	9,455	106
	BM 192,829	3,814,200	--	4,007,029	44,923
St. Vincent	m ³ 304	5,787	--	6,091	309
	BM 129,000	2,402,530	--	2,581,365	130,530
Trinidad	m ³ 18,000	154,309	--	172,309	2,256
	BM 7,628,400	65,396,154	--	73,024,554	956,092
Totals	m ³ 139,368	(a)307,048	10,117	435,887	6,554
	BM 59 million	130 million	4.4 million	184.7million	

Source: Country missions, statistics Unit of CARICOM Secretariat, Guyana Forestry Commission

- Notes:
- (a) Including imports from within CARICOM
 - (b) Including 5000 m³ (2 million BM) Mahogany lumber
 - (c) Average figures 1981 and 1985
 - (d) 1986 figures as provided by the Guyana Forestry Commission
 - (e) 1984 figures

ANNEX VIII

DRAFT PROJECT DOCUMENT

Country: CARICOM Regional

Title of project:	Intra-regional tool maintenance training programme for the furniture and joinery industry.
Government counterpart agencies:	Ministries of Industry and Forestry
Executing Agency:	United Nations Industrial Development Organization (UNIDO)
Duration	3 years
Estimated starting date:	
External inputs	US\$ 240,000
Government inputs	To be indicated in final project document.

PART I - LEGAL CONTEXT

To be indicated in final project document.

PART II - THE PROJECT

PART II A - Development Objective

To promote regional cooperation in developing the efficiency of the wood processing industry.

PART II B - Immediate Objectives

1. To improve the ability of personnel in the furniture and joinery industry of CARICOM member states to carry out effectively tool maintenance work.
2. To extend the scope of Guyana's Tool Maintenance Training facilities to cover the needs of the furniture/joinery industry in CARICOM.

As a direct result of the project, a basis will have been laid for longer serviceable life of cutting tools and better performance of woodworking machines in the plants of those attending the programme.

PART II C - Special Considerations

The project will contribute towards fostering technical cooperation among the member states of the Caribbean Community.

PART II D - Background and Justification

Most plants visited in nine of the thirteen CARICOM countries in the course of the UNIDO/CARICOM project UC/CAR/86/201 were found lacking in appropriate tool maintenance equipment and know how.

In most plants, for instance, narrow bandsaw blades are considered as disposable items, that is are simply thrown away once broken. In this particular case rapid wear is due, inter alia, to uncorrectly set blade guides, worn out pulley linings and improper straining of blades as well as misaligned wheels.

The major tool maintenance problem is, however, encountered in the use of carbide-tipped circular saws. Adopted by many plants on the assumption that they would outlast normal-steel blades, these particularly expensive tools account for a high share of the inflated operating cost as they are rapidly discarded for lack of the required sharpening facilities. Notable, is the widespread absence of facilities for replacing carbide tips once they fall off the blade. In fact in some cases carbide-tipped sawblades are sent as far away as Miami for sharpening and re-conditioning.

Basic, although in many cases rudimentary, equipment does exist for sharpening planing knives. However, only very few of the plants visited were

equipped with the type of equipment which would allow simultaneous sharpening of knives in sets to help retain equal knife weight and prevent uneven load on bearings of cutting spindles.

In most cases moulding cutters, boring bits and routing bits were sharpened free-hand on bench grinders thus affecting the accuracy of cutting edges and the balance of cutters.

In addition to resulting in drastically reduced serviceable life, poorly maintained cutting tools contribute to inferior surface quality of processed wood components, leading to wastage of material and added cost of remedial work.

The lack of know-how on tool maintenance is compounded by a widespread absence of knowledge on the geometry requirements of cutting tools based on the characteristics of given timber species. This prevents the correction of machining defects such as torn grain - a problem experienced, for instance, in the machining of Purpleheart and responsible for the resistance to the use of this species on the part of furniture manufacturers in CARICOM.

No tool maintenance training programme has been undertaken in the past in any of the CARICOM countries. However, a UNDP/UNIDO project is expected to be carried out in 1988 at the Development Unit of the Guyana Forestry Commission in Georgetown to help establish a Tool Maintenance and Servicing Centre for the benefit of the local woodworking industry. The project includes both expertise and provision of maintenance equipment.

This project proposes that once the Centre becomes operational its scope be extended to provide short-term training courses of one month each in tool maintenance for the benefit of the furniture/joinery industry of other CARICOM member states.

PART II E - Outputs

1. Curriculum of training in Tool Maintenance Techniques for the requirements of the furniture and joinery industry.
2. Fifty-four technicians from the furniture/joinery industry of CARICOM member states trained in tool maintenance techniques.
3. Information sheets on critical topics of tool maintenance techniques as a permanent reference for the industry.

PART II F - Activities

1. Elaboration of content, methods and structure of the training programme to provide training for 54 trainees over a period of three years, consisting of three one-month courses per year with six trainees each course.
2. Preparation of purchase specifications for additional equipment and supplies required for the three year programme.

3. Preparation and printing of training material.
 4. Implementation of actual training.

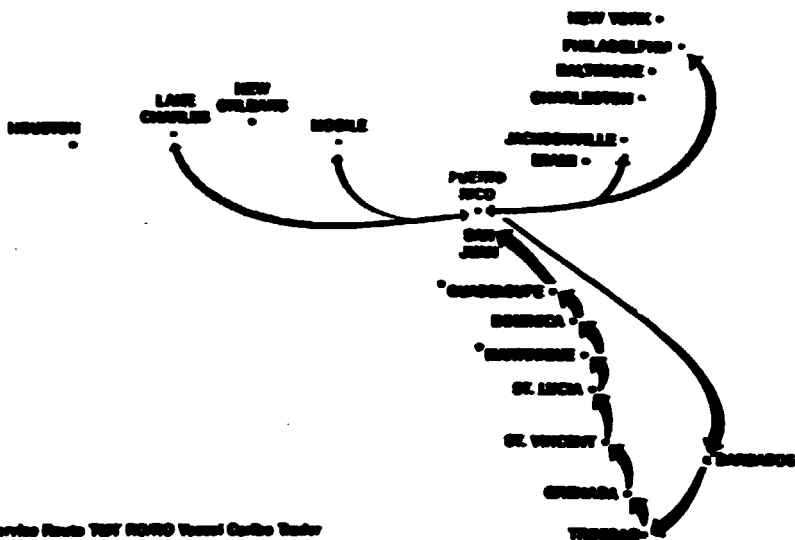
PART II G - Inputs

	<u>man/months</u>	<u>US\$</u>
1. External inputs		
1.1 Personnel		
- Sandoctoring expert (two months preparatory activities and 9 missions of one month each to carry out actual training)	11	83,000
1.2 Group training		
(51 months fellowships)	51	135,000
+ 36 months fellowships for Guyanese	36	18,000
1.3 Equipment		
1.3.1 Non-expendable		
Additional Universal Grinder		8,000
Van for collecting and delivering tools		12,000
1.3.2 Expendable		
Supplies		1,000
1.4 Miscellaneous		5,000
Total external inputs		260,000
2. Government inputs		
2.1 Personnel		
Counterparts for the expert		p.m.
2.2 Equipment and premises		
Use of the lecture room, lecture facilities and existing equipment at the Forestry Commission Development Unit		p.m.

ANNEX IX

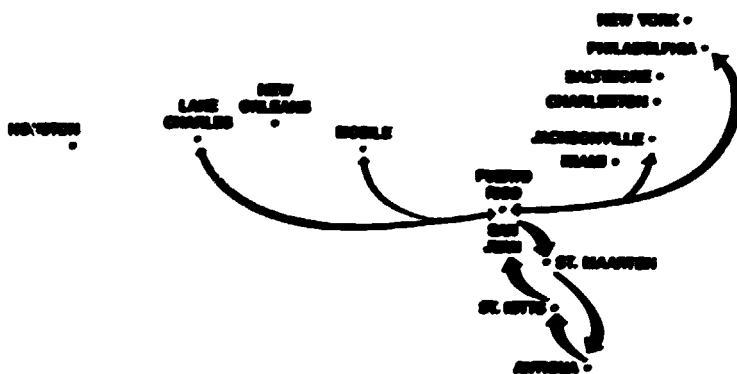
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**EASTERN CARIBBEAN SERVICE
EFFECTIVE AUGUST 20, 1986**

I. Southbound Weekly Sailing Schedule

	TRANSIT TIME (DAYS)		GULF
	NEW YORK	JACKSONVILLE	
(a) <u>CARIBE TRADER</u> - DEPART San Juan every Saturday			

ARRIVES:

BARBADOS - Monday	10	8	16
TRINIDAD - Tuesday	11	9	17
GRENADA - Wednesday AM	12	10	18
ST. VINCENT - Wednesday PM	12	10	18
ST. LUCIA - Thursday AM	13	11	19
*MARTINIQUE - Thursday PM	13	11	19
DOMINICA - Thursday PM	13	11	19
*GUADELOUPE - Friday AM	14	12	20
SAN JUAN - Saturday AM	--	--	--

*Alternate Bi-Weekly Service

(b) CARIBE MERCHANT - DEPART San Juan every Wednesday

ARRIVES:

ST. MAARTEN - Thursday AM	13	* 8	13
ANTIGUA - Thursday AM	13	* 8	13
ST. KITTS - Friday AM	14	* 9	14
SAN JUAN - Saturday	--	--	--

* Based on Wednesday sailing from Jacksonville

Line-Haul Vessel Departures:

Philadelphia - Every Thursday
Jacksonville: - Every Wednesday
 Every Saturday
Gulf: Lake Charles: Every Friday
 Mobile: Every Sunday

II. Northbound Weekly Sailing Schedule

	TRANSIT TIME (DAYS)		GULF
	SAN JUAN	NEW YORK JACKSONVILLE	
(a) <u>CARIBE TRADER</u> - ARRIVES San Juan every Saturday			

DEPARTS:

BARBADOS - Monday	5	17	14	15
TRINIDAD - Tuesday	4	16	13	14
GRENADA - Wednesday AM	3	15	12	13
ST. VINCENT - Wednesday PM	3	15	12	13
ST. LUCIA - Thursday AM	2	14	11	12
*MARTINIQUE - Thursday PM	2	14	11	12
DOMINICA - Thursday PM	2	14	11	12
*GUADELOUPE - Friday AM	1	13	10	10

* Alternate Bi-Weekly Service

(b) CARIBE MERCHANT - ARRIVES San Juan every Saturday

DEPARTS:

ST. MAARTEN - Thursday AM	2	14	11	12
ANTIGUA - Thursday PM	2	14	11	12
ST. KITTS - Friday AM	1	13	10	11

Line-Haul Vessel Departures From San Juan:

Philadelphia - Every Thursday
Jacksonville - Every Tuesday and Friday
Lake Charles/Mobile - Every Monday

ANNEX X

LIST OF DRAFT PROJECT DOCUMENTS CONCERNING INDIVIDUAL COUNTRIES

Item	Country	Project title	Ref.Doc. No./pages	Estimated Cost US\$	Project Immediate Objectives
1.	Belize	Assistance to the Whitney Integrated Woodworking Plant	IO/R.56 p.21	72,000	1.Efficient utilization of new production equipment purchased for the purpose of expanding the sawmilling operation and integrating it with a planing and parquet making production. 2.Introduction of proper tool maintenance methods for the new equipment; and 3.Introduction of proper kiln drying and wood preservation techniques.
2.	Belize	Assistance to Loskot Integrated Woodworking project	IO/R.56 p.25	40,000	To enable the Loskot Enterprises Co. to develop an initial capability to produce furniture for export incorporating both hand-carved and machine-made components, and reflecting decorative patterns of the Maya heritage.
3.	Belize	Assistance to Pine Lumber Sawmill	IO/R.56 p.28	25,000	To enable the Pine Lumber Sawmill to validate its expansion plans and present a basis for access to credit facilities.
4.	Dominica	Technical Assistance in the establishment of a demonstration small-scale furniture plant	IO/R.57 p.19	98,500	To enable the supervisory staff of the new factory to be set up by the Cheapside Company, and trainees from other Dominican furniture factories, to acquire critical production know-how for the manufacture of standard furniture for export.
5.	Dominica	Technical Assistance to the North Eastern Timber Integrated Woodworking Plant	IO/R.57 p.22	50,000	To enable the management of the Northeastern Co. to: (a) develop a rational basis for the expansion of its sawmilling operation, and, (b) increase the efficiency of its furniture making operation.

Item	Country	Project title	Ref.Doc. No./pages	Estimated Cost US\$	Project Immediate Objectives
6.	Dominica	Assistance to Furniture Woodworking Ltd.	IO/R.57 p. 26	25,000	To enable the Furniture Woodworking Ltd. to acquire the necessary know-how for providing tool maintenance services to Dominica's furniture and joinery industry.
7.	Guyana	Assistance to the Sawmill industry	IO/R.58 p. 32	32,000	To enable the sawmill industry, especially the export oriented plants, to establish a rational basis for: (a) upgrading the efficiency of the existing production machinery; and (b) renewing and expanding the existing sawmilling facilities.
8.	Guyana	Rehabilitation of the Guyana Timber Ltd. (GTL) to serve as a timber supply center for the CARICOM market	IO/R.58 p. 36	25,000	To enable Guyanese private sawmills to assess the viability of taking over the GTL Woodworking Complex and converting it into centralized facilities for seasoning, further processing and storing of timber prior to shipping to Caribbean destinations.
9.	Jamaica	Technical Assistance to the Fairway Furniture	IO/R.59 p.40	25,000	To enable the Fairway Furniture Factory to acquire the necessary know-how for providing tool maintenance services to the small-scale furniture/joinery industry in Jamaica
10.	Trinidad and Tobago	Technical Assistance to the Specialist Furniture Ltd.	IO/R.63 p.35	25,000	To enable the Specialist Furniture Ltd. to acquire the necessary know-how for providing tool maintenance services to the furniture/joinery industry in Trinidad and Tobago.
11.	Barbados	Technical Assistance to the Barbados Furniture Trading Co. (BFTC)	IO/R.55 p. 36	25,000	To enable the BFTC to acquire the necessary know-how for providing Tool Maintenance Services to the furniture/joinery industry in Barbados

Item	Country	Project title	Ref.Doc. No./pages	Estimated Cost US\$	Project Immediate Objectives
12.	St. Lucia	Technical Assistance to the St. Lucia Furniture Manufacturers' Association	IO/R.61 p.31	25,000	To enable the Furniture Manufacturers' Association to acquire the necessary know-how for providing tool maintenance services to St. Lucia's furniture/joinery industry.
13.	St. Vincent and the Grenadines	Technical Assistance to the Hutchinson and Co. Ltd.	IO/R.62 p. 30	17,000	To enable the existing Hutchinson Tool Maintenance Centre to acquire the necessary know-how for expanding their servicing scope.

ANNEX XI

LIST OF TECHNICAL REPORTS ISSUED BY THE PROJECT

Document No.	Title	No. of pages
IO/R.53	Technical Report: Selection of Woodworking Equipment for the Small-scale Furniture/Joinery Industry in the Caribbean Community	76
IO/R.54	Technical Report: The Situation in Antigua and Barbuda	39
IO/R.55	Technical Report: The Situation in Barbados	39
IO/R.56	Technical Report: The Situation in Belize	45
IO/R.57	Technical Report: The Situation in Dominica	33
IO/R.58	Technical Report: The Situation in Guyana	69
IO/R.59	Technical Report: The Situation in Jamaica	42
IO/R.60	Technical Report: Review of the Woodworking Unit of Things Jamaican Ltd.	19
IO/R.61	Technical Report: The Situation in Saint Lucia	33
IO/R.62	Technical Report: The Situation in Saint Vincent and the Grenadines	35
IO/R.63	Technical Report: The Situation in Trinidad and Tobago	37