OCCASION

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

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

RESTRICTED

16329

DP/ID/SER.B/569
1 June 1987
ENGLISH

ASSISTANCE TO THE WOOD PROCESSING INDUS ''

SI/SOI/86/803

SOLOMON ISLANDS

Terminal report*

Prepared for the Government of the Solomon Islands
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Horatio P. Brion, Secondary Wood Processing Specialist and Team Leader, Alan Cameron, Primary Wood Processing Specialist and Alastair Fraser, Wood Resources Specialist

Backstopping officer: A. V. Bassili, Agro-based Industries Branch

United Nations Industrial Development Organization
Vienna

251

* This document has been reproduced without formal editing.

V.87 85656

EXPLANATORY NOTES

The monetary unit of the Solomon Islands Government is the Solomon Islands Dollar (SI$). The current official rate of exchange for the SI Dollars is SI$1.77 = US$1.00. Also SI$1.00 = ¥889.86 (Japanese Yen).

The following acronyms are used in this Report :

ADAB	-	Australian Development Aid Bureau
ANUTECH	-	Australian National University Technical Services Organization
CDC	-	Commonwealth Development Corporation
C.E.M.A.	-	Commonwealth Export Marketing Authority, SIG
CSIRO	-	Council of Scientific and Industrial Research Office, Melbourne, Australia
CTA	-	Chief Technical Adviser, MTCI
EEC	-	European Economic Community
ESCAP	-	Economic and Social Committee for Asia and the Pacific, United Nations
FAO	-	Food and Agriculture Organization of the United Nations
GATT	-	General Agreement on the Tariffs and Trade
ITC	-	International Trade Centre
LPT	-	Levers Pacific Timber, Ltd.
MNR	-	Ministry of Natural Resources, SIG
MTCI	-	Ministry of Trade, Commerce and Industry, SIG
PNG	-	Papua-New Guinea
SI	-	Solomon Islands
SIG	-	Solomon Islands Government
UNCTAD	-	United Nations Conference on Trade and Development
UNDP	-	United Nations Development Programme
UNIDO	-	United Nations Industrial Development Organization

A hypen between numbers (e.g., 1-5) indicates the full range involved, including the beginning and end points.

A full stop (.) is used to indicate decimals.

A comma (,) is used to indicate thousands, million, billions.

The following symbols and/or abbreviations are used in this Report:

cm.	-	centimeter
cu.m.	-	cubic meter
d.b.h.	-	diameter at breast height
FD	-	Forest Division, Ministry of Natural Resources, SIG

ha.	-	hectare
hr.	-	hour
HSS	-	High Speed Steel, a steel alloy used for making cutting tools such as sawblades, planer knives, router bits, etc.
kg.	-	kilogram
km.	-	kilometer
km^2	-	square kilometer
kw	-	kilowatt
m.	-	meter
MAI	-	Mean Annual Increment
mm.	-	millimeter
m-hr.	-	man-hour, work done by one man in one hour
no.	-	number
pcs.	-	pieces, denoting unit of quantity
RL	-	Random length, normally used to specify items of various lengths
SQ	-	"Standard Quality", applied to all exportable grade logs with diameters greater than 60 cm.
sq.ft.	-	square foot, an area measuring one (1) foot wide and one (1) foot long
SS	-	supersmall, a term applied to logs with diameters 30-59 cm. at breast height
Sta.	-	"Santa", Spanish word for Sait, used in island names such as Sta. Cruz (Temotu Province); Sta. Isabel (Isabel Province)
T & G	-	Tongue and Groove
TCT	-	Tungsten-Carbide-Tip, a hard metal alloy used to reinforce the edges of cutting tools
V-Cut	-	a system of joining (laterally) wooden walling laths, characterized by beveled edges to form a V-shaped groove at the joined edges
yr.	-	year
/	-	per, meaning "for each"
%	-	per cent, 1/100th part of a whole
Ø	-	symbol for diameter
US$	-	U.S.Dollars, currency of the United States of America
SI$	-	Solomon Islands Dollar, currency of the Solomon Islands
¥	-	"Yen", currency of Japan

Mention of company names and product brands does not imply endorsement by the United Nations Development Organization (UNIDO).

TECHNICAL ASSISTANCE TO THE WOOD AND WOOD PRODUCTS INDUSTRY OF THE SOLOMON ISLANDS

SUMMARY

Upon request of the SIG, a team of UNIDO specialists conducted an in-depth study of the country's wood and wood products industry from July to September 1986. Forest resources, logging operations, sawmilling facilities, furniture and joinery plants were visited and studied. Industry leaders of the three major sub-sectors of the wood industry were interviewed. Government officials responsible for the development of national economic plans, the enforcement of national laws, corresponding rules and regulations on the extraction, processing and marketing of wood and wood products were also interviewed. Existing laws, rules and regulations, and policies pertinent to the developemnt of the industry were studied, particularly with respect to the possibility and opportunities thus provided to encourage, support and sustain the healthy growth of the wood and wood products industry of the country. The UNIDO team furthermore, looked into the adequacy of the number, preparation, training and capabilities of the lower echelons of government officers to discharge their duties and responsibilities under existing laws, rules and regulations governing the extraction, processing and marketing of wood and wood products. These studies were also carried out considering the established policy of the SIG, as set forth in the National Economic Development Plan for 1985-1989, which lays emphasis on the development of industries based on the use of indigenous materials.

Development of the SI secondary wood processing sub-sector is indicated to optimize revenues from forest-based industries. Such a programme, however, is greatly dependent on a known and reliable resource of material inputs : available volumes and corresponding wood species which determine the type and quantities of end products to be manufactured and sold. Based on available data, interviews with industry leaders and government officials,

and field visits, the mission found the industry situation alarming! If current cutting rates go on, unabated or uncontrolled, the SI may have to import its domestic needs before the end of this century!

The UNIDO mission found that the following conditions and practices contributed to the undesirable situation prevailing in the timber extraction and sawmilling industries which prevent the immediate development of the SI secondary wood processing industry sub-sector :

(a) The undertaking of a detailed and complete resource inventory has not been a pre-requisite for the issuance of licenses for commercial timber harvesting, nor has the registration of land been required as a means of avoiding disruptive land disputes after operations commence.

(b) The long-term sustainability of the resource is being jeopardized by inadequate investment in regeneration. Only 20 per cent of the forest being cut over is replanted and inadequate attention has been given to the future utilization of the plantation resource in determining the size of the project, areas planted and species used.

(c) Current ad hoc approach to licensing operators who succeeded in reaching an agreement with customary land owners is executed with inconsistency in the application of existing national regulations on the extraction of timber from the forests.

(d) Available timber resource has not been fully considered in the issuance of licenses with the result that several major licensed operators are facing impending shortages of raw materials.

(e) Available industry data are unrealistic and/or inaccurate as a result of the laxity in enforcing national regulations on periodic operations reports from licensed operators, and is further aggravated by under-trained personnel and/or under-manned government offices responsible for the enforcement of such regulations.

(f) Licensed volumes are not related to mill outputs as there is minimal government monitoring activities of the sawmilling industry.

(g) The existing combination of low log quality, inappropriate sawmilling equipment and design and restricted market conditions limit the recovery of sawn timber suitable for export and secondary processing.

(h) The implementation of the 20% local processing requirement and the intention to increase this further in the "National Forest and Timber Policy, 1984" has been introduced without adequate consideration of the implications for the government and industry in terms of monitoring performance, developing markets and products and setting-up the necessary institutional framework to achieve the overall objective. Many of the mills installed in response to this requirement represent minimal capital cost solutions and may not be appropriate for extending the policy on local processing.

(i) The performance of the sawmilling industry and the efficiency of its resource utilization appears to be even worse than the statistics indicate, because of large discrepancies between sawn timber production and sales. As much as 20 per cent of output is unaccounted for.

(j) The apparent willingness of the domestic timber user to accept material of poor dimensional accuracy, variably undesirable moisture content and variable grading quality is encouraging the persistence of poor standards in the primary industry.

(k) The "Development Plans" of the industry have so far been evolved or implemented without the benefit of market research or an analysis of its possible good effects (including intagible ones) to the economy of the country.

(l) The basis of the national statistics on the timber industry is inadequate for effective use in evolving national policies and in monitoring the performance of the industry.

(m) Reputable companies are discouraged from investing in the SI wood industry on a long term involvement due to the effects of insecurity and uncertainty of legal jurisdiction over certain tracts of land caused by the existing "customary land" ownership system. And

(n) The funds raised through the Reforestation Levy have not been fully utilized for financing reforestation operations, and the surplus is not being accumulated to finance future activities. No financial support has yet been made available from the Levy funds to the private sector for reforestation.

A small number of furniture and joinery shops comprise the existing SI secondary wood processing industry. However, the combination of improperly prepared wood, inappropriate organization and use of machines and production materials, and inadequate

training of management and shopfloor level supervisors limit the quantity and quality of its output. The resulting high cost of furniture and joinery products inhibit both domestic and export sales.

The country's rattan furniture industry is heavily dependent upon imported rattan materials (plastic-coated rattan strips and big diameter rattan poles), in spite of indications of good rattan resources in the country. Crude manufacturing techniques and primitive production facilities contribute to the low quality and high cost of the resulting rattan furniture. The relatively smaller capital requirements and lower degree of sophistication (as compared to wooden furniture manufacture) required by the rattan furniture industry gives it good potentials for development in the SI, provided adequate rattan resources are confirmed to exist in the country.

According to the National Economic Development Plans for 1985-1989, development of the SI wood industry with a view to optimizing forest revenues through "manufacturing value added" (MVA) should be pursued to meet local demands and result in export-oriented secondary wood processing operations. This can be achieved through a series of activities that should be undertaken in a defined order of priority and with corresponding individual objectives (see Figure 3). This programme of activities compose the "Development Strategy" which, if implemented effectively will help assure the attainment of Government's desire to develop the wood and wood products industry.

Among others, the following moves are strongly recommended for immediate implementation :

i - Extension of the current moratorium on new commercial logging licenses until a Development Strategy is formulated including the unutilized areas previously committed to Levers Pacific Timbers, Ltd.

ii - Undertaking of a complete inventory of the potentially commercial forest resources of the country.

iii - Comprehensive review of the Plantation Programme

iv - Formulation of a Medium Term Log Production forecast.

v - Creation of a Forest and Timber Council through legislation.

vi - Market research and product promotion at both the national and international levels.

vii - Formulation, adoption and implementation of Grading Rules and Standards which will help assure the acceptability of SI wood products in both the domestic and foreign markets.

viii - Formulation of unambiguous and practical regulations for the trading and use of timber preservatives, and the handling and disposal of timber treated with toxic chemicals should be undertaken without delay. Detailed information on the nature of the chemicals and of the treatment processes should be made available to the authority responsible for formulation of the regulations.

Upon successful attainment of the objectives of the above moves, the following should be carried out :

ix - Optimum utilization scheme for wood products based on the Log Production Forecast.

x - Granting of foreign investment licenses, commercial logging licenses, sawmilling and industrial licenses must be coordinated between pertinent government agencies so that the over-all development strategy is realized, rather than adversely affected by ad hoc licensing activitie..

xi - Log harvesting should be controlled on an area basis and accurate records of volumes cut, areas logged be kept for comparison with original inventory estimates.

xii - Prior registration of the land should be made a condition to the grant of licenses for commercial exploitation of timber resources, in addition to the requirement for regeneration activities on the part of the licensee.

xiii - Require the submission and approval by the pertinent government authorities, of a land-use plan also as a condition to the grant of commercial logging licenses.

xiv - Review of the Forest and Timber Policy (1984) to make it more comprehensive, encompassing all aspects of the establishment and preservation of a national forest estate, and the development and maintenance of a viable industry contributing to the national economy, eliminating details of implementation of the policy which are more properly matters for executive decision.

xv - Research and development activities, with external assistance if necessary, should be undertaken without delay in order to provide the information necessary for the formulation of the over-all Development Strategy.

xvi - The Government should provide a system of financial incentives to attract investors and encourage them to conduct their licenses in consonance with the established programme.

xvii - A comprehensive training programme for key industrial plant personnel should be formulated and the corresponding facilities and training staff be organized to meet the requirements of the training programme.

xviii - A consultative committee on coastal shipping should be created. This committee will advise government on matters required to rationalize coastal shipping services and provide impetious for port development. and

xix - A continuing market research is expected to indicate the direction and mode of product development that will help develop the wood and wood products industry of the country.

Development of the secondary wood processing industry, primarily the furniture and joinery industry, should await the rationalization of the sawmilling industry of the country, and must proceed according to the schedule enumerated in Annex VI.

The rattan furniture industry, provided the existence of adequate rattan resources in the forest is confirmed, should be developed to attain export levels. This development programme (see Annex VII) can be initiated without waiting for the formulation and adoption of the over-all Developemnt Strategy.

TABLE OF CONTENTS

Chapter/Section | Page

Chapter/Section — Page

-----oOo-----

I. INTRODUCTION

1.1 BACKGROUND AND PROJECT OBJECTIVES

The Wood and wood products industry of the Solomon Islands is based on wood resources available from approximately 200,000 to 250,000 hectares of exploitable forests (according to current logging techniques). Among other causes, this timber resource has been depleted as a result of :

i - logging operations since 1966 ;

ii - a number of strong cyclones which visit the archipelago annually; and to a minor extent

iii - uncontrolled clearing of forest lands brought about by shifting cultivation.

At best, the available growing stock was calculated at about 10,000,000 cu.m. in the early 1970's. No other formal data on the existing timberstand is yet available, although aerial surveys have been made on the forest lands with the aid of the Australian Government in the 1970's. However, the final results of the last aerial survey have yet to be confirmed by surveys on foot to arrive at a more realistic estimate of the timberstand.

Logging operations have increased since 1966 and reached an annual production of about 450,000 cu.m. in 1984. However, the primary processing sub-sector of the wood industry has been confined to sawmilling alone. The sawn timber output of the industry did not increase proportionately to the growth of the logging industry, so that export revenues from the industry was mainly due to log exports. A few furniture and joinery workshops compose the secondary processing sub-sector of the wood industry. Its total output, however, was primarily for the domestic market only.

The 1985-1989 National Development Plan lay emphasis on the development of industries based on local raw materials. It is hoped that development of the wood industry to levels which will allow the export of wood products in a more advanced state of manufacture will help the country earn more foreign exchange through the "added value" contributed by further processing operations.

The country's planning authorities wish to submit to Cabinet a consolidated report to justify the development of the wood and wood products industry.

Moreover, this move is viewed to allow proper allocation of the country's resources under the National Development Plan to launch, among other projects, an integrated programme for the development of the wood processing industry in line with the development priorities set forth in the plan.

The SI Ministry of Natural Resources, together with the Ministry of Trade, Commerce and Industry, has therefore, requested UNIDO for assistance in the formulation of a realistic and coherent program of action to develop the wood processing industry of the country.

1.2 THE PROJECT TEAM

In response to the request of the SIG, UNIDO provided the services of a team of three (3) Specialists, one for each of the principal sub-sectors of the wood and wood products industry, to wit :

i - a Wood Resources Specialist ;

ii - a Primary Wood Processing Specialist ; and

iii - a Secondary Wood Processing Specialist

who were given the general task of :

- analyzing the present raw material situation ;
- studying the present state of the wood processing industry in the country ;
- evaluating the potentials for development of the wood processing industries based on existing facilities and manpower resources ; and
- studying the potentials for export of various semi-finished and finished wood products

among other specific tasks. The team was composed of :

HORATIO P. BRION, Team Leader and specialist in secondary wood processing industries (in the Solomon Islands from 7 July to 28 August 1986) ;

ALAN L. CAMERON, specialist in primary wood processing industries (in the Solomon Islands from 21 July to 11 September 1986) ; and

ALASTAIR I. FRASER, wood resource specialist (in the Solomon Islands from 24 July to 13 August 1986).

The specific tasks of each of the three (3) specialists are given in more detail in the respective Job Descriptions, copies of which are presented as Annexes I-A, I-B and I-C, respectively.

II. FORESTS AND TIMBER RESOURCES

2.1 FOREST DISTRIBUTION

The forests of the Solomon Islands have not been the subject of a survey since the mid 1960s, when air photo interpretation was carried out, and areas of forest which met the criteria for commercial logging at that time were identified. These areas were subsequently surveyed on the ground and the total volume considered as having commercial potential was estimated. In 1982, the Forestry Division prepared an assessement and summary of all the commercial forest areas with estimates of the quantity of timber which had been logged in the period since the inventory, in order to derive an estimate of the remaining commercial growing stock. This data was given to ADAB for their 1985 mission, and the relevant table from their report is reproduced below as Table 2.1.

Since this 1982 summary was compiled, a further 1.6 million cu.m. of logs have been harvested, reducing the residual growing stock to 12.7 million cu.m.

In 1979, the Chief Forestry Officer prepared a Timber Assessment - Research Report s/1/79 on which Table 2.1 is based, but in the final analysis the timber resources of Santa Isabel, Malaita and Makira were omitted, because, on the basis of air photo interpretation they had been too badly damaged by cyclone "Ida" in 1972 and by a combination of subsequent cyclones and shifting cultivation. The estimate of commercially available timber was therefore put at 10.6 million cu.m.

The ADAB Mission of 1985, reproduced the table from the 1979 Research Report, but added the 8.1 million on the three islands to arrive at the 18.5 million in their Table 2.2. The discrepancy between the two sources of 0.2 million is difficult to explain, but seems to be due to the inclusion of that amount in the Research Report under the general heading of Minor areas, other than in Western and Central Provinces. The volume felled since 1979 is about 2.6 million cu.m., so that the remaining growing stock would be 8 million or 15.6 million, depending on the inclusion or omission of the three islands mentioned above.

TABLE 2.1

LOG VOLUME BY ISLANDS BASED ON A 1960's INVENTORY REPORT, Reproduced from ANUTECH

Island	Area Ha.	Total Volume cu.m.	Volume Already Logged, cu.m.	Remaining Volume cu.m.	Remarks
Shortlands	10,250	500,200	386,200	114,000	Logging should be completed in 1985.
North Choiseul	3,800	195,000	---	195,000	Unlogged
Mono Ovai	1,250	70,000	---	70,000	Unlogged
Vella Lavella	12,600	520,000	---	520,000	Unlogged
Kolombangara	38,500	1,713,000	1,550,000	163,000	Re-logging southern part of Island.
North New Georgia	78,000	2,620,000	620,000	2,000,000	Logging commenced in 1980.
South New Georgia	25,400	1,544,500	914,737	629,763	
Vangunu	18,700	1,070,000	70,000	1,000,000	
Rendova	3,800	130,000	---	130,000	
Santa Isabel	62,900	4,795,000	190,500	4,604,500	Considerable cyclone damage in 1972.
Russell Islands	3,900	170,000	---	170,000	Mostly copra plantation.
Rennell	---	---	---	---	Cyclone damage 1979
Guadalcanal	31,600	1,336,200	150,000	1,186,200	
Malaita	13,700	665,000	65,000	600,000	Heavily populated; little forest left.
Makira	73,000	2,920,000	---	2,920,000	Cyclone Damage 1972.
Sta. Cruz	3,050	95,000	60,000	35,000	Kauri
Vanikolo	5,450	146,000	140,000	6,000	Kauri
TOTAL	385,900	18,489,900	4,146,437	14,343,463	

Source : Letter dated 11-10-82 from the Chief Forestry Advisor, Division of Forestry to the Assistant Director General, Forestry Department, FAO

TABLE 2.2

ESTIMATES OF CHANGES IN GROWING STOCK IN THE NATURAL FOREST BY ISLAND 1983-1986 AND THE LIKELY LIFE OF THE NATURAL RESOURCE AT CURRENT HARVESTING LEVELS (1000 cu.m.)

Island	Estimated Growing Stock 1982	Removals 1983-1986	Estimated Growing Stock 1986	Annual Capacity	Remaining Life (years)
Shortlands	114	114	---	---	---
North Choiseul	195	5	190	2	85
Mono Ovai	70	---	70	---	---
Vella Lavella	520	---	520	---**	---
Kolombangara	163	160	---	---	---
North New Georgia	3,592*	740	2,852	225	12
South New Georgia	629	220	409	75	5
Vangunu	1,000	10	990	5	190
Rendova	130	5	125	2**	60
Russell Islands	170	10	160	2	80
Rennell	---	---	---	---	---
Guadalcanal	1,186	400	786	190	4
Sta. Cruz	33	---	33	---	---
Vanikolo	6	---	6	---	---
Sub-Total	7,808	1,664	6,144	501	12
Sta. Isabel	4,604	10	4,594	2	
Malaita	600	100	500	25	20
Makira	2,920	210	2,710	100	27
Sub-Total	8,124	320	7,804	127	61
GRAND TOTAL	15,932	1,984	13,948	628	22

* This figure is taken from the 1979 Forest Division Report, which includes areas assessed as commercial by LPT, but not included in the 1982 data used by ADAB, given in Table 2.1.

** These resources are under negotiation with existing operators whose current resources are almost complete, with a combined capacity for 110,000 cu.m. per year, each giving 13-14 years cutting at current levels.

The first estimate referred to above and reproduced in Table 2.1 includes 8.1 million cu.m. in Sta. Isabel, Malaita and Makira, so that if these three (3) islands are omitted as being seriously cyclone-damaged, the available resource is reduced to 4.6 million cu.m.

It is very worrying that the data on the resource is so subjective, but this has now been recognized and the Government has submitted a project to ADAB for funding, which will prepare a new national forest inventory. This matter is discussed in more detail in section 7.1.

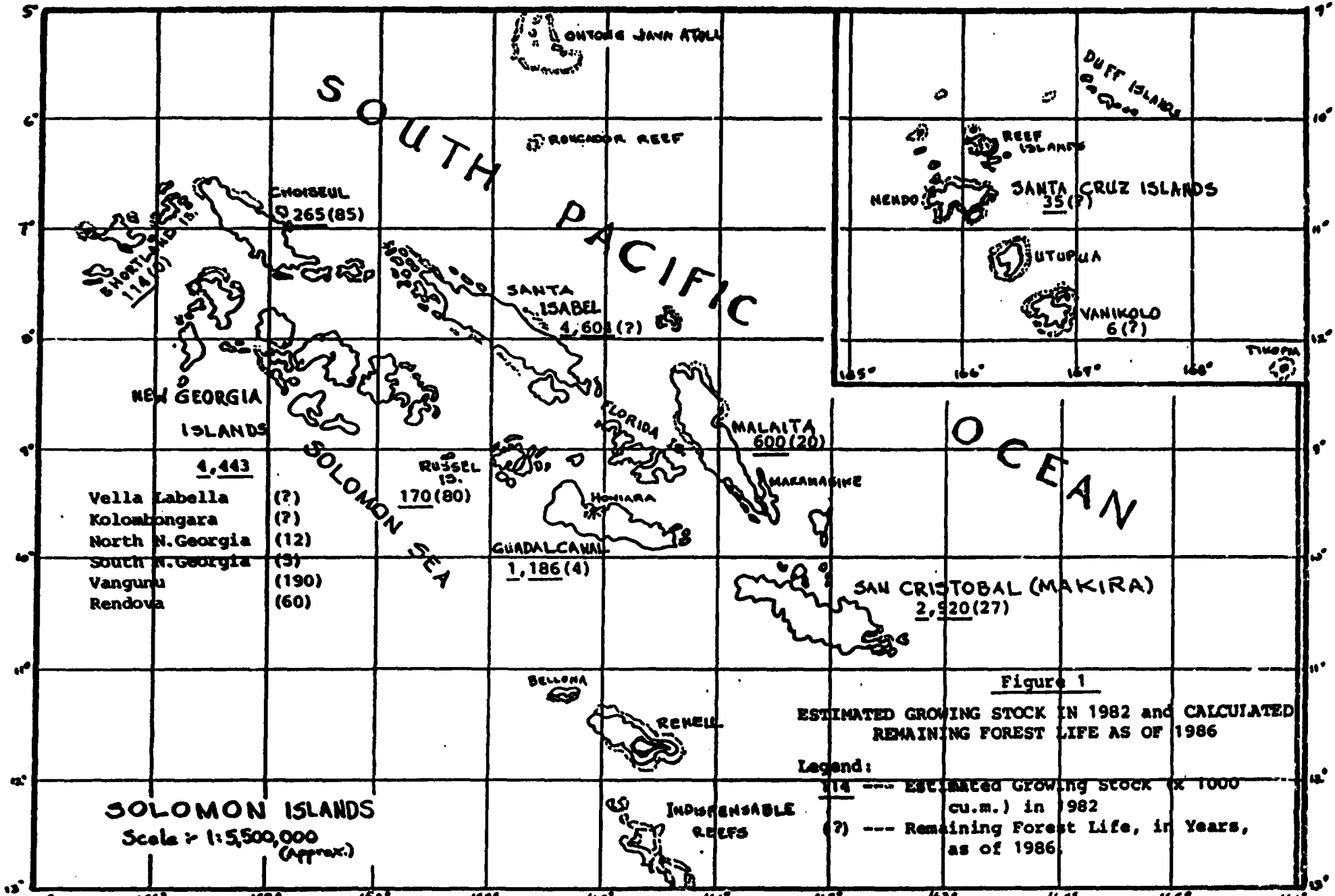

Figure 1

ESTIMATED GROWING STOCK IN 1982 and CALCULATED REMAINING FOREST LIFE AS OF 1986

Legend:

114 --- Estimated Growing Stock (x 1000 cu.m.) in 1982

(?) --- Remaining Forest Life, in Years, as of 1986.

However, since at present there is no exploitation of any significance on Sta. Isabel and Malaita, and operations have only recently started on Makira, it is worth considering that the two estimates of the remaining resource on the islands currently being exploited are 4.6 million cu.m. and 8 million cu.m. The former is the more recent figure, being derived from the 1982 submission to FAO.

At current harvesting levels these represent about 10 years and 17 years for the industry as it stands at present, and in its present location. However, this national assessment masks some important local variations, which have a bearing on the prospect for developing processing capacity.

Table 2.2 takes Table 2.1 as the starting point and adjusts the data for recorded removals from each island over the intervening period to arrive at an estimate of the current remaining resource. The data for North New Georgia is adjusted to take account of the results of an LPT inventory reported in the 1979 Forest Division Report. The current harvesting capacity on each island is also noted in order to arrive at an island by island assessment of the likely remaining resource life. The results are very disturbing, in that they reveal that on the two major islands of New Georgia and Guadalcanal, which account for almost 80% of all current removals, there appears to be only sufficient resource to sustain operations at current levels for 4-5 years, and possibly up to 12 years on North New Georgia. This conclusion if correct has a number of important implications in that log supply is likely to become increasingly difficult from now on, and as a result the logging companies will be tempted to start logging on more marginal sites, in order to try to sustain supplies, with probable serious adverse environmental consequences (see Figure 1).

2.2 FOREST OWNERSHIP AND EXPLOITATION POLICIES

Almost 90% of the land area of the Solomon Islands amounting to about 2.6 million ha. is covered with forest of some kind, though the quality, composition and local site conditions vary greatly.

There are varying estimates of what proportion of the forested land is suitable for exploitation, but if criteria of suitability for

conventional mechanized logging, sufficient stocking of commercially accepted species, and suitability for reforestation or conversion to agriculture are taken, then about 386,000 ha. or around 15% were originally considered as "commercial" forest.

TABLE 2.3

DISTRIBUTION OF LAND AREA, "COMMERCIAL" FOREST AREA, AND OWNERSHIP BY ISLAND GROUP

	West	Isabel	Central	Guadal -canal	Malaita	Makira	East	Total
Total Land Area (sq.km.)	8573	4014	1722	5646	4543	3561	837	29896
Total Commercial Forest Area	1923	629	39	316	137	730	85	3859
- customary owned	1095	350	39	316	137	730	---	2351
- government owned	828	279	----	----	----	----	85	1241
Other Land	6650	3385	1683	5330	4406	2831	752	25037
- customary land	6405	3269	1313	5051	4367	2799	702	23955
- government land	245	116	370	279	39	32	50	1082

Source : FAO (1979) and ANUTECH (1985)

The distribution of this "commercial" forest area by island group is given in Table 2.3, together with the breakdown between government and customary ownership, which is almost in the ratio one-third/two-thirds.

Prior to 1979 most large scale exploitation of commercial forest was carried out on government land, except for the operation on Guadalcanal. Small sawmills were operating on most islands, using timber cut from customary land.

By 1982 practically all the government owned "commercial" forest in the Western province had been subjected to logging, with the result that from now on all logging will have to take place on customary land, except in Sta. Isabel if sufficient areas can be found that have escaped cyclone damage in the past.

The initial policy for exploitation of the forest resources was set out in 1968. Prior to that time the forestry sector had been comprised of small scale logging for local processing, and logging of Kauri logs for export from Sta. Cruz. However, the latter was an exploitation

operation, and was not organized on a sustained yield basis, so that it finished in 1964 when the resource had been liquidated.

The local processing consumed about 10,000 cu.m. of logs annually, which met around 90% of domestic requirements.

From the mid 1960's onwards, the establishment of large-scale logging operations for log export were encouraged as a way of increasing government revenue. While benefits from possible local processing were recognized, the policy document considered it unrealistic to expect much increase in local processing at that time. Some stress was placed on the need to regenerate the forests to ensure a sustained yield of logs and timber in the future.

By the end of a decade, in the mid 1970's during which time about 1.6 million cu.m. of logs had been exported, the log exporting activities had become an important source of government revenue.

However, the allowable cut was based on liquidating the existing commercial resource over a 20-year period on the assumption that plantations would be ready for harvesting after that to sustain output. The replanting programme was not being implemented at a sufficient rate to meet this target, and forecasts of production showed an increasing gap between the final liquidation of the natural resource and the coming on stream of plantation grown products.

Since the FAO study in 1979 which pointed to this gap, the situation has got steadily worse and despite warnings from the Forestry Division, the government has neither stepped up the rate of replanting, nor reduced the rate of logging to meet its main policy objective of a sustained yield.

It now seems too late to avoid a sharp drop in timber supplies towards the end of the next decade.

Following recommendation by FAO (1979) the government has introduced a condition of new licenses, that requires 20% of the logs harvested to be processed locally, either for domestic market or for export and companies which are in default of this condition are being required to suspend operations until they comply.

In April 1983, a moratorium on the issue of new logging licenses was imposed, to be reviewed in September 1986. This was to allow time for a new National Forest Inventory to be completed, so that future harvesting could be properly planned. Rendova, Choiseul and Isabel were exempt from the moratorium and Malaita has recently also been given exemption.

A customary landowner can exploit timber on his own land without a license or any other form of control. However, a license is required to fell, harvest and extract logs for sale, so that some control can be exercised through the issue of licenses and the terms attached to them.

The current form of license, as gazetted in February 1986, includes conditions on environmental protection, access and infrastructure, exclusions of certain species, preservation of materials for domestic needs, crops and safety, and on payments of wages and royalties. It also lays down measurement standards and methods of payment, but it does not as a general condition require the deposit of any funds, bank bond or guarantee by the operator.

2.3 FOREST MANAGEMENT

In the Annual Report of the Forest Division, the term forest management is applied exclusively to the plantation forest activities. However, it is more usually applied to all measures taken to implement forestry policy with regard to the utilization, conservation, protection and regeneration of a forest resource.

In the Solomon Islands, forest management of the natural forest resource is hardly developed, and is only passive in the sense that it attempts to exercise some control over plans drawn up by others for harvesting. There is no attempt to manage the natural resource, as a resource in its own right, only to liquidate selected areas of forest, and convert them to plantations.

The management of natural tropical forests is very complex, and despite attempts in many parts of the world over many years, little success has been achieved in developing a silvicultural system which combines

commercial logging, with the regeneration of the forest in something like its pre-harvest condition. Where some encouraging results have been achieved, as in Suriname, the cutting intensity has been low, to minimize damage to advance growth, and this has been followed by chemical cleaning operations to remove undesired species competing with desired ones. Such a system can probably ensure a sustained yield and a gradual raising of the net annual increment of commercial species so that a long term Mean Annual Increment (MAI) of around two (2) cu.m. per hectare per year might be practised in the Solomon Islands, the sustained yield from government-owned forest land would perhaps be about 250,000 cu.m. per year.

An alternative to this approach, which has been adopted in the Solomon Islands is the conversion of the high forest to plantations. By the end of 1986 a total of 21,077 ha. had been planted with various species. Results from permanent and temporary sample plots are not yet available in a form which will allow a reliable forecast of future production to be made.

Early estimates of likely yield by the Forest Division were 140 cu.m. per ha. after 20 years or an MAI of 7 cu.m. per ha. per year. This may be achieved with the three indigenous species which account for about 14,000 ha. of the area currently planted, and might give a sustainable yield of 70,000 cu.m. per year after allowing for possible losses from various courses.

The area planted annually has been averaging about 800 ha. since 1981, though prior to that it reached a peak of 3,743 ha. in 1978. Over the 20 years since planting began the overall annual average has been about 1,000 ha., which represents about 20% of the area logged during the same period.

The remaining 80,000 ha. which have been logged-over but not replanted have been abandoned, and may eventually partially regenerate. However, the lack of intervention will mean that the future species composition may be less then ideal, and regeneration of desirable species may be inhibited for a considerable period as a result of climbers and competition with fast growing pioneer species.

In Ghana some success has been achieved in converting logged-over high forest to plantations by establishing charcoal-making operation to use up all the woody residues before replanting. This might be applicable on a limited scale in the Solomon Islands but the local market for charcoal will need to be developed.

Some areas are at present being logged at a low intensity by the customary land owners, and the timber sold to small local sawmills. If such logging is very selective, so that damage to remaining trees is minimized and adequate "mother" trees of desirable species are left, it could enable the forests to be regenerated naturally, and managed on a genuine sustained yield basis. If removals are kept to about one tree per ha. per year then a combination of growth on the remining trees and natural regeneration should be able to sustain the resource.

At slightly higher cutting intensities the resource will be gradually liquidated, but it may still prove a better way of securing regeneration in the long run, than the very heavy cutting of 30-60 cu.m. per ha. practised by the big logging companies which neither leaves enough to regenerate naturally over a reasonable time frame, nor removes enough to make the establishment of plantations an economic proposition.

The present approach to utilization of the natural forest is leading nowhere, and needs to be reviewed. A more coherent strategy for managing the nation's forest resources is needed and should be worked out as soon as the inventory data is at hand.

It is unlikely that a continuation of the current ad hoc approach to licensing whichever speculator succeeds in reaching an agreement with customary land owners will prove to be the most beneficial way of developing a timber sector, which can contribute to the country's well being and future income.

2.4 TIMBER SPECIES

About two-thirds of the current output of logs is comprised of four species; while two (Pometia pinnata 32% and Calophyllum spp. 19%) represent about half (Fraser 1980). Campnosperma brevipetifolia 10% and Terminalia spp. 4% make up the difference to the two-third level. In the past five years the proportion of Pometia has been increasing while the

other three have been declining, keeping the proportion of the whole group at much the same level.

The output of the Group A (valuable) species, Vitex cofassus, Gonystylus macrophylla, Schizomeria serrata, Palaqium app. and Dysoxylon spp. has declined from around 5% to 3% while production of Group C species (less well established or less common valuable species) has almost ceased, mainly it seems because of a ban on felling many of them.

Output of Group D (the difficult species) has increased from 8 to 10%, mainly Dillenia solomonensis and Parinari solomonensis while Supersmalls has fallen from 10 to about 4%. "Other" species now account for over 12% compared with only 4% in 1980, which may reflect either a real increase in the number of species being cut or an increase in the quantity of traditionally minor species being cut by exporting companies. The number of companies exporting logs has trebled in the past five years and it is possible that the newcomers have adopted slightly different cutting and marketing practices.

It would be desirable to have all species which account for more than about 1% of exports reported separately, so that charges in the markets can be monitored.

Without detailed inventory data it is impossible to predict how the species availability from logging natural forest will change overtime, if at all, but it is probably reasonably safe to assume that the four Group B species will continue to account for about two-thirds of log supply in the future.

As indicated in section 2.1, the remaining unlogged natural forest can probably only sustain logging at the current rate for a further 10-15 years. It may be possible to extend this by logging smaller areas not previously considered commercial and there is no way of knowing what effect this may have on species composition.

At some future date, the industry will have to convert to using plantation grown timber, and this will have a major impact on species availability. There are at present time nominally 21,000 ha. of plantations, but survival rates are low with the result that the effective area is only about 11,000 ha. Nominally Campnosperma

brevipetifolia and Terminalia spp. account for two-thirds of the area planted, while a further quarter is planted with Agathis macrophylla (13%) and Eucalyptus deglupta (10%). The remaining 10% is made up of Mahogany (Swietenia macrophylla) 7%, Teak (Tectona grandis) 0.2%, Gmelina (Gmelina arborea) 2% and others.

The combination of multiplicity of species and small areas means that it will be very difficult if not impossible to establish any industries to use these species once the plantations reach a harvestable size.

The 21,000 ha. of plantation are spread over four major planting sites, each on separate islands, so that there is no concentration of any one species in any locality. Although the emphasis on choice of species has been on "quality" timbers, the most nicely planted species, Campnosperma brevipetifolia is not considered as a leading timber in world terms, and might be difficult to develop high value uses.

There is also some doubt as to whether the two real quality timbers planted - Mahogany (Swietenia macrophylla) and Teak (Tectona grandis) will produce the desired quality of wood to reach their full value potential in as little as 20 years. A 50-year rotation is likely to be more appropriate.

2.5 FUELWOOD AND OTHER MINOR FOREST PRODUCTS

2.5.1 Fuelwood

The most important source of domestic fuel is wood, which is collected from a variety of sources, including driftwood, forest and sawmill residues and from garden residues. No data is available on the annual consumption, but on the assumption that all households outside the urban areas use exclusively wood, and that annual per capita consumption is 0.75 cu.m. of firewood, the total annual consumption is likely to be around 150,000 cu.m.

There does not appear to be an established market for fuelwood, as most is self collected, and there is no sign at present of any serious shortages impending, except possibly in very localized areas on the more densely populated parts of some islands.

A number of the exotic species which have been grown in plantations, such as Eucalyptus deglupta, Acacia mangium and even Gmelina arborea are very fast growing and could be used for local fuelwood projects if the necessary extension advice were provided, possibly in combination with seedlings.

Small amounts of fuelwood are used for industrial purposes, most notably fish curing which is estimated, following a visit to a curing station, to consume around 2 kg. wood per kg. of cured fish and copra drying. The total consumption of wood for this purpose is likely to be around 1500 tonnes or 2000 cu.m. annually.

2.5.2 Utility Wood and Poles

Most rural houses are built of local material including a substantial quantity of poles. A visual estimate would suggest about one cu.m. of poles per house. The rural population of around 200,000 would require a total of about 35,000 to 40,000 houses, and if these are assumed to have a life of 10 years, the annual turnover in houses is possibly around 3,500 requiring 3,500 cu.m. of poles.

It is noted that when copra prices, and therefore rural incomes, are high, purchases of second grade timber from sawmills primarily for house construction is also high. Some of this production is not recorded in official statistics, since generally only sales of first grade timber are reported.

Most sawmills visited reported that second grade timber accounted for around 25% of their output, so that the additional supply of this to the informal market, would represent an additional one third to the recorded told sales of sawn timbers. In 1985, this would possibly amount to as much as 5,000 cu.m. of second grade sawn timber. Some of this may be substituted for poles cut from the forest so that overall the consumption of utility wood is probably around 7,000 cu.m. annually.

2.5.3 Coconut Wood

The coconut tree (cocus nucifera) is another source of wood for house construction and furniture making purposes. Latest estimates (1985) indicate that there are approximately 9 million coconut trees in the Solomon Islands, distributed as follows :

TABLE 2.4

TOTAL ESTIMATED NUMBER OF COCONUT TREES, BY THE PROVINCE
(Plantation and Small Holders)

Province	No. of Trees	% of Total
Western	2,093,795	23%
Isabel	817,555	9%
Central	1,287,680	14%
Guadalcanal	1,824,790	20%
Malaita	1,980,595	22%
Makira	540,810	6%
Temotu	494,420	5%
Total	9,015,859	100%

Note : The above figures have not yet been adjusted to take up the number of trees which were damaged by the May 1986 cyclone.

Source: "COCONUT DEVELOPMENT PROJECT PHASE I, COCONUT SURVEY", Agrar-Und -Hyro-technik GmbH, Ministry of Agriculture and Lands, September 1985.

The same study showed that the age distribution of the coconut trees are as follows :

TABLE 2.5

PERCENTAGE DISTRIBUTION OF AGES OF COCONUT TREES

District	Immature	Young Mature	Mature	Old
Western	n.a.	n.a.	n.a.	n.a.
Central	20 %	29 %	51 %	0
Malaita	16 %	29 %	49 %	5
Eastern	24 %	29 %	46 %	0
National	20 %	29 %	49 %	2

Note : The above figures have not been adjusted to take up the damage done by the May 1986 cyclone.

Source : "COCONUT SURVEY", Agrar-und-Hydro-technik GmbH, Ministry of Agriculture and Lands, September 1985.

Experience in many coconut-raising countries of the tropics indicated the need to replace trees which are 50 years old or older, in order to attain optimum yield from the coconut plantation. An integrated national coconut tree replanting programme to replace the old and more mature coconut trees with high yield hybrid species (or the same species as the old coconut tree, if the local conditions do not permit replacement with hybrids), will thus make available a continuous supply of coconut tree stems which can be converted into cocowood (coconut sawn timber). Table 2.5 indicates that 51% (about 4,600,000 coconut trees) of the country's coconut trees are either mature of old. Assuming that one-fourth of the coconut trees classified as "mature" are already above 50 years old and have declining yields of nuts every year, it is thus indicated that about 14% (or 110,250 coconut trees) should be replaced with new seedlings now in order to preserve the overall coconut yield rates at desirable economic levels. An additional 2% will become available every year for replacement as more of the "young mature" and "mature" coconut trees exceed their optimum fruiting age and become eligible for replacement. On this basis, it will take at least 25 years to replace the present "mature" and "old" coconut trees, so that a replanting programme calling for an annual replanting rate of 2% of the total coconut tree population of the SI is indicated. Thus, approximately 180,000 coconut stems will be available annually for conversion to "cocowood". (In actual practice this may not be realized!)

In studies conducted by FAO and UNIDO in the Philippines, it was shown that approximately 0.9 cu.m. of roundwood is available from each coconut stem coming from a tree 50 years or older, (for lack of actual data based on the coconut tree population of SI, it will be assumed that the same volume of roundwood is available from each coconut tree stem). H.P. Brion has shown that it is possible to obtain a 50% yield of coconut sawn timber, using existing bandmilling facilities or a 43% yield by the use of chainsaws.

Thus, assuming a more realistic 60% implementation efficiency in actual practice, a total of about 40,000 cu.m. of cocowood may be made available each year for building schools and houses, and/or school desks and house furniture items. In turn, this means that an equivalent volume of sawn timber cut from traditional wood species can be made available for alternative purposes!!

2.5.4 Rattan

Rattan species are found widely throughout the Solomon Islands, but no data exists on either the quantities that might be commercially available or of current consumption. As these species have commercial potential for furniture making in particular the proposed forest inventory should include them in the assessment.

2.5.5 Bamboo

A similar situation prevails with regard to bamboo as with rattan. Small amounts are used domestically but in total consumption seems quite small.

2.5.6 Natural Resins

Many of the species found in the natural forest exude gums, latexes and resins, but as far as can be determined few are utilized, and these are unlikely to have commercial potential in the near future. However, it would be worth developing a record of all the species with exudates, and the properties in case interest increases at some future date.

2.5.7 Fruits and Nuts

Many native species in the Solomon Islands bear edible fruits and nuts, including Pometia, several species of Terminalia, especially T.kaernbachii. There is clearly an interest in growing fruit trees for local consumption, shown by the fact that they account for 60% of the trees distributed from the Munda nursery.

There may be scope for cultivating some of these trees commercially in the longer term, provided they are subjected to selection.

2.6 PROBLEMS IN THE EXPLOITATION OF FOREST RESOURCES

2.6.1 Land Tenure

The present state of land tenure in the SI, has been described in section 2.2 which shows that most commercial forest likely to be exploited in the short and medium term is on customary land.

Under the Constitution, and the present legislation, customary land owners are free to exploit their forests as they wish provided they can

establish their rights to the land. As very little land is formally registered, so establishing who or which group of people has the rights to a particular piece of land there is scope for endless disputes over who has the right to enter into logging agreements on particular tracts of land.

These rights can even be disputed after an agreement has been signed between a land owning group and a logging company for commercial timber extraction, sometimes with serious consequencies : first it is inhibiting investment by reputable companies, who would be prepared to commit themselves to a long term involvement, and second it is inhibiting investment in reforestation on customary land. Both of these consequences are a direct result in insecurity and uncertainty regarding the legal jurisdiction over particular tracts of land. The long term implications for the forestry sector and development generally are very serious. If companies are under-capitalized because of lack of long term security, operating costs are higher, investment in infrastructure such as roads and wharves is minimized, safety standards may be reduced, and profitability is also reduced. Tax revenue to the government and wages are also likely to be lower than could be expected, and as a result the SI do not receive as much benefit as they might from liquidating some of their forest resources.

These effects are immediate, but equally important is the long term consequences of failure to regenerate logged-over forest. The forest resources of the SI are very limited as has been stressed in section 2.1 above. Unless a substantial part of the revenue derived from liquidating this resource is invested in productive activities, whether it be replacement forest crops or alternative agricultural or industrial enterprises, the country will face serious economic consequences when the present resources is finally eliminated towards the end of this century.

2.6.2 Infrastructure

All current timber extraction is taking place in parts of the country with little or no existing infrastructure in the way of roads, airfields, harbours, hospitals, schools, etc. The cost of establishing these facilities is very high, and is probably higher than it need be, because of inadequacies in the existing sea transport system, and the poor state

of development of the supporting services sector. Thus, for example, machine utilization is generally low because few stocks of spare parts are essential materials within the country is slow.

The costs of developing most of the essential infrastructure is borne by the commercial logging companies with the result that many of the facilities are only of a temporary nature, and are only constructed to the minimum standard necessary to achieve their purpose.

Without any prospect of a long term involvement in an area, because of the limited life of the natural resource and little or no commitment to replanting, maintenance is minimized.

On Kolombangara Island the infrastructure developed at Ringi Cove by LPT, may be acquired by government for use as a base for a proposed commercial reforestation project, illustrating that long term benefits can be obtained from logging infrastructure if they are well established and maintained. Many of the smaller logging companies will not be leaving such useful facilities behind when they withdraw.

2.6.3 Yields

The current estimates of growing stock are mainly based on a series of inventories carried out by the Forest Division during the 1960's, supplemented by some subsequent company surveys. The original inventories only measured species then considered commercial, with girth at breast height greater than 6 ft. (diameter bh 58 cm.).

These surveys showed that there was substantial variation locally, but over the country as a whole the mean stocking did not vary widely from place to place. The overall mean was around 55 cu.m. per ha.

Some of the company inventories found higher figures, but this generally was a result of extending the measurement to more species or to smaller diameters. As SS logs have never accounted for more than 10% of the logged volume in best years, there is still an unexplained discrepancy between the two figures, possibly accounted for by the FD practice of assuming 25 cu.ft. per sq.ft. of Basal area. This implies an average log length of around 11 m. which may be on the pessimistic side.

Most logging operators in the SI are much more selective than those of LPT, and most companies report removals in the range 25-30 cu.m. per ha. However, since logging is only controlled by volume and not by area there is no way of verifying the figure.

From the commercial point of view there are advantages to the companies to increase removals per unit area, as fixed costs, especially on roads are spread over a larger volume, thereby reducing unit costs. However, the impact on the forest is very severe, and it may be no coincidence that the most serious problems with Meremia vine invasion are in Kolombangara, where LPT have been carrying out very heavy logging.

In view of the difficulties in maintaining the plantation programme at the necessary rate to sustain the industry, it may be desirable to modify cutting practices so as to encourage natural regeneration.

However, the relatively small percentage of trees in the 30-60 cm. diameter category, in the older cut-over areas, suggests that a wholesale conversion to the use of natural regeneration should be undertaken, and some research into the problem should be initiated.

An alternative approach has been followed with some success in Ghana, whereby the forest is clear-felled, and all woody material which cannot be sold for export or on the domestic market, is converted to charcoal for use as domestic fuel. However, this approach is unlikely to be appropriate in the SI because of the small and scattered nature of the domestic market for all forest products.

The lack of up-to-date and accurate inventory data is a serious constraint to the proper monitoring of existing logging operations, and to the proper planning and licensing of new areas. It is to be hoped that the shortcoming will be rectified shortly, but detailed comments on the proposals are made in section 7.2.

2.6.4 Cyclones

Cyclones occur frequently throughout the SI usually striking one or two islands severely. Very severe cyclones which cause widespread damage in the forest occur about every decade, but so far only the forest on Santa Isabel, Choiseul, Malatia and Makira have been damaged to a degree where commercial logging is prevented or seriously restricted.

It will be an important task of the proposed National Forest Inventory, to determine whether areas on the above islands damaged during the 1960's and 1970's have sufficient surviving trees to make commercial harvesting economically attractive.

2.6.5 Forest Fires and Shifting Cultivation

These phenomena both occur, but are not serious or widespread, and do not affect commercial logging.

III. THE MECHANICAL WOOD PROCESSING INDUSTRY

3.1 GENERAL OUTLOOK (UP TO THE YEAR 2000)

If the rate its wood resources are being depleted during the last five years continues, the wood industry of the SI faces a very bleak future - it will be importing its domestic requirements for sawn timber long before this century is over. The previous Chapter of this Report has pointed to the need for strong and decisive measures, both at national and provincial levels of government, to rationalize the timber exploitation activities of the country with a view to attaining a sustained forest yield within the shortest possible time it can be done. Furthermore, the SI must take steps to avail itself of the increased revenues from forest yields through the "added values" that can be realized from more advanced processing of its forest timber output.

The desired shift from logs to sawn timber exports has not materialized as hoped for, so that sawn timber accounts for less than 15% of the wood and wood products export revenue of the country in 1985. The current industry average for sawn timber yield rate per unit volume of log input (less than 40%) is very much less than yield rates (60%) in the sawn timber producing countries of Southeast Asia (Malaysia, Indonesia and the Philippines). This situation together with the high cost of maintaining machinery and equipment in reasonably good operating condition, lead to high cost of sawn timber production.

Further "added value" to be gained by processing sawn timber into furniture and joinery products is denied to the country because the primary ingredients that make possible the development of the secondary wood processing industry are not yet available. Thus, in spite of the heavy surchages and customs duties levied on imported furniture items, stockists in Honiara, Guadalcanal Province, still find it very profitable to sell imported furniture items.

The problems in the wood processing sector of the SI will be discussed in more detail and corresponidng solutions presented in the sections that follow.

3.2 THE PRIMARY WOOD PROCESSING SECTOR

3.2.1 The Sawmilling Industry

3.2.1.1 Background

The sawmilling industry in the Solomon Islands only started to emerge from the "small local mill" phase in the mid 1970's. Until that time the country was an importer of sawn timber, but was approaching balance between production and consumption. From 1962 to 1975, imports constituted an aggregate 7 per cent of domestic consumption (Forest Division, Annual Reports). The opening of the Foxwood mill in 1974 filled the supply gap and provided a surplus for export. In the following ten years considerably increased domestic and export sales (Table 3.1) were achieved mainly by increases in capacity of existing mills.

The timber processing industry is currently in a state of flux as it emerges from a number of shareholding and management changes which affected production. It is now adjusting to greatly increased installed capacity. The latter has occured as a result of the government requirement that all companies exporting logs must undertake domestic processing of a minimum of 20 per cent of their gross log cut. This requirement has been met in all cases by installation of sawmills rather than other processing options. The requirement has its origins in the recommendation made by FAO (1979), but appears to have been instituted without regard to the qualifications suggested in the FAO report. The further option cited in the "National Forest and Timber Policy (1984)" to engage in some unspecified level of reforestation was apparently never considered. Had the possibility of financial subsidy been offered, as proposed by Fraser (1979), this option may have been considered.

The change in the rationale for the level of installed sawmill capacity, from being dictated by conceived demand, i.e., market factors, to that dictated by government decree, based largely on log export capacity is a dramatic "change in the rules". It is inevitable that stresses will be generated in the sector, which may produce corporate casualties. Many mills will find it difficult to compete and remain

TABLE 3.1

LOG PROCESSING 1976 - 1985
LOG INPUT, PRODUCTION (cu.m. 000's), RECOVERY (%) and SALES (SI$ per cu.m.)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
LOG INPUT*										
Total	22.88	21.39	27.28	40.90	40.88	49.90	58.67	49.46	33.00	55.60
Sawmills	21.90	20.70	25.60	38.82	38.01	47.62	58.67	49.46	33.00	55.60
Veneer mills	0.98	0.69	1.68	2.08	2.87	2.14	---	---	---	---
PRODUCTION										
Sawn Volume**	9.12	8.19	10.80	17.00	19.50	20.10	23.46	19.78	12.00	20.80
Recovery (%)	42 %	40 %	42 %	44 %	51 %	42 %	40 %	40 %	36 %	37 %
Veneer Volume	0.41	0.36	0.80	1.10	1.50	1.18	---	---	---	---
Recovery (%)	42 %	52 %	48 %	53 %	52 %	55 %	---	---	---	---
SALES										
Domestic										
Sawn Volume	4.99	4.74	6.84	7.72	8.54	11.69	7.92	9.62	7.09	14.04
Unit Price SI$	100.00	108.00	121.00	137.00	137.00	201.00	209.00	218.00	216.00	230.00
Export										
Sawn Volume	1.42	1.57	2.50	8.33	5.80	5.06	7.26	5.05	4.84	2.91
Unit Price SI$	115.00	99.00	109.00	136.00	172.00	205.00	199.00	197.00	216.00	263.00
Veneer Volume	0.32	0.27	0.90	1.11	1.53	1.22	---	---	---	---
Unit Price SI$	67.00	58.00	64.00	91.00	119.00	129.00	---	---	---	---
Apparent sawn inventory increase (reduction or stock loss)	2.71	1.88	1.46	0.95	5.16	3.35	8.28	5.11	0.07	3.85

Notes :

The data base is not complete and in several instances is based on incorrect assumptions. Much of the data in the publication "Statistics 1984-85" appears to assume that the aggregate of domestic and export sales is equal to total production for the year. Some data in the Forestry Division Annual Reports seems to make the same assumption, but comments in the text of the reports gives the clue to error in treatment.

In several instances the raw data could not be retrieved from files so "probable" estimates have been calculated from such data as was extraced from Divisional files and the text of report.

*No veneer mill log inputs were available for 1979 to 1980 but total log volume to processing was available to sawmills. Veneer mill log inputs are therefore derived. The sawmill log input for 1980 appears very low (yielding an average recovery of 51%), however, neither log input or sawn output data could be extracted from files. The figure used in the table is highly suspect. The 1984 log input was recorded as 31.46 thousand cu.m. in "Statistics 1984/85", but no justification could be found for the deviation from Forest Division data.

**1978 data is estimated from incomplete data by assuming recovery between data for 1977 and 1979 and an estimate recorded in FAO (1979). 1981 data is calculated from stated log input data and recovery cited in the text of the Forest Division Annual Report. 1982-1983 data is estimated from recorded log input data to which a "best guess" recovery factor has been applied. 1984 data is derived from stated log input and stated recovery. 1985 data was extracted from files but may under estimate production as some mill output information was nonsensical, indicating recoveries as low as 12 per cent, and no reports were received from a number of mills.

viable unless the standards of production and marketing, particularly export marketing, are raised rapidly and operational and financial efficiency are improved. Companies with high debt financing costs will be most at risk.

The sharp drop in sawn timber production in 1984 (Table 3.1) was due to an extended closure of the Foxwood mill as a result of sale of the company. It appears that this seriously affected the availability of sawn timber for both the domestic and export markets. It was revealed in discussions with Forestry officials that sawn timber was imported in 1984, 1985 and again in 1986, but no official figures exist in any reports found.

Reporting from mills is totally inadequate. The Forest Division does not appear to have the power to enforce the submission of proper statistical returns and until recently did not have the staff or funds to do so.

The apparent increase in inventory (or stock loss) is an interesting figure. Probably due to deficiencies in the data used to derive it, the figures may not be accurate, but they are probably close enough to illustrate a number of points.

Taken over the full ten-year period, the sawn timber data can be summarized to :

log input	389,380	cu.m.	
sawn output	160,750	cu.m.	
recovery			41.3%
sales, domestic	83,190	cu.m.	
export	44,740	cu.m.	
totoal	127,930	cu.m.	
apparent stock deficiency	32,820	cu.m. =	20.4%

of reported production.

From mills and timber yards visited, it is considered extremely unlikely that existing inventory at end July 1986 would have exceeded 4,500 cu.m. and Hyundai claims their accumulation in 1986 has been about 2,500 cu.m., hence total closing stock at year end 1985 was probably less than 2,000 cu.m. If this estimate is correct and there was no opening stock in 1976, almost 20 per cent of reported production has either been generated by creative measurement and reporting,

written off and disposed of as unsaleable, sold without record or stolen. While there has probably been a combination of these four factors, the first two probably feature strongly.

It would appear that the "effective" production over this period was about 130,000 cu.m., giving a "real" recovery of 33 per cent.

It appears that mill management does not have the basic data available for effective control of operations, or are not reporting accurately. This does not augur well for the future of the industry.

3.2.1.2 Industry Profile

3.2.1.2.1 Licensing

There are currently 32 licensed sawmills with another mill now being installed and to be licensed when operational. Thirteen licenses were cancelled early in 1986 as the mills ceased operations some time in the last two to three years. Licenses have been withheld from a further five or six mills as it is not known whether they are operating or not and no response to enquiries has been received from the reputed owners. One other mill is licensed for firewood production.

Table 3.2 illustrates the geographical distribution of mills believed to be operational or about to be so, while Figure 2 compares their milling capacities with the estimated available timber volume, 1986, and remaining life of the forests in the same island.

The Forestry Division has not been provided with the staff or finances to sufficiently monitor the sawmilling industry. Reporting of production and sales by mills is irregular, ususally delayed, and in some cases of doubtful value for monitoring and satistics value.

It is apparent from Table 3.2 that license volumes do not always reflect mill capacity and in some cases are grossly exceeded. One manager interviewed was not aware that the maximum log input was devined. Medium sized mills in Western and Malaita provinces are particularly noteworthy. It can be readily understood that "license volume" can be relatively easily altered or even ignored when there is no coherent plan for development and maintenance of the industry.

TABLE 3.2

SAWMILL NUMBERS, DISTRIBUTION AND CAPACITY (Volume cu.m.)

Province*	No. of Units Licensed** Large	Medium	Small	Licensed Volume Logs	Estimated Capacity*** Log Input	Sawn	Marketability**** 'Export	Domestic
Western	1			14,000	14,000	5,200	3,600	1,600
		5		15,800	23,400	8,200	3,900	4,300
			8	5,100	6,200	2,000	nag.	2,000
Sub-Total	1	5	8	34,900	43,600	15,400	7,500	7,900
Choiseul			2	900	900	270	---	270
Guadalcanal	2			60,000	38,000	15,200	9,500	5,700
		1		5,600	5,600	2,000	1,000	1,000
			2	850	1,650	500	---	500
Sub-Total	2	1	4	67,350	46,150	17,970	10,500	7,470
Sta. Isabel			3	600	600	250	---	250
Malaita		1		8,250	15,000	5,600	2,800	2,800
			1	100	100	30	---	30
Sub-Total	-	1	4	8,950	15,700	5,880	2,800	3,080
Makira	1			14,000	14,000	5,600	3,800	1,800
			1	1,000	1,000	350	---	350
Sub-Total	1		1	15,000	15,000	5,950	3,800	2,150
Central Island			1	500	500	150	---	150
Eastern				---	---	---	---	---
Sub-Total	-	-	1	500	500	150	---	150
Totals	4			88,000	66,000	26,000	16,900	9,100
		9		29,650	44,000	15,800	7,700	8,100
			18	9,050	10,950	3,550	---	3,550
GRAND TOTAL	4	9	18	126,700	120,950	45,350	24,600	20,750

Notes :

* Choiseul is listed separate from Western Province because it is not typical of the province in terms of timber supply and delivery.

** The classification of mill size has arbitrarily been set at :

"Small" : less than 3000 cu.m. estimated log input capacity ;
"Medium" : 3000 cu.m. - 10,000 cu.m. estimated log input capacity ; and
"Large" : greater than 10,000 cu.m. estimated log input capacity.

*** The estimated log input and sawn timber output capacities are arguable. In the case of medium and large mills a compromise has been struck between the claims of management, past production performance and the mission's "best guess" based on comparable mills cutting light mixed hardwoods in the region. In the case of two of the mills the figure of 20% of gross log cut has been used but it is possible "capacity" may exceed this figure.

In the case of small mills the inputs are based on regular operations. It is probable that in many cases these levels will not be achieved.

Outputs are calculated using claims of management and mission informers, checked against likely recoveries under current condition. So called "second grade" timber is excluded from output figures.

**** The export component is a "best" guess based on the likely proportion of each mill's cut that might be of export grade. Log carriage characteristics and log turning devices as well as quality of sawing, as seen, formed the basis of classification.

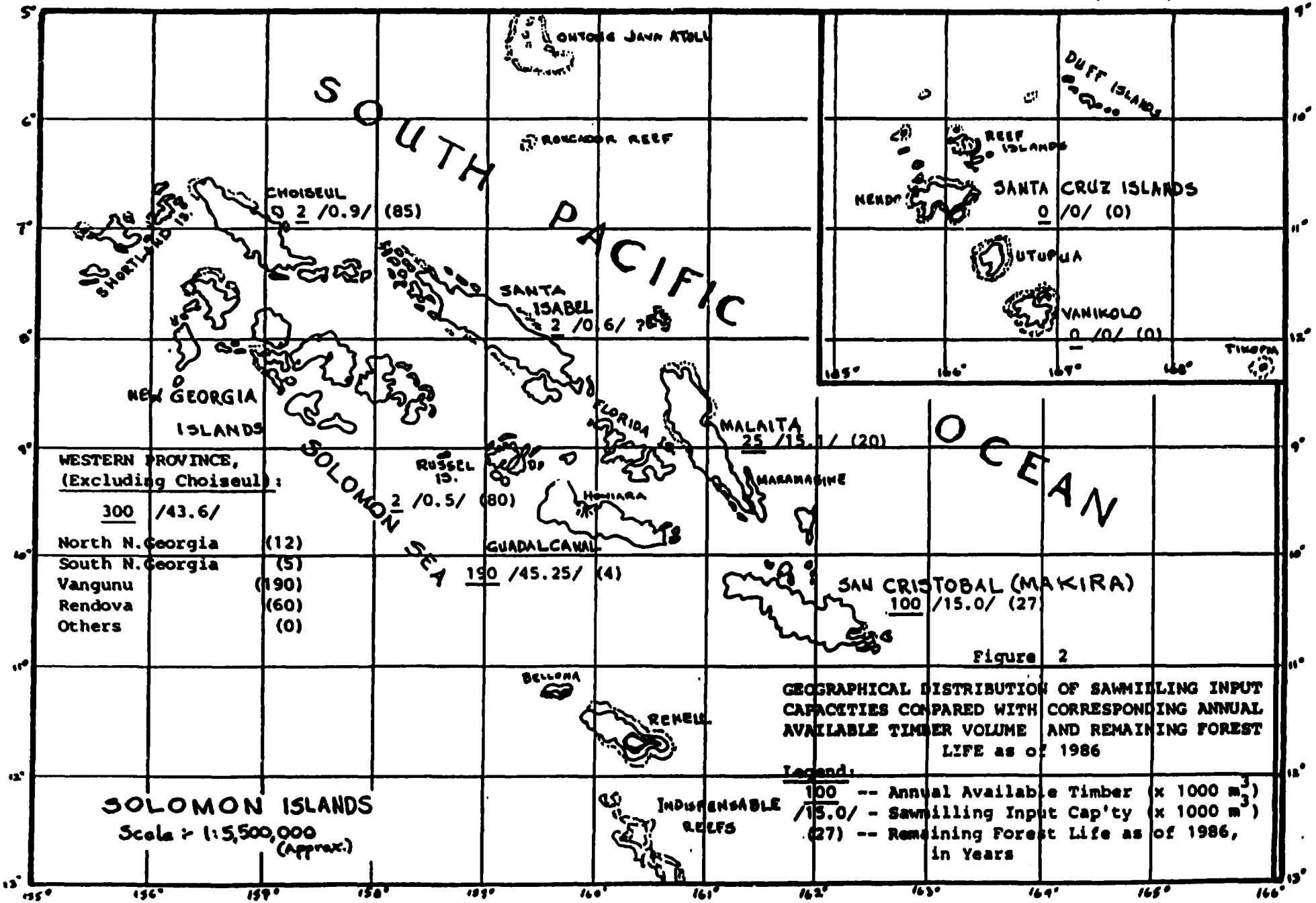

Figure 2

GEOGRAPHICAL DISTRIBUTION OF SAWMILLING INPUT CAPACITIES COMPARED WITH CORRESPONDING ANNUAL AVAILABLE TIMBER VOLUME AND REMAINING FOREST LIFE as of 1986

Legend:

100 -- Annual Available Timber (x 1000 m^3)
/15.0/ - Sawmilling Input Cap'ty (x 1000 m^3)
(27) -- Remaining Forest Life as of 1986, in Years

It appears that adherence to "licensed volume" is not strictly required, hence rate of harvest of the forest is not as controlled as it might be. The need for such control may become more apparent as up-to-date forest inventory data becomes available and forward planning for development and future maintenance of the industry is established.

3.2.1.2.2 Forest Resource

Major species sawn are Pometia pinnata and Calophyllum kajewskii. Most mills cut minor quantities of Vitex cofassus and some Terminalia spp. Felling of a number of higher value species is prohibited. In the case of Pterocarpus indicus and Intsia bijuga this ban is of questionable value as it is more likely that trees will be wasted rather than used in traditional crafts. Virtually no "mixed" species are sawn. Taking log export species data as a guide, it appears in the case of mills not associated with major log export operations, that utilization of the commercial forest is running at less than 60 per cent. In the case of small mills an even lower utilization is probably being achieved.

Available resource is not yet widely seen to be a limiting factor for the processing industry. Some small and medium mills are in fact now starting to face a log scarcity situation and ad hoc resource allocation will drive some mills out of business if allowed to occur.

The Forest Division has attempted to curb some developments but the interests of the investors have prevailed, in spite of contrary advice from the Forest Division regarding the resource. One investment with a resource expected (by the investor) to last for about 20 years will face log scarcity within five years of commencement of operation.

Of the seven major and medium mills coming on stream as a result of the 20 per cent processing decision, three and possibly five will suffer from scarcity of resource within three to five years of commencing production. The production capacity at risk, as detailed in Table 3.2, is some 14,000 cu.m. of which about 8,000 cu.m. has been assessed as being of likely export potential, i.e.,

almost one-third of the total projected volume. If this volume is taken out of the market, particularly the export market, even for a short period, the country's reputation for reliability of supply will be severely damaged. Resource allocation practices will be to blame.

Consideration of the utilization of plantation grown forest is required now, species selection should be market-oriented. Planning programmes should take into account estimated requirements of the processing industry in terms of number of species and volume to be absorbed by any one plant. A reasonable minimum log input for a general purpose sawmill would be about 15,000 cu.m. a year. A mill sawing high value "appearance" species could be smaller but mills cutting generally small diameters low density timbers should have inputs nearer 30,000 cu.m. a year. Veneer or plywood production is likely to require upwards of 60,000 cu.m. a year to achieve economies that will be necessary to compete in export markets.

3.2.1.2.3 Technology

The type of mills now employed are highly variable. Small mills are either chainsaw slabbing units or "forest mills" using circular, insert tooth saws. Medium mills tend to use circular saw, plate or inserted tooth, though some horizontal bandsaws are in use. Large mills vary from bandsaws throughout, mixed types to full circular mills. A gang frame saw is installed but not used in one mill. Few have carriages and log turning equipment adequate for high through-put and "grade" cutting.

Saw maintenance and millwright skills and equipment are limited, with only four to five mills adequately serviced. Small mills tend to buy new insert teeth rather than sharpening them, as they do not have grinding equipment. An attempt to establish a commercial saw maintenance unit failed. Reasons are not clear as reports are conflicting. Recovery is generally low, in spite of some very high figures reported in monthly returns.

The question of mill technology is discussed further in section 6.4.

3.2.1.2.4 Production Capacity

Table 3.2 shows estimated capacity of those mills expected to be in operation by late 1986. The figures are very much "estimates", based on a consideration of management claims, historical performance where appropriate and a knowledge of performance of similar mills in the region.

It is assumed that recovery by most mills will remain below 40%. Production will depend on log export performance and quality of logs directed to mills. It is likely in some cases that only reject logs will be processed, reducing actual production, recovery and proportion of production of export quality.

Without a plan for future development of the industry it is impossible to predict future production beyond a couple of years, but it appears that the basic "core" of production will be sufficient to satisfy domestic market requirements and provide a substantial surplus for export.

3.2.1.2.5 Timber Seasoning

There is virtually no provision by sawmills for seasoning of timber for domestic use, or for export, though Foxwood did air-dry in the past. It appears that the willingness of the domestic market to accept green timber, even in dressed and moulded products, has contributed to the present situation. Lack of forward planning by users will place them in the position where they will accept anything, in order not to delay completion of a job. It is also possible that they are not prepared to meet the additional cost of seasoning. The situation is such that timber which is "shipping dry", is being referred to, by even experienced millers, as "dry" which it most certainly is not.

Timber tends to be block-stacked in most mills though some efforts to stack for drying were seen by the mission. Fillets are not adequately prepared and fillet placement varied from poor to pointless. A number of mills "store" timber under cover but it is usually block-stacked while quite green. At one mill stacks opened up during the visit by the mission were rotting. Where

timber is stacked in the open, the proven principles of air seasoning stack and yard design were not employed. Seasoning must be seen as an important step in the timber production process. It must be recognized that properly constructed stacks, lifted well above the ground, laid out in a manner to make best use of natural air movement for a reasonably even and predictable, if not completely controlled, rate of drying, are required. Stack covers and stack-end curtains can considerably reduce degrade in the most vulnerable parts of the stack. For high value species, end coating of boards should be considered. Many texts deal with the subject of seasoning and these should be consulted for guidance. Training in air seasoning should be carried out. This would be a worth-while matter for early attention by the "Forest and Timber Council".

If consumer demand does result in timber being seasoned a number of mills will encounter problems because they will not have the yard capacity to hold stocks and many will find it difficult to finance stocks.

A company in Honiara engaged in timber trading, mainly for export, recently installed a dehumidifier with the stated capacity of about 280 cu.m. a month (of Pometia or Calophyllum). While the major target is preparation of timber for the export makret, custom drying is carried out. The management indicated difficulty in obtaining sufficient timber of acceptable grade to achieve maximum through-put. This lack of supply is limiting export sales.

For a wood manufacturing industry to be founded, the provision of seasoned timber will be essential. This would most logically be carried out by sawmills, at least for air drying.

3.2.1.2.6 Timber Grading

A form of timber grading is practiced but there is no formal nation-wide standard, hence grading is of limited use in marketing. Most mills use two grades, the second grade usually being highly defective. Small mills tend to include second grade in their production reporting, leading to reported recoveries of over 60 per cent and up to 82 per cent in at least one care (Forest Division files, 1985, monthly returns). There is some difficulty

in recognizing an important defect in Pometia with the result that "Brittle Heart" is accepted into first grade in some mills; while "want", "wane", white pocket rot and severe splitting are frequently present in second grade.

The introduction of "standards" for specification of timbers in use, and of grading should be commenced as soon as possible. This would enable the use of wider range of species, improving forest utilization and reducing the wasteful use of structural and "appearance" grades in non-structural and non-display applications. Marketing will also be improved on both the domestic and export market.

It will not be a difficult task to draw up standards, as modification of existing standards in countries in the region, would suffice. Grading for export markets simply requires dissemination of information on the standards of the buyers, and training of graders. The Malayan Grading Rules or local modifications are widely used in the region, and are accepted by most buyers.

3.2.1.2.7 Timber Preservation

The dip-diffusion treatment process was used by all large and medium mills until the use of treated timber was prohibited for health reasons. A pressure treatment facility had been installed at the country's largest mill shortly before this decision was taken.

This decision has resulted in the use of untreated timber in all construction over the past two years. As the major species used are of relatively low durability (class 3) a severe maintenance problem has been created.

Approval was given for treatment of export timbers, where specified by buyers, as export sales were being affected. In 1986 approval was given to carry out treatment for domestic consumption provided certain "conditions" were adhered to. There appears to be confusion at present over what the "conditions" actually mean, and at this stage no mills are treating timber and in general do not intend to do so until the position is clarified and treatment is specified in orders.

It is understood that a decision has been taken that all timbers used in government and foreign aid financed construction must be

treated. The mission endorses this decision and recommends that the problems regarding the conditions under which treatment chemicals and treated timbers are traded and used, be resolved without delay, so that the decision to use only such timber can be implemented. It is assumed that construction carried out by or on behalf of the SI Housing Authority or arranged privately but dependent on SI Housing Authority finance, is included in the mandatory treatment decision. Othe providers of construction finance, e.g., the Development Bank and the National Bank should be advised of this decision and encouraged to require a similar condition for any construction financed by them.

3.2.1.2.8 Further Manufacture

Most large and medium, and some small mills have moulding and/or dressing facilities. Virtually all mouldings are produced from green timber. Resawing for grade improvement is not undertaken, at least on a regular basis. It appears that joinery and furniture manufacturers have to do so this themsleves, with the result that they may buy timber in greater cross-section and length than they require. This reduces marketability of "fall down sizes" from the mills, thus reducing "real" recovery and reducing the volume available for export. This may also result in increased price of timber to other manufacturers.

Machines are generally old and as evidenced by finishing defects, not maintained to a high level. Knife grinding and sharpening appears to be a problem, though feed speeds may be a contributing factor in the quality of finish being achieved. It is doubtful whether there are any qualified wood machinists employed by sawmilling companies.

At least one mill has engaged in building prefabrication, and others expressed interest in doing so. However, at present this activity is reserved to the SI Housing Authority. This has almost certainly resulted in the accumulation of unsaleable "shorts" at mills, which could be used in frame and truss fabrication. It is doubtful whether this exclusivity of manufacturing rights will result in a cheaper product but it will most likely increase wood waste.

3.2.1.2.9 Conclusion

The existing combination of low log quality, inappropriate mill equipment and design, and restricted market conditions will limit recovery of sawn timber suitable for export and secondary processing. It is likely that the impending over-supply for the domestic market will prevent reasonable recovery figures being achieved for some time.

3.2.2 Wood Based Panels

3.2.2.1 Veneer

While not strictly a panel, veneer is treated here for convenience. Veneer was produced in Guadalcanal from 1975 to 1981 as an adjunct to a sawmilling operation. Production was low, a six-year total of just over 5,000 cu.m., peaking at 1,500 cu.m. in 1980, the year before the operation ceased, because it was claimed to be unprofitable. The equipment has been described as very old and in poor condition. Recovery was low. Only core was produced and it was sold green. The product was all exported to an associated company and FOB prices were very low. This operation can hardly be cited as a fair test of the commercial viability of veneer production the Solomon Islands.

The possibility of veneer production meeting the processing obligations of existing or intending investors should be pursued. However, resource life may now be too short in most cases.

International trade in hardwood vener has declined over the past few years. The prohibition of export of veneer from Indonesia has the most pronounced effect. Veneer capacity in Sabah has increased but will be directed mainly to domestic plywood manufacture.

Australia and New Zealand as well as Europe may be potential markets for face grade material at reasonable prices, as their own hardwood resources have contracted sharply in recent years. It is likely that harvesting in natural forests, particularly the wetter forests will be further restrictured in the future, increasing dependance on imported hardwood veneer or plywood.

While "south sea" log supplies are sufficient to support the reduced plywood manufacturing capacity in Japan and Korea, they are unlikely markets for veneer unless an investor is supplying to its parent comapny. India has only recently commenced buying logs from the region as a result of the virtual removal of import duties on veneer

logs. They have been fairly selective on species, emphasizing red timbers. While the purpose of the reduction in tariff was to preserve the Indian plywood industry, the extreme difficulty or discharging logs in India may make the importance of veneer, particularly Pometia and Calophyllum attractive in the future. China may develop as a market but this could take a long time.

The possibility of producing sliced veneer in the SI appears remote. The species available, with established markets, are limited in number and volume. Pterocarpus, Palaquium and Diosporus would seem to have the greatest potential. Cordia would be worth testing. The level of technology and skills required are high, as are capital costs. Such an enterprise is likely to develop only as part of an integrated veneer/plywood and sawmilling venture, and this is unlikely until a major high value plantation resource is available.

3.2.2.2 Blockboard

The consumption of blockboard in the SI is really quite small. However, in time, development of joinery and furniture could result in increased demand.

Blockboard is not a high priced product and is unlikely to be a viable export, but small scale manufacture using simple equipment and techniques is possible, provided a press is availalbe to apply veneer. A heated press is preferable, but use of cold setting glues is possible. Such a plant could be established as an adjunct to a joinery furniture manfuacturing operation.

3.2.2.3 Other

Consumption of wood based panels in the SI is small. Entry to the export market would be difficult. "Minimum economic size" of plants would be such that "available" natural forest has neither the security of tenure nor the volume of acceptable raw material to contemplate manufacture of the reconstituted wood products such as medium density fibreboard, particleboard, oriented strand board, etc. Plywood manufacture is unlikely to be viable, but should not be excluded as a possibility until closely examined.

The concept that manufacture of products such as those cited above would satisfy the domestic requirement and leave a surplus for export is unrealistic. Any industry established would have to be geared to export. This would involve the manufacture of a limited range of

sheet sizes and thicknesses, with the result that a considerable proportion of wood based panels consumed domestically would still have to be imported.

The possibility of panel manufacture in the long term, based on plantation grown material is more promising. Countries now producing low priced plywood may find they have a resource problem in the future and the opportunity to make inroads into their traditional markets may well exist. It would be preferrable that the products be based on high value species.

3.2.3 Piles, Poles and Posts

There is virtually no production of wooden piles or poles, except in the informal sector of the exonomy, and posts for livestock and other fencing needs tend to be small untreated rounds, selected more for their ease of collection than durability.

The Livestock Development Authority has used creosote treated (apparently hot-and-cold soak treatment) split and sawn posts at Auki and presumably other cattle holding yards. There would be little pressure for village cattle projects to use treated posts as there is a plentiful supply of saplings for post production, and in any event cattle can be readily recovered if they do escape. However, rotted posts lead to damaged wire and as replacement of wire becomes necessary, a demand for greater durability of posts could arise, provided the villagers are aware of the causal relationship.

Some fence posts and most house stumps in the formal sector are either steel or concrete. The extension of Henderson airport involves the use of a large number of concrete posts. The prohibition of timber preservation may have been a significant factor in the choice of concrete in this project. The use of treated round house stumps would seem to be a potentially large market - particularly in the low-cost housing sector. Yet a Government Ministry recommended to a visiting aid group [1/] that they use imported steel posts for reconstruction of village schools destroyed in the 1986 cyclone. While pressure treated posts would be preferrable in larger projects such as those carried out by the SI Housing Authority, hot-and-cold creosote treatment would be satisfactory for village use, prolonging the life of timber in ground contact.

1/ Victorian Department of Works, [illegible]ria, Australia.

The SI Electricity Authority have used both concrete and tubular steel poles in the past, in some cases even the cross-arms are of angle iron. All poles now being installed are of fabricated steel. Cross-arms are usually of domestic hardwood. Pole costs vary from SI$500 to SI$700 each. These costs are far above what could be expected for domestically produced and treated timber poles. The Authority has considered the use of wooden poles but their demand is so low: estimated at 20-30 a year, that the capital cost of the necessary treatment facilities would not be warranted for this purpose alone. Such a plant was installed shortly before the preservation treatment involving arsenic was prohibited. Telephone lines are usually laid underground but where overhead lines do exist, tubular steel poles have been used. Annual requirements are low. Neither Authority envisages any greater extension of transmission lines in the foreseeable future.

Wharves are constructed of concrete decking over steel piles, or in the case of smaller wharves, concrete capping over coral, which may be encased in wire baskets. The majority of bridges on major and even minor roads are constructed of steel and concrete. Where timber has been used it is not treated.

The use of timber of high natural durability or appropriately treated, in a bridge design developed for remote locations, using simple construction techniques would reduce reliance on imported materials. Information on such designs and construction techniques are available from UNIDO

No data was obtained on the likely future requirement of poles and piles except for the SI Electricity Authority estimate. But taking these into account and adding the volume of heavy section timber that could be used as an alternative to concrete in bridges and wharves, plus the possible requirement of pressure treated posts and inground, exposed and "wet area" use of sawn timber, the cost of a pressure treatment facility which can treat with water borne and oil preservatives may in fact be warranted. Whether such a plant should be fixed in a major centre, or barge-mounted to travel to locations where the materials are collected for use, would need to be studied.

3.3 THE SECONDARY WOOD PROCESSING SECTOR

The total composition of the SI secondary wood processing sector is made up by a few furniture and joinery workshops, two moulding plants and a handful of joinery shops located at the capital towns of four major provinces : Guadalcanal, Western, Malaita and Makira. There is a prefabricated housing factory in Honiara. This factory is owned and operated by a parastatal firm, the Solomon Islands Housing Authority, Ltd. Except for the small furniture workshop reported to be operating in Kirakira, Makira province, all these establishments were visited and their owners/managers or key personnel interviewed. A sawn timber seasoning enterprise has recently started operations in Honiara. See section 3.2.1.2.5.

The distribution of the secondary wood processing firms as of July - August 1986, is shown in Table 3.3, while the corresponding work force distribution is shown in Table 3.4.

TABLE 3.3

DISTRIBUTION OF SECONDARY WOOD PROCESSING FIRMS, Solomon Islands (July - August 1986)

Type of Operation	PROVINCES				Total No. of Firms
	Guadal-canal	Western	Malaita	Makira	
Sawn Timber Seasoning	1	---	---	----	1
Wooden Furniture Workshop	5	1	---	1**	7
Rattan Furniture Workshop	2	---*	1	----	3
Furniture and Joinery Workshop	1	1	1	----	3
Joinery Workshop	---	1	1	----	2
Moulding Plant	2	---	---	----	2
Pre-fab Housing Plant	1	---	---	----	1
Total	12	3	3	1	19

*Rattan furniture in Munda, Western province, is made by a man who produces them during his spare time only.

**Data supplied by ADB/UNIDO Industrial Site Project Team.

No data is available on the total value of the industry's output since there are many other individuals reported to be producing furniture items

on an informal basis, who together with some registered small firms in outlying provinces, do not report their sales regularly.

TABLE 3.4

PLANT WORKERS EMPLOYED IN THE SECONDARY WOOD PROCESSING INDUSTRY OF THE SOLOMON ISLANDS*
(July - August 1986)

Type of Operation	PROVINCES				Total No. of Workers
	Guadal-canal	Western	Malaita	Makira	
Sawn Timber Seasoning	5	---	---	---	5
Wooden Furniture Workshop	108	6	---	4**	118
Rattan Furniture Workshop	22	---	10	---	32
Furniture and Joinery Workshop	28	4	3	---	35
Joinery Workshop	---	6	5	---	11
Moulding Plant	18	---	---	---	18
Pre-fab Housing Plant	56	---	---	---	56
Total	237	16	18	4	275

*Includes factory workers only

**Information furnished by ADB/UNIDO Industrial Site Project Team.

In general, the secondary wood processing industry of the country is small, fragmented and definitely classed as "artisan", with the exception of one or two firms which have from time to time had production runs.

3.3.1 Furniture Manufacturing: Current Status

There are twelve (12) registered firms engaged in the manufacture of furniture and other home furnishing items throughout the SI. Three of these workshops produce rattan (cane) furniture on a regular and continuous basis; two shops are located in Honiara, Guadalcanal Island, while the other shop is located in Auki, Malaita province. In addition to these furniture workshops, an unknown number of non-registered individuals (usually carpenters) accept small orders for furniture or joinery products.

One joinery plant (SI Investment, Ltd.), in Rinandi, Honiara, uses seasoned lumber produced by the dehumidifying plant referred to in

earlier paragraphs, is the most advanced secondary wood processing facility in the country, occassionally producing furniture or joinery items on a limited "serial production" basis. It is the only furniture factory in the SI which is equipped with a centralized dust collecting system to dispose of manufacturing residues in all its machining operations and uses spray guns to apply its system of nitro-lacquer-based finishing materials on its products.

All other furniture and joinery plants in the SI use unseasoned timber, apply finishing materials with hand brushes and produce furniture and joinery products of low quality and at low productivity levels.

In general, the wooden furniture industry in the SI may be characterized as follows :

i - machines are not set up to achieve production runs with the result that they are not being used to best advantage ;

ii - poor "housekeeping" practices exacerbate the already undesirable effects of faulty machinery lay-out ;

iii - production jigs and fixtures are not used, so that the industry is deprived of the benefits it can give in terms of better quality products and higher outputs; for this aspect of furniture production technology is entirely new or unheard of to many of the entrepreneurs in the industry ;

iv - the use of inadequately seasoned sawn timber leads to gluing, joining and finishing problems ;

v - varnishing, a tedious and long-drying operation, is still the most popular finishing system in the country, thus limiting output at the end of the production line ;

vi - industrial residues (saw-dust, shavings, etc.) occupy large sections of the factory floor area, as a result of the absence of any system which will effectively collect and dispose of the residues ;

vii - adhesives (the most common of which is PVA for joints and rubber-based contact glue for laminating panels) are not properly applied, so that open-gap joints and delamination of panels are common features of furniture and joinery products of the country ;

viii - the wrong type and grit of abrasives are used for many of the finer aspects of furniture and joinery

manufacture, so that the end products almost always bear sanding marks left by rough sanding paper (or cloth) ;

ix - poor maintenance of machines and cutting tools leads to poor workmanship and low quality products ;

x - most of the furniture shop workers were trained as carpenters and do not have the skill and finesse of workmanship required in the manufacture of furniture products ; and

xi - the lack of effective documentation and communication of important production parameters exacerbates the effects of poor (or total absence) of effective management and supervisory techniques.

3.3.2 Joinery Products Manufacturing: Current Status

The joinery products manufacturing industry of the SI is less developed than the furniture manufacturing industry. Except for the low outputs of the joinery workshop in Gizo, Western Province, (privately owned) and the works division joinery workshops in Auki, Malaita Province, the country's requirements for joinery products are mostly supplied by the building contractors themselves (fabricated at the construction site). On a few cases, however, some of the furniture workshops accept orders to produce joinery products.

Nevertheless, the joinery industry of the SI is characterized by the same poor state of development and is plagued with the same problems as its furniture manufacturwng industry.

3.3.3 The Rattan Furniture Manufacturing Industry

The rattan furniture manufacturing industry of the country had its beginning early in the 1970's when a Chinese entrepreneur, employing Solomon Islanders from Malaita, established a furniture workshop in Honiara. Initially, all the rattan poles, rattan strips, weaving and matting material requirements of the industry were imported from Hongkong. Lately, however, small diameter rattan poles obtained from the country's forest found use in the local rattan furniture industry. The practice of using imported raw materials led to the neglect of the development of local rattan material resources. To date, even though the rattan furniture industry has been taken over by local people, imported synthetic substitutes for rattan strips have become standard binding materials for rattan furniture products made both in Honiara and Auki.

Large diameter rattan poles used for structural components of furniture items are still imported from Hongkong or Singapore. The local rattan poles which have smaller diameters than the imported variety, are used mostly for auxiliary components which are more ornamental than structural in purpose.

The local rattan furniture industry may be characterized as follows :

i - the use of plastic binding materials as substitutes for rattan strips cast a cheap image on the local rattan furniture products, which are definitely not acceptable in the export market ;

ii - the manufacturing techniques are so crude that outputs are low while production costs are high ;

iii - furniture and furnishings design are mostly copies of foreign manufactured products which use large diameters rattan poles thus preventing the use of the smaller diameter poles which are more available from local sources ; and

iv - varnishing with paint brushes is the most commonly used fwnishing system, thus adding to the low quality image of the finished products.

Subject to confirmation on the availability of rattan resources as discussed in section 2.5.4, it may be possible to further develop the local rattan furniture industry, possibly including exports. This development is dependent upon the rationalization of rattan poles harvesting, handling and preparatory processing, together with the adoption of the more modern techniques of rattan furniture production based on product designs acceptable to both the domestic and export markets. Among others, some of the techniques that will help improve the quality and increase the productivity of the industry are :

i - use of simple machines in straighthening and sanding rattan poles ;

ii - use of steaming operations before bending rattan poles ;

iii - use of proper grit of sanding material ; and

iv - use of better (faster drying) finishing materials and spray operations.

3.3.4 Conclusion

The combination of improperly prepared wood, inappropriate organization and use of machines and production materials, and inadequate training of management and shopfloor level will limit the quantity and quality and raises the cost of output of the secondary processing sector and thereby inhibit domestic and export sales.

3.4 ESSENTIALS FOR THE DEVELOPMENT OF THE WOOD PROCESSING SECTOR

3.4.1 The Resource

3.4.1.1 The Natural Forest

A well managed and appropriate forest resource is a fundamental pre-requisite for any sustained development of the wood processing sector. The quantity, quality and cost of the resource must be matched to the processing opportunities which make the best technical and economic sense for thr future.

The existing natural resources cannot be changed, but as its life is limited it is desirable that what is left be put to the best possible use, in order to maximize the benefits to Solomon Islanders during its remaining life.

To determine what is "the best possible use", it is essential to have up-to-date, reliable and complete inventory data. Only then will it be possible to examine in some detail, the various alternative development strategies which might be followed.

With the imminent departure of LPT, and the current imposition of the moratorium on new felling licenses, it is an apportune moment for the government to review the options.

The remaining natural forest resource may be anywhere between six million cu.m. and 14 million cu.m. according to Table 2.1 depending on how severe past cyclone damage has been, and could be more if areas identified as suitable for commercial harvesting are extended marginally.

So far development of forestry and forest industries in the SI, has taken place on an ad hoc basis, with licesnes for logging and saw-milling being issued on the strength of applications received, rather than on the basis of a planned or coordinated strategy.

This has already resulted in several serious anomalies, with land owners and operators over-estimating the resource, and receiving quotas to cut a much greater volume than is present.

The aggregate of all license quotas currently in force is about double the amount which should be cut if the removal of the resource is to be spread over a sufficient period to allow plantations to sustain future supplies. It is quite likely that the current quotas are far higher than the resource can sustain for the licensed cutting period, and existing operators will have to apply for new areas sooner than expected.

The ability of the government to control the rate of cutting is seriously limited by the fact that most of the resource is on customary land.

However, in Santa Isabel, substantial areas of cutomary land were registered in the 1960's, in order that the owners could grant timber rights. The granting of timber felling rights was never implemented because of severe cyclone damage in 1972, but the procedure creates an important precedent for the future.

The government could make land registration and the implementation of an inventory according to defined standards a requirement for the granting of a license to sell timber. Once a tract of land is registered and inventoried the land owners would be in a better position to seek detailed proposals for the timber exploitation, even going so far as seeking proposals from a number of potential operators, before commiting themselves to a particular operator.

The cost of the inventory should ultimately be borne by the exploiter but might initially be carried out by government or registered independent private companies, and costs recovered through license fees or direct payments when logging commences.

There are at present about 25 small sawmills meeting exclusively the local market, which take logs from their own land or buy from land owners in the general vicinity. Their aggregate annual demand for logs is about 25,000 cu.m. and steps need to be taken to ensure that at least the level of supply will always be available throughout the islands.

3.4.1.2 The Plantation Resource

The existing plantation resource is inadequate to sustain a wood processing industry in the future, even in the next five years when the target of around 5,000 ha. additional hectares is achieved. The possible initiation of a plantation project on Kolombangara by CDC in the near future may result in the creation of a resource on that one island capable of sustaining a single industrial complex at some future date.

It is disappointing to see that the revenue collected from the Reforestation Levy in 1985, SI$1.57 million, exceeds the government's expenditure on all reafforestation and maintenance activities by SI$390,000, when this work is so badly needed.

However, as discussed in section 2.4 there are also problems with regard to the choice of species. If the intention is to sustain only the local demand for timber in the next century, then the current choice of species and balance between native and exotic, utility and quality, fast growing and slow growing may be appropriate. The size of the current plantation resource should also allow the SI to remain self-sufficient in timber.

If it is the government's intention to sustain an export industry in the long term, then both the choice of species, and the area and its distribution need to be reviewed.

For several reasons, and in particular difficult ecological conditions, where trees face strong competition from a wide range of wild plants; general remoteness from international markets, with the extra costs that it entails; and limited availability of land in areas where trees might be grown commercially, the SI are at a competitive disadvantage in producing low cost wood.

Demand for decorative woods, and species with good machining and finishing properties for joinery, furniture and interior finishes is less sensitive to price than fiber or construction timbers. The SI is, therefore, far more likely to find a market in the future for species which are suited to these end-uses, such as some of the native species harvested at present, like Vitex and Calophyllum.

Other native species which meet these criteria are: Pterocarpus indicus, Intsia bijuga, Palaquium spp., Gonystylus macrophyllus, Dysoxylon spp. and Schizomeria serrata. In addition, two of the exotic species presently grown in plantation - Swietenia macrophylla and Tectona grandis may also meet these criteria if grown on relatively long rotations. The native species Agathis macrophylla which has been planted on about 2,000 ha. to date also falls into this category.

Although most of these species are slower growing than Campnosperma and Terminalia which are the most commonly planted species at present, if these latter species are to fetch comparable prices, they will probably have to be grown to peeler log size which may take a long time.

In selecting a specie for planting, consideration should be given to the area required to sustain a reasonable level of supply, either to a local processor or for export. To supply 10,000-15,000 cu.m. per annum of logs for a small/medium scale enterprise, (see section 3.2.1.2.2) including sawmilling and possibly some secondary processing would need around 2,000 ha. of plantations of not more than two or three of the above species grown on medium to long rotations of 30-50 years.

Therefore, such an area should be taken as the very minimum to be established in one locality, and preferrably with one specie and not more than two of the above species which have similar working properties.

3.4.2 The Primary Wood Processing Sub-Sector

3.4.2.1 The Processing Option

The concept of "domestic processing" of forest products to add value before export has been promoted in most "developing countries" with a significant forest resource. In the region, Indonesia, Malaysia (particulary West Malaysia) and the Philippines are the major examples. In all cases they have high populations (the majority being landless) with a higher per capita consumption of sawn timber

than the Solomon Islands. In all cases they have at some stage been the major supplier of logs to the major East Asian processing industry (Japan, Singapore, Taiwan province of China, and more recently the Republic of Korea). In some cases they were importers of the products they now export. Difficulties have been experienced in the transition in each case. Indonesia was selling plywood in the early-mid 1980's at US$200 to US$250 per cu.m., when log prices were US$90 to US$120 per cu.m. With recovery of plywood to log volume unlikely to be greater than 50 per cent, it is difficult to identify any value added, though this will probably improve in time, for those mills which survive.

Papua-New Guinea sought to follow the same road, but have accepted that they should concentrate on log export for the time being to earn foreign exchange. In the case of Papua-New Guinea as a result of their earlier policy, sawn timber production capacity was built up to far exceed domestic consumption. Much of that capacity is now stood down or plant has been sold outside of the country, some coming to SI to meet the processing obligation there. Papua-New Guinea has many similarities with SI, in particular low per capita sawn timber consumption, a small population, most of whom have rights to land, and a dearth of technical and managerial skills. SI has a lower basic cost structure but does not have a well established timber promotion body. The chances of success in SI do not really appear much better than was achieved in Papua-New Guinea, however, SI probably has a greater incentive - an impending scarcity of timber, and in this respect is more akin to the Philippines and Malaysia where the move to domestic processing has probably been most successful.

Given that the introducton of the 20 per cent minimum processing requirement, and the intent of the "National Forest and Timber Policy (1984)" to further increase this, has been at least partially implemented, without the creation of the necessary structures to enhance the chances of success, and apparently without any analysis of the likely implications to the country, the Government would appear to have two options :

i - to suspend the decision ; or

ii - create the environment which will improve the chances of success.

The first option requires the issuing of logging licenses which leads to further installation of sawmilling plant to be postponed until market development is well advanced and increased production can be justified on market factors. Some overcapacity in the industry may have to be accepted, at least for a few years, which would require temporary or partial suspension of the requirement if industries in default are not be closed down.

For the second option, the most urgent action that can be taken is to engage in a very active promotion programme. This will require the preparation of promotional material and an export marketing excercise using competent people with industry, trade and product knowledge. The objectives should be to expose the country's products to buyers and end-users, identify the higher value end uses of the species available, and ensure that the producers are fully informed on the type and quality of products that can be sold.

The problem of utilization of the surplus volume raises the opportunity, indeed the need, to now develop further processing activities. This will require substantial investment in timber seasoning and resawing facilities at sawmills. Industry should be actively pursuing the development of new products for export and establishing the market outlets.

The need for expansion of secondary wood processing, particularly for export marketing, is now urgent. For this to occur, positive action by SIG to attract appropriate investment will be essential.

The mission agrees with the principle of "domestic" processing, but considers that further implementation of the stated aims in the "Policy" should be delayed until the commercial implications are analyzed, and further processing should be phased in after careful planning, which is founded on market research and an analysis of the benefits to the country (some of which will be intangible).

The implementation of the decision to require that at least 20 per cent of the total cut by log exporting companies must be processed in the SI has resulted in a rapid increase of processing capacity. Sawn timber production capacity has been raised from around 24,000

cu.m. in early 1983, to some 45,000 cu.m. in late 1986. At about the same time, the use of preservative timber was banned. No action has been taken at Government level, and little at company level to ensure this massive increase in timber supplies will find a profitable outlet on either the domestic or export markets. The increase in supply will most likely depress domestic prices, putting the viability of companies unable to support sawmilling by log exports, at risk. The possibility of the small village mills entering the main stream of marketing has been reduced, denying them the opportunity of expansion.

Projected base level domestic market for 1987 is 13,500 cu.m. Export levels are difficult to predict, but are unlikely to exceed 10,000 cu.m., giving total sales of 23,500 cu.m. Production, excluding "second grade" is likely to be about 45,000 cu.m. leaving a balance of 21,500 cu.m. for which no market exists.

Industry response is likely to be to reduce production or attempt to finance massive inventory costs. Both actions will cause hardship.

3.4.3 The Secondary Wood Processing Sub-Sector

Any national programme for the development of the wood and wood products industry should include certain pre-requisites which must be used as the basis for a decision to go ahead with a full scale development of the secondary wood processing sub-sector of the country. These pre-requisites may be summarized as follows :

i - rationalization of the forest and logging industries to a level which could assure a well-developed sawmilling industry of the species and corresponding quantities of timber inputs, as required to adequately support the needs of an export-oriented secondary wood processing industry ;

ii - the development of the country's sawmilling industry to a level which will provide reasonably low-cost sawn timber inputs for the secondary wood processing industry ;

iii - the development of the country's infant timber seasoning industry to a level which can dry a sufficient volume of sawn timber down to moisture contents required in the export trade and at reasonably low costs which will still allow the secondary wood products to be competitive in the export market ; and

iv - the development of the country's training facilities to a level which will enable it to supply particular industries selected by the SIG as priority industry sectors of the national economy, for their annual requirements of factory managers and middle management personnel and factory technicians such as mechanics, electricians, millwrights, sawfilers and finishing technicians.

Satisfaction of the above-listed pre-requisites will put the SI in a good position to consider the development of the secondary wood processing industry with the following objectives :

i - to supply the furniture and joinery products needs of the country at prices affordable and quality levels acceptable to at least the upper levels of the low income group of the country's population ; and

ii - to convert eventually all sawn timber in excess of the country's buildings and construction and domestic furniture and furnishings needs into wood products that could be competitive in the export market.

Consequently, the secondary wood processing industry of the SI could become a major foreign currency earner of the country's economy. Attainment of the above objectives depends on certain essentials for the development of the secondary wood processing industry of the country, to wit :

i - technical and managerial "know-how" needed to develop the industry will have to be imported. Effective transfer of this "know-how" could only be possible if the local talents are placed in a position to understand and assimilate the management concepts and techniques and manufacturing systems and methods to be delivered by expatriates ;

ii - the industry at present is composed mostly of small entrepreneurs, who operate on very small capital and will not be in a position to finance the expansion costs required by export-oriented operations. Thus, it appears that the country will have to rely on foreign investors to help develop the industry. The investment climate, therefore, should be made attractive to both foreign and domestic investors through the effective implementation of legislation tha provides incentives for them to invest in the country and the active promotion of the country overseas as a place to invest.

iii - mindful of the fact that the secondary wood processing industry is one of a number of major industry sectors of the national economy to be developed for export oriented operations, the SIG should be prepared to make available to these industries the infrastructural support needed to initiate and sustain the industry's development within the time frame laid down in the National Economic Development Programme. The infrastructural features should include: roads and bridges networks, carriers, shipping ports and facilities, waterworks and sewerage systems, reasonable cost electric power, and telephones and telex systems, which would be made accessible and available in areas where the industry will be located. In view of the high investment costs required, establishment of priorities and coordination of activities is essential ; and

iv - the SI domestic market is small and will not be able to support the establishment of industries which manufacture the non-wood materials (paints and finishes, adhesives, upholstery and hardware and fasteners) and production and maintenance supplies (cutting tools, abrasives, etc.). The SIG therefore, in order to help industry keep its manufacturing costs at competitive levels in the export market, should correspondingly cooperate in keeping importation costs of these items at reasonably low levels.

Utmost care should be taken in the implementation of programmes that aim to provide the above-listed essentials to the development of the secondary wood processing industry, in order to preserve an equitable balance of benefits among the industry, the Government and the customers of the industry.

IV. THE MARKET STATUS FOR WOOD AND WOOD PRODUCTS OF THE SOLOMON ISLANDS

4.1 LOG EXPORTS, CURRENT STATUS AND POTENTIALS

The export of logs has been taking place at a very low level, around 5,000 cu.m. annually, for many years, until about 1964 when it registered a five-fold increase following the commencement of large scale logging. In 1968, with the arrival of more international companies, the export of logs again increased rapidly to reach a level of around 250,000 cu.m. annually by the mid 1970's.

In 1981, when large scale logging operations began in North New Georgia log exports increased to around 350,000 cu.m. and they have risen steadily since then to around 420,000 cu.m. as other companies have commenced operations.

The value of the logs exported in 1985 was about SI$25 million, compared with about SI$15 million in 1980. However, all the increase in prices has been due to a fall in the value of the SI$. The current log price expressed in US Dollars and Japanese Yen which gives a better indication of the real value compares badly with prices obtained five to eight years ago.

TABLE 4.1

AVERAGE FOB LOG PRICES (per cu.m.) IN SI$, US$ and YEN and CONSTANT SI$ FOR SAWMILL QUALITY EXPORT LOGS SOLOMON ISLANDS

Year	SI$	US$	YEN	Constant SI$
1974	18.8	28.0	8,120	22.6
1978	30.6	35.0	7,875	28.1
1980	85.9	95.0	21,945	61.8
1985	71.0	41.2	6,380	30.9

Note: Constant SI$ adjusted for changes in Retail Price Index (RPI), referred to 1977 as base year.

Most of the logs exported from the SI go to Japan (88 per cent) and Korea (12 per cent), with occasional small shipments to other Asian countries and Europe, so that the substantial fall in the real price of logs in Japan is probably an important factor in the rise in volume.

Japanese imports of tropical hardwood logs has been declining steadily, as other Asian countries have banned log exports in order to encourage local

processing, and this has led to some structural changes in the Japanese wood-using industry.

In 1980, it was reported by Fraser that about 18 per cent of the logs imported into Japan were of peeler quality and were used for veneer and plywood manufacture, although the logs used for this purpose did not achieve higher prices.

About 4 per cent of SI logs were used for specialized mouldings manufacture in 1980, and over 30 per cent was used in furniture manufacture. Both of these end-uses should command a price differential over run-of-the-mill logs, because of the higher quality specification and the higher value of the end product, but the log export prices do not affect the FOB price of logs exported from the SI.

The remainder of the logs imported into Japan were used in 1980 for either general construction or utility purposes like pallets and packaging.

Without a detailed survey of current end-use in Japan it is not possible to be definite about any changes in end-use that might have taken place, but it seems unlikely that there has been any substantial change in the way the logs are used. In fact, total log exports to Japan from SI have increased by about 40 per cent since 1980 while total log imports by Japan have fallen. Therefore, it is likely that SI logs are at least finding new users, even if the uses are much the same.

The general trend for trade in logs has been downward for some years, as industry in the importing countries has either adapted to using partially processed wood as raw material or has been relocated in the log exporting countries.

As this trend continues, it seems likely that the demand will be for higher quality logs, which can more easily bear the freight costs. It has been pointed out in previous paragraphs that a significant portion of SI log exports in the past were high grade logs mixed with lower grade logs in lots which were sold at lower price levels corresponding to mixed grade lots. Thus, it appears that improved log grading and marketing practices will allow SI to benefit from the general trend of increased demand for higher quality logs, since SI may have increasing difficulty in supplying higher quality logs in the future due to resource depletion and emphasis on high yielding species in plantation programme.

4.2 SAWN TIMBER EXPORTS, CURRENT STATUS AND POTENTIALS

Export of sawn timber commenced in 1975. Volume and average price data the period 1976 to 1985 are contained in Table 3.1. Unfortunately, there is no summarized data on deliveries by "market", and most people now in the industry were not involved in the export trade until very recently. Information is therefore very limited and is based on recollections of one or two people.

The rapid climb of volume to 1979 reflects a determined penetration of the Australian and New Zealand markets and large deliveries to the U.K. In the recession years to 1983, much of the U.K. market was lost because prices could not be held down and claims resulting from failure to meet specification became common. However, exports to Australia and New Zealand held and may have even increased in this period. It appears from the data in Table 3.1 that exports were limited in 1984 by a lack of supply (due largely to the shut-down at Foxwood), but the 1985 performance has more serious implications. The production data for 1985 suggest an adequate supply in that year. A large mill came on stream in late 1984 and was a major force in exports in 1985, channeling their produce through a trading organization, yet export volume declined markedly.

FAO (1979) indicated a market potential (up to 1985) for SI sawn timber as follows :

TABLE 4.2

MARKET POTENTIAL (1983-1985) FOR SI SAWN TIMBER

Market	cu.m. per year
Australia	13,000
New Zealand	3,000
Europe	6,000
Japan	3,000

These figures have not been achieved, though "several thousand" cu.m. were exported to Europe (U.K.) in 1978 and the New Zealand target was met and possibly exceeded in some years.

The price competitiveness of SI timber, stated (FAO 1979) to be the key to continued export development, would have been improved by the devaluation

of the SI dollar over the past two to three years. The devaluation of the Australian dollar relative to Southeast Asian and Papua-New Guinea currencies would have further improved the position of SI timbers in the Australian market. A housing boom in Australia would have again improved marketing potential in the 1984-1985 period. The rise in the value of the pound Sterling relative to the SI Dollar, suggests that the U.K. market may have been worth investigation in the past year or so.

An increasing price advantage on a rising market would seem to be an ideal situation for increasing market share, yet the opposite appears to have occurred. SI timber sales declined so that in 1985 only some 450 cu.m. were sold in Australia, 15 per cent of the very low total for that year (data extracted from Forest Division files). In that year 84 per cent was shipped to New Zealand and 1 per cent to other South Pacific countries. The major exporter is a trader rather than a producer, the company has long established connections in New Zealand. This would in part explain the concentration on that market, but it is difficult to understand the apparent disinterest by producers in developing a significant presence in what must be potentially the largest market in the immediate region. Imports to Australia from Southeast Asia and Papua-New Guinea have not shown a significant decline in the past two to three years, indeed the latter has increased exports in the last two years in spite of a higher basic cost structure and an adverse currency movement of some 30 per cent in that time.

There is reason to question whether, in spite of currency devaluation, SI timbers have maintained a price advantage. Price movements are indicated below, with 1976 taken as the base year with an index = 100. The data is derived from Table 3.1.

TABLE 4.3

PRICE MOVEMENTS OF SI SAWN TIMBER

Year	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Price SI$	115	99	109	136	172	205	199	197	216	263
Index	100	86	95	118	150	178	173	171	188	229
% Change on Prior Year	---	(14)	10	25	26	19	(3)	(1)	10	22

Information suggests that prices now (mid 1986) being sought by sawmillers would result in a rise in the index to about 280 for 1986, a rise of almost 25 per cent in 1985.

The data follows an expected pattern, i.e., a rapid rise in the "boom" years to 1980, holding through the recession (most competitors dropped prices), followed by a rise with economic recovery from 1984. The rise in 1985 is higher than might have been expected in the New Zealand and Australian markets at that time and may have been achieved at the expense of volume. The indicated current price being sought has met some buyer resistance, as could be expected. Competitors have held prices down to retain markets. Fiji has been increasing its deliveries to the Australian and New Zealand markets on the basis of price.

The species mix has apparently varied with time and this would distort price changes. Volumes and prices for individual species are available only for the period 1983 to 1985 and are provided in Table 4.4.

It is noteworthy that the higher value species (the second group in the Table) have held volumes reasonably well in spite of very dramatic price increases and the overall volume decline. Over the two-year period (on average mid 1983 to mid 1985), total price increases for the species in the order as listed in the Table, have been: 30.9%, 34%, 23.6%, giving an average for this group, of 32.6%; 56.4%, 23.6%, 72.2%, 21.1% (one year only), 98.3%, giving an average for the group of 59.2%. It is unfortunate that it is prohibited to cut two of the higher value group (except on road lines). The potential of these species to earn foreign exchange is quite high.

It is not possible to predict what volume might be exported in the next few years, but it is claimed that 10,000 cu.m. a year could be shipped to New Zealand and Australia now, if the volume is available. It is not unreasonable to assume this could be increased with promotion, particularly promotion which is targeted on specific end-uses. Much will depend on whether mills do in fact concentrate on cutting for the export market, and whether the possible oversupply to the domestic market will deter production. There seems good reason to expect that with promotion and a concerted effort to meet standards of production and presentation, the export targets indicated in the FAO (1979) report, with the exception of Japan, can be achieved.

Once a substantial presence is established in the market, particularly at the user level, growth potential is probably high.

TABLE 4.4

SAWN TIMBER EXPORTS, 1983 - 1985
Volume (cu.m.) by Species, mean Price SI$/cu.m.

Species	1983			1984			1985		
	Vol.	%	Price	Vol.	%	Price	Vol.	%	Price
Pometia pinnata	1962	39.1	197	2889	59.6	204	1190	40.9	258
Calophyllum kajewskii	390	7.8	188	1049	21.6	205	665	22.9	252
Terminalia brassii	367	7.3	178	144	3.0	210	15	0.5	220
Sub-Total	2719	54.1	193	4082	84.2	204	1870	64.3	256
Vitex cofassus	571	11.4	209	473	9.8	262	444	15.3	327
Pterocarpus indicus	14	0.3	302	24	0.5	431	7	0.2	374
Amoora spp.	14	0.3	198	14	0.3	214	22	0.8	341
Intsia bijuga	----	----	---	6	0.1	303	7	0.2	367
Palaquium spp.	51	1.0	240	145	3.0	277	37	1.3	476
Sub-Total	650	12.9	213	662	13.7	271	517	17.8	339
Other*	1655	32.9	194	103	2.1	279	520	17.9	213
TOTAL**	5024			4847			2907		

Source: Forest Division Files

* The 1983 data include a large volume of Canarium, sold prior to the prohibition on cutting that species.

** The 1983 total differs from the Forest Division Annual Report for that year.

Attention must be paid to pricing, or the market could be lost. This is an important aspect for which good market intelligence is required.

To summarize, the industry is not sufficiently prepared to make a substantial push on the export market. With few exceptions, mill design and equipment is not suitable; few mills are accustomed to export presentation; virtually no promotion has been carried out and price expectations appear to be unrealistic. The marketing channels are not well established and it appears possible that producers may offer timber to the agent in Honiara and to overseas customers at the same price. This would lead to small producers in relatively remote locations attempting to service markets which they are not big enough to supply and to organize export packaging, etc. by remote control. Opportunities to aggregate cargoes from several suppliers would be lost, as would coordinated

promotion. This lack of orderly marketing would be detrimental to the industry if it occurs. The proposed "Forest and Timber Council" should deal with marketing as a matter of urgency.

4.3 DOMESTIC MARKET FOR SAWN TIMBER

4.3.1 Market Size

Table 3.1 (with qualifications previously expressed) illustrates the reported domestic consumption of sawn timber for 1976 to 1985. Recorded imports in 1976 to 1979 were negligible, being 17, 27, and 33 cu.m. respectively. It has been claimed that sawn timber was imported in 1983 to 1985, but no data is published. The volume in 1985 was stated to be considerable and this matches comment reported above by a trader.

Because there is differing treatment of sales of "second grade" timber, and reputed but unrecorded imports, it is not possible to state what the current market is. The existence of so-called "formal (cash economy) and "informal" (primarily subsistence economy) markets of undefined and probably changing relative sizes, further complicates the picture. These difficulties will remain until an adequate reporting system is devised and enforced.

Growth in consumption has been substantial in the past few years, but erratic. It is difficult to assess whether this rapid rise is a real trend or not. The market is so small that a couple of major projects can have a large influence on the annual performance. Also the high copra prices in the period may have caused a substantial part of the increase. The 1986 figures will also be distorted by reconstruction following cyclone "Namu", so a return to trend is unlikely until 1987 and even that may be distorted by "Namu" in the early part of the year.

However, it is felt that some attempt should be made to estimate the future market. Fraser (1980) calculated an apparent growth of about 7 per cent in the previous five years. From a smoothed curve of the five-year moving average of data from 1962 to 1985 a growth rate of just under 8 per cent was calculated for the past eight years. From growth data for total population, formal employment and GDP it appears that an

increase in sawn timber consumption of this order is reasonable, but without data known to be reliable any projection must be extremely tentative. Projected consumption is presented in Table 4.5.

TABLE 4.5

PROJECTED BASE LEVEL OF DOMESTIC DEMAND FOR SAWN TIMBER, SOLOMON ISLANDS

Year	cu.m. per year
1985	11,500
1986	12,500
1990	16,900
1995	24,700
2000	36,200

Notes:

Reported sales in 1985 were 14,037 cu.m., but exceptional circumstances prevailed. It is expected that the actual 1986 figure will far exceed the projection but a decline could be expected in 1987.

The projections assume no change in the pattern of use. This may not be the case as the use of timber for external cladding of houses appears to be on the increase and with increasing affluence houses will probably be larger and more furniture be purchased.

4.3.2 Geographic Distribution of the Market

The magnitude of the market by province is not known. However, the formal sector consumes the greatest bulk of sales and this is concentrated in Honiara, with smaller areas in Gizo, Munda, Auki and Noro. Kirakira may also be included here but it is very small. Honiara may account for as much as 50 per cent of domestic sawn timber sales. Fraser (1980) estimated per capita consumption of 0.039 cu.m. Projecting population from the last census at a growth rate of 3.4 per cent and using the projected "base consumption" (Table 4.5) the 1986 per capita consumption is 0.045 cu.m. (actual figure for 1985 was over 0.05 cu.m.). If consumption outside Honiara is only 50 per cent of the national total, their per capita consumption here would be under 0.025 cu.m., in some provinces very much below this. In an effort to identify timber

deficit areas Table 4.6 was constructed, using projected population and estimated sawn timber production capacity.

TABLE 4.6

SAWN TIMBER PRODUCTION BY POPULATION UNIT

Area	Population (1986)	Volume Available (cu.m.)	Volume/ Capita (cu.m.)	Excess (E) Deficit (D)
Western	42,000	7,900	0.188	E
Choiseul	14,500	270	0.019	D
Guadalcanal	65,300	8,500	0.130	E*
Sta. Isabel	14,600	250	0.017	D
Malaita	84,100	2,830	0.034	E
Makira	20,800	2,830	0.136	E
Central Is.	19,000	150	0.008	D
Eastern	15,300	0	0.000	D
Total	275,600	22,730	0.082	E

* Honiara: Population - 25,000; consumption - 0.25 cu.m. rest of province population - 40,300; consumption - 0.025. The Guadalcanal figure (7,300 cu.m.) is close to the capacity figure now and Guadalcanal is likely to become an importer again before long.

The situation is likely to change dramatically in the near future as mills run out of resource. The Table indicates the possible shipping requirements in the immediate future, however, this is expected to change dramatically. The figures also point to the need to establish plantations in most, if not all provinces for local wood needs in the future, though some small areas of natural forest will remain for sawmill supply for many years.

Detailed examination of the matter is required well before needs arise.

4.3.3 Sawn Timber Uses

No information on end-use of sawn timber is available. A total value for all types of construction in Honiara only, is recorded but this is of little use in assessing the market for sawn timber. No data on construction approvals apparently exists. This type of information is desirable for analysis of past performance and projection of timber needs by the industry. The lack of such information makes it much

easier for an "outsider" to understand why mills are not in a position to supply seasoned timber. Management has little or no information on impending demand until tenders are called, generally to commence supply immediately.

However, it is apparent that the great bulk of sawn timber is used in house construction. It appears that little is used in heavy construction such as bridge and wharf building, etc. Little is used in furniture manufacture or boat-building.

The industry would be well advised to attempt to increase the number of uses for sawn timber in the country, with emphasis on high value applications. Only two companies appeared to have given this aspect any thought.

4.3.4 Marketing and Promotion

Just as promotion and market intelligence is vital to expansion of sawn timber exports, so it is essential in the domestic market. As indicated elsewhere in this report, this function could be undertaken by an industry body rather than individual companies with better cost effectiveness.

4.3.5 Government Purchasing Policy

This matter is dealt with in greater detail in section 6.3, but the matter is raised briefly here. The extensive use of imported external cladding on houses in Honiara, in particular, is the direct result of inadequate consideration of domestic industry in Government purchasing policy. Unfortunately, it appears that there is considerable ignorance of domestically manufactured products, rather than a positive preference for imported goods because of some real or imagined intrinsic advantage or a lower cost. There does not appear to be formal provision for accepting a marginally higher cost of local materials. This a fairly common practice in countries seeking to sponsor domestic enterprise, justified on the ground that it conserves scarce foreign reserves.

Some formal monitoring of purchasing practices is warranted. This could take the form of a committee of reference, which would be advised of the materials to be purchased and advise the Government on the availability of goods produced in the country. The committee would include industry representatives, preferrably through bodies such as the proposed forest industries council,

the Chamber of Commerce and Industry, etc. The Government should draw on the skill and knowledge of industry and commerce at every opportunity. To fail to do so is to waste a large part of the collective skills in the country.

Confidence in the intent of the Government to support local industry will do much to encourage investment and development of products to achieve the self sufficiency sought in the National Development Plan 1985-1989.

4.4 DOMESTIC MARKET FOR FURNITURE AND JOINERY PRODUCTS

There is no data available on the size of the domestic market for furniture and joinery products. At best, the size of the domestic market can only be an estimate based on the value of sawn timber inputs of the secondary wood processing plants, the average annual domestic purchases of wood-based panels and synthetic laminate sheets, adjusted by using industry data (for developing countries) on manufacutirng value added for furniture and joinery products. Based on data on wood and other material inputs accumulated during interviews with heads of furniture and joinery plants, the gross value of the domestic market for wooden furniture and joinery products is estimated at about SI$985,000.00 per annum. This figure does not include the value of the products produced and sold by non-registered individuals, such as those described in section 3.3.1 of this Report.

Almost all sales are done on a "produce-on-order" basis and very little, if at all, is sold from inventory. Shops with display stores do some "over-the-counter" sales supported by a very small inventory of a few types of finished goods. The distribution pattern for secondary wood products follows more or less the urban development of the country together with accessibility to the existing inter-island shipping services. Thus, Honiara being the most organized locality and the inter-island shipping center, it is not strange to find that the great bulk of the furniture and joinery products are produced and sold from this town. The volume of the products manufactured in Gizo and Munda (Western Province), Auki (Malaita Province) and Kirakira (Makira Province) are sold within the respective islands of the province, to fill up the local requirements which could not be shipped from Honiara.

Although the population growth rate is very high there is no corresponding increase in family income and, as a result of stagnant house building activities the domestic market for wooden furniture and joinery products may not be expected to increase significantly.

4.5 EXPORT MARKET POTENTIALS FOR FURNITURE AND JOINERY PRODUCTS

It appears that the establishment of wood seasoning facilities in Honiara helped start this year (1986) the export of profiled wood products. There are no reports on exports of other types of wooden furniture and joinery products.

4.5.1 Wooden Furniture

The export of wooden furniture, *per se*, from the SI is unlikely in the next decade, or even fifteen years. However, there is a possibility of developing the manufacture of drawer sides and blanks for other furniture components, which require not too sophisticated manufacturing technology and needs relatively lower initial capitalization. The main material input requirements for this type of industry is properly seasoned sawn timber.

4.5.2 Rattan Furniture

The large scale manufacture of rattan furniture products in the SI has very good possibilities if the reported existence of a good supply of rattan (*calamus* family) in the remaining forests of the country is confirmed. In fact, this is the type of industry which should be encouraged in the SI because it does not require high sophistication in manufacturing process; it is labour intensive and it requires relatively low capitalization. As discussed in previous paragraphs of this Report, the development of the industry was neglected as a result of the importation of synthetic substitutes for rattan strips (binding materials) and the larger diameter rattan poles which are required by the designs of rattan furniture pieces produced in other countries where such larger diameter (greater than 25 mm) poles are more readily available. Development of the local rattan furniture industry, therefore, should include changes in the design to allow the use of smaller diameter (25 mm or less) rattan poles in structural components of the rattan furniture. A suggested development programme for the rattan furniture industry in the SI is given in Annex VII.

4.5.3 Mouldings and Other Profiled Products

The export market for mouldings and other profiled products is a highly competitive one. Quality requirements are very high. Demand for one profile may even change more than twice a year, so that to survive in the foreign mouldings market one has to be highly attuned to the fast changing needs of the building and house construction industry. It is not, therefore, advisable for the SI to enter the foreign mouldings markets unless it is done on the basis of "captive markets" through joint venture arrangements with well-established construction syndicates or wood products distributor firms.

4.5.4 Joinery Products

Entry into the international market for joinery products (doors and door jambs, windows and window frames, partitions, etc.) require a thorough understanding of the designs required by construction practices and building codes in the target country. The foreign market for these products, like that of mouldings and other profiled products, has become very competitive. Likewise, it is not advisable for SI to attempt to export these items unless it is done under "captive market" or licensing arrangements with well-established foreign firms.

4.5.5 Other Products

i - Pallets and Vegetable Crates

There is a demand for pallets and vegetable crates in foreign markets. . However, in view of the relatively low value of these items (compared to other wood products) they can be considered as outlets only for the commercially-less-acceptable-species of timber in the SI forests, which still have to be identified, located and enumerated under the proposed national forest inventory project.

ii - Matchsticks, Toothpicks, Medical Supplies (Tongue Depressors, etc.)

The manufacture of these items for both domestic and export purposes will depend on the availability of softwood species which meet the specific properties required by each type of

end product. The available volume, location and properties of these softwood species still have to be determined under the proposed national forest inventory.

iii - Turnings

There are a number of fine-grained hardwood timber species in the SI forests which could be used as the basic material for turnings (lamp shade stands, balustrades, broom and tool handles, etc.) which are in demand in foreign markets. Again the available volume, location and turning properties of these timber species still have to be determined under the proposed national forest inventory before any decision could be made to encourage the manufacture of turnings in the country.

iv - Miscellaneous

The industrial residues that develop in both the logging and sawmilling operations provide a great source of raw materials for a wide range of wooden products such as: chopping boards, clothes pegs, children's toys, shoe racks, utility trays, paper weights, coat hangers, toilet seats, etc. These products could also be produced out of boards which do not find any market abroad.

4.6 MARKETING PRACTICES

4.6.1 Marketing Practices for Logs

In recent years, most logs exported from the Solomon Islands have been going to Japan and the Republic of South Korea with eleven companies involved in the exporting end of the operation.

The timber is sold through Agents in the country of destination who arrange all the shipping and pay for the logs f.o.b. The Agents frequently act for more than one company in the Solomon Islands and make up ship loads from two or three company's outputs.

Once the logs reach Japan several things happen over which the vendors in the Solomon Islands have no control. The shipments of logs are normally broken up into smaller parcels, and sometimes they are separated by specie or species groups. Some parcels may be sold directly to end-users, but others are sold on to dealers and middlemen who may divide them further and sell them on to smaller dealers or end-users. In 1980 it was found that the price of Solomon Island logs to the end-user in Japan was often around 40% higher than the landed cost of the logs, so that a greater profit is made on the logs in

Japan than in the Solomon Islands.

The lack of any serious competition for Solomon Island logs means that not only are prices generally low compared with other SE Asian logs, but also that the log prices have not adjusted to take account of inflation, as shown in Table 4.1.

In real terms, the current average price of Solomon Island logs has shown an average annual increase of about 4% since the mid 1970's apart from the large short term peak in 1980, though in Yen terms for the buyers the price of logs has actually fallen by an average of 3% per annum.

Another shortcoming in the marketing arrangements pointed out in earlier reports is the lack of any quality grading. About 20% of the logs exported are used for veneer production, but this is not reflected in the log price.

The buyers do reject a proportion of the logs which do not meet the basic S.Q. quality standards, but there is no price differential for better than average quality logs.

At the present time the Forest Division does not have good access to reliable independent market intelligence, which would allow it to compare the f.o.b. prices declared by the exporters, with the prices paid by the end-users. Only when such information is available will it be possible to judge whether value is being lost to the Solomon Islands economy through underpricing of all or some of the logs exported, but the indications are that the excessive dependence of Agents and on one market, does not bring the best return to Solomon Islands.

4.6.2 Sawn Timber Marketing Practice

Marketing here is treated in its broad sense, not to be confused with "selling" which is the major objective of marketing and constitutes its final phase. The needs and methods of operation on the export and domestic market differ.

4.6.2.1 Market Intelligence

There appears to be little formal market research carried out formally. However the domestic market casual discussion does substi-

tute to some extent. This results in large mills, with more sophisticated management, being informed on a national scale and provides the opportunity to take advantage of the more lucrative markets and participation in larger projects. This enhances their tendering and negotiating position. Small mills in rural areas are similarly more aware and conscious of rural needs but generally have no concept of the market requirements beyond their own locality.

There is no impartial clearing house for enquiries from potential overseas buyers or to alert producers to large domestic tenders or projects "in the pipeline". There is no national industry body to officially collect market intelligence and to promote the timbers and forest products of the country. Until a national body is created with the full support of government and industry the country will be at a serious disadvantage. Pleas have been recorded in Forestry Division annual reports for many years for the creation of such a body. A sustained deaf ear to these pleas will continue to cost the country dearly. The Forest Division receives market information from some international sources but much of it is irrelevant and that which is, is not disseminated to producers.

A private timber trading company recently established in Honiara intends to improve grade and presentation of sawn timber for export and will go some way towards filling this gap. This source of information and outlet for timber, or something like it, would be best supported by the industry for its own benefit, at least until the national marketing programme is established.

On balance, the producers are not well informed of potential markets, the end uses to which their timber is put and the standards required on those markets. The chance of successful product development and promotion under these circumstances is low.

4.6.2.2 Product Knowledge and Promotion

The Division of Forests has produced a two-volume description of the properties of a considerable number of S.I. species. These would serve as a good foundation for preparation of market-oriented publications which could be used for timber and manufactured product promotion. They should be professionally prepared. A national

industry body could be charged with responsibility for preparation of such publications. While these efforts would be primarily directed at the export market a similar approach could be used on the formal domestic market.

4.6.2.3 Sales

The larger mills tend to sell to larger customers direct from mill, but sell to the small and casual trade through retail yards. Small mills sell to the casual trade direct from the mill, and provide very little of their production to retail yards. This reduces the exp of their products and would reduce their sales volume. The use of retail yards does show signs of developing, but there is a tendency to expect that the retail yard should pay the same price ex-mill that the users pay. The mill therefore competes with its own distributor. Such practices are unworkable.

Sales are generally made on the basis of 30-day credit to larger corporate buyers, but small sales tend to be on a cash basis. Small mills sell the majority of their products on a cash basis but there are moves in Gizo and Munda and possibly elsewhere, to sell through agents who require credit and possibly supply of timber "on consignment". This could create cash flow difficulties at the start of the programme and in the latter case may cause hardship in market down turns.

However, credit selling is normal in the trade and small mills may need to adjust to this if they want to expand their market area. Advice on credit checking and control is required by the small and some medium mills.

4.6.2.4 Pricing Policy

Price of its products is critical to the profitability of any enterprise. Larger mills tend to set higher prices than the small isolated mills, even when the freight cost is added on to obtain a valid comparison. While the small mills probably have lower costs in many inputs, it is suspected that they have very simplistic view of pricing policy. Larger foreign-managed mills tend to have normal pricing policy but it is possible that small mills are

more ready to negotiate price, particularly to local buyers, and "ability to pay" may influence the pricing policy. This fits the "social" nature of these mills but may reduce their profit. If they are not making adequate provision for plant replacement this may cause problems in the future. Some small mills are receiving acounting assistance and business advice' Pricing policy is an area that should be covered in that advice.

A complaint was voiced at one mill visited that the retail yard was making too large a mark-up. The mark-up was 50% on ex-mill price, but had to cover the cost of sea freight as well as yard costs and trading margin. Producers should be concerned about the price charged for their products by Agents, but only to the effect that it affects volume of sales and their ability to alter prices. As a result of this mark-up the mill was reluctant to supply to that yard.

4.6.2.5 Centralized Marketing

The possibility of government controlled centralized marketing has been suggested for both the domestic market (to hold prices down and improve distribution) and the export market (to increase price and volume).

The success of bodies such as the Commodities Export Marketing Authority (C.E.M.A.) cannot be projected to all commodities. C.E.M.A. handles 2 different products each with a limited number of grades, perhaps 6 "sorts" (a "sort" here means, e.g., one grade of copra or one grade of cocoa). Product prices are set by world markets and these are published several times a day. There is a large number of producers, each tending to produce a single product, generally a single "sort", if the control is sufficient. The only "orders" placed by C.E.M.A. are for more or less volume. There is a limited number of processors at the buying end and the end-uses are very limited. C.E.M.A. has no influence on price.

The timber industry has a multitude of species, in several grades, and in the case of sawn timber, in a large number of sizes (section and length), potentially over a hundred "sorts". There is

no posted world or even regional price for any one of these "sorts". Each "sort" is produced against specific order. There is a limited number of producers but a large number of processors at the buying end and a very large number of potential end uses, each with specific requirements.

The purposes of bodies such as C.E.M.A. are to aggregate the production of a large number of small producers, and to provide some stability in price, by administering a price maintenance scheme. There is little need to supply market intelligence to producers, apart from urging them to improve grade, or deliveries. The timber industry requirements are substantially different, because it is a manufacturing industry. Marketing has a far greater influence on production than it does in plantation agricultural production. There must be a daily exchange of information between marketing and production. Over the range of "sorts" to be produced, no centralized system that could feasibly be introduced in the Solomon Islands will provide the information exchange necessary. The imposition of a Government controlled centralized organization will be the death knell for private investment in the forestry sector. The disastrous results of such an approach as tried in Ghana is described in section 6.7.2 .

4.6.3 Secondary Wood Products

The evolution of an export marketing strategy for SI secondary wood products must take into consideration certain limitations in the capability of the country to supply each type of secondary wood product. The over-all marketing strategy should also recognize the different distribution systems in foreign markets which are principally guided by the type of end-users of the product. Thus, company-to-company arrangements between the foreign end-user and the SI supplier would provide optimum revenues for SI exports of blanks for furniture components. (Note: Drawer sides are handled and sold as moulded items.) This scheme eliminates the services of middlemen and does not require heavy outlays for promotion and advertising. Mouldings and other moulded items (including drawer sides), however, are handled and sold as "commodities" and are subject to significant price fluctuations which go with that type of marketing approach.

During the early stages of the industry's development, when SI is not yet equipped with the proper image as a reputable and dependable supplier of secondary wood products in the foreign market, it will help encourage foreign buyers to patronize SI products if the SIG assists in setting up an export financing guarantee system which will help assure delivery of their orders placed with SI suppliers.

In other countries, market changes are followed by, and adjustments in local production operations are made through, an industry or trade association (more often with government representation in the association's management group) which is responsible for the various interests of the industry. Activities of these trade associations usually start with the marketing of logs and primary wood products, and more often than not, includes monitoring of quality levels of the wood products. In some countries, like Malaysia, Singapore and Papua-New Guinea, the activities of trade associations have been enlarged to include secondary wood products. Government control of quality levels of wood product exports is exercised in the Philippines, Indonesia and Thailand.

Nevertheless, the SIG should seek advice from international agencies, such as the International Trade Center (UNCTAD-GATT), Geneva, Switzerland, the export marketing assistance agency of the United Nations, operating under the auspices of GATT and UNCTAD. The EEC also offers export marketing assistance. Regional financing institutions, like the Asian Development Bank, also offers assistance in this aspect of the industry.

V. EXPORT TRADE AND SHIPPING

5.1 GENERAL

The Solomon Islands has no Shipper's Council in which the authority to conduct negotiations with shipping lines on all matters pertinent to the export of produce by sea would normally be vested. The Commodities Export Marketing Authority does perform this function to some extent on behalf of producers of copra and more recently cocoa. Shippers of other commodities conduct their own negoatiations and in the case of smaller organizations, tend to be "price takers".

There is no formal mechanism for gathering market intelligence on the shipping trade, particularly with regard to freight rates and methods of packaging and handling cargoes. There appears to be no contact with Shippers Councils in the region, though there has been contact in the past between the C.E.M.A. and the PNG Copra Board, regarding freight rates and cargo volumes for this commodity.

However, the Solomon Islands are at present well served by the lines and freight rates appear to be in line with PNG. This is probably the result of freight negotiations by large companies which dominate some commodities, and the rates negotiated by bodies outside SI which are passed on to SI by the lines.

It is not within the terms of reference of this mission to explore this aspect in depth, but it is doubtful whether a Shippers Council, with an expensive secretariat, collecting, analysing and disseminating market intelligence, is required and this could be sought through the Ministry of Transport, Works and Utilities, or Trade, Commerce and Industry. Assistance is likely to be available from Shippers Councils in Australia and New Zealand, and PNG, when the latter have developed a sufficient data base. ESCAP in Bangkok may also be prepared to provide some assistance, though this would normally be provided to a Shippers Council. This intelligence will be particularly important when the current shipping crisis is resolved (25% of the world's merchant fleet is now in mothballs and many ships are being scrapped).

Within the country there is no formal body, which includes shippers and ship-owner/operator representation to provide advice to Government re-

garding the conduct of coastal trade. Such a body (e.g., Coastal Trade Committee) would be expected to provide advice on the number and suitability of vessels in the trade, the quality of service provided in the various routes, the need for registration of vessels for specific routes, etc., and to make representation to the Harbours Board regarding the suitability of port facilities.

There does not appear to be any control on the number or type of vessels employed, provided they satisfy the safety requirements for either costal or inter-island travel. This may stem from the stated belief in Government that a great many more vessels are required to provide a more sufficient service. Shipowners claim that there are too many vessels, at least on some runs, with the result that most are operating at well below capacity. while it may be assumed that these "market forces" approach holds freight rates at a minimum, under-utilization of vessels may actually increase costs, and do nothing to enhance the service.

The mission recommends that the Government consider the creation of a Coastal Trade Committee, to include representatives of shipowners/ operators, shipping agents, shippers and government, to advise on the matters discussed above. Vessel and route licensing may be used to reduce the problem of multiple handling, which is a serious drawback to marketing by small isolated sawmills.

5.2 FOREIGN GOING VESSELS

5.2.1 Vessel and Equipment Suitability

5.2.1.1 Log Vessels

Standard purpose-built vessels conduct the trade in logs. As chartering is almost always the responsibility of the Agent or buyer, no influence can be exercised by local logging companies, except by negotiation with the charterer. With the impending departure of LPT it is unlikely that any log exporter will be in a position to do their own chartering as none are big enough to warrant a full time presence in ship brokering. There have been instances of countries in the region believing they can break into the trade and some success has been obtained, but volume ex-

ported must be far greater than SI could ever hope to achieve.

5.2.1.2 General Cargo

The timber trade has not been of sufficient significance in the region to greatly influence the provision of vessels and equipment. Some vessels do still accept "break-bulk" cargo and "master packs" for timber have now been introduced to SI. The long established trend to the use of container vessels has been difficult for the timber trade but the trend is likely to continue in general purpose vessels. The timber trade has no option but to adjust to the vessels and facilties available and should do so actively. A concerted effort should be made to develop a handling system that will allow economic use of standard contianers as open siders or flatracks are unlikely to reappear in sufficient numbers.

The efforts to utilize standard containers must solve the unstuffing problems at the unloaing port as well as improving the efficiency of container volume utilization. The key to development of handling systems will be regular high volume shipments, with a limited number of loading and discharging ports.

The use of small dedicated vessels discharging at one or at most two minor ports in Australia or New Zealand may be a viable alternative, provided sufficient cargo can be assured for regular voyages. The discharge ports would need to be well located to major markets, with particular attention to road or rail freight costs and reliability.

In short, the industry should seek to make the available vessels and equipment efficient rather than trying to hold to outdated handling methods. Success will depend on product marketing as much, if not more, than engineering solutions.

5.2.2 Schedules and Loading Ports

The Solomon Islands is quite well served by foreign vessels. The joint Bank/Columbus Liner service has monthly sailings to Europe with potential access to South Asian and Middle East ports. The

Polish Ocean Line also operates on this run but tends to be less regular. Kyowa serves other South Pacific areas and East Asian ports, including Singapore, with monthly sailings. Australia has several sailings a month and New Aealand two to three. There is no direct service to North America, but regular sailings do occur from Bougainville in Papua-New Guinea and the vessel could probably be induced to call at the Solomon Islands by sufficient cargo on a regular basis.

Honiara is the only port used by foreign going vessels, with occasional calls at Yandina. The up-grading of Noro will provide a further well place port as far as sawn timber exports is concerned. Most ports are not really satisfactory for loarge vessels as wharf space and shore based transport equipment is not sufficient to allow efficient and fast loading. As far as timber is concerned, additional facilities, while desirable, are not likely to be warranted until a large export industry is established, and this in turn is unlikely to occur except on a large plantation resource base.

5.2.3 Freight Rates

Log freight rates are reported to be between US$18 and US$30 per cu.m., to Taiwan province of China, Japan and the Republic of Korea. It is very difficult for producers to establish the rates actually paid by agents or buyers. The range of quoted prices is suprisingly wide, but may be influenced by the number of loading ports as many exporters appear to engage in part shipments.

Freight rates for sawn timber on the runs to Europe, Australia and New Zealand compare well with services from Papua-New Guinea. The rates to other South Pacific ports seem to be very high. The possibility of discounts exists on most runs for regular large (greater than 500 cu.m.) shipments. This is unlikely to be achieved by any shippers in the near future. The SI$20-SI$25 advantage to New Zealand compared with Australia would in part explain the preference shown for that market by shippers. Current quoted rates are as shown in Table 5.1.

Table 5.1

CURRENT SHIPPING RATES

Destination	SI$	US$
Europe:		
Rotterdam,Hamburg,Hull	87.93	49.68
Singapore	82.00	46.35
Japan	115.10	65.00
Australia:		
Sydney, Brisbane	84.57	47.78
Melbourne	90.05	50.87
New Zealand:		
Auckland	65.00	36.72

Source: Agents through Forest Division

5.3 COASTAL VESSELS

5.3.1 Vessel and Equipment Suitability

Data on coastal ships, relevant to the carriage of sawn timber, was not readily available. Of the 104 ships listed, at the commencement of 1986, for the coastal trade, about 20 appear to be sufficiently equipped and of hatch and hold design suitable for handling packaged timber (packs to about 2 tonnes). About 20 are designated as passenger ships, tugs, etc. The balance are designed for passengers and mixed freight, particularly small loads of copra. Most of these latter have small hatches and holds and limited deck space for timber of any length. They do not have derricks, hence any timber carried would have to be loaded and discharged piece by piece, as no small-ships wharves in the country appear to have shore based cranes.

Many of the small sawmills are located at places which have inadequately marked channels, no wharf or a very small one, and no pontoon or barge suitable as a lighter for packaged timber. Thus, vessel suitability is probably less of a problem than "port" facilities.

Until such time as this problem is rectified small isolated mills will be unable to enter the "formal" timber trade in any significant way.

Action is under way to design small vessels with on-board cranes and sufficient hatch and hold dimensions to fit them to carry either "packaged" or "piece" cargoes. If these vessels are designed to be beached on loading and discharge, this would improve the opportunity for shipment of timber where the port facilities problem is not yet solved. In some cases where travel can be totally in protected waters, use of a shallow draught "river truck" type of vessel would be useful. These are small barges which can be run up on the beach for loading. If packaged timber was carried, an on-shore crane would be preferred for unloading.

5.3.2 Schedules and Loading Ports

Large vessels tend to operate on scheduled runs, with fairly regular sailings. The majority of small ships tend to operate more like "tramps", with little attention to schedules or regular runs. They mainly provide a service to the group or individuals who own them, such as villages and missions, and carry copra as their main commodity cargo. It is claimed that the service is not of sufficient regularity or reliability for a manufacturing business, such as sawmilling.

Loading ports vary, depending on the type of vessel. Vessels equipped to carry packaged timber tend to call only at the major coastal ports. Few of the small sawmills are able to take advantage of this service. They will divert if sufficient cargo is available and the "port" is adequately marked.

As indicated above, route licensing may assist in improving the coastal service. It would also create pressure to improve port facilties. However, much of this work could be carried out by the port users. A sawmill owner could be expected to construct a small wharf, possibly erect a simple crane if required and mark channels. Advice and supervision by the ports authority and the Works Division would be required to ensure that acceptable standards were maintained.

5.3.3 Freight Rates

Freight rates quoted by the major Lines for timber vary from SI$25 to SI$34 per cu.m. from almost any port in Western Province and the west coast of Malaita to Honiara. It is difficult to establish any particular pattern of freigh rates, for shipment to outports, because few mills have shipped timber with any regularity or in any quantity with the shipping lines. No data was obtained but it is believed that lower rates do apply for some voyages, but the variation from the rates quoted above is likely to be small. The vessels delivering timber to small "ports" do not appear to have a fixed freight rate but negotiate on a case-to-case basis.

Coastal freight rates are of themselves probably not a significant deterrent to marketing, but rather the need to double-handle, thereby meeting two freight bills. The total coastal trade is small, and the timber component, apart from deliveries to Honiara, insignificant. It is difficult to conveive of any improvement, except by increasing volume. One of the major companies use its own vess for supplies and back-load timber. This service has been offered to small mills in Western Province, but is not much used. This seem to be about the best way to overcome the problems of double-handling, but it may involve sale of the timber to a trader. This ha dealt with under domestic marketing.

VI. NEEDS FOR THE DEVELOPMENT OF THE WOOD AND WOOD PRODUCTS INDUSTRY OF THE SOLOMON ISLANDS

6.1 MANPOWER RESOURCES

6.1.1 Forestry

It was estimated by FAO in 1980 that total employment in forestry plantation work and logging was about 1,655, or 28 per cent of the employment in the Agriculture Forestry and Fisheries sector. In addition there were an estimated 209 people employed in sawmilling, giving the total for the forestry sub-sector of 1,864.

Since that time employment in plantations has not changed, but log output has increased by about 60 per cent. If no increase in labour productivity has taken place current employment is likely to be around 1,770 in logging. Over the same period sawmilling output has doubled, and employment is therefore likely to have risen to around 410 bringing the total number currently employed to about 2,720 or about 11.6 per cent of the labour force. This employment is heavily concentrated in Western province.

In addition to the labour force employed around the country, there are a total of 48 professional staff employed in the government, two or three in education and training and about 40 in management with the logging companies. Most of the latter are expatriates.

Since less than half of the adult population of working age is currently in employment, there is a large untapped pool of labour. However, there are large variations between islands and regions. Western province has a population of about 57,000, of which about a quarter or 14,500 are males of working age. About 80 per cent of the employment in forestry and forest industries amounting to about 2,170 people is in Western province. Although this is only about 15 per cent of the potential labour force, it represents more than 50 per cent of current employment in the region.

Most of the population not engaged in formal employment are engaged on subsistence agriculture, and in Western province there is adequate land for most of the population to grow sufficient for their needs. However,

in Malaita especially, population density is higher and there is less suitable land, so that many Malaitans seek employment on other islands.

Labour shortages are, therefore, unlikely to be a constraint for any development.

There is little formal training provided for the labour force, except on-the-job instructions, with the result that labour productivity tends to be low. At the management level, the government has had a programme for sending a limited number of trainees to Fiji for Certificate level training, for Diploma level training to Bulolo Forestry college in PNG and for Degree level training to Unitech at Lae, PNG.

The Certificate level training will be provided in the SI by the School of Natural Resources of the SI College of Higher Education (SICHE) from 1987 onwards. As most of the students are likely to be sponsored by the government for future employment in the Forestry Division the main emphasis on the training will be on Forest Management, Silviculture, and some Utilization. The latter is unlikely to cover such topics as wood identification, seasoning and sawmilling in sufficient detail to suit candidates sponsored by processing industries, though it is to be hoped that some of the logging companies will sponsor some candidates.

In order to upgrade the level of technical training in the forestry sector, the government could make it a condition of issuing licenses that a specified number of candidates be sponsored for a Certificate at SI College of Higher Education.

6.1.2 Manpower Needs for the Primary Wood Processing Industry

Development of the timber industry is hampered by the lack of a number of skills. As far as the mission is aware no study exists for the SI to determine what the manpower requirements of the industry are or what training is required. This would require a specific study, so it is possible now to speak only in general terms and no attempt to rank requirements is made.

The aspects needing attention can be divided for convenience into several sections :

i - The Operator Level

A number of examples of poor work technique were witnessed or evidence of this problem seen. This results from inadequate training and supervision, but is often a symptom of a lack of understanding of the role played by the operator and the machine in the production process. Lack of attention to detail is a common occurrence. This results in very high maintenance costs in the logging sector as well as low efficiency. Poor sawing technique is the major cause of poorly sawn timber, which was seen to be a common fault, not restricted to the small village mills. Unless the consequences of poor technique are repeatedly pointed out by training and supervisory staff, mediocrity becomes the accepted standard of excellence. While training may be obtained in a formal situation, i.e., a training centre, follow-up in the work place is essential. It is, therefore, preferrable that training be conducted in the SI, so that training staff can readily and frequently carry out re-inforcing sessions in the workplace. Except for training on specialized or "new" types of machines, training will generally be "in service".

It is appropriate to include training of log and timber graders in this section. These should have a high priority once a decision to introduce grading is taken.

ii - The Trade Level

There is no formal training available in the Solomon Islands in skills specific to the timber industry. Of particular concern are saw maintenance and mill-wright skills. The deficiencies are not restricted to small mills. As proposed above, it is considered preferrable to conduct training, as much as possible, inside the SI. This is certainly so for basic general courses. It may be necessary to undertake training on specialized equipment in the supplying country, possibly at the factory in which the equipment is manufactured.

iii - The Supervisory Level

It is claimed that there is a marked reluctance by most employees to accept authority for supervision and if necessary, disciplining of fellow workers. It is believed that this stems mainly from cultural origins and is common throughout government and business. The mission cannot offer a simple solution. The selection of staff for promotion to positions of authority is obviously crucial. They must not only be good at their job, they must want authority and then be taught how to use it properly.

iv - Management Level

There is an apparent shortage of accountants in the country. Training is available within the SI. Opportunities exist for further training overseas, and this an area which aid agencies are likely to support. Marketing, production and general management are not really catered for in the SI and unfortunately staff employed in the timber industry tend not to have education levels which fit them to undertake such training overseas, except in specially designed courses sometimes run by aid agencies, taking account of the low education levels. It is a common failing that the people most likely to be chosen to attend such courses are public servants who will not really be in a position to practice the skills learned, unless they leave the government service.

Large foreign investors are probably in the best position to provide the in-service training that must follow formal courses and joint ventures in particular offer opportunities for in-service training in their home-base operations.

6.1.3 Manpower Needs of the Secondary Wood Processing Industry

Adequately trained personnel peculiar to the needs of the furniture and joinery industry such as: woodworking millwrights, knife-grinding and saw-filing technicians and finishing systems technicians should be made available, in addition to other highly skilled and skilled personnel commonly needed by other types of industry to maintain plant machinery and equipment such as: industrial mechanics and industrial electricians. Managerial and middle management personnel have also to be trained from qualified local talents.

It appears that the brunt of the training requirements will have to be shouldered by the SI College of Higher Education, as it is the only institution in the country that possesses the potential to conduct such training activities. During the early period of the industry's development programme, when such trained and skilled personnel are not yet readily available, the industry should avail itself of the services of qualified expatriates.

The following is a minimum requirement for the above listed supporting key personnel in a typical medium-sized furniture or joinery factory:

Type of Work	No. of Men Per Work Shift
Woodworking Millwright	1 man per production line
Knife-grinding and Saw-filing Technician	1 man per production line
Finishing Systems Technician	1 man per production line*
Industrial Mechanic	1 man per production line
Industrial Electrician	1 man per production line

Note: *This technician may not be needed in production set-ups which do not include finishing operations.

6.2 RESEARCH AND DEVELOPMENT ACTIVITIES FOR FOREST-BASED INDUSTRIES

6.2.1 Research and Development Activities for the Forest and Logging Phases of the Industry

In view of the fact that the Solomon Islands, on the one hand, is very dependent on exporting timber products for its economic development, and on the other hand, a very small producer in world terms, it is essential that the country should have products for which demand is strong.

There are indications that supplies of low grade utility woods will always be relatively good and that prices for these products will remain low. It is species with special properties such as Teak and Ramin which are declining in availability and rising sharply in price.

It is essential for the SI that a long term strategy for the plantations to provide raw material for the future, be properly evaluated, so that the competitive position of the country be improved as much as possible.

There are a number of native species which are at present highly sought after, though supplies are limited, of which Vitex cofassus, Pterocarpus indicus, Intsia bijuga, Gonystylus macrophyllum and Schizomeria serrata are the more important ones. Some of these regenerate naturally, and some are easily propagated, but some like Pterocarpus indicus though growing rapidly in the early stages suffers from poor form.

The current Research and Development programme covers a very wide range of topics with a very small staff, and therefore, has limited scope for taking on additional work, without increasing the available resources. Some work does focus on native species and on natural regeneration, but little attention has been given to the valuable native species listed above.

Most emphasis has been on fast growing species, but it seems likely that various techniques may be developed for improving growth rate of traditionally slow growing species using genetic engineering and methods of vegetative propagation, so that some selection of valuable native species is an essential pre-requisite before more advanced research methods can be applied.

The local processing of these valuable species at small or medium scale is likely to be much easier to promote in the future, than the large scale processing of low grade utility wood.

In view of the fact that Gmelina arborea has proved a sucessful fast growing species, studies with this specie should be extended to include management as a coppice with standards system, using either selected Gmelina or even other species to be grown on a longer rotation in a matrix of Gmelina coppice.

In section 3.4.1 the need for an overall review of the plantation programme is discussed, and the outcome of such a review would also enable research priorities to be more closely identified.

6.2.2 Research and Development Activities for the Wood Processing Industry

Physical properties of the major and some minor wood species of the SI have been determined by laboratory tests conducted by the CSIRO in Australia. These properties, however, are expressed in the accepted units for hardness, toughness, etc., which are not readily usable in the woodworking industry for these data still require translation into quantities which are in turn to be expressed as industrial parameters such as feed speeds, knife-grinding angles, knife-cutting angles, etc. It has been suggested that for these laboratory test data to be more meaningful and useful to industry, the required machine settings and knife-grinding characteristics for each species tested should be given in reference to a well-known-and-used species whose machining characteristics are already known to industry and corresponding machine settings and knife-grinding specifications are already determined and widely used in the woodworking industry. This technique of expressing the results of laboratory test data is well applicable, and highly important, if the SI is to develop its secondary wood processing industry to export levels in the very near future.

As was pointed out in early paragraphs of this Report, the timber yield per unit forest area may be increased if industrial use could be found or developed for trees which are classed as "commercially-less-acceptable-species" (CLAS). Studies conducted on this aspect of the wood industry indicate that the use of mechanical stress grading techniques will enlarge the number of species acceptable for building and construction purposes to include CLAS. Similar studies should be conducted to determine which of the existing CLAS trees in the forests can be used in the furniture and joinery manufacturing industry of the SI.

Other aspects of the furniture/joinery manufacturing industry which need specific research and development efforts include:

i - screw/nail holding properties of SI wood speices: major, minor and CLAS ;

ii - abrasive (sanding) properties of SI wood species: major, nimor and CLAS ;

iii - adhesive needs of the industry peculiar to the wood species to be joined; and

iv - development of kiln-drying schedules for various species of SI timber.

When the SI secondary wood processing industry has developed to a stage at which export of finished goods is potentially feasible, research and development activities on the finishing properties of SI wood species are needed long before actual shipments of the finished goods are effected.

6.3 INVESTMENT ATMOSPHERE - DESIRABLE, WORKABLE AND ACCEPTABLE PRE-REQUISITES TO BOTH FOREIGN AND DOMESTIC INVESTORS

It has been pointed out in previous sections of this Report that the development of the secondary wood processing industry of the SI depends, to a great extent, on the influx and assimilation of manufacturing technology from sources outside the country. It must be stressed at this point that technology has to be paid for in one way or another; it is not given away free!! Furthermore, it has been the experience among other developing countries of the world that the fastest and most effective way of acquiring "new" technology, without sizable direct cash outlays, is through joint venture arrangements between the local entrepreneur and the foreign source of the "new" technology. This type of conduit for "technology transfer" is most

desirable for SI since its secondary wood processing industry is composed mostly of small entrepreneurs who most probably do not have the capability to raise the amount of money needed for the development of the industry.

Among the incentives that attract foreign investors to risk their money in developing countries are :

i - tax shields during the critical and early life of the joint-venture firm ;

ii - provisions for repatriation of profits and capital of foreign investors ;

iii - accelerated depreciation schedules ;

iv - tax incentives for the employment of foreign technicians and managers ;

v - protective tariff for selected secondary wood products ; and

vi - duty-free or reduced customs duties on importation of machinery and equipment.

The effective implementation of legislations providing for such incentives among others, will surely generate a healthy investment atmosphere that will attract foreign investors, provided that positive steps are taken by SIG to bring these incentives to the attention of potential investors.

6.4 DEGREE OF SOPHISTICATION FOR WOOD PROCESSING PLANTS

6.4.1 Sawmills

The range of equipment available falls into a number of basic types, with differing characteristics in terms of the important criteria of recovery, accuracy, versatility, capital cost, technical skills (and equipment) required to maintain saws and machines.

The development of increasingly superior technology in sawmilling has been prompted largely (perhaps solely) by log cost and availability (or more properly log scarcity) on the raw materials side and labour and material costs within the mill and a complex of market factors. The "appropriate technology" for the SI at any time will be the result of the interaction of these factors. As the balance of these factors alters, the optimum "appropriate technology" will shift, but existing mills will not be greatly modified to meet that change. New mills may

meet the optimum but are unlikely to greatly exceed it in terms of sophistication unless it is considered that the optimum will rise fairly quickly.

In the SI log costs are low. Hence there is no pressure from this source to improve recovery by way of major technological change. This will alter dramatically when plantations become the major resource for mills and stumpage values conceivably exceed harvesting and delivery costs, as they will if crop growing costs are to be recovered as stumpage.

There is no scarcity of logs. Log supply is becoming a problem in some isolated cases but this is a result of prices being offered for logs by several buyers, not scarcity. This is likely to change in some areas in the not too distant future.

Unit labour costs are low so the pressure for machines with high through-put and recovery is low. Low log costs combined with low unit labour costs do not create pressure for high recovery on the breaking down saw, so under current conditions there is little conceived need to increase headrig accuracy or through-put, hence production and recovery suffer.

There is a dearth of skills for maintenance of highly technical equipment designed to increase through-put, recovery and imensional accuracy. Of mills visited by the mission, only five had "in house" saw doctoring skills and in half of these cases the qualified man had other duties which permitted him to play only a supervisory role on a part-time basis. Millwright skills were even less available. The majority of mills are so small that maintenance equipment for the next step up in technology would probably exceed the capital cost of the present milling equipment.

The market factors of greatest current significance include an apparent willingness (created by lack of an alternative) to accept material of poor dimensional accuracy, variable moisture content, variable grade in terms of strength, appearance and stability (taken here to include acceptance of bow, spring, twist and cupping) a comparatively simple pricing structure and an apparent preparedness of the customer to do resawing.

All of these factors fail to provide pressure to improve recovery, dimensional accuracy and mill versatility (in terms of log handling to

improve grade) of existing mills. However, there are signs of this pressure rising, particularly in the case of export timbers. Producers will find an increasing need to take their products to a higher status of finish.

Some further discussion is warranted on recovery. Low reported recovery has been cited as a major concern, and seems to be the rationale for seeking technologically more advanced mill equipment. There is a view that government should control the type of conversion equipment selected, either by making selection of equipment a condition of the sawmill license or by inducements through tariff or taxation considerations. The inference is that bandsaws should be used, "because they give better recovery". In fact where bandsaws are used elsewhere they have usually been selected because they are capable of achieving greater recovery, and high recovery is considered by the investor, to be necessary for commercial reasons for raising it. Efficient use of the forest would be considered a "good commercial reason" by responsible management.

There is no doubt that bandsaws, in a given situation, if properly installed and maintained, can achieve better recoveries than cricular mills provided there is a commercial advantage to the operator in realizing this benefit. If this incentive is not present the bandmills are no better than circular mills.

Many of the mills installed in response to the government requirement to process a minimum 20 per cent of total log cut represent minimal capital cost solutions. This decision is not unreasonable from the investors' point of view, but may not be appropriate if the minimum processing requirement is increased in the future.

It would be a mistake for the government to attempt to dictate the type of mill installed, but rather should concentrate on inducements which would encourage the industry to cooperate in meeting the overall development objective. When the plantations come on stream, a radically fifferent approach to sawmill equipment can be expected because of significantly different log characteristics.

Regarding major ancillary equipment, the most important development is likely to be the introduction of kiln-drying. The industry would be well advised to keep equipment as simple as possible, consistent with achieving

the objectives. Low cost solar and small direct flue gas type of kilns have reached a satisfactory level of development to warrant serious consideration, particularly for smaller mills. A major disadvantage of the solar kilns is the time taken to dry the timber to requisite moisture contents, which could result in the need to finance a substantial inventory and would have to be compared with the higher capital and operating costs and higher level of skills required to operate conventional kilns or dehumidifiers.

6.4.2 Degree of Sophistication of Secondary Wood Processing Plants

The degree of sophistication of secondary woodworking plants to be established under any industry development programme must depend, to a great extent, on the capabilities of manpower to assimilate the level of technology proposed. Consideration should also be given to the available non-wood materials and production supplies (e.g., adhesives, paints and coatings, abrasives, etc.) and supporting services (e.g., machine shops, labour training institutes, and middle and top management training facilities).

Joint venture arrangements with foreign firms could be of great help in the choice of technology for SI woodworking plants, most possibly where the arrangements require the foreign partner to participate in the risks involved in the choice of technology.

Last, but not least, of course, the nature of the end product and the price and volume requirement that it commands in the foreign market, will also greatly influence the choice of manufacturing technology for SI woodworking plants.

6.5 FORWARD INTEGRATION OF THE INDUSTRY; INDUSTRIAL ZONES FOR SECONDARY WOOD PROCESSING ACTIVITIES

The archipelagic nature of the country together with the unbalanced distribution of the remaining timber stand versus existing primary wood processing mills make it a difficult task to rationalize the development of the country's wood and wood products industry using the concept of total forward integration of operations: i.e., from logging to sawmilling to secondary wood processing (or furniture and joinery products manufacture). At best, logging and sawmilling operations could be integrated, for

experience has shown that sawmills should be located nearest to the timber sources while furniture/joinery factories are best located near urban centers. However, there may be a case for aggregating small parcels of high value species at a centralized and specialized processing facility. This type of development could be encouraged by the application of differential physical requirements.

A more recent concept is to locate industry in industrial "zones" or "sites". Land and other infrastructural features (e.g., electric power supply, water and sewerage systems, etc.) are made available by the government at minimal costs to the locators. The major benefits to be derived by furniture and joinery plants located in "industrial sites" are :

i - minimal cost of leasing land for 30-50 years ;

ii - availability of electric power and water supply ;

iii - accessibility to road transport ;

iv - accessibility of port and harbour facilities for sea transport purposes ; and

v - better access to a skilled labour pool (e.g., electricians, mechanics, etc.).

It is suggested that the locators in such industrial sites be made eligible to some of the investment incentives discussed in the previous paragraphs of this section.

6.6 QUALITY CONTROL

6.6.1 Log Grading

In section 4.6 reference is made to the lack of proper grading of export logs. It is not clear whether grading logs by quality would result in any increase in total revenue under the present marketing arrangements, as it is argued that the average price offered reflects the mix of qualities in the parcel.

However, the end-use and likely recovery from a log is influenced by the quality so that improved grading of logs would allow better selection of raw material for any new processing capacity that might be installed in the SI.

At present logs are collected by the logging company at their shipping point, and they are generally sorted by species. The buyers may reject some logs before purchase and shipment.

Most of the obligatory 20 per cent domestic processing is done with the rejected export logs, with the result that the quality and recovery of the locally processed timber tends to be very low compared with those achieved on SI logs in Japan.

6.6.2 Sawn Timber Grading

As has been stated elsewhere in this report, quality control in sawmills is variable, but generally of a low standard. Quality control to be effective must be exercised constantly and at all stages of production. As much as possible, quality standards should be clearly defined. This makes it easier to provide instruction on standards and grading, gives a constant basis of reference, and allows for independent checking.

It is understood that there are no published "standards" in the SI, regarding the production of sawn timber or its use, except for building codes which are only applied in Honiara. There is, therefore, a need to investigate the whole question of standards. It would be sufficient to adapt appropriate standards from other countries, as has been done for the building codes for Honiara.

A programme to implement "standards" for timber production and treatment would include :

i - the preparation and implementation of timber grading rules. These rules would cover at least dimension, strength and defect and possibly moisture content. Strength grading of many species is increasingly being carried by machine but has been satisfactoruly done visually in the past. Rudes for visual strength grading would be sufficient at this stage in SI. Grading on the basis of visible defect is central to strength grading but is alsc important for many non-load bearing uses, e.g., linings, trim, furniture, etc. Moisture content is important in many applications, particularly furniture, but also most mouldings.

ii - the preparation and implementation of rules for specification of timber in use. This will be concerned primarily with the specification of

minimum grades to be used in the various structural components in housing, etc. It would also list those species with the basic properties to meet the grade requirements, and would include the requirements of durability, define minimum standards of preservation treatment required. It should be noted that this is not intended to be a "building code", but would be used in conjunction with building codes and may influence the requirements of the codes.

iii - the preparation and implementation of standards of preservative treatment. If timber preservation is to become a reality in the SI it will be necessary to define the minimum standards of treatment for various applications. In the case of treatment involving pressure impregnation using water-borne salts or prservative oils, adaptation of existing standards in other countries should be adequate, at least as an interim measure. It is more difficult to define standards for the diffusion process, as checking of the result involves complex chemical analysis. However, proven application of the process can be checked to an acceptable degree by quite simple methods.

Limited research may be required to prepare these standards but from a brief inspection of available data it is believed that the majority of background information is available now. Training in the application of the domestic standards and of grading rules for timber export will be necessary. It is likely that the costs of preparation of standards and training in their application would be borne by aid agencies.

6.6.3 Furniture and Joinery Products

The establishment of building and timber codes will simplify the formulation of standards for joinery products in the SI.

In the case of an export-oriented furniture industry, the requirements of the target foreign market will greatly influence the set of standards that should be adopted by the industry in the SI. Machining standards are normally supplied by buyers of furniture components in various stages of manufacture. Thus, definition of quality standards will not be a major problem during the early stages of the industry's development programme.

The manufacture of complete wooden furniture items in "knock-down" form, however, raises the need for the set of standards to be acceptable in

the buyer-country. And since different countries do not use the same set of standards, it will become necessary for SI to adopt a set of standards applicable to as many of its potential markets as possible. A preparatory market study should help to determine which set of standards is practicable for the SI furniture industry.

Thus, the domestic market, even at this point in time, should start specifying higher standards and quality for furniture products. This should prove highly beneficial to the proposal for the industry to engage in the export of furniture components/products if the SIG will take the lead in specifying higher standards than currently accepted in its purchases for furniture products.

6.7 TRADE/INDUSTRY COUNCILS, ASSOCIATIONS

When logs or timber products provide a substantial proportion of exports, it is important for the government to assist the industry improve its performance and quality, and at the same time to ensure that the country derives the maximum benefit from its exports.

Exporting for small companies is an expensive business, so that the temptation to sell through visiting agents, who take care of everything is very great, but greatly limits the scope for developing new markets, unless the agents are truly international.

The need for a centralized body to coordinate efforts to develop the wood industry and promote timber marketing has been raised in a number of reports of the Forestry Division, and proposals have been prepared by the Ministry of Trade, Commerce and Industry.

A number of developing countries have set up various types of such a centralized body to be responsible for the development of their respective wood industries: The Wood Industries Development Authority of the Philippines; the Timber Industry Board of Malaysia; the Trade Development Board (formerly Timber Industry Board) of Singapore, are examples. While the needs and status of the wood industry differ from one country to another, examples of experience with such bodies in Sarawak, Ghana and Papua-New Guinea which are related to the situation in the Solomon Islands, are discussed.

6.7.1 Sarawak Timber Industry Develop ~~t Corporation

In Sarawak, the Sarawak Timber Industry Development Corporation was set up in 1974 as a statutory body with representatives of industry and government to supervise, coordinate and promote the development of the timber industry. The Minister for Forestry is the Chairman and the Corporation has a full-time General Manager. As with the new Ghana Timber Export Development Board, the Sarawak Timber Industry Development Corporation mainly provides information through regular publications, both to the indigenous industry and the outside world and acts as a clearing house for information for suppliers and buyers.

New buyers seeking particular products can advertise their requirements through the Sarawak Timber Industry Development Corporation and new producers can also obtain valuable marketing information.

The STIDC also undertakes training activities for the timber trade, especially on logging and grading, so that it contributes directly towards improved standards and labour productivity.

All persons in Sarawak engaged in the manufacture of timber, its production, distribution and marketing are required to be registered with STIDC to enable the Corporation to monitor practices on the one hand and to maintain standards, and on the other to provide good data for proper planning of the industry's development.

6.7.2. Timber Export Development Board of Ghana

In Ghana the original idea was a Timber Marketing Board set up in the 1960's which declared quarterly minimum prices in advance for each category of product, and companies were not allowed to sell below the declared price. Export documentation was withheld if the declared price was not obtained. In practice, an inability to declare realistic minimum prices through a combination of bad management, lack of experience in the market and poor market intelligence meant that the declared price did not relate to current market prices, and the industry was unable to achieve adequate sales to survive.

The Ghana Timber Marketing Board has now been replaced by a new Timber Export Development Board with a remit to promote Ghana timbers and to control quality of product, but individual companies make their own sales

direct to buyers. The Timber Export Development Board provides market intelligence, undertakes market research, promotes Ghana timbers through exhibitions and presentations, and acts as a clearing house for foreign enquiries for timber products. This arrangement appears to be working satisfactorily. Its activities are reinforced by an independent Forest Products Inspection Bureau, which is concerned with quality control in order to enhance Ghana's reputation in the market.

6.7.3. Forest Industries Council (FIC) of Papua-New Guinea

Papua-New Guinea has found that the Forest Industries Council has been able to make a very positive contribution to the industry. Much of this success is due to the basis on which it exists and the responsibilities it assumes. Briefly, the conditions of its operations and functions it performs are described in the following paragraphs.

The FIC was established by Act of Parliament and its purposes are :

i - to advise the Minister for forests on matters affecting the forest industries ;

ii - to represent the interests of the forest industries to appropriate government departments and bodies ;

iii - to collect, analyze and distribute data on production and trade in forest products ;

iv - to arrange the testing of timber species for various end use applications and dissemination of results to the industry and markets ;

v - to represent the forest industry at appropriate national and international forums ;

vi - to organize promotion of forest products at national and international products displays, etc.

vii - to advise industry on operational methods, equipment selection, etc.

viii - to advise industry on matters such as log and timber grading, seasoning, preservation treatment, packaging and general product presentation and to provide operational training where appropriate ;

ix - to represent the industry on technical (i.e., trade and operator) training matters ;

x - to provide market information and contacts ; and

xi - to promote self regulation of industry by registration of approved companies and organization on the basis of competence, ethics, etc.

The Council consists of representatives of industry, appropriate government departments (including Forests, Public Works, etc.) and statutory bodies (e.g., National Investment Corporation). Members are appointed by the Minister, in the case of industry representation, recommendation by the Forest Industries Association. At least one position is reserved for "small" producers. Industry representatives constitute a majority on the Council.

The Council is financed entirely by a levy on industry which is based on log volume cut. This levy is compulsory and is enforceable under the Forest Industries Council Act.

The Council employs a full-time Secretariat and has authority to determine staffing and remuneration of its employees. It has many of the authorities and responsibilities of a corporate body. Its books are subject to audit by the Auditor-General or commercial auditor nominated by the Auditor-General. The Council participates in reviews of the minimum export price for log exports, review of log royalties, negotiation of shipping rates, etc. (through its representation on the Papua-New Guinea Shippers Council).

The Council represents logging, processing and furniture manufacturing interests.

6.7.4. Proposed Wood Industry Development Body for the Solomon Islands

Based on the need established elsewhere in this Report (see sections 4.2, 4.3, 4.6 5 and 6) and on the foregoing paragraphs, a central body to be responsible for the implementation of the development programme for the wood and wood products industry of the SI, is justified.

A more detailed description of the composition and functions of an appropriate body is given in Annex VIII.

6.8 PARTICIPATION BY SOLOMON ISLANDS CITIZENS IN THE INDUSTRY

6.8.1 Background

The SIG has clearly stated, as an objective of its National Development Plan (NDP) 1985-1989, that it will "promote greater self-reliance and local control of the national economy" (NDP 2.4(Cc)). The NDP(2.8) expands on this objective to include "encouragement, support and fostering of indigenous entrepreneurship", and cites as an element of the national development strategy (NDP3.4(b)) its intention of "providing an environment conducive to increased private sector investment ...."

However, all of the above is qualified by the objective of "ensuring those values and principles which provide strength in traditional society are preserved, promoted and adapted to the present day situations and changing those no longer relevant". Many of the characteristics required for success as an entrepreneur, particularly stringent financial control and "man" management, and the single-minded pursuit of financial success, are not strongly developed in Melanesian culture and in fact may be quite contrary to it. It is difficult to find a "group" with similar motivation, when that group is determined by clan ties rather than ambition. It is difficult in the SI to engage in large-scale activities based on customary owned land, or investments requiring large capital, except with the paticipation of the clan.

This "cultural" aspect is not recognized as a possible constraint on development or of citizen participation at the entrepreneur level in Chapter 19 of the NDP. Conflicts of interest between cultural needs and business development needs are inevitable, they are occuring now. Resolution of this conflict is probably the greatest challenge the SI faces in its quest for successful entrepreneurial business development by citizens.

Many businesses have been established to serve the needs of a community, e.g., a village or a clan. The failure rate is high, because the needs of the community are paramount, not the needs of the business. Perhaps some distinction should be made between "private" investments which have a strong social purpose, and those with a definite profit motive. The former undoubtedly have their place, and may in time be a better foundation for on-going national development, but the latter will probably

more rapidly achieve the economic objectives of the NDP, provided finance can be made available.

6.8.2 Participation as Forest Owners

Until recently forest harvesting was concentrated on government-owned land. In effect the participation by the citizens was indirect. Forest operations are increasingly dependent on "customary" owned land. Paticipation as forest owners is now direct, and the success of the sector is heavily dependent on the performance of SI citizens as forest owners. The record is not promising, as is evidenced by the failure of North New Georgia Timber Company to sustain operations of Levers Pacific Timbers. To attract competent and "honourable" investors prepared to risk the large sums of money necessary for viable forest operations, requires a resonably confident expectation of unimpeded access to the forest. If SI citizens are to continue to participate in the industry as forest owners, even in the short term, it will be necessary to accept moral obligations as well as legal responsibility for their actions, which may include substantial claims for damages in the event of breach of contract. Further implications of this are dealt with in paragraph 6.8.5.

Of greater concern for the future of the industry, is the failure of the forest owners to invest a substantial part of the proceeds of the sale of the capital asset represented by the forest, in income producing assets. It merely provides the opportunity for such development. Much of the royalty paid to forest owners is spent on consumption of non-durable goods and services, as often as not imported. The opportunity to mobilize the wealth contained in the forest, for further development, is therefore lost. From a national viewpoint, it would be better that at least a portion of royalties be held in trust to be invested in financially sound ventures or in financial institutitons, to ensure on-going income. Such a trust would be best managed by people or organizations which are competent to do so and have some legal liability for negligence in the administration of the trus. There is a strong tendency to blame forest harvesting companies for the failure of land owners to make provision for enduring development. The failure is mainly in the conditions governing the sale of timber.

The future participation as forest owners may be best achieved by requiring that some land use suitability assessment be carried out in areas to be

harvested, and plans for some form of reforestation be agreed before harvesting commence. As proposed by Fraser (1980), funds collected in the form of the reforestation levy could be used to subsidize reforestation activities. The government would need to provide sufficient staff to monitor the programme and ensure that the area was sustained as a forest, possibly with legal recourse to recover the funds if the area was not maintained for the prescribed purpose.

6.8.3. Participation as Contractors

This would seem to be the most promising route to larger business activity in view of the present constraints of financial capacity and management skills available. Progression from a very small business as, e.g., a felling contractor, to ultimate ownership of an entire log extraction and hauling operation is possible, if strict financial control and sound personnel management is exercised. As indicated above, there may be some cultural difficulties, but there is an awareness of the problems and it is believed that the necessary discipline is developing and could be expected to accelerate. Thus, the early stages may be frustratingly slow and there will almost certainly be failures. However, once a sound core of contractors is developed, contracting of forest harvesting operations could be expected to spread rapidly with sporadic progression to larger businesses.

Physical and technical skills may be sufficient now to warrant a number of current logging company employees to be considered for engagement on a contract basis. Capital requirements can be kept quite low initially by restricting the size and nature of the contract. As management skills develop and profits are accumulated, a step up the business ladder could be contemplated. Experience elsewhere suggests that logging companies may be prepared to assist small contractors by helping with records and reserving in a proper manner, income to be applied to capital replacement and possible growth. "Labour only" contracting is a possibility in some activities, e.g., ship loading, with little outlay for working capital. The potential list of these service type activities is extensive.

It must be recognized that a number of commercial dangers do exist. A company reliant on contractors with poor management skills is at risk. Some provision may, therefore, be necessary to allow the company to step

in if contractor performance causes the company additional commercial risk. Demurrage on vessels, lack of logs for a sawmill (which affects marketing as well as cost of production) and quality control are examples.

6.8.4 Participation as Industry Owners

There are now a number of sawmills owned by either individuals or co-operatives or other groups. Success is mixed, and while lack of mechanical skills is the most frequently quoted scapegoat for failure, the reasons are more likely to be a lack of financial control and marketing. Most of these enterprises are large enough to employ at least a moderate level of mechanical skill. Financial and marketing skills are more expensive and very much harder to find. These are the areas where greatest long-term assistance will be required. Mechanical skills, saw-doctoring and general mill maintenance can be more readily imparted and periodically checked.

Down the line processing into furniture and joinery is now carried out by local companies, but as detailed elsewhere, operations are small and quality is rather low. These types of operations need an infusion of machining and cabinet making skills, design assistance, capital and management and marketing skills. Entry into export markets will not be possible until these deficiencies are rectified. The domestic market is so small that any rapid growth is dependent on export development.

Development of a viable industry, contributing to export earnings is now largely the responsibility of foreign investment. Lack of domestic capital and technical, managerial and marketing skills, suggests that citizen participation may be best achieved through joint venture.

The most important decision to be made is the selection of the foreign partner. There is a tendency to seek "new" investors for this purpose rather than approaching existing operators. In other countries this has frequently attracted "promoters" rather than "operators", particularly in logging activities, with detrimental effects on the industry. A proven "track record" in the particular type of activity with heavy emphasis on technology, financial strength and marketing, should be a prime requirement. This decision is far too important to be left completely to inexperienced land-owners. The actual mechanism of selection of foreign partners is beyond the scope of this Report, but government would be well

advised to play a guiding role and to seek external advice on "new" investors and the terms of the proposed venture, until "in-house" assessment skills are developed.

The joint venture may take many forms and it would be unrealistic to propose some "formula" to which all ventures must conform. The local partner has little to contribute in the way of capital or skills so it would be usual to expect them to commit forest resource or the use of land to purchase equity over a period of time. In this context, selling standing trees or receiving rental for the use of land is not a "contribution". Participation only as shareholders should be avoided, as it is unsatisfying and may eventually lead to distrust and disruption of the venture. It is of utmost importance that the local partner be exposed to the decision making process, so that reasons for decisions taken by management, which will be almost invariably foreign, are understood. It may be advisable to have independent people with solid business experience, on the board of directors to obtain balance, providing an impetus for the board to make decisions which are in the interest of the company rather than one or other group of shareholders.

6.8.5 Sources of Finance

Participation in any industry requires contribution of finance or some skill or asset. Customary land ownership has been cited as the major inhibitor of development in Melanesian countries. This may also be said of citizen participation in development. The difficulty lies not in the "ownership" per se but in the inability, under existing finance security requirements, to mobilize the wealth that is represented in the land. In most "capitalistic" or "mixed" economies, land is a readily marketable asset. It has, therefore, been possible to mobilize this wealth for investment in income producing ventures, including development of the land itself. This is not the case in Melanesian countries, which do espouse a mixed economy philosophy.

Solution of this problem will do much to promote development and will greatly increase citizen participation in that development. It is clear that the people wish to retain customary land ownership, because of the social benefits the system provides. But if they want development and wish to maximize their participation, they must recognize the need to

satisfy the security requirements of banks and other financiers. The possible means of achieving this could be discussed at great length, but this report is not the place to do so. Obviously, detailed consideration of all the options by the Solomon Islanders is required. External assistance in analyzing the financial and other implications may be required but the solution must ultimately come from Melanesian society itself. Perhaps a starting point might be that the people, represented by the state, should underwrite or guarantee any loans raised on the security of land or forest with appropriate penalties for defaulters. While this would appear to risk the national economy, the growth it would stimulate would tend to improve that economy. The key, of course, is to support investments requiring such action, only when the profit potential is good and the risk is low. Selection of the foreign partner will be crucial to obtain the protection of a competent assessment of the venture, and competent management.

More immediate financial assistance to local investors is available or potentially so. Logging companies may be prepared to assist very small contractors directly, e.g., a felling contractor, by financing equipment, perhaps two saws and minor tools. They may even be prepared to finance contractors with "track records" into logging equipment, by selling existing plant, but the purchase of new plant would need to be financed from other sources.

Log royalties have been used in some cases to finance plant and equipment, and this would seem to be an excellent method, partly because payments can be deducted at source, partly because it may deter flippant interference with operations, but primarily because it establishes the link between sale of one asset and the purchase of another.

Financial institutions and government will undoubtedly be called on to finance the bulk of industry participation by Solomon Islanders, whether directly or through some system which allows the use of land or forest as security. The past record is mixed. Comments (Forest Division Annual Reports) indicate that loan repayment performance on small sawmills some years ago was good, but current information discloses some fairly substantial failures. While the full details of these were not available to the mission, inadequate project appraisal and monitoring appear to be

the prime cause. The banks in the SI are unlikely to be in a position to have "in-house" knowledge of the broad range of businesses which are seeking finance but it is possible to obtain a quick, rough check on the likely viability of an operation for which finance is being sought, by getting comment from senior operational and financial executives of existing companies. Sufficient confidentiality can be maintained provided the information is treated sensibly and reputable executives are chosen.

VII. CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

The manufacture of more advanced forms of wood products is indicated if SI desires to optimize its revenues from forest-based industries. Further development of the furniture and joinery industry of the country will necessarily be export-oriented because the domestic market is small. Entry into the export market, however, requires a continuous and adequate supply of the industry's primary raw material input - sawn timber. Current conditions in the SI forest, log extraction and sawmilling industries, however, do not even allow any reliable prognostication of the wood species and corresponding quantities of logs (and sawn timber, consequently) that could be expected to be produced within the next five years. This situation is a minus factor for any endeavor to enter the export market for furniture and joinery products. Among other things needed, such data is required to evolve a rational plan of action which will determine what product types and quantities could be commited by the SI furniture and joinery industry, if ever it is going to be developed to export-oriented levels.

The UNIDO mission found that the following conditions and practices contributed to the present undesirable situation in the wood industry of the SI :

7.1.1 Policy/Planning/Legislation

(a) Preliminary studies indicate that only two or possibly three islands still have commercial timber stock. The timber resources on the other islands are either cyclone damaged or will shortly be exhausted and logging operations should not be allowed to continue in those islands after that point is reached to avoid endangering the forest. The use, therefore, of a national average for the remaining years of timber resource life of the country is misleading and any development policy based on such a national average will result in problems of raw material supply shortages (see Figure 1).

(b) The "Development Plans" for the industry has so far been evolved or implemented without the support of market research or an analysis of possible benefits (including intangible ones) to the economy of the country.

(c) The implementation of the minimum 20 per cent local processing and the intention to increase this further in "National Forest and Timber Policy, 1984" has been introduced without adequate consideration of the implications for the government and industry in terms of monitoring performance, developing markets and products and setting-up the necessary institutional framework to achieve the over-all objective. Many of the mills installed in response to this requirement represent minimal capital cost solutions and may not be appropriate for extending the policy on local processing.

(d) Logging operations require heavy investment in roading, which at present tend to be laid out for the convenience of logging companies. There is scope for greater integration of the forest road network into long-term roading plans for Provincial and State Governments.

(e) Up-grading of the sawmilling industry and development of the secondary wood processing industry are both indicated if the country wishes to benefit from the added value on wood and wood products. These up-grading and development activities will require technical and financial inputs which are not available within the SI.

(f) Enforcement of laws, rules and regulations covering the extraction, reforestation, processing and promotion and marketing of wood and wood products in the SI has been ineffective due to lack of trained personnel, inadequate funding and the absence of coordination among the various government and industry organizations.

7.1.2 Resource Allocation

(a) Current ad hoc approach to licensing operators who succeeded in reaching an agreement with customary land owners is in-

consistent with existing national regulations and the extraction of timber from the forests.

(b) Available timber resources have not been fully considered in the issuance of licenses with the result that several major licensed operators are facing impending shortages of raw materials.

(c) The control of logging is at present done only on a volume basis, which is a major reason why so little is known about the remaining resource. No records are kept of the area logged, nor of the volume harvested per unit area, to compare with the original inventory estimate. The harvesting needs to be controlled on an area basis so that wasteful practices can be identified, and closer watch kept on the residual resource to avoid sudden unforeseen shortages of logs arising in the future.

(d) The undertaking of a detailed and complete resource inventory has not been a pre-requisite for the issuance of licenses for commercial timber harvesting, nor has the registration of land been required as a means of avoiding distruptive land disputes after operations commence.

7.1.3 Resources Control/Security

(a) The long term sustainability of the resource and the industry is being jeopardized by inadequate investment in regeneration. Only 20 per cent of the forest being cut down is replanted and inadequate attention has been given to the future utilization of the plantation resource, in determining the size of projects, areas planted and species used.

(b) Reputable companies are discouraged from investing in the SI wood industry on a long-term involvement due to the effects of insecurity and uncertainty of legal jurisdiction over certain traits of land caused by the existing "customary land" ownership system.

(c) As more forest is cleared shortages of products needed for local development will become apparent. In order to avoid this, more emphasis needs to be placed on local small-scale plantations and

agro-forestry activities, especially in logged-over forest near habitations. These should concentrate mainly on building materials, fruit trees and fuel, but could also include some quality timbers for the long term, which would benefit from the more intensive management that would be possible. The results of the new agro-forest project, at Malaita should be carefully monitored and extended elsewhere.

(d) There is a serious anomaly at present with regard to the issuing of licenses for Foreign Investment since these are issued to companies interested in investing in logging operations without prior clearance of the proposed operation by the Forest Division. This makes it very difficult for the Forest Division to impose conditions upon the licensee.

7.1.4 Statistical Base

(a) Available industry data are unrealistic and/or inaccurate as a result of the laxity in enforcing national regulations on periodic operations reports from licensed operator and is further aggravated by under-trained personnel and/or under-manned government offices responsible for the enforcement of such regulations.

(b) The basis of the national statistics on the timber industry is inadequate for effective use in evolving national policies and in monitoring the performances of the industry.

7.1.5 Processing Industry, Marketing and Training Deficiencies

(a) The existing combination of low quality, inappropriate sawmilling equipment and design, and restricted market conditions limit the recovery of sawn timber suitable for export and secondary processing.

(b) The performance of the sawmilling industry and the efficiency of its resource utilizations appears to be even worse than the statistics indicate because of the large discrepancies between sawn timber production and sales. As much as 20 per cent of output is unaccounted for.

(c) The furniture and joinery industry in the country is predominantly still in the "artisanal stage". Except for one factory located in Guadalcanal island, the production technique could still be considered as primitive and is based on "artisan" methods of fabrications.

(d) The combination of the use of insufficient seasoned wood, inappropriate organization and use of machines and production materials, and inadequate training of management and shop-floor level supervisors limit the quantity and quality, and raises the cost of the output of the secondary processing sector, thus inhibiting both domestic and export sales.

(e) The rattan furniture industry is highly dependent on imported materials and plastic-coated rattan strips, in spite of the availability of rattan materials in the forests of the country.

(f) The training facilities of the SI College of Higher Education should be used as the nucleus for a national training programme for the primary and secondary wood industry sectors. This will require substantial development of training modules, training facilities and teaching staff, to allow proper training of industry personnel in: log and lumber grading and scaling, saw doctoring, basic woodworks production operations, knife-grinding and other tools maintenance techniques, quality control in furniture and joinery manufacturing, production management, and such other topics required by modern industrial production operations.

(g) There is no organized selling or marketing activity for the wood and wood products of the country. This could be the reason why SI wood products are priced lower than competitor's products in the foreign market.

(h) The apparent willingness of the domestic timber market to accept material of poor dimensional accuracy, variable moisture content and variable grading quality is encouraging the persistence of poor standards in the primary industry.

(i) There is a great variety of equipment types and brands in what is a very small industry. This naturally leads to difficulties in obtaining spare parts "off the shelf" in the country. It is understood that a proposal to restrict the number of "brands" of motor cars and light commercial vehicles is being considered by government and has been suggested for wood processing plants. Standardization of brands of sawmill plant and equipment would have little if any effect because the manufacturers are rarely represented in the country. A great danger is the creation of virtual monopolies with the possibility of no improved service. Application of this concept to the furniture and joinery industry will be disastrous, if not impossible.

7.1.6 Industry Regulation

Mill outputs are not related to license volumes as there is minimal government monitoring activities of the sawmilling industry.

7.1.7 Reforestation Levy

The funds raised through the Reforestation Levy have not been fully utilized for financing reforestation operations and the surplus is not being accumulated to finance future activities. No financial support has as yet been made available from the Levy funds to the private sector for reforestation.

7.1.8 Infrastructure

The coastal shipping trade is unable to provide adequate service for the development of a decentralized timber processing industry. The lack of a consultative committee to advise government has meant that the Marine Division and the Ports Authority do not get formal comments by a representative from the users and supplier of shipping services.

7.2 RECOMMENDATIONS

To achieve successful development of the primary and secondary wood industries in the SI a large number of inter-related activities need to be carried out, and decisions taken based upon the outcome. Omission or delay in the implementation of any one of the activities will seriously jeopardize or

even nullify the effects of the others and thereby prevent the over-all development objectives from being achieved.

It is, therefore, recommended that the government should take the necessary steps to formulate a clear medium-term development strategy for the sector, which will determine in detail the action needed for its implementation. In order to formulate this strategy certain preliminary actions should be indicated, aimed at establishing a sound data base for the planning work, and the institutional framework to mobilize the government and the industry representatives for taking part in and contributing towards the planning process.

In view of the fact that the life of the remaining resource is limited, it is strongly recommended that the current moratorium on new commercial logging licenses be extended, until such time as the Development Strategy is formulated, and this should apply also to the unutilized resource previously committed to LPT.

Figure 3 below, sets out the inter-relationships between the targets that the government should aim for, and the necessary activities required to achieve them. Some activities require to be initiated at once in order to allow progress towards achieving the first target of an agreed Development Strategy, while other activities can only be fefined in detail once the Strategy is in place. Part of the Strategy formulation will involve in determining the scope of future activities, e.g., in the case of training of industry personnel in both the primary and secondary sectors, which can only be broadly indicated as an essential activity at this stage, while details of numbers and types of trainees will be determined according to the strategy finally adopted.

The recommendations which follow are, therefore, divided into those requiring immediate implementation and those which will follow the adoption of a Strategy and a decision to proceed with its implementation.

The task of formulating a Development Strategy is complex, and would benefit from the support of computer-based analytical facilities which allow the implications of several options to be examined before reaching a final decision. The government should, therefore, consider seeking external aid to help in the technical and economic aspects of the Strategy formulation.

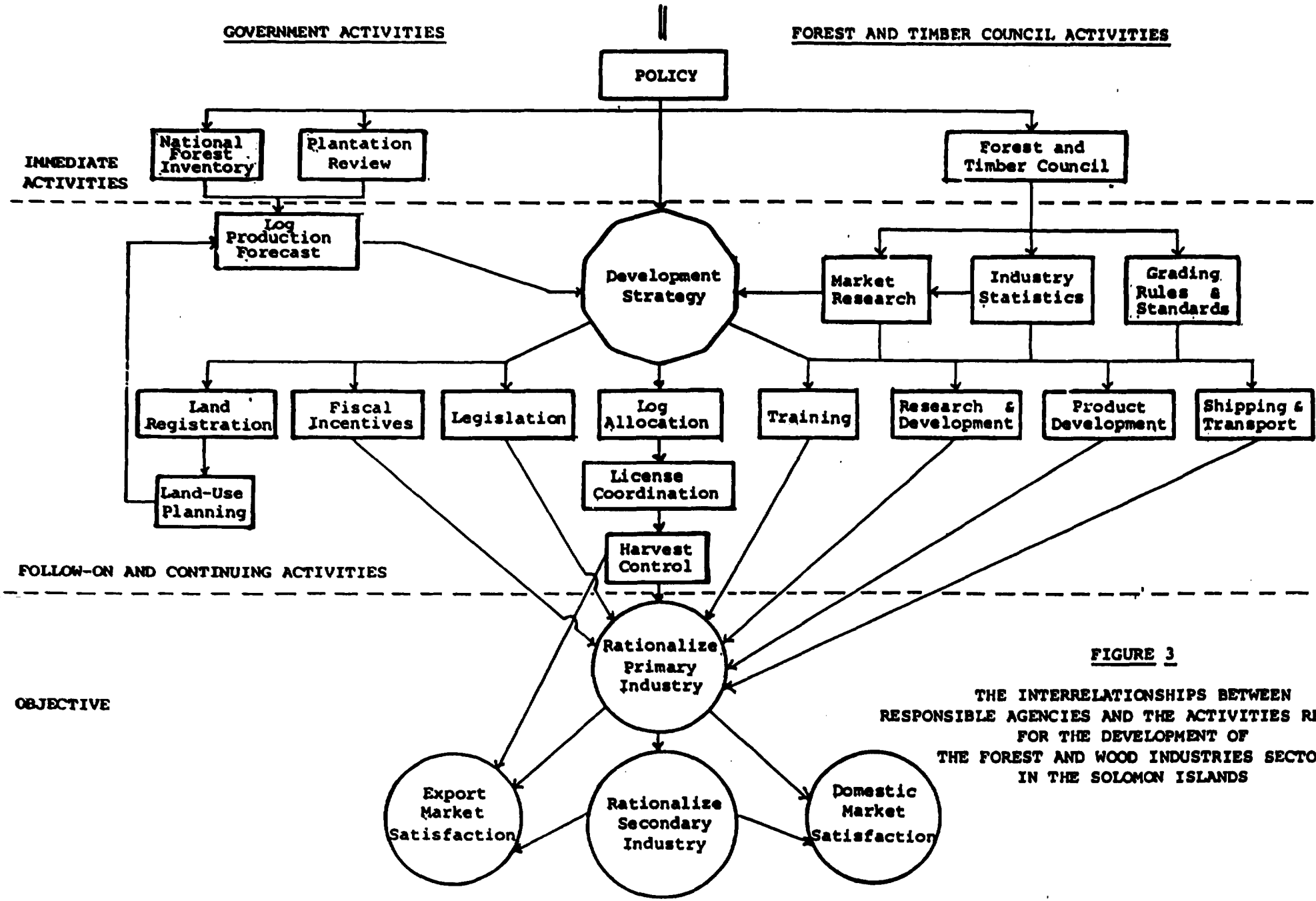

FIGURE 3

THE INTERRELATIONSHIPS BETWEEN RESPONSIBLE AGENCIES AND THE ACTIVITIES REQUIRED FOR THE DEVELOPMENT OF THE FOREST AND WOOD INDUSTRIES SECTOR IN THE SOLOMON ISLANDS

7.2.1 Immediate

7.2.1.1 National Forest Inventory

An inventory of the potentially commercial forest resource should be carried out urgently in order to develop a coherent strategy for utilizing the remaining resource to the best advantage, and for the preparation of forecasts of future production. The current proposals for an inventory by ADAB (see Annex IX) should be reviewed to ensure that it will provide suitable local level results which can be used for detailed planning and forecasting purposes, and in particular that it will include measurements of minor species, especially rattan, of the amount of natural regeneration present, and records of clear ownership (see further details in Annex IV).

7.2.1.2 Plantation Review

A comprehensive review of the achievements to-date of the plantation programme should be undertaken, in order to produce medium-term production forecasts of production by species and size assortment, with a view to orienting future plantation programmes towards the creation of sufficient quantities of specified timber resources for the sustenance of the anticipated wood processing industry in the future.

7.2.1.3 Log Production Forecasts

From the results of the National Forest Inventory, and the Plantation Review a medium term forecast of production should be produced, which sets out the level of production which can be sustained over a prolonged period, by species group and size assortment, to provide a basis for the rational development of existing and new processing capacity. The log production forecast should be regularly reviewed, and should also take account of the methods to be used for regenerating the forest.

7.2.1.4 Forest and Timber Industry Council

A Forest and Timber Industry Council should be established by Act of Parliament to confer on it an official status. The Council should be composed of representatives of industry and government and its purposes should include provision of advice to the Minister of Natural Resources on matters affecting forestry and forest industry, promotion of forest products, representation of the industry in

national and international fora. It should encourage self-regulation of the industry and provide a statistical service for the industry. (See Annex VIII for further details.)

7.2.1.5 Market Research

Market research and product promotion on both the national and international level should be addressed by the Forest and Timber Industry Council. The service to be provided should be as comprehensive as funds will allow and include a basis for prudent development.

7.2.1.6 Grading Rules and Standards

Log and sawn timber grading should be introduced without delay. This will require preparation of appropriate rules. A guide to the specifications of timber in construction should be prepared and the government should require that all timber used in construction financed by government or overseas aid agencies should use only graded lumber. Standards should be established for manufacture of furniture and joinery products and government should insist on these standards being met by all suppliers to government.

7.2.1.7 Preservation

All timbers used in government and foreign aid financed construction must be treated. This mandatory treatment policy should also be applied to construction projects funded by para-statal firms. Government financial institutions should be advised of this policy and encouraged to require similar mandatory wood treatment conditions for construction projects funded by them.

The appropriate system of preservative materials and preservation technique should be determined on a "case-to-case" basis with a view to attaining the most economical and effective results of the activity based on the specific conditions and operations parameters that exist in each case.

7.2.2 Follow-on and Continuing

7.2.2.1 Log Allocation

On the basis of the log production forecast the optimum utilization of the logs between direct export and local processing should be determined in the light of the overall development strategy for the species and quality of the logs expected to become available.

7.2.2.2 Licensing Coordination

In order to ensure that the production forecasts are attainable, and are achieved to the extent that market conditions and other external factors allow, the granting of foreign investment licenses, commercial logging licenses, sawmilling and industrial licenses must be co-ordinated between the various departments responsible, so that overall development strategy for the sector is realized and is not distorted by anomalies broght about by *ad hoc* licensing.

7.2.2.3 Harvest Control

The control of logging is at present done only on a volume basis, which is a major reason why so little is known about the remaining resource. No records are kept of the area logged, nor of the volume harvested per unit area, to compare with the original inventory estimate. The harvesting needs to be controlled on area basis, so that wasteful practices can be identified, and closer watch kept on residual resource to avoid sudden unforeseen shortages of logs arising in the future.

7.2.2.4 Land Registration

The granting of license for the commercial exploitation of timber resources should be made conditional upon the prior registration of the land, so that harvesting, regeneration and other land-use plans can be implemented without disputes over ownership and responsibility. The owners would be responsible for ensuring that regeneration obligations required in the license are met, but this should be assignable to third parties.

7.2.2.5 Land-Use Planning

Once land is registered, it should become conditional for the granting of commercial logging licenses that a land-use plan for the licensed area be prepared and followed. All land not proposed for clearance for agriculture or for the establishment of tree plantations or other acceptable use which is approved for logging, should prescribed for natural regeneration, and harvested in such a way that the forest is able to regenerate with commercial species within a reasonable time frame. The land-use plans should also designate areas to be reserved for protection, conservation, scientific and other purposes.

7.2.2.6 Policy and Legislation

The Forest and Timber Policy (1984) should be reviewed with a view to making it more comprehensive and to remove matters for executive decisions. All legislation pertinent to the implementation of Forest and Timber Policy and of the Development Strategy should be reviewed to ensure that the authorizations necessary are contained in legislation administered by the appropriate executive branch of government.

7.2.2.7 Research and Development

The research and development programme necessary to provide the technical information which is required in formulation of the Development Strategy and in product development, promotion and marketing should be commenced without delay. External assistance will be required for the bulk of this work and should be sought as soon as the Forest and Timber Industry Council has been able to consider a programme.

7.2.2.8 Fiscal Incentives

(a) The government should, if necessary with external assistance, explore the implications of extending financial incentives to influence the type and location of industry established and the contribution of industry to development of infrastructure for further use and extend those incentives where required.

(b) It will help to encourage foreign buyers patronize SI products if the government assists in the development of an SI image as a reputable and dependable supplier of secondary wood products. The SIG, therefore, should assist in setting up an export financing guarantee system, to help assure delivery of foreign orders for SI wood products.

7.2.2.9 Training

(a) To help up-grade the level of training in the forestry sector, the government should make it a condition of issuing licenses that a specified number of candidates be sponsored by the licensee for a certificate at the SI College of Higher Education.

(b) It is recommended that the foundations for an on-going training programme for plant operators and tradesmen be laid as a matter of urgency, and training commenced. Initial emphasis should be on the primary processing sector but extended to secondary processing as soon as possible.

7.2.2.10 Shipping and Transport

(a) The creation of a consultative committee to advise government on coastal shipping matters is required to rationalize coastal shipping services and provide impetus for port development in order that a decentralized industry such as sawmilling may provide a more economic service to the wood using industry.

(b) The industry should seek to make the available vessels and equipment efficient rather than trying to hold to out-dated handling methods, with maximum efforts on product market, as well as engineering solutions.

(c) The SIG should encourage and support current activities to design, construct and operate small vessels that can be beached on loading and discharge. Other features of the small vessel design should include: on-board cranes; sufficient hatch and hold dimensions to allow the vessel to carry either "packaged" or "piece" cargoes. In other cases where travel can be totally in protected waters, the use of small barges (shallow draught "river truck" type) should be explored; encouraged and supported, if found useful.

7.2.2.11 Product Development

Market research will reveal the avenues for product development that should be pursued. This will be a continuing process.

7.2.2.12 Activities for Conditional Immediate Implementation

Although it is indicated in Figure 3 that certain events or activities should precede the rationalization of both the primary and secondary

sectors of the industry, some of these activities may be implemented even much earlier than scheduled. Among others, the following activities may be initiated earlier than indicated in Figure 3 provided industry conditions and funds allow them to be implemented :

(a) Setting up and adoption of grading rules for logs and sawn timber ;

(b) Adaption of a timber building code ;

(c) Up-dating the training facilities and staff at the Solomon Islands Institute of Higher Education along an industry-oriented approach ;

(d) Training of key industry personnel in machinery and equipment maintenance and repair techniques ;

(e) "Saw doctoring" for the sawmilling industry and cutting tools maintenance techniques for furniture and joinery manufacturing operations ;

(f) Development and introduction of small volume timber seasoning equipment and operating techniques, such as solar kiln-drying and the wood fired, flue gas heated kiln-drying systems ;

(g) Study tour for key industry personnel to acquaint themselves with modern woodworking manufacturing techniques and the requirements of foreign markets for furniture and joinery products or their component parts ; and

(h) Rationalization and development of the SI rattan furniture industry as recommended in Annex VII.

-----oOo-----

ANNEX I-A

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

PROJECT OF THE GOVERNMENT OF THE SOLOMON ISLANDS

Assistance to the wood processing industry

JOB DESCRIPTION
SI/SOI/86/002/11-01

Post title	Wood resource specialist
Duration	Two months
Date required	As soon as possible
Duty station	Honiara
Purpose of project	To assist the government to formulate a plan to develop the wood processing industry based on existing data and its analysis.
Duties	The specialist shall be a member of a team of three, comprising also specialists on primary and secondary wood processing industries. Together with the Government counterparts, the specialist will be expected to:

- Appraise the existing reports on the raw material situation;
- Study the concession and plantation policy;
- Assess the technology used to extract the logs, the equipment used and the skills available;
- Estimate the potential for improvement of yield of the forests;
- Assess the local and export markets for logs and estimate future trends;
- Appraise the existing training facilities.

Based on the above, and in collaboration with the other members of the team and the Government counterparts, prepare a report that will incorporate a plan for the development of the country's forest resources and its wood processing industry, recommending the measures that will have to be taken by the industry, the Government and possibly also international organizations to ensure the timely implementation of the plan. ..../..

Applications and communications regarding this Job Description should be sent to:

Project Personnel Recruitment Section, Industrial Operations Division
UNIDO, VIENNA INTERNATIONAL CENTRE, P.O. Box 300, Vienna, Austria

V.81-33106

Qualifications: Forester or forest economist with considerable experience in planning development of the forest sector. Experience in developing countries and tropical forestry necessary.

Language: English

Background information:

Forests cover some 2.4 million hectares of the Solomon Islands but about 200,000 to 250,000 hectares are exploitable using current logging techniques. Logging activities have been going on since 1966. In 1984, logging activities have risen to an estimated 10,000 hectares per annum.

It was estimated in the late 1960s and early 1970s that the total accessible volume of timber available from the forest resources was about 10,000,000 m^3. However, due to cyclones, shifting cultivation and logging operations it is not known for certain what area of forest remains. The logging industry is dominated by some nine or ten companies. These companies operate mainly in the Western Province and on Guadalcanal. The total production and export of logs has been rising steadily over the last five years to 455,000 m^3 in 1984. Export of logs alone have risen steadily over the last five years to 417,000 m^3 in 1984.

In December 1984, there were 41 registered sawmills operating throughout the Solomon Islands ranging from chainsaw slabbers to static mills. Only 16 of the registered mills produced sawn timber of which four produced over 75 percent of the timber required for the domestic market. The forestry sector's contribution to the national economy is quite significant. In 1983, it contributed 28 percent of the total export earnings of the country. The sector accounts also for about eight percent of all formal employment in the country in the same year.

In the National Development Plan, 1985-89, the Government intends to lay emphasis to develop industries based on local raw materials. Special emphasis has been laid on increasing the quality, output and range of wood products and improve their efficiency. It is also envisaged that by modernization, diversification and expansion of wood processing industries, the country will be able to earn more foreign exchange by exports. The Department for Industrial Development, Ministry of Commerce and Industry has made several studies on resource inventory and the possibilities of developing the wood processing industries. However, the department now has to sub-

mit a consolidated report to the National Planning authorities justifying the development of the sub-sector. This would ensure allocation of resources out of the National Development Plan to launch an integrated programme for the development of the wood processing industries in consonance with the development priorities of the Plan.

The Ministry for Commerce and Industry therefore requested UNIDO's short-term assistance for formulating a coherent plan of action for the development of the sub-sector. As the draft of the National Development Plan, 1985-89 has already been delayed in its finalization, the report is to be prepared on an urgent basis.

ANNEX I-B

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

PROJECT OF THE GOVERNMENT OF THE SOLOMON ISLANDS

Assistance to the wood processing industry

JOB DESCRIPTION

SI/SOI/86/002/11-02

Post title Specialist in primary wood processing industries.

Duration Two months.

Date required As soon as possible

Duty station Honiara

Purpose of project To assist the Government to formulate a plan to develop the wood processing industry based on existing data and its analysis.

Duties The specialist shall be a member of a team of three, comprising also specialists on wood resources and secondary wood processing industries. Together with the Government counterparts, the specialist will be expected to:

- Appraise the existing reports on the primary wood processing industry.
- Assess the technology used to produce sawnwood, chips for pulping, veneer and wood based panels and the skills available.
- Assess the concession policy and procedures whereby the mills are assured their raw material supply.
- Assess the local and export markets for primary wood products and estimate future trends.
- Study the problems facing the industry with respect to import of equipment, spares, etc.
- Study investment incentives for foreign firms.
- Study the transport possibilities for the shipment of logs and primary wood products overseas.
- Appraise the existing training facilities.

Based on the above, and in collaboration with the other members of the team and the Government counterparts, prepare ..../..

a report that will incorporate a plan for the development of the country's forest resources and its wood processing industry, recommending the measures that will have to be taken by the industry, the Government and possibly also international organizations to ensure the timely implementation of the plan.

Qualifications: Wood technologist or engineer with considerable experience in planning the development of the primary wood processing sector. Experience in operation and management, at policy making level, of primary wood processing industries in tropical countries desirable.

Language: English

Background information:

Forests cover some 2.4 million hectares of the Solomon Islands but about 200,000 to 250,000 hectares are exploitable using current logging techniques. Logging activities have been going on since 1966. In 1984, logging activities have risen to an estimated 10,000 hectares per annum.

It was estimated in the late 1960s and early 1970s that the total accessible volume of timber available from the forest resources was about 10,000,000 m^3. However, due to cyclones, shifting cultivation and logging operations it is not known for certain what area of forest remains. The logging industry is dominated by some nine or ten companies. These companies operate mainly in the Western Province and on Guadalcanal. The total production and export of logs has been rising steadily over the last five years to 455,000m^3 in 1984. Export of logs alone have risen steadily over the last five years to 417,000 m^3 in 1984.

In December 1984, there were 41 registered sawmills operating throughout the Solomon Islands ranging from chainsaw slabbers to static mills. Only 16 of the registered mills produced sawn timber of which four produced over 75 percent of the timber required for the domestic market. The forestry sector's contribution to the national economy is quite significant. In 1983, it contributed 28 percent of the total export earnings of the country. The sector accounts also for about eight percent of all formal employment in the country in the same year.

In the National Development Plan, 1985-89, the Government intends to lay emphasis to develop industries based on local raw materials. Special emphasis has been laid on increasing the quality, output and range of wood products and improve their efficiency. It is also envisaged that by modernization, diversification and expansion of wood processing industries, the country will be able to earn more foreign exchange by exports. The Department for Industrial Development, Ministry of Commerce and Industry has made several studies on resource inventory and the possibilities of developing the wood processing industries. However, the department now has to submit a consolidated report to the National Planning authorities justifying the development of the sub-sector. This would ensure allocation of resources out of the National Development Plan to launch an integrated programme for the development of the wood processing industries in consonance with the development priorities of the Plan.

The Ministry for Commerce and Industry therefore requested UNIDO's short-term assistance for formulating a coherent plan of action for the development of the sub-sector. As the draft of the National Development Plan, 1985-89 has already been delayed in its finalization, the report is to be prepared on an urgent basis.

ANNEX I-C

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

PROJECT OF THE GOVERNMENT OF THE SOLOMON ISLANDS

Assistance to the Wood Processing Industry

JOB DESCRIPTION

SI/SOI/86/002/11-03

Post title	Specialist in secondary wood processing industries.
Duration	Two months
Date required	As soon as possible
Duty station	Honiara
Purpose of project	To assist the Government to formulate a plan to develop the wood processing industry based on existing data and its analysis.
Duties	The specialist shall be a member of a team of three, comprising also specialists on wood resources and primary wood processing industries. Together with the Government counterparts, the specialist will be expected to:

- Appraise the existing reports on the secondary wood processing industries.
- Assess the technology used to produce furniture, joinery, packing crates and wooden components for housing, and the skills available.
- Study the legislation affecting the use of timber in construction and the local policy of building societies and insurance companies towards wooden houses.
- Assess the local and export markets for secondary wood products and estimate future trends.
- Study the problems facing the industry with respect to import of equipment, auxilliary materials, spares, etc.
- Study investment incentives for foreign firms.
- Study the transport possibilities for secondary wood products to the major overseas markets.
- Appraise the existing training facilities.

..../..

Based on the above, and in collaboration with the other members of the team and the Government counterparts, prepare a report that will incorporate a plan for the development of the country's forest resources and its wood processing industry, recommending the measures that will have to be taken by the industry, the government and possibly also international organizations to ensure the timely implementation of the plan.

Qualifications: Wood technologist or engineer with considerable experience in production of furniture and joinery for export. Experience in operation and management, at policy making level, of an export oriented factory in a developing country desirable.

Language: English

Background information: Forests cover some 2.4 million hectares of the Solomon Islands but about 200,000 to 250,000 hectares are exploitable using current logging techniques. Logging activities have been going on since 1966. In 1984, logging activities have risen to an estimated 10,000 hectares per annum.

It was estimated in the late 1960s and early 1970s that the total accessible volume of timber available from the forest resources was about 10,000,000m^3. However, due to cyclones, shifting cultivation and logging operations it is not known for certain what area of forest remains. The logging industry is dominated by some nine or ten companies. These companies operate mainly in the Western Province and on Guadalcanal. The total production and export of logs has been rising steadily over the last five years to 455,000m^3 in 1984. Export of logs alone have risen steadily over the last five years to 417,000m^3 in 1984.

In December 1984, there were 41 registered sawmills operating throughout the Solomon Islands ranging from chainsaw slabbers to static mills. Only 16 of the registered mills produced sawn timber of which four produced over 75 percent of the timber required for the domestic market. The forestry sector's contribution to the national economy is quite significant. In 1983, it contributed 28 percent of the total export earnings of the country. The sector accounts also for about eight percent of all formal employment in the country in the same year.

In the National Development Plan, 1985-89, the Government intends to lay emphasis to develop industries based on local raw materials. Special emphasis has been laid on increasing the quality, output and range of wood products and improve their efficiency. It is also envisaged that by modernization, diversification and expansion of wood processing industry, the country will be able to earn more foreign exchange by exports. The department for Industrial Development, Ministry of Commerce and Industry has made several studies on resource inventory and the possibilities of developing the wood processing industries. However, the department now has to submit a consolidated report to the National Planning authorities justifying the development of the sub-sector. This would ensure allocation of resources out of the National Development Plan to launch an integrated programme for the development of the wood processing industries in consonance with the development priorities of the Plan.

The Ministry for Commerce and Industry therefore requested UNIDO's short-term assistance for formulating a coherent plan of action for the development of the sub-sector. As the draft of the National Development Plan, 1985-89 has already been delayed in its finalization, the report is to be prepared on an urgent basis.

ANNEX II

FIRMS VISITED; GOVERNMENT OFFICIALS AND INDUSTRY LEADERS INTERVIEWED : LOGGING AND SAWMILLING INDUSTRIES

Andresen, E.	Permanent Secretary	Ministry of Trade, Commerce and Industry
Barley, B.	Manager	Kindu Sawmill, Tabango Island, W.P.
Bato, R.	Manager	Saikele Development Co., Hapai Village, W.I.
Bayers, J.	Assistant Manager	Earthmovers P/L Arundel, Kohingo Island, W.P.
Bella, K.	Forest Officer (Research)	Anara Forestry Camp, W.P.
Bera, R.	Minister of Economic Planning of the S.I.G.	Central Government
Bower, D. J.	Construction Manager Education Group	Public Works Department, Victoria, Melbourne
Cannarella, J.	Forestry Adviser	Province of Guadalcanal
Carden, C.	Forestry Instructor	Solomon Islands College of Higher Education
Chaplin, G. E.	Senior Forest Adviser	Forestry Division, Ministry of Natural Resources, S.I.G.
Choi, C. J.	Manager	Hyundai Timber Co., Ltd., Honiara
David, Rev.	Manager	Seghe Lay Training Centre, New Georgia Island, W.P.
Delaney, C.	Manager	Allardyce Timber Co., Ballalae, Shortland Is., W.P.
Dennis, C.	Advisor	Binca Sawmill, Malaita Prov.
Douglas, K.	Partner	B.K. Maurice/Dalsol, Honiara
Finch, A. C.	Chief Forestry Adviser	C.D.C., London
Forester, R.	General Manager	Kalena Timber Co., Viru Harbor, W.P.
Foukuma, B.	Minister	Ministry of Trade, Commerce and Industry, S.I.G.
Gavira, S.	Chief Forestry Officer	Forestry Division, Ministry of Natural Resources, S.I.G.
Gibson, M.	Consultant	B.K. Maurice/Dalsol, Honiara
Gina, G.	Manager	Kwan How Yuon, Pty., Ltd., Gizo, W.P.

Annex II
- page 2 -

Hayward, D.	General Manager (Operations)	Taisol Investment Corp. (S.I.) Ltd., Fate, Malaita Prov.
Hazelman, E.	Admin. Manager	Kalena Timber Co., Viru Harbor, W.P.
Hermescec, B.	General Manager	Foxwood (S.I.) Timber Ltd., Honiara
Hisco, K.	Manager	Batuna Sawmilling, Vangunu Island, W.P.
Hood, M.	Admin. Manager	Buma Sawmills, Malaita Prov.
Hughes, T.	Governor	Central Bank of the Solomon Islands, Honiara
Ilala, S.	General Manager	Commodities Export Marketing Authority, Honiara
Inimau, E.	Forest Officer	Suki, Malaita Province
Jensen, F.	Managing Director	Sawmill Production and Consulting Service P/L, Buna, Malaita Province
Kao, G.	Forest Ranger Asst.(U)	Forestry Division, Ministry of Natural Resources, Honiara
Kera, R.	Permanent Secretary	Ministry of Economic Planning, Honiara
Kera, T.	Managing Director	Saikele Development Co., Hapai Village, W.P.
Kim, A.	Economic Adviser	Prime Minister's Department, Honiara
Kimney, R.	Principal, Natural Resources Department	Solomon Islands College of Higher Education, Honiara
Kwanairara, E.	Principal Forest Officer	Forestry Division, Ministry of Natural Resources, S.I.G.
Lennard, T.	Chief Engineer	Solomon Islands Electric Authority, Honiara
Leslie, A.J.	Forestry Consultant	C.D.C., Australia
Liaka, M.	Admin. Manager	Bina Sawmill, Malaita Prov.
Maenuu, L.	Permanent Secretary	Ministry of Finance, Honiara
Markwrath, F.	Managing Director	Markwarth Shipping P/L, Honiara
Mauriasi, R.	Senior Forest Officer	Forestry Division, Ministry of Natural Resources, S.I.G.
Misi, K.	Managing Director	Development Bank of S.I.
Moon, K. C.	General Manager	Hyundai Timber Co., Ltd., Honiara
Morris, J.	Previous Proprietor	Kalena Timber Co., Viru Harbor, W.P.

Nolan, T.	Forest Adviser	Forestry Division, Ministry of Natural Resources, S.I.G.
Pepene, M.	Undersecretary	Ministry of Finance, S.I.G.
Pule, N.	Dep. Chief Investment Officer	Prime Minister's Department, Honiara
Rini, S.	Proprietor	Island Timber, Yanyuna, W.P.
Sande, S.	Minister	Ministry of Natural Resources, Honiara, S.I.G.
Shires, R.	Managing Director	Whitecliffs (S.I.)P/L, Honiara
Siapu, G.	Permanent Secretary	Ministry of Natrual Resources, Honiara, S.I.G.
Smith, B.	Director of Agriculture	Ministry of Agriculture and Lands, Honiara
Stenzle, G.	Manager	Tradco Shipping Ltd., Honiara
Tanen, I.	Forest Officer	ALU Forestry Camp., Shortlands
Taraem, J.	Assistant Manager	Taisol Investment Corp.(S.I.) Ltd., Fote, Malaita Prov.
Titiulu, R. (Mrs.)	Planning Officer	Prime Minister's Office
Turnbull, C.	Forest Mensuration and Inventory	Vital Statistics Agency, New Zealand
Wickham, E.	Managing Director	Kenelo, Rendova Island, W.P.
Wornald, T. J.	Forestry Consultant	C.D.C., Australia

ANNEX III

FIRMS VISITED ; GOVERNMENT OFFICIALS AND INDUSTRY LEADERS INTERVIEWED : FURNITURE AND JOINERY INDUSTRIES

Aitken, D.	UNIDO Expert	"Industrial Sites Development Study", ADB/UNIDO Project (ADB No. TA 760), Honiara
Bogese, G.	Furniture/Joinery Contractor	c/o Central Bank of the Solomon Islands, Honiara
Dakin, K.	Head, School of Industrial Development	Solomon Islands College of Higher Education, Honiara
Diau, J.	Manager	Tome & Sons, Ltd., Honiara
Fafale, P. S.	Managing Director	Malaita Cane Furnitures Manufacturing, Ltd., Auki
Ferguson, B.	Operations Manager	Bowman's, Honiara
Hoffmann, A. M.	Joinery Manager	Solomon Islands Investments, Ltd., Honiara
Kafomoko, J.	Supervisor	Regiala Joinery, Auki
Kamasai, J.	Industrial Assistant	R & M Industries, Honiara
Koroi, N.	General Manager	Solomon Islands Housing Authority, Honiara
Mamae, W.	Personal Manager	Adamasia Furniture (Workshop), Honiara
Misikui, M.	Managing Director	Festus Folia & Sons Co., Ltd., Honiara
Narain, H.	Managing Director	Cowrie Furniture (Workshop), Honiara
Paia, W. A.	Managing Director	Kelton Marketing (S.I.), Ltd., Honiara
Palmer, J.	Senior Works Supervisor	Regiala Joinery, Auki
Pezzulo, R.	Managing Director	R & M Industries, Honiara
Pitsopa, A.	General Manager	Silava Construction Enterprise, Ltd., Gizo
Qae, L.	Proprietor/Manager	L. Qae Enterprises, Ltd., Gizo
Qurusu, A.	Member of National Parliament	North Choiseul Constituency
Spread, P.	Economist	"Industrial Sites Development Study", ADB/UNIDO Project (ADB No. TA 760), Honiara
Vakio, J. G.	Factory Manager	Adamasia Furniture (Workshop), Honiara

Annex III
- page 2 -

Zaraza, J.	Secretary	Solomon Islands Housing Authority, Honiara
	(Shop Foreman)	Gizo Furniture Workshop, Gizo

ANNEX IV

PLANTATION REVIEW
(MECHANISM FOR THE DEVELOPMENT OF THE S.I. FOREST RESOURCES)

A. BACKGROUND

The first plantations were established in the Solomon Islands in 1967. Since then a gross area of about 21,000 ha. has been planted.

The original expectation was that the crops could be grown on a 20-year rotation, and that a total of 140 cu.m. per ha. of small sawlogs could be harvested on felling at the end of the rotation. Were these expectations to be realized, the first plantations should be ready for harvesting within two (2) years, and an annual output of 60,000 cu.m. should be obtained for the first five years, rising to around 140,000 cu.m. per year by the end of the century.

A considerable amount of inventory work has been carried out in these plantations over the past few years, which suggest strongly that these yield expectations will not be achieved. One reason for this, is that the plantations have fewer trees remaining than was originally expected. A second reason is that the measured basal areas suggest that only certain species on the better sites have achieved the expected growth rates, while the most widely planted species has generally grown slower than expected.

However, the inventory data does not as yet provide yield estimates, nor does it provide the basis for preparing production forecasts without a considerable amount of additional analysis, to convert the data into growing stock data, broken down by size class assortment.

In view of the possible imminence of some harvesting operations, and the need to draw up plans for the utilization of the resource and of the degree of reliance that will have to be placed on the plantation resource to sustain the wood processing industry in the near future, the time is very opportune to have a thorough review of the performance so far of the plantations.

B. SCOPE OF THE REVIEW

1. Determine the economically manageable areas of plantations, by species and locality, taking account of crops which are poorly stocked and/or slow growing and should be abandoned, crops which need further inputs to bring them to an acceptable stocking, and crops which are satisfactory with no further inputs.

2. On the basis of existing inventory work and if necessary, following further measurements, determine the current growing stock by sub-compartment and for crops over five (5) years old prepare projections of increment up to harvestable age, using the historic performance of the older plantations as a guide.

3. Prepare provisional forecasts of production by species and size class assortment for each locality for the next ten (10) years, with indications for the following ten years, to provide a basis for planning the most appropriate utilization of the crops.

4. Thoroughly review the choice of species in the plantations, in the light of their performance, cost of production and the forecast volume production in relation to likely end-uses for the timber. Make recommendations for any changes in species use and selection which may be appropriate.

5. Thoroughly review the various silvicultural systems used for establishing and managing the plantations and make recommendations as to the most appropriate methods for the future.

6. In the light of the above, review, investigate possible processing enterprises which could be established within the Solomon Islands, and possible export markets for either logs or manufactured products, and make recommendations regarding the scale and species choice for future plantations in order to maximize future benefits from the investments.

C. TIMING

This review should be undertaken as soon as possible in order that appropriate decisions can be taken regarding the future management of the existing resource, the possible development of new processing enterprises, and the continuance of the plantation programme.

About six (6) months should be allowed to undertake the work, and completion should be sought by the end of 1987 when the oldest crops will be two years old.

D. ASSISTANCE REQUIRED BY SOLOMON ISLANDS GOVERNMENT

In view of the shortages of staff within the Forest Division, SIG will probably have to seek outside assistance for carrying out the review. A team consisting of :

(a) Inventory/Mensuration Specialist ;
(b) Silviculturist ;
(c) Forest Management Specialist ;
(d) Economist ; and
(e) Utilization/Marketing Specialist

would be required, and a total of 15 to 20 man-months are likely to be needed to complete the review to a satisfactory degree of detail.

ANNEX V

MECHANISM FOR THE DEVELOPMENT OF THE SAWMILLING INDUSTRY

A. STATISTICAL DATA

Background

The statistical data on forest industry and activities affecting forest industry is not sufficiently comprehensive or soundly based for monitoring of industry's performance by government or for analysis and planning by industry. This stems in part from the non-collection of some data, inadequate definition of figures required and failure of companies to submit returns on time or in many cases completely.

It is acknowledged that some data considered necessary for planning will be difficult to collect. However, it is desirable that a start be made on the establishment of a comprehensive data base. As much as possible data should be capable of ready extraction from company records.

Major Statistics Required

Data sought that should be considered for inclusion in required reporting are listed below :

1. Forest harvesting
   - 1.1 Volume harvested, by species and in the case of log exporting companies, log grade, by license area
   - 1.2 Actual area of forest on which harvesting is completed
   - 1.3 Log allocation, i.e., to export or processing; volume by species and grade where appropriate
   - 1.4 Value of logs exported by species and grade
   - 1.5 Opening and closing log stocks
2. Sawmilling (or other processing facilities)
   - 2.1 Volume of logs received (by own harvest) or purchased by species/grade
   - 2.2 Volume of logs processed by species
   - 2.3 Sawn production volume by species and grade (grade here can be simplified into what is now termed "first" and "second" grade). The point of recording should be defined.

2.4 Volume seasoned (air or kiln)

2.5 Volume preservative treated by treatment process (treatment completed)

2.6 Volume dressed or moulded

2.7 Opening and closing stock volume by species, type of finish

3. Timber trading

3.1 Volume received on purchase by species, grade and type of finish

3.2 Volume and value of sales (including "own consumption") by species grade, type of finish and market

3.3 Opening and closing stock volume by species, grade (where appropriate and type of finish)

4. Shipping

4.1 Volume carried by port of loading and port of discharge for both domestic and import trades

5. Timber manufactures

5.1 Volume of sawn timber purchase, by species, grade and type of finish

5.2 Wholesale value of products sold by type (furniture, joinery) and market

5.3 Opening and closing stock of sawn timber by species, grade and type of finish

6. Construction

6.1 Construction approvals by value, surface area and type (i.e., commercial, etc.) and major materials used for local bearing and external cladding

6.2 Construction commencements by value, type and major materials

6.3 Construction completions by value, type and major materials

Action Required

The Government, in consultation with the forest industry, shipping and construction companies, should establish the details required, frequency of reporting, method of presentation, checking and analysis. Establish the legal requirement to submit data as required.

B. SAWN TIMBER GRADING AND SPECIFICATION OF TIMBER IN CONSTRUCTION

Background

Sawn timber grading in the Solomon Islands is not standardized and is not based on end-use requirements.

Only three out of a great number of species are used to any real extent in construction and other timber applications in the Solomon Islands. A high proportion of the potentially commercial forest is being by-passed by the sawmilling industry with the result that the forest is being depleted more rapidly than necessary to meet market requirements and is thereby creating a potential timber scarcity.

Specification of timber is usually by species name rather than on the basis of the properties, strength, hardness, durability, stability, density, nail- and screw-holding properties, etc., that are really being sought and are required for the purpose. Specification of timber by properties required will provide the opportunity to meet specification with a much greater range of species. There will be situations where appearance is important and specification by species is justified.

It is possible to prepare the necessary information for such a programme before the institution of the Forest and Timber Council (Annex VIII) which would be requested to conduct on-going development and training.

Action Required

1. Manuals should be prepared containing :

   1.1 Formulation and adoption of sawn timber grading rules for application to timber sold in the domestic market. It should be possible to make these sufficiently comprehensive to make them adequate for export marketing as well. Adaptation of existing internationally accepted rules should be sufficient.

1.2 A list of "standard trade names".

1.3 A list of species classified into "use" oriented groupings of strength, natrual durability, pressure treatment permeability, shrinkage, etc.

1.4 The class of timber by property, required to meet construction needs in all types of load bearing and non-load bearing members used in construction

1.5 Its minimum grade of timber required for each species in use.

2. Training in the application of grading rules at the industry operative level and promotion of specification by property rather than species of timber to architects, engineers and other specifiers of timber.

Method of Accomplishment

It will be necessary to obtain external technical and probably financial assistance to achieve the preparation of manuals and possibly for training of industry operatives. Consultations with timber producers, specifiers and users will be required. While some research may be required to allow inclusion of more species, sufficient data now exists for a great many of the native species or their properties are sufficiently close to other species in the region that adequate classification can be carried out now.

ANNEX VI

MECHANISM FOR THE DEVELOPMENT OF THE SECONDARY WOOD PROCESSING INDUSTRY OF THE SOLOMON ISLANDS

-----oOo-----

I. GENERAL OBJECTIVES OF THE PROGRAMME

A. To supply the furniture and joinery products needs of the country at prices affordable and quality levels acceptable to a majority of the nation's family income groups ; and

B. To convert, eventually, all sawn timber in excess of the country's building and construction and furniture and joinery needs into wood products at cost and quality levels which allow the products to be competitive in the export market.

II. MAJOR PRE-REQUISITES TO A DECISION TO DEVELOP THE SECONDARY WOOD PROCESSING INDUSTRY OF THE SOLOMON ISLANDS

A. Increased efficiency of the sawmilling industry to levels which would make available lumber at prices comparable to other developing countries which are engaged in the export of wood products;

B. The development of the SI timber seasoning industry capable of drying at least 50% of the sawn timber output of the sawmilling industry to moisture contents acceptable in the export market and at reasonable cost ; and

C. Upgrading of the country's technical training facilities to make it more industry-oriented and capable of producing technical, managerial and supervisory personnel required by the country's economic development programme.

III. THE DEVELOPMENT PROGRAMME

The over-all development programme is packaged in three phases, each of which is a 5-year period with specific goals and a set of corresponding activities designed to set the desired conditions and usher in the industry's growth under the prescribed goals for each development phase.

A. PREPARATORY PERIOD (5 years from date of adoption and approval of the Programme)

1. Stage Objectives :

   (a) to attain three pre-requisite objectives ;

   (b) to develop the local rattan materials supply industry leading to zero imports of rattan materials ; and

(c) to develop the local rattan furniture manufacturing industry to levels which allow cost and quality levels acceptable in the foreign market.

2. Stage Activities :

(a) Legislation or Ministry Ruling

i - creation of wood industry development central body;

ii - enactment of legislation granting investment priority status to the secondary wood processing industry sector ;

iii - promulgation of rules and regulations implementing (ii) ; and

iv - total ban of exports of all forms of rattan raw materials.

(b) Activities at Ministry Level

i - completion of long delayed timberstand survey and inventory, to include rattan, bamboo and natural-resin-exuding species (URGENT) ;

ii - adjustment of wood industry development programme targets as called for by the final results of timberstand survey and inventory ;

iii - UNIDO assistance in upgrading existing training facilities and providing initial trainors for key personnel of the secondary wood processing industry;

iv - ITC/UNIDO assistance in determining markets and types of products for the secondary wood processing industry, including rattan furniture ;

v - UNIDO (or EEC or other international entities) technical assistance in the development of the rattan furniture industry, including study tour of key industry leaders to rattan furniture factories in other developing countries ; and

vi - UNIDO (or other entities) technical assistance in developing small scale kiln-drying facilities and training required personnel for the wood seasoning programme of the country, using appropriate technology. The appropriate seasoning technology should be determined on a "case-to-case" basis, considering the specific conditions and operating parameters that exist in each case.

B. INITIAL DEVELOPMENT PERIOD
(5 years, from completion of Preparatory Period)

1. Stage Objectives :

(a) to upgrade and accelerate development of the rattan furniture industry to allow sizable exports of the products ;

(b) to develop the wooden furniture and joinery products industry to a level capable of:

i - supplying the domestic needs of the country with furniture and joinery products of acceptable quality and reasonable costs; and

ii - engaging in limited exports (with increasing volumes annually) of blanks or semi-finished components for furniture and joinery products components; and

(c) to sustain the effective transfer of technical 'know-how' both through the local training institutions and expatriate experts and technicians hired by industry.

2. Stage Activities:

(a) Legislation or Ministry Ruling

i - restricted, then eventual total ban, of log exports;

ii - ban on additional or new capacity of sawmilling plants with rated sawn timber yield rates below 50 per cent;

iii - special incentives for recruitment or expatriate management, technicians and highly skilled personnel for employment in the Solomon Islands' secondary wood processing industry.

iv - special incentives for the import of woodworking machines, etc.

v - special facilities for the import on 'drawback' of all inputs needed for furniture produced for export.

(b) Activities at Ministry Level

i - evaluation and review of existing laws and rules and regulations for the implementation thereof; and recommending the enactment of supplementary legislations that would prepare the industry for the next period of the industry development programme;

ii - evaluation and review of current methods and techniques of enforcing laws and rules and regulations affecting the secondary wood processing industry; and recommending improvements thereof, with a view to assuring the healthy development of the industry in the years to come;

iii - adoption and use of a national timber code;

iv - evaluation and review of current training activities for the key personnel of the secondary wood products industry and instituting improvements thereto with a

view to making the training programme more responsive, not only to the needs of the secondary wood industry, but also of the other industries allied to or supportive of the furntiure and joinery industry;

v - continued marketing and manufacturing technical assistance activities by UNIDO, ITC or similar organizations to assure the growth of the industry according to plans;

vi - adoption of enforcement of quality standards for furniture and joinery products; and

vii - restriction, then eventual ban, of the use of unseasoned or untreated wooden materials in buildings and construction activities.

viii - bi-lateral arrangements with customer countries on trade for Solomon Islands' secondary wood products and rattan furniture;

ix - development of inter-island shipping industry based on sea-crafts which could economically transport wooden products in addition to other domestically traded commodities.

C. FINAL DEVELOPMENT PERIOD (5 years from completion of Initial Development Period):

1. Stage Objectives:

(a) to develop the export of 'knock-down' wooden and rattan furniture products;

(b) to preserve, sustain and enhance the gains attained in the logging, sawmilling, kiln-drying and woodworking industries of the country during the previous stages of the development programme; and

(c) to attain optimum revenues from the timber harvest of the country through their total conversion to secondary wood products in an export-oriented wood and wood products industry.

2. Stage Activities:

(a) Legislation or Ministry Ruling

i - restricted, then eventual total ban, of sawn timber exports;

ii - additional export incentives for wood products using increased local materials contents;

iii - total ban on imports of both rattan and wooden furntiure products;

iv - total phase out of sawmilling plants operating at sawn timber yield rates less than 50%, and

v - updating the mandates and powers of the wood industry development body to make it more effective and responsive to the changing needs of the growing wood and wood products industry.

(b) Activities at Ministry Level

i - evaluation and review of existing laws, and rules and regulations for the implementation thereof, and recommending the enactment of complimentary regulations that would preserve the gains so far made by the industry and sustain its further growth ;

ii - evaluation and review of current methods and techniques of enforcing laws and rules and regulations affecting the secondary wood processing industry and recommending improvements thereof ;

iii - review of current quality standards for wood products in relation to needs of the international market and adoption of revisions thereto ;

iv - accelerated and improved marketing activities for wood products in the foreign market, considering product types, design, prices and quantity targets for the SI secondary wood processing industry ; and

v - continued technical assistance from UNIDO, ITC and/or other international agencies, on aspects of the wood products industry which need up-dating and/or expansion.

ANNEX VII

MECHANISM FOR THE DEVELOPMENT OF THE SOLOMON ISLANDS RATTAN FURNITURE INDUSTRY (DP/RAS/83/017)

The Programme of Activities described in the following paragraphs was formulated on the basis of the following findings by the UNIDO Team of Specialists on the Wood and Wood Products Industry during their study of the industry situation in the Solomon Islands during the period July to September 1986 :

i - the existing rattan furniture industry is primarily dependent upon imported rattan materials: e.g., large diameter poles, plastic coated binding strips and machine-woven rattan matting ;

ii - initial findings indicate the existence of a good growth of rattan vines in the SI forests, of species which can be used by the rattan furniture industry ; and

iii - the manufacture of rattan furniture, even for export purposes, require simple technology and small initial capital outlay.

The Development Programme is envisioned to consist of three major phases, with the ultimate goal of an export-oriented rattan furniture industry, to wit :

Phase I - Exposure and familiarization of SI rattan furniture manufacturing entrepreneurs and technicians to modern production systems and techniques in the preparation of rattan poles, its semi-finished products and rattan furniture furnishings.

Simultaneously, in this phase, the Forestry Division, MNR, SIG, should take steps to prepare a survey of the country's rattan resources. The survey shall attain full momentum upon the arrival of the UNIDO Expert on Rattan Poles Gathering and Preparatory Treatment and Processing.

Phase II - Transfer of technical "know-how" in two major aspects of the industry :

(a) rattan poles gathering and preparatory treatment and processing ; and

(b) techniques of production of rattan furniture and furnishings delivered by experts from foreign centers of the rattan furniture industry.

Phase III - Follow-up activities to check on the progress of implementation of the approved development programme and, whenever necessary, revise and redirect the implementation of the Programme.

The programme of activities are summarized as follows :

Phase	Time Period	Objectives	Remarks
I	three months	Familiarization and orientation with modern production systems and techniques	Study tours to Philippine and Thailand Rattan Furniture Centers
II	minimum of three months each	Delivery of technical "know-how" (see attached Job Description for two (2) Rattan Industry Experts)	Two (2) Experts to Solomon Islands; mission to start within three to six months after Phase I
III	minimum of three months each	Monitoring of project progress and marketing assistance	Three (3) Experts to Solomon Islands; mission to start within six to twelve months after completion of Phase II

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna, Austria

JOB DESCRIPTION

Post Title	RATTAN POLES GATHERING, HANDLING AND PREPARATORY PROCESSING EXPERT
Duration	Three (3) months (with possible extension)
Date Required	As soon as possible
Duty Station	Honiara, with travel within the Solomon Islands
Purpose of Project	To rationalize and accelerate the development of the Solomon Islands rattan furniture industry, through : i - the use of indigenous rattan poles and their semi-finished products (rattan splits, cores, weavings and mattings, etc.) ; ii - the introduction of effective techniques of gathering, handling and preservation of rattan poles which will be more acceptable to the rattan furniture production industry ; iii - the improvement of existing rattan furniture manufacturing facilities by the use of techniques involving steaming operations, production jigs and fixtures ; and iv - the adoption of production systems which lead to serial production and allow better use of production management and supervision techniques.
Duties	The Expert, in cooperation with local authorities and the Rattan Furniture Production Expert, (under this Project), shall provide technical advise and assistance in SIG's efforts to rationalize and accelerate the development of the rattan furniture industry, as follows : i - Assist the Forestry Division, Ministry of Natural Resources, in the identification and location of rattan species and allied forest products which can be used as raw materials input for the rattan furniture industry ;

ii - Train local rattan gatherers (in selected areas of the country) in the correct techniques of cutting, handling, preserving and preparatory processing of rattan poles into raw materials and semi-finished material inputs of the rattan furniture manufacturing industry ; and

iii - Assist local authorities in the development of a system to collect, store and distribute the raw materials and semi-finished goods thus produced, with a view to preserving their desirable qualities and keeping costs at acceptable levels.

Qualifications — **Specialist in rattan materials supply, having ample exposure in the rattan gathering industry and extensive practical experience in the handling, preparation and preservation of rattan poles and their preparatory processing into semi-finished goods (splits, cores, weavings, mattings, etc.) inputs of the rattan furniture manufacturing industry.**

Language — **English. Knowledge of Pidgin would be an advantage.**

Background Information — There are some half dozen small-scale rattan furniture producers already established in the Solomon Islands although only three (3) are formally registered companies. Although prices and quality are comparable to locally produced wooden furniture, the local rattan furniture is priced higher but has a lower quality than corresponding products from the Philippines, Thailand and other Southeast Asian countries. The main problems appear to be :

- the high prices of imported rattan, exacerbated by long delivery lags ;
- the inadequate preparation and preservation of locally produced rattan poles ;
- crude production systems leading to poor workmanship and low quality furniture products ;
- lack of managerial and supervisory personnel adequately trained to operate the rattan furniture workshops on modern business systems ;
- very limited marketing coverage, based primarily on "over-the-counter" sales ;
- low-grade upholstery materials and low quality upholstering techniques ; and

- use of synthetic or plastic coated weaving material with subsequent high cost and poor marketing image problems.

Currently, only canes with small diameters are gathered and supplied from local sources. These cane products are not treated and handled properly so that the resulting rattan furniture bear the marks of poor quality raw materials. Large diameter rattan poles, rattan splits and cores, rattan weavings and mattings are all imported from Hongkong (or Singapore) as the local resources and preparatory processing facilities do not produce such materials inputs of the industry. It is held that strengthening domestic supply of raw materials and semi-finished goods, improving production systems under desirable management and supervisory techniques will greatly improve the quality, without adversely causing a major upswing of costs of the resulting rattan furniture products, and thus provide a take-off condition for export-oriented operations in the future.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna, Austria

JOB DESCRIPTION

Post Title	RATTAN FURNITURE PRODUCTION EXPERT
Duration	Three (3) months (with possible extension)
Date Required	As soon as possible
Duty Station	Honiara, with travel within the Solomon Islands
Purpose of Project	To rationalize and accelerate the development of the Solomon Islands rattan furniture industry, through:

i - the use of indigenous rattan poles and their semi-finished products (rattan splits, cores, weavings and matting, etc.);

ii - the introduction of effective techniques of gathering, handling and preservation of rattan poles which will be more acceptable to the rattan furniture production industry;

iii - the improvement of existing rattan furniture manufacturing facilities by the use of techniques involving steaming operations ; and

iv - the adoption of production systems which lead to serial production and allow better use of production management and supervision techniques.

Duties

The Expert, in cooperation with local authorities, under the Ministry of Trade, Commerce and Industry, and the Rattan Poles Gathering, Handling and Preparatory Processing Expert, is expected to provide the following :

- Technical advice on the modernization of existing rattan furniture production facilities in order to allow serial production techniques ;

- Train local key production personnel of selected rattan furniture production establishments in the following aspects of the industry :

  (a) design and fabrication of steaming chambers for rattan furniture components;

  (b) design and fabrication of production jigs and fixtures ;

  (c) selection of production and maintenance equipment, machines and hand tools ;

  (d) design and fabrication of appropriate drying systems for materials-in-process ;

  (e) selection and use of appropriate fastening and binding materials according to their availability in the local market ;

  (f) selection and use of appropriate finishing materials system and application techniques ;

  (g) design of furniture products consistent with the demands of the local market and the properties of available indigenous rattan materials ; and

  (h) evolve a master plan for the developemnt of the local rattan furniture industry on an export basis.

Qualifications Rattan furniture production specialist with extensive practical experience in the manufacture of rattan furniture and allied products. Experience in training factory personnel desirable.

Language English. Knowledge of Pidgin would be an advantage.

Background Information There are some half dozen small-scale rattan furniture producers already established in the Solomon Islands although only three (3) are formally registered companies. Although prices and quality are comparable to locally produced wooden furniture, the local rattan furniture is priced higher but has a lower quality than corresponding products from the Philippines, Thailand and other Southeast Asian countries. The main problems appear to be :

- the high prices of imported rattan, exacerbated by long delivery lags ;
- the inadequate preservation and preparation of locally produced rattan poles ;

- crude production systems leading to poor workmanship and low quality furniture products ;
- lack of managerial and supervisory personnel trained to operate the rattan furniture workshops on modern business systems ;
- very limited marketing coverage, based primarily on "over-the-counter" sales ;
- low-grade upholstery materials and low quality upholstering techniques ; and,
- use of synthetic or plastic coated weaving materials with subsequent high cost and poor marketing image problems.

Currently, only canes with small diameters are gathered and supplied from local sources. These cane products are not treated and handled properly so that the resulting rattan furniture bear the marks of poor quality raw materials. Large diameter rattan poles, rattan splits and cores, rattan weavings and mattings are all imported from Hongkong (or Singapore), as the local resources and preparatory processing facilities do not produce such materials inputs of the industry. It is held that strengthening domestic supply of raw materials and semi-finished goods, improving production systems under desirable management and supervisory techniques will greatly improve the quality, without adversely causing a major upswing of costs of the resulting rattan furniture products, and thus provide a take-off condition for export-oriented operations in the future.

ANNEX VIII

FOREST AND TIMBER COUNCIL

A. BACKGROUND

Any government benefits from close, regular and formal exchange of information and ideas with national industry bodies. The forest based industries in the Solomon Islands have no such forum and this has been seen to be a serious deficiency by the Forest Division and the industry. The lack of a coordinated "national" approach to marketing has not been used within the country and more importantly on the export market.

There is no coordinated approach to training in specialized areas essential for the optimum development of the country.

Company managements rightly have to concentrate on the activities and direction of their own enterprise rather than that of the "industry", unless forced to take a broader national view. Similarly, government can quite easily be more concerned with administration of legislation than constructive development.

Self regulation of industry is more often appropriate in many activities than externally imposed regulation by bodies which may not have the depth of understanding or breadth of view to make regulations constructive rather than constraining.

A Forest and Timber Council, composed of broad representation from all of the sub-sectors of industry and from various government ministries or bodies which can make a positive contribution to the council and the industry can provide the impetus for a "national" view and effort.

It has been found elsewhere that greatest effectiveness is achieved where the council membership is restricted to resident chief executives of companies and heads of government ministries or departments and other bodies. While the admission of designated (by gazettal) "alternatives" may be necessary, the casual attendance of "representatives" is usually counter-productive. It is preferrable to specify individuals as members rather than persons representing organizations.

To obtain the consultation and open cooperation of industry, it is desirable that the Council be, and be seen to be, an industry body, rather than a regulatory arm of government. To this end the Chairman should be drawn from industry and industry should have an equal or greater representation on the Council than government. The Council should be created by Act of Parliament to confer on it the status necessary to have maximum impact within the country and overseas. The Council should have right of access to the Minister to offer advice on matters of concern and interest to the Council. To be able to efficiently perform its functions, the Council needs to be able to attract highly competent staff, particularly the chief executive, and the ability to finance its training, research and development, promotional and advisory services. While it is preferrable that funds be supplied by the industry itself, probably through a production-related levy, some government or aid agency funding may be required at the establishment stage, as the industry is small and would have difficulty in accumulating funds for the high initial costs. Any levy should be compulsary and authorized by the Act.

B. FUNCTIONS OF THE COUNCIL

The functions of the Council should include :

(1) Advise on matters affecting the industry to the relevant government ministers - which it is proposed, to be the Minister of Natural Resources and the Minister of Trade, Commerce and Industry ;

(2) Representation of the interests of the forest and timber-based industries to appropriate government ministeries and bodies ;

(3) Representation of the industry and the country at appropriate international fora ;

(4) Representation of the industry at appropriate national fora and on consultative committees ;

(5) The collection, analysis and distribution of information on production and trade of forest and timber products ;

(6) The organization of special training programmes for the wide range of skills required by the industry ;

(7) The organization of testing of species and of materials used by the timber-based industries and whenever needed, completely

assembled end-products or components thereof, and dissemination of these results to industry ;

(8) Provision of advice to industry on manufacturing systems and techniques, equipment selection, etc. ;

(9) Provision of advice to industry and timber users, on matters such as log and timber grading, seasoning, preservation treatment, packaging and general product presentation ;

(10) Serve as a forum for trade enquiries and provide information to potential investors ;

(11) Organization of timber product development and market research and product promotion in national and international markets ; and

(12) Promotion of self-regulation of the industry and its sub-sectors.

C. IMPLEMENTATION

The details of the necessary Act including definition of membership function powers and responsibilities of the Council should be determined after consultation between government and industry. It may be advisable to seek external assistance to guide these consultations, point out the implications and possible pitfalls of various regulations, and to estimate the costs and funds required to establish and operate the Council.

While funding would ideally come entirely from the industry, this may not be possible in the early stages. The Government may have to provide the bulk of the establishment costs and assist in operating costs, in declining proportion, over the first three to five years. It will be critical to the council that the Act provide the necessary authority to conduct its functions in a businesslike manner. This may make government funding difficult to justify, but appropriate regulations regarding audit and accountability should overcome this possible conflict.

The following estimates assume a minimum staff complement. It is considered false economy to employ a low level Executive Director, as much of the success of the Council, and ultimately the industry, will depend on his skill and dedication. The requirements for the position will include a sound understanding of the international

timber and wood product trade and of marketing, as well as production technology, a good administrative background, and an interest in training. Experience of tropical forest products would be highly desirable. He will need to have experience in negotiation at top level in industry and government and be a very good communicator. Previous experience as a resident in a foreign, preferably tropical, developing country would be desirable. Such a man will not be easy to find, and this task should probably be contracted to a recruitment agency.

Local staff include a top class secretary and at least one research officer. This latter would need a background in forestry or industry, have tertiary qualifications and be a good communicator. The employment of additional research officers would follow in time, possibly with differing experience and qualifications, to provide the Council with a broader research base. A clerical assistant of a high order would be required for data processing, etc.

The costs of establishment and operation will depend very much on what the Council is required to do, particularly in regard to overseas promotional travel, and are therefore, difficult to estimate. However, the order of these costs is likely to be as follows :

(i) Establishment

office furniture and equipment	SI$20,000.	
vehicle	15,000.	
staff recruitment and establishment costs	30,000.	
data bank, library (initial)	5,000.	
		SI$ 70,000.

To this may be added the costs of attendance at meetings and charges by any outside advisors, or visits to other countries for "background" legislative work, etc., say SI$ 30,000.

Total ---------- SI$100,000.

(ii) Annual Administration Costs

executive director*	SI$100,000.
other staff**	30,000.
vehicle	4,000.
office rental, services	15,000.
communications	6,000.
professional services	2,000.
members attendance at meetings***	5,000.
internal travel	5,000.
subscriptions, stationary, etc.	2,000.
insurance, etc.	1,000.
miscellaneous	5,000.
	SI$175,000.

* assumes a medium level expatriate, and includes all costs.
** assumes minimum local staff, and includes all costs.
*** travel and accomodation costs for "out of town" members.

(iii) Promotional Costs

These will obviously depend on funds available, and it could be expected that there will be an initial high demand, followed by a period of lower cost consolidation, with costs then rising again. The costs will depend on the markets to be explored and developed. Initially, it would seem reasonable to concentrate on Australia and New Zealand for sawn timber. The Indian log market should receive attention as well as the traditional east Asian areas. In time, other markets for sawn timber and wood manufactures would be visited, particularly Europe and North America if a satisfactory shipping service can be arranged for the latter. The domestic market will aso require attention but these costs can be kept relatively low.

A reasonable minimum budget for direct promotional costs would be SI$40,000. Much of this could be obtained as assistance from international agencies and governments. SI$ 40,000.

(iv) Research and Training

This capacity will take some time to establish and staff have not been included in (ii) above. For training, considerable reliance would have to be placed on international assistance for some time, though advice would result from staff visits and the Council could consider sponsorship of trainees. A pro-

portion of the budget should be devoted to training of the Council research officer. Research into timber properties will probably be beyond the resources of the Council for some time. Market research is covered under promotion in (iii) above. A combined budget of SI$5,000 might be feasible. SI$ 5,000.

TOTAL ---------- SI$220,000.

With an establishment cost of some SI$100,000 and minimum annual operating costs of about SI$220,000, the Council will not be cheap. However, the industry has had an annual foreign exchange earning capacity in excess of SI$20 million for some time. The budget for industry promotion through the Council would be about one per cent. This is not expensive. Unfortunately, it is considered likely that there will be a decline in timber exports (from the high levels of 1984-1986) in the next few years, so the burden on the remaining industry would be quite high.

The Council will need a reasonably assured minimum income to survive and attract quality staff. A levy based on a percentage of FOB balue does not achieve this as well as a levy based on volume, and in fact could reduce the effectiveness of the Council at the time when its efforts are most needed. A levy of SI$1.00 per cu.m., based on an assumed drop in production to 220,000 cu.m. would be required to meet the minimum annual costs. If the government was prepared to meet say, 75 per cent of the establishment costs and 50 per cent of the first two years operating costs, 30 per cent of the next two years and and 20 per cent of the fifth year, a viable Council could be established which should be financially acceptable to industry. Government and industry contributions would then be as follows (amounts in 1986 SI$) :

Year	Government	Industry
establishment	75,000	25,000
one	110,000	110,000
two	110,000	110,000
three	66,000	154,000
four	66,000	154,000
five	44,000	176,000
Total ---------	471,000	729,000

The options available for striking a levy are virtually infinite, but this should be kept simple, and be readily verifiable. A levy based on FOB value of exports would not cater for the required contribution from processors supplying the domestic market. Income would also decline in poor market conditions when the services of the Council are most needed. A levy based on total log cut has been used in PND with good results. Some combination could be considered. If log cut exceeds the base level of 220,000 cu.m. the options available would include a reduction of government contribution or, preferably, an increased promotional budget. The opportunity for variation of levy should exist, but not if this would involve the government in expenditure above that intially commited.

ANNEX IX

COMMENTS ON
THE CURRENT PROPOSAL FOR A NATIONAL FORESTRY INVENTORY
SOLOMON ISLANDS

The current proposals for support of a National Forest Inventory by ADAB, as described in the Report by Graves and Byron, December 1985, should be reviewed before any final commitment to proceed is made, with special reference to the following points.

1.0 TIMING

The Project depends on aerial photographic interpretation, to be funded by the New Zealand Government, being completed.

In view of the fact that Harsell and Wall prepared detail vegetation maps only a decade ago, the emphasis should be on :

i - identifying the areas where charges have taken place : forest clearing, logging, and cyclone damage ; and

ii - identifying the areas where forest type, access, terrain, and extent make the resource suitable for commercial logging.

This actively should aim for completion in around six (6) months.

2.0 FIELD PROCEDURES

The FORIN method proposed is not suited to a variable mixed tropical high forest. FAO has examined inventory designs and practical experience shows that a transect method is more efficient because :

i - transects can be more rapidly and accurately located on the ground ;

ii - transects yield more information about the local variation of forest as types grade into one another according to topography and other factors ;

iii - costs and time are reduced compared with point sam samples, because one transect 5000 m long x 10 m wide samples the same area as 10 spot sample plots of 0.5 ha. each of which must be located separately perhaps several kilometers apart ; and

iv - transect results can be more easily used to estimate the local resource, because the forest types are sampled in one vicinity more or less in proportion to their presence locally. Aggregation of results from spot samples may rely on data for certain forest types from plots outside the area of interest.

3.0 DATA COLLECTION

The following items should be added to the information collected in the field :

- Land ownership
- Minor species - especially rattan
- Rot defects - by boring all trees during measurements
- Regeneration

4.0 LOGISTICS

Field crews should be positioned by the most rapid means possible, including the use of helicopters where possible - to economize on time spent positioning. Transects are again an advantage for putting down and picking up field crews.

5.0 PROGRAMME

The inventory needs to cover 400,000 to 500,000 ha. of forest in detail as only such an area is likely to be commercially important.

0.1% sampling means measuring 500 ha. which using 5000 x 10 m transects is 100 transects.

As a guide, a reasonable target should be around three (3) transects per crew per month. With four (4) crews the whole survey could be completed in eight (8) months.

The aim should be to complete all field work within a year, and allow three to four months for data processing, though this hsould be done concurrently with the field sampling as far as possible.

B I B L I O G R A P H Y

Anonymous CUSTOMARY LAND TENURE - SOLOMON ISLANDS, LAND RESEARCH CONFERENCE 25-29 June 1979, F.F.S.C., 1979.

Anonymous FISCAL ASPECTS OF THE TIMBER INDUSTRY, FINAL REPORT : APRIL 1980, The Government of the Solomon Islands, International Forest Science Consultancy, Mediothian, 1980.

Anonymous RESEARCH REPORT, AIR SEASONING - SOLOMON ISLANDS TIMBER UTILIZATION PAPERS, U/1/79, I.F.S.C., 1979.

Anutech THE SOLOMON ISLANDS FOREST INDUSTRY REPORT No.2, Solomon Islands Government, Honiara, 1985.

Bassili, A. V. PRE-REQUISITES FOR ESTABLISHING EXPORT-ORIENTED SECONDARY WOOD PROCESSING INDUSTRIES IN AFRICA, UNIDO/IOD.86/Rev.1, Vienna, 1978.

Bolza, E. THE MECHANICAL PROPERTIES OF 33 SOLOMON ISLANDS TIMBERS, Division of Building Research Technical Paper (Second Services) No. 37, Commonwealth Scientific and Industrial Research Organization, Melbourne, 1981.

Brion, H. P. CURRENT STATUS AND FUTURE DEVELOPMENT OF THE SECONDARY WOOD PROCESSING INDUSTRY OF DEVELOPING COUNTRIES, UNIDO ID/WG.395/4, Vienna, 1983.

Brion, H. P. POTENTIALS AND REQUIREMENTS OF INCREASING THE DEGREE OF WOOD PROCESSING IN DEVELOPING COUNTRIES OF ASIA AND THE PACIFIC, UNIDO/IS.395, Sectoral Working Paper Series No.5, Vienna, 1983.

Brion, H. P. REGIONAL SITUATION PAPER: THE WOOD AND WOOD PRODUCTS INDUSTRY OF ASIA, ITS CURRENT STATUS (1981-1982) AND FUTURE DEVELOPMENT, UNIDO ID/WG.387/1, Vienna, 1983.

Brion, H. P. ON THE DEVELOPMENT OF THE SECONDARY WOOD PROCESSING INDUSTRIES IN DEVELOPING COUNTRIES OF ASIA AND THE PACIFIC, FO:RAG/78/010, Mission Report No.8, FAO, Kuala Lumpur, 1986.

Coene de, A. PROMOTION OF SOLOMON ISLANDS TIMBERS, EEC Economic Development Fund, Brussels, 1981.

Eddowes, P. J. COMMERCIAL TIMBERS OF PAPUA-NEW GUINEA, Office of Forests, Department of Primary Industry, Port Moresby, 1977.

F. A. C. LOCAL TIMBER PROCESSING STUDY, PHASE 2 - SOLOMON ISLANDS, FO:DP/SOI/74/003, Rome, 1979.

Fraser, A. I. FISCAL ASPECTS OF THE TIMBER INDUSTRY - FINAL REPORT TO GOVERNMENT OF THE SOLOMON ISLANDS, International Forest Science Consultancy, Edinburgh, April 1980.

Bibliography
- page 2 -

Fraser, A. I. PROJECT IDENTIFICATION SURVEY: FORESTRY AND WOOD-BASED INDUSTRIES, SOLOMON ISLANDS, for the Center for International Development, Brussels, International Forest Science Consultancy, Edinburgh, 1982.

Groone, et.al. BACKGROUND REPORT: MARKETING SOLOMON ISLANDS WOOD AND WOOD PRODUCTS, for F.A.O. Project SOI/74/003, Rotarua, New Zealand, 1979.

Hansell & Wall LAND USE ASSESSMENT OF THE SOLOMON ISLANDS, Volumes 1-8, L.R.D.C., London, 1976.

S. I. G. ANNUAL REPORT, Division of Forestry, Honiara, 1975-1985.

S. I. G. SOLOMON ISLANDS TIMBERS, MAJOR SPECIES, Timber Booklet No.1, Forestry Division, Ministry of Natural Resources, Honiara, 1979.

S. I. G. SOLOMON ISLANDS TIMBERS, MINOR SPECIES, Timber Booklet No.2, Forestry Division, Ministry of Natural Resources, Honiara, 1979.

S. I. G. FOREIGN INVESTMENTS GUIDE, Bulletin No.1, F.I.D., Prime Miniter's Office, Honiara, March 1984.

S. I. G. FOREIGN INVESTMENT DIVISION, ANNUAL REPORT, 1983, Office of the Prime Minister, Honiara, June 1984.

S. I. G. FORESTRY AND FOREIGN INVESTMENT, F.I.D., Office of the Prime Minister, Honiara, October 1984.

S. I. G. NATIONAL FOREST AND TIMBER POLICY, Honiara, 1984.

S. I. G. ANNUAL REPORT, Central Bank of the Solomon Islands, Honiara, 1985.

S. I. G. ESTIMATE OF NON-MARKET PRODUCTION IN THE SOLOMON ISLANDS, National Accounts: Discussion Document No.1, Statistics Office, Office of the Prime Minister, Honiara, 1985.

S. I. G. INVESTMENT AND LABOUR, IMMIGRATION AND CITIZEN[illegible], F.I.D., Office of the Prime Minister, Honiara, 1985.

S. I. G. STATISTICAL YEARBOOK, 1984/85, Statistics Office, Honiara, 1985.

S. I. G. SOLOMON ISLANDS NATIONAL DEVELOPMENT PLAN, 1985-1989, Ministry of Economic Planning, Honiara, August 1985.

S. I. G. WHITE PAPER FOR INDUSTRIAL AND INVESTMENT DEVELOPMENT IN THE SOLOMON ISLANDS, Honiara, 1985.

S. I. G. CUSTOMS AND EXCISE TARIFF, Government Printing Works, Honiara, 1986.

S. I. REGISTER OF SOLOMON ISLANDS VESSELS, 1986, Solomon Islands Ports Authority, Honiara, 1986.

Bibliography
- page 3 -

S. I. G. RURAL HOUSEHOLD INCOME AND EXPENDITURE SURVEY, 1982, National Accounts: Discussion Document No.2, Statistics Office, Honiara, 1986.

S. I. G. TWENTY-EIGHT ANNUAL REPORT FOR THE YEAR ENDED 30th SEPTEMBER 1985, Solomon Islands Ports Authority, Honiara, 1986.

S. I. G. COCONUT DEVELOPMENT PROJECT, PHASE I, COCONUT SURVEY, Agrar-und Hydrotechnik GMBH, Ministry of Agriculture and Lands, September 1985.

S. I. G. COCONUT DEVELOPMENT PROJECT, PHASE [illegible]. PROJECT PREPARATION STUDY, Agrar-und Hydrotechnik GMBH [illegible]istry of Agriculture and Lands, December 1985.

S. I. C. C. SOLOMON ISLANDS TRADE DIRECTORY, 1986, Solomon Islands Chamber of Commerce, Honiara, 1986.

Turnbull, C. REVIEW OF PLANTATION INVENTORY WORK TO DECEMBER 1985, Forestry Note No.5-5/86, Division of Forests, S.I.G., Honiara, 1986.