## 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

Malaysia

# PROPOSALS FOR THE DEVELOPMENT OF TIMBER INDUSTRIES IN SARAWAK

by

DR. G.B. VON WENDORFF - U.N.I.D.O.
CONSULTANT TIMBER INDUSTRIES

and

MR. FRANK APAU - PRINCIPAL
ASSISTANT SECRETARY (ECONOMICS)
SARAWAK

KUCHING - AUGUST/SEPTEMBER 1971

TABLE OF CONTENTS

"Proposals for the Development of Timber Industries in Sarawak"

by

Dr. G.B. von Wendorff - UNIDO

and

Mr. Frank Apau - Principal Assistant Secretary (Economics) Sarawak

21.24 Wood production on secondary growth

21.25 Padang Paya

21.26 Nipah - Mangrove Swamps

21.26 1 Mangrove woods

21.26.2 Nipah fibres

21.27 Bamboo

22 Regional Distribution of Timber Resources

22.0 Introduction - Notes

22.1 Means of Transport

22.11 Round logs river transport

22.12 Round logs road transport

22.2 INFLUX AREAS

22.21 Reyang Influx areas

22.22 Baram - Miri Influx area

22.23 The Kuching Influx area

22.24 Bintulu Section

22.25 Lawas-Trusan Influx area

22.26 Limbang Influx area

(3) Present State of Timber Industry in Sarawak

31 Industrial Sawmills

31.1 Number and capacity

31.2 Technical equipment

31.21 Band saws

31.22 Resaws

31.23 Trimming

31.24 Crosscutting

31.25 Sawdoctoring

31.26 Power supply

31.27 Cranes and Loading devices

31.28 Interior Transport

34.31 Layout

34.32 Seasoning

34.33 Raw material

34.34 Glue

34.35 Suitability of machinery

34.36 Boiler

34.37 Packing & Loading

35 Furniture Industry

35.1 Number of enterprises

35.2 Equipment

35.3 Surfacing

35.4 Design and prices

35.5 Cost factors

35.6 Problems

35.61 Marketing

35.62 Competition

35.63 Cost of transport

35.64 Consumers

35.65 Racial Participation

36 Boat building

36.1 Observations

36.2 Long boats and dug-outs

36.3 Motor speed boats

36.4 Tug boats

36.5 Fishing boats and small tankers

36.6 Lighters

36.7 Ocean going ships

36.8 Paddles and oars

36.9 Blocks and tackle

37 Matches

38 Wooden Chips

(4) MARKETS

41 Internal Market

41.0 General Remarks

41.1 Internal market for sawn wood

41.11 Buildings

41.12 Bridges and Harbour piling

41.13 Sawn wood for boat building

41.14 Sawn wood for Furniture

41.15 Sawn wood for vehicle body building

41.16 Sawn wood for windows and doors

41.17 Sawn wood for household implements

41.18 Sawn wood for carving and arts

41.19 Sawn wood waste for foundations

41.2 Internal market for board products

41.21 Plywood

41.22 Fibre boards

41.23 Particle boards

41.24 Block boards

41.25 Lamin boards

41.3 Internal demand for pulp and paper

41.4 Internal demand for boxes, crates and containers.

41.41 Fruit boxes

41.42 Bottle boxes

41.43 Travelling boxes

41.44 Cooperage

41.45 Wood wool

41.46 Pallets

41.47 Containers

41.5 Internal demand for furniture

41.51 Chairs

41.52 Tables

41.53 Chests of drawers

41.54 Wardrobes

41.55 Upholstery

41.56 Writing desks

41.57 School furnitures

41.6 Coffins

41.7 Internal demand for boats

41.71 Light boats, speed boats, long boats

41.72 Wooden lighters and tug boats

41.8 Internal demand for matches and toothpicks

41.81 Matches

41.82 Toothpicks

41.9 Internal demand for other wooden articles

41.91 Coat hangers

41.92 Walking sticks

41.93 Tool handles

41.94 Brooms and Brushes

42. External Market

42.1 External Market for sawn wood

42.10 General remarks

42.11 Types of sawn tropical hardwoods

42.12 Regional markets

42.12.1 Western European Market for tropical sawan woods

42.12.11 General Tendency

42.12.12 Non-decorative sawn wood

42.12.13 Ramin/Limba

42.12.14 Meranti

42.12.15 Decorative sawn wood

42.12.2 East Asiatic Market for sawn wood

42.12.21 Japan

42.12.22 Taiwan

42.12.23 South Korea

42.12.24 Hong Kong

42.12.25 Mainland China

42.12.3 The North American Market

42.12.4 The Market in Australia and New Zealand

42.12.5 Potential new and undeveloped markets for sawn wood

42.12.51 Persian Gulf Area

42.12.52 Israel

42.12.53 South Africa

42.12.54 United Arab Republic

42.12.55 Iran

42.12.56 Pakistan

42.2 Export markets for <u>plywood products</u>

42.20 General remarks

42.21 Distinctions and applications of various plywood products

42.21.1 Thin plywood sheets

42.21.2 Multi-plywood sheets

42.21.3 Form ply

42.21.4 Elasto ply

42.21.5 Special plywoods

42.22 Trend of market development

42.22.1 World wide

42.22.2 Western Europe

42.22.3 America

42.22.4 East Asia

42.22.5 Australia

42.22.6 New markets

42.3 Export markets for board products

42.31 Particle boards

42.31.1 Comparison of Cost factors

42.31.2 Types of particle boards

42.31.3 Potential markets

42.32 Fibre boards

42.32.1 World market

42.32.2 South East Asia

42.32.3 West Asia

42.33 Insulation boards

42.33.1 World market

42.33.2 Regional market

42.33.3 Prefabricated houses

42.33.4 Competative materials

42.34 Block boards

42.34.1 Types of blockboard and application

42.34.2 Regional markets

42.34.3 Market prospects for various types of blockboards

42.35 Flashdoors

42.35.1 Types of flashdoors

42.35.2 Trend on the world market

42.35.3 Potential markets

42.4 Mouldings

42.41 Types of Mouldings

42.41.1 Frames

42.41.11 Uses

42.41.12 Market prospects

42.41.13 Potential Markets

42.41.2 Roundlings

42.41.21 Uses

42.41.22 Market prospects

42.41.23 Potential markets

42.41.3 Window and Door frames

42.41.31 Types

42.41.32 Competition with non-wooden frames

42.41.33 Potential Markets

42.41.4 Leaders

42.41.41 Types

42.41.42 Competition between the materials

42.41.43 Potential markets

42.5 Export market for Furniture

42.50 Classification of furniture

42.51 Chairs

42.51.1 World trade in Wooden chairs

42.51.2 Potential markets

42.51.3 Marketing

42.52 Knock-down Furniture

42.52.1 Types and Classes

42.52.2 Potential markets

42.52.3 Market promotion

42.53 Art-craft furnitures

42.53.1 North American market

42.53.2 West Asian market

42.53.3 European market

42.53.4 Australian and South African market

42.54 Furniture parts

42.54.1 Types, uses

42.54.2 East Asiatic Market

42.54.3 American Market

42.54.4 European Market

42.54.5 Australian Market

42.54.6 New markets

42.6 Export market for boats

42.61 "Do it yourself" boats

42.61.1 Principles

42.61.2 American Market

42.61.3 Carribean and South American market

42.61.4 European market

42.61.5 Other markets

42.62 Speed boats

42.62.1 Competition

42.62.2 Potential markets

42.63 Fancy boats

42.63.1 Types

42.63.2 Potential market

42.64 Oars and paddles

42.64.1 Types

42.64.2 Potential maeket for carved paddles

42.64.3 Potential market for laminated paddles and ors

42.65 Wooden lighters

42.65.1 Problems of marketing

42.65.2 Potential Markets

42.7 Export market for Matches

42.71 World trade in matches

42.72 Brunei

42.73 Not registered export

42.8 Export market for wood chips

42.81 Types and utilization

42.82 Prospect and tendency on the world market

42.83 Quantitative aspect and transport

42.84 Japan market

42.85 Israel

42.86 Australia

42.87 Mainland China

## (5) IDENTIFICATION OF POTENTIAL TIMBER INDUSTRIES

### 51 Small Saws

51.1 Type, raw material and production

51.2 Equipment, Staff

51.3 Capital requirement

51.4 Coast calculations

51.5 Organization

51.6 Marketing

51.7 Finance

### 52 Board Production

#### 5211 Blockboards

52.11 Type, raw material, production

52.12 Equipment, Staff

52.13 Capital requirement

52.14 Cost calculation

52.15 Ownership, Finance

52.16 Locations

52.17 Marketing

#### 52.2 Veneered Particle boards

52.21 Type of product

52.22 Equipment, Staff

52.23 Capital requirement

52.24 Cost calculation

52.25 Finance, Ownership

#### 52.3 Plywood

52.31 Type of plywood production

52.32 Equipment, Staff

52.33 Capital requirement

52.34 Finance, Ownership

52.35 Locations

52.36 Marketing

53 Moulding plants

53.1 Type of products

53.2 Equipment, Staff

53.3 Capital requirement

53.4 Cost Calculations

53.5 Locations

53.6 Ownerships

54 Furniture production

54.1 Knock-down Furniture

54.11 Types of products

54.12 Equipment & Machinery

54.13 Investment

54.14 Profit

54.15 Development of industry

54.2 Production of chairs

54.21 Chrisis in chairs factories aborad

54.22 Organization

54.23 Acting Body.

55 Boat building

55.1 Problems

55.2 Training

55.3 Marketing

55.4 Equipment

56 Match Factory

56.1 Equipment and Staff

56.2 Capital requirement

56.3 Technical requirement

56.4 Profit

56.5 Finance

56.6 Location

57 Floating Chip-plant

57.1 Principles of operation

57.2 Capital requirement

57.3 Cost calculation

57.4 Potential partners

57.5 Feasibility study

58 Wood wool plant

58.1 Principles of operation, raw material

58.2 Equipment, Staff

58.3 Investment

58.4 Cost calculation

58.5 Potential market

59 Fibre board production

59.1 Type

59.2 Equipment, Staff

59.3 Investment, capacity

59.4 Profit

59.5 Location

59.6 Ownership

59.7 Raw materials

(6) Recommendations

61 Principles

62 Marketing Promotion

62.1 Organization

62.2 Project

62.3 Marketing promotion, Finance

## 7. Summary

71. There is ample supply of wooden raw material in Sarawak, though Ramin logs will be rare in the next years.

72. There is sufficient or too much saw-milling industry, to supply saw wood to any secondary timber industry.

73. The potential production of wooden material outside of the forests exceeds by far the present production of forest logs. This material may form the base of a "small-saw" industry to introduce and initiate those part of the population, which does not participate in Sarawak's present timber trade, and other timber industries.

74. The development of timber industry in Sarawak is hampered by an outdated and inefficient marketing system. Proposals for the development of an industrial - marketing system were made.

Marketing is the key problem for Sarawak's potential timber industry.

75. There are good prospects to develop the following timber industries in Sarawak:

Small "Saw-mills"
Blockboard production
Production of veneered particle boards
Plywood factories
knock-down furniture production
Chair manufacturing
One match factory
Production of "enameled" fibre boards
Boat-building
Wood-wool slicing
A floating wood-chip production.

76. Bilateral projects were recommended for the development of boat-building and furniture production.

An international project was proposed for:

Market research and market development organization and training of the timber trade and technical assistance to the timber industry.

77. Suggestions for the modification of regulations, grading rules and measurement were made. Proposals for administration of the timber industry were put forwards.

78. Quick actions were recommended in regard to:

The increasing costs of investment the present availability of investment capital, the expected growth of competition on the market; and

The present interest of the timber trade to commence industrial production.

# CHAPTER I

## (1) INTRODUCTION

On the request of the Government of Malaysia, the United Nations Industrial Development Organisation delegated Dr. G.B. Von Wendorff, Consultant in Timber Industries as a member of a team of industrial experts to Malaysia in order to :-

(1) identify the possibilities for starting new manufacturing operations in various fields;

(2) conduct required prefeasibility studies, especially in the wood products industries;

(3) identify problems and needs of existing industries;

(4) assess the prerequisites for industrial development such as the availability of natural resources and raw materials;

(5) assess the manpower and infrastructure requirements of the recommended industrial development;

(6) train counterparts in the above activities.

In co-ordination with the investigations of the Federal Industrial Development Authority, it was agreed to concentrate in the first phase of the assignment on the State of Sarawak. The expert arrived in Malaysia on the 1st of July, 1971 and visited Sarawak.

### (1.2.) Acknowledgements

The expert is greatly indebted to the Federal Government of Malaysia and the Government of Sarawak for the active support which he enjoyed during his stay in the country.

He wishes to express his gratitude to FIDA for the friendly co-operation, guidance and for the provision of all facilities and information and in particular to the following:-

(1) The Deputy Chief Minister and Minister for Communications and Works, Mr. Stephen Yong Kuet Tse;

(2) Deputy State Financial Secretary, Mr. Liang Kim Bang;

(3) Conservator of Forests, Mr. L.S.V. Murthy;

(4) Working Plans Officers, Forest Department, Mr. Leo Chai Chia Liang;

(5) Senior Statistician, Mr. Wong Tat Pook;

(6) Timber Research Officer, Mr. John Cheng Siang Kok;

(7) Section Forest Officers in Sarawak;

(8) Loggers, sawmillers and timber merchants who have been very helpful during the course of the field investigations.

...3/

# CHAPTER II

## (2) THE RAW MATERIAL

### 21. WOODLANDS

#### 21.0 General.

Sarawak has a landed surface of 47,588 square miles of which approximately 35,748.1 square miles are covered with forests. About 26,500 square miles of this are considered unsuitable for agricultural purposes. But there is as well a considerable number of trees, shrubs and cane growing outside of the forests, as for instance:-

| | |
|---|---|
| rubber plantations | 1,229.5 square miles |
| orchards and gardens | 30.9 square miles |

shade trees on pastures and farm land relief trees on recently claimed agriculture land.

No state-wide forest inventory was done up till now. Forest inventories cover only some of the Forest Reserves and Protected Forests, mostly in the swamp and lowland forests, and few in the hill forests. The older inventories give only summarized figures and do not give details on the distribution of timber species. The new, more detailed inventories done after independence do not cover the whole country.

Figures given hereunder are therefore not supposed to anticipate the outcome of a future general forest inventory. In the absence of more detailed information, these figures represent a rough estimate, to show, with which kind of wooden raw material and in which quantitative dimension the future timber industry should be considered.

21.1 Forests

The table below shows the area of forests in Sarawak:

| Type of Forest | Square miles | Acres |
|---|---|---|
| Mixed Swamp Forests | 4,533.2 | 2,901,248 |
| Alan Forests | 746.8 | 477,952 |
| Padang Paya | 409.8 | 262,272 |
| Hill Forests | 28,577.6 | 18,289,664 |
| Kerangas Forests | 1,412.6 | 204,064 |
| Riverain Forests | 40.1 | 25,664 |
| Beach Forests | 28.0 | 17,920 |
| Total | 35,748.1 | 22,178,784 |

Source: Planimetric Measurement of Land Use Map, Sarawak 1966.

21.11 Swamp Forests Species

21.111 The Mixed Swamp Forests and Alan Forests may have had a stand of about

13,500,000 tons Ramin from which
about 4,000,000 tons Ramin had been taken, leaving
about 8,500,000 tons Ramin stand of which about
900,000 tons Ramin are on not exploitable locations
7,400,000 tons

This species grows rather slowly. The exploited forests could be harvested in another 60 years, less the ten last years under considerations. That means, if the present rate of exploitation continues, the present stock of mature Ramin logs will be consumed in about 12 to 16 years, and there will be a gap of 32-34 years with little or no supply of Ramin wood.

The F.A.O. Report: The Peat Swamp Forests of Sarawak and their industrial potential (Appendix 2) Kuala Lumpur 1970, page - estimates the growing stock of Ramin with 5,515,564 tons.

The recorded production of Ramin logs was

| | tons | The export in roundwood equivalent tons/heppus |
|---|---|---|
| 1965 | 435,576 | |
| 1966 | 442,183 | 384,744 |
| 1967 | 495,147 | 341,527 |
| 1968 | 562,843 | 384,797 |
| 1969 | 523,985 | |

That means, if the present rate of exploitation continues, the total stock of Ramin would be cleared away within about 12 years or allowing for 1% increment per year in about 15 years' time.

The difference between the two estimates is caused by the minimum diameter which was considered. Both estimates arrive to the same conclusion: that the Ramin exploitation of the last years surpassed the annual increment considerably and that Ramin wood will be in short supply within the very next year.

21.112 Alan

The F.A.O. Report estimates the present stand of Alan to be 8,168,168 tons calculated on the basis of 5.7 tons/acre in average of all the swamp forests. The reports on forest industries in various swamp forest areas indicate a wide range of difference in the stand of Alan wood per acre as in table:

Swamp Forest and Mixed Dipterocarp Forests

| Forest Type | Lingga Klauh | Beluru | Meludam | Sligi |
|---|---|---|---|---|
| | Stands per acre | Stands per acre | Stands per acre | Stands per acre |
| 3.1 Alan | 0.3 tons | | | |
| 3.6 Alan Forests | 38.6 tons | 38.6 tons | 41.3 tons | 43.4 tons |
| 3.7 Alan Bunga Forests | 54.4 tons | 48.5 tons | 33.3 tons | 55.0 tons |

Source: Forest Working Plan

The difference of Alan stands in mixed dipterocarp swamp forests is about 0.2 - 0.8 ton/acre and in Alan Forests, the difference is 48 ton/acres. It was estimated that 2,800,310 acres of mixed swamp forests contain about:

2,080,186 tons

and 477,952 acres of Alan Forests contain about 2,045,634 tons

Total 4,125,820 tons

The stands of Alan wood in the 262,272 acres of Padang Paya were not considered, since it seemed unlikely that these low-stand swamps could be exploited economically.

The exploitation of Alan wood was recorded as below:-

| | |
|---|---|
| 1965 | 136,792 tons |
| 1966 | 208,876 tons |
| 1967 | 251,003 tons |
| 1968 | 208,308 tons |
| 1969 | 346,779 tons |

It must be considered that this figure includes roughly 55% Alan Batu hollow logs, which were calculated with 50% of their standing volume.

| | |
|---|---|
| That means, | 112,500 tons Alan bunga |
| roughly | 275,000 tons of Alan batu trees |
| were felled per annum (total) | 387,500 tons per annum |

Taking 10% of the Alan stands as unexploitable, this would mean that from an exploitable stock of

| | |
|---|---|
| roughly | 3,713,000 tons about 387,000 tons were harvested |

or more than 10% while the increment may be taken in the range of about 2.3% per annum, resulting to an "over cut" in the range of 7.7% a year or more. This leads to:

(a) removal of overmature material as found in all virgin forests, resulting in rise of increment.

(b) destruction of the seed bearing trees, resulting in decrease of increment.

While both could be observed as far as Ramin was concerned, where exploited mixed dipterocarp swamp showed a decrease of Ramin population and an increase of non-desirable species and an increase of Alan population, the exploited Alan forests showed a promising regeneration, indicating an increase of productivity. This increase of productivity means better increment in volume, and in addition to that, an even higher increase of value production per acre. The trade value per cubic foot of young Alan bunga exceeds by far the value of overmature, (mostly hollow) Alan batu.

Therefore, the "over cut" of Alan, can be considered as being of advantage as long as it guidss to a shorter rotation.

A shorter rotation, resulting in smaller average diameters of the harvested logs, will have its consequences on the type of conversion.

Overmature, hard, hollow, Alan batu can up till now only be converted by sawmills. Sawn Alan batu does not stand good chances for export, (see Table No.1). Only a very small proportion of the Alan wood, which was extracted from the forests, was exported in the form of sawn wood. A somewhat more important part was exported as round logs, mainly during the last years, but the bulk was not exported. There are no records available on the quantity of :-

(i) Alan Batu sawn up for domestic consumption;

(ii) Alan Batu logs lost on the way between forest and sawmills;

(iii) Alan Bunga sawn up for domestic consumption;

(iv) Alan Bunga logs lost on the way between forest and port of shipment or the sawmills;

(v) Alan Batu logs recorded as "extracted from the forest" but found to be too decayed for any industrial conversion and subsequently rejected in the mills.

Apparently the quantity of Alan logs lost between forests and loading or sawing is very considerable. Decaying Alan logs can be seen all along Sarawak's sea coast and along nearly all main streams in the swamp area. It can be assumed that an even bigger quantity of Alan logs have been drowned.

The demand on the oversea's market for Alan bunga (and this is exported in log form only), showed much instability The demand rises steeply during periods of short supply of the market for peeler logs. Alan is the first timber species to be affected by seasonal or structural digressions of demand

Summary considerations on Alan.

(1) The overcut of Alan forests and some of the Ramin forests, results in an increased regeneration of Alan. Therefore, more Alan wood will become available on long term future.

(2) The overcut of Alan shall result in a removal of mostly Alan batu.

(3) If the Alan forests are worked on a short rotation, more Alan bunga logs with diameters between:

(a) 18" and 24" and

and less (b) 24" and 36"

will become available.

(4) Alan bunga is primarily a timber for plywood production and has little trade value as sawn wood.

(5) Alan batu cannot yet be used for plywood and its sole outlet are at present the sawmills. The market oannot absorb as much sawn Alan batu, as has been produced.

(6) This calls for additional industrial capacity to convert:

(a) Alan bunga, diameter 18" to 24" which cannot be exported easily. (Diameters 24" and more will find an open international market if no Alan batu are mixed in the parcels).

(b) Alan batu for products other than sawn wood.

21.113 **Jong Kong**

The stands of Jong Kong may be in the range of :

6,720,000 tons in the Mixed Swamp Forests and
200,000 tons in the Alan Forests

6,920,000 of which about
1,040,000 may be on non-exploitable sites

5,880,000
1,725,000 tons were exploited during the last years.

The remaining
4,155,000 tons plus an increment of 4% per annum
(4% per annum = 160,220 tons/per year)
1,160,000 tons during ten years

5,757,000 indicated that the present rate of exploitation removes the overmature material, but can be maintained for the next 25 years, if the regeneration is encouraged.

The F.A.O. Report (Appendix 2): The Peat Swamp Forests of Sarawak and their industrial potentiality, 1970, page 26 estimates a growing stock of 3,292,703 tons of Jong Kong or 2.3 tons per acre on 1,442,384 acres of swamp forests.

The inventories of the various peat swamp forests in Sarawak indicates that the stands of Jong Kong wood in the Forest Type 3.6 (Alan Forests) and 3.7 (Alan bunga forests) together roughly 478,000 acres and Forest Type 3.9 (Padang Paya) roughly 262,000 acres contain very little (in average less than ½ ton per acre) or no Jong Kong. Also Mixed Swamp Forest Type 3.4 (Swamp Forest in the Baram District) contains little or no Jong Kong. The only forest type in which Jong Kong can be found in economical quantities is the Mixed Swamp Forest Type 3.1 and its subtypes.

The area of swamp forest with 1,442,384 acres, taken as bases for this calculation comprises only those swamp forests which have been gazetted as permanent forests.

This gazetted forest areas contain Padang Paya with practically no exploitable stock while the report takes it for granted, that all the swamp forests on unalienated State Land Peat Swamp Forest has no wooden stock, worth to be considered.

Without a State-wide inventory, covering the total peat swamp regardless of its property status either

as gazetted permanent forests,
as unalienated State Land or
as private or community property,

it is hard to say how much timber production can be expected at present and in the future of the total peat swamp area.

On the limited visits to swamp forest areas, it was observed that there was not only a considerable (although not always fully recorded) timber production outside of the gazetted permanent forests areas, but a considerable stock of wood and a regeneration (population of young trees), indicating potential timber production of the next generation as well.

It is a fact, that some of the non-protected forests is being destroyed. But the impact of forest destruction is mainly on lowland, alluvial sites and accessible hill forests, connected with dry padi and only marginal on peat swamps.

The area of unalienated peat swamp forest is roughly as follows:-

| | |
|---|---|
| Total swamp forests | 3,641,472 acres |
| less gazetted permanent forest | 1,442,384 acres |
| | 2,199,088 acres |

To consider timber production on this unalienated peat swamp forest as nil therefore appears to be not fully justified.

If one takes it, that Jong Kong grows on mixed dipterocarp swamp forests type 3.1, the area would be:*

| | | |
|---|---|---|
| Kuching | | 921,280 acres |
| Sibu | | 1,133,070 acres |
| Bintulu | | 249,780 acres |
| Miri | 597,620 | |
| minus swamp forest type 3.4 | 411,120 | |
| | 186,500 | 186,500 acres |
| Total forest type 3.1 and similar types presumably containing Jong Kong | | 2,490,630 acres |

Taking a stock of 2.3 tons/acres for the whole area the stand could be estimated in the range of about 5,730,000 tons.

However, if one distinguishes between stands of Jong Kong in gazetted permanent forests type 3.1 and unalienated mixed swamp forests type 3.1, the total stand could be estimated at about 4,010,000 tons. (See table below).

* Planimetric Measurement of Land Use Map-Sarawak,1966.

| | Acreage | tons/acre | Total (tons) |
|---|---|---|---|
| Gazetted Permanent Forest type 3.1 | 996,000 | 2.3 | 2,291,000 |
| Unalienated mixed swamp Forest type 3.1 | 1,495,000 | 1.15 | 1,719,000 |
| | | | 4,010,000 |

## EXPORT OF JONG KONG

from Sarawak in Hoppus Tons

| | as round logs code 24,23106 | as sawnwood in cubic tons sawn 24,33156 | total export in round wood equivalent hoppus tons |
|---|---|---|---|
| 1970 | | | |
| 1969 | 179,681 | 856 | 181,383 |
| 1968 | 194,723 | 1,238 | 197,199 |
| 1967 | 196,394 | 948 | 198,290 |
| 1966 | 170,140 | 688 | 171,516 |
| 1965 | 134,510 | 3,666 | 141,842 |
| 1964 | 107,846 | 4,093 | 116,032 |
| 1963 | 98,418 | 3,378 | 105,174 |
| 1962 | 93,211 | 2,846 | 98,903 |
| 1961 | 61,065 | 1,526 | 64,117 |

21.114 SEPETIR PAYA

The inventory reports do not list the species separately. Without an inventory it is hard to estimate how much of this timber is available at present or shall be available in the future. The matter is complicated by the fact that the name "SEPETIR PAYA" is attributed to two species; from different families. (Pseudo sindora - see "Common Sarawak Trees" Page 85 ).

Copaifera palustris - see "Common Sarawak Timbers" Page 64

on which the botanical nomenclature is uncertain.

It was observed that some of the sepetir paya timber had qualities and decorative value of the Mahogany class. Other sepetir is hard, brittle and dull and does not seem to have promising features.

21.115 Geronggang

There are no information available on:

(a) the quantity of production

(b) the stand per acre or the total stand in Sarawak

(c) the volume of export

The visual impression is that this species responds favourably on forest operations and regenerates well after exploitations and in secondary forests. Since this species grows faster than Ramin wood and several of the Meranti group, there may be chances that more geronggang wood will become available from re-logging and second-turn operation.

Geronggang belongs to the group of moderate light timber species for which the demand rose continuously with the expansion of board production all over the world.

Geronggang could probably be worked on a relatively short rotation and might reach an annual increment ranging from 60 - 120 cubic feet per acre in pure stands or mixed with Alan compared with about 15 - 40 cu.ft./acre/annum of natural mixed peat swamp forests.

A handicap for the economical utilization of geronggang is the butressed form of the log. Geronggang logs are often not "pipe-round" and have many small bumps on the surface. There are very few defects underneath such bumps or buttresses which may influence the technical value. But the somewhat rough appearance of the logs is a disadvantage for marketing and for first introduction of this species to a consumer.

21.116 KAPUR

Reports on forest inventories in the swamp forests often do not list Kapur or Kapor as an individual timber, but summarize it together with other class 1-3 timbers.

Without further inventories, it is hard to make an estimation of the frequency of the stands of Kapur. More recent inventories list Kapur with stands of 4.0 ton/acre in swamp forest type 3.4. (Joseph Yong : Forest Inventory Beluru Forest Reserve 1971) mentioned it as scattered in Forest Type 3.6 (Alan Forests).

The steadily rising export of Kapur, which approaches the export quantity of Jong Kong may indicate a substantial stand of Kapur in Sarawak's Forests. Kapur occurs not only in the Swamp Forests but in the Hill Forests as well. Inventories on Niah Forest Reserves illustrates this fact.

| Forest Type 4.1 | Tons/Acre |
|---|---|
| Dipterocarp on Low and Undulating Terrain (Low Volume) ... ... ... | 0.6 |
| Dipterocarp on Low and Undulating Terrain (Medium Volume) ... ... ... | 1.4 |
| Dipterocarp on Low and Undulating Terrain (High Volume) ... ... ... | 2.7 |
| **Forest Type 4.2** | |
| Dipterocarp on Hilly terrain and Broken Hills (Medium Volume) ... ... .... | 1.2 |
| Dipterocarp on Hilly terrain and Broken Hills (High Volume) ... ... ... | 4.5 |
| **Forest Type 4.3** | |
| Dipterocarp on gentle slopes (Low Volume) ... | 0.6 |
| Dipterocarp on gentle slopes (Medium Volume) ... | 2.1 |
| Dipterocarp on gentle slopes (High Volume) ... | 10.2 |
| **Forest Type 4.4** | |
| Dipterocarp on steep slopes and dissected terrain (Medium Volume) ... .... ... | 1.5 |
| Dipterocarp on steep slopes and dissected terrain (High Volume) ... ... ... | 9.0 |

## Export of KAPUR from Sarawak

| | Round Logs in Hoppus Tons | Sawn Wood in Cubic Tons | Total Export in Round Wood equivalent Hoppus Tons | F.O.B. Price per Hoppus Ton Round Wood Statistical Average | F.O.B. Price per cubic ton Sawn Wood Statistical Average |
|---|---|---|---|---|---|
| 1970 | | | | | |
| 1969 | 164,820 | 2,051 | 164,820 | 92.5 | 146.2 |
| 1968 | 124,143 | 1,962 | 128,067 | 84,9 | 153.4 |
| 1967 | 67,036 | 1,680 | 70,396 | 79.3 | 155.9 |
| 1966 | 53,426 | 2,172 | 57,770 | 74.2 | 151.9 |
| 1965 | 22,268 | 2,816 | 27,900 | 68.1 | 148.7 |
| 1964 | 14,556 | 3,192 | 20,940 | 74.3 | 149.5 |
| 1963 | 13,755 | 3,497 | 20,749 | 74.7 | 139.0 |
| 1962 | 5,200 | 3,053 | 11,306 | 71.1 | 128.5 |
| 1961 | 3,460 | 1,537 | 6,534 | 61.5 | 146.6 |

Source: Annual Reports of Forestry Department.

The rising export of Kapur roundwood could therefore be accounted (at least partly) to the opening of low-land hill forests.

In spite of the steadily increasing export which Kapur enjoyed during the last years, marketing expansion is doubtful. The prices received for Kapur sawn wood and round wood were always in the lowest category of prices. The weight of

41 lbs./cu.ft. for floating Kapur
(corresponding to a shipping rendiment of about 850 kg./$m^3$)

and 49 lbs./cu.ft. for sinker Kapur
(corresponding to a shipping rendiment of exceeding 1,000 kg./$m^3$ (1041 kg./$m^3$) 1120 kg./$m^3$)

will prove a serious handicap for further market promotion for round logs of Kapur. The wide and distinct sapwood (sometimes affected by borers) reduces the outturn in sawmilling and the resin often stunes the convertion-tools.

The export to the low-price import markets mainly (Hong Kong, Brunei, Sabah, Korea) is another indication that this timber does not answer the technological requirements of the more expanding wood industries.

21.117 **Pulai**

Although not so frequent in number, Pulai makes an important commercial species in the swamp forests for the future. Up till recently, this species was often left by the contractor and subsequently poisoned by the Forestry Department. The reason was that the present way of export in the form of round logs encourages blue stain and decay. Pulai logs left over from a shipment were often found unsuitable for shipment on arrival of the next ship.

This has hampered the utilization of another Alstonia species in Africa as well, until plywood-peeling capacity was installed close to the forests, and the logs were brought fresh to the mills. Peeled veneers of Alstonia are used for:

(a) tomato-fruit boxes (exported to Italy, Spain, Algenia, etc.)

(b) cors of plywood.

The buttressed lower part of the trees are used for blocks in blockboards and for sawn fruit boxes.

In the absence of detailed inventory data on the swamp forests it is hard to say how much Pulai wood originally stocked in the swamp forests and how much is left over for a second operation.

It seems the regeneration of Pulai is greatly favoured by the intensive overcut as executed in nearly all swamp forests. However, many potential seed bearers had been poisoned.

It would be wrong to consider Pulai "as a forest weed". In the forest inventory it was classified under Inventory Class 4 and is regarded as a "non-obligatory species".

The quantity of Pulai exported is not known, since no separate code is used for it in the statistics of export.

The few detailed records and field observations, re-confirmed by interpretations of air photos, indicate that the present stand of "swamp Pulai" could be estimated in the range of about 1.6 to 1.8 million Hoppus Tons and that a cut of about 26,000 tons per year would be corresponding to the annual increment.

21.118 MERANTI from the swamps

21.1180 General notes on Meranti

There are more than 100 Meranti species in Sarawak, which have so different mechanical and technological properties that they cannot be taken as one timber for the purpose of utiligation.

Alan (Shorea Albida) which had formerly been counted as Meranti is now always treated as an individual timber species.

The trade distinguishes between:-

Red Meranti

White Meranti

Yellow Meranti

Selangan

Selangan batu

with a wide differentiation in prices for application and market destinations.

21.1181 **The Red Meranti.**

The Red Meranti group is the most numerous section of Sarawak's Merantis. Most of this Meranti is found inland on the low land hill forests and in the mountains. But SHOREA PLATYCARP and SHOREA MACRANTA occur in the swamp forests.

Again, we have no reliable information on the stock of Red Meranti:

(i) standing in untouched swamp forests
(ii) remaining in swamp forests after operation
(iii) in the regeneration

The Red Meranti were grouped together with other class 1-3 hardwoods, or even more confusing, with other medium light hardwoods, royalty class C and probably as well with other medium light hardwoods royalty Class D.

In some of the inventory reports on swamp forests (T.W.W. Wood: on SEBUYAU 1965) Meranti was mentioned to stock in forest type: 3.1 Mixed Swamp Forests 3.8 tons/acre

| | |
|---|---|
| 3.11 | 3.4 tons/acre |
| 3.12 | 4.8 tons/acre |
| 3.5 | 5.0 tons/acre |

Only the newer inventories (Joseph Yong on Beluru Forest Reserves, April 1971) give more reliable information.

The Red Meranti referred to in the Sebuyau report seem to be mostly SHOREA ULIGINOSA, which have a weight of nearly 50 lbs./per cu.ft. It should not therefore, be counted together with the "Red Meranti" which have a weight between 25-40 lbs./cu.ft. according to page 32 of "Common Sarawak Timbers" Third Edition 1968.

But it is well possible that the older forest inventories considered Alan as "Meranti", since it belongs to the SHOREA's and considered it as a lesser-commercial species - henceforth grouped in inventory class 3 and royalty class D.

The visual impression was that about 1.1 tons/acre of Red Merantis stocked in the untouched swamp forests, and that the regeneration in the exploited swamp forests indicated an increase of the proportion of Red Meranti against the decrease of Ramin.

Only detailed inventories could qualify this rough estimation.

If the visual impression is correct the stock of Red Meranti in the swamp forests may be in the range of about three million tons, and that about 45,000 tons of Red Merantis could be extracted annually from swamp forests in balance with the increment.

It seems that very much more Red Merantis had been exploited from swamp forests during the last years than the annual increment would have allowed for.

21.1182 The Dark Red Merantis (exclusively the SELANGAN-BATU)

The most important of the dark Red Merantis growing in the swamps seems to be SHOREA ULIGINOSA and SHOREA TEYSMANNIANA, and SHOREA SPLENDIDA which is often planted as fruit trees (illipenuts) near kampongs.

The density of distribution in the swamp forests varies very much. Aerial photos and reports from contractors indicate that dark Red Merantis could be found up to 4.2 tons per acre or even more, while from other areas, no dark Red Merantis were reported.

The dark Red Merantis are sinkers and provide, therefore, difficulties for rafting and loading. Unlike other species, most dark Red Merantis cannot be air-seasoned to become floaters without considerable cracking of the crosscut faces. Therefore, timber contractors may overstate the amount of dark Red Merantis, to show how uneconomical and low-profitable their forest operation is, or they understate the number of dark Red Merantis and leave those trees standing to be subsequently poisoned after exploitation.

It is very difficult if not impossible to make a precise identification of dead trees in the dense second growth of the swamp forests.

If one takes the natural stand of dark red merantis in the swamp with approximately 2.5 million tons, the annual increment would be in the range of approximately 30,000 tons per year. It would be an advantage, if this group of timber species could be "overcut", thereby reducing the proportion of dark red Merantis in the swamp forest considerably. Timber species with the technological properties of the dark red Merantis will have a declining demand in the long term future as the use of strong, heavy woods for construction declines, and such outlets as: heavy wooden flooring, heavy wooden waterkrafts, parquettery etc. decline .

As face veneer, the heavy, dark red Merantis stand a good chance if converted in plants close to the forests to avoid costs of transport and decay (pin hole borers) on the way. But dark red Merantis must be steamed or well heated previous to slicing or peeling. As sliced veneers dark red Meranti veneers 0.7 mm. thick, would have a price free delivered to furniture and door factories in the range of about M$ 0.8 - 1.10 per square meter. Excentric peeled veneers cost about M$0.65 - 0.90 per square meter and round peeled veneer (plywood faces) about M$0.36 - 0.70 per square meter.

21.1183 SELANGAN BATU

Timber species of the Selangan Batu group are not typical for the peat swamp forests, but may be felled by swamp forest operators on surrounding clay-riverbanks, lowland forests and near the coast on bright yellow sandy soils (SHOREA FLAVA). Where found, the economical utilization of Selangan Batu often provides a problem to the contractor. The export market for these heavy (sinker), logs is very limited and the price hardly covers the costs of extraction. Several swamills found it difficult to saw Selangan Batu.

21.119 Other Swamp Species

21.1191 Keruin

Keruin appears in swamp forests as well as on dry-land, hill and mountain forests. In the swamp forests it may stock up to 1.7 tons per acre (in forest type 3.4). In the most of the working plans for swamp forests Keruin is not mentioned but it seems to appear quite frequently in secondary growth of swamp forests, mainly on sides with some clay deposits. Without a series of forest inventories, it would be hard to give any estimations on the quantity of Keruin round wood available from swamp forests. Since this species is very

common all over Sarawak, one may state, that the future supply will surpass the demand, in as much as this species has several infavourable technological properties:

brittle;
changes the colour under the influence of light;
splits and cracks in seasoning;
sapwood liable to borers;
contains oleo-resins, interfering with some gluing and surfacing processes;
lacquers "sink-away" inequally.

This is one of the species for which an expansion of utilization appears to become necessary.

21.1192 Rengas

The trade name "Rengas" covers a wide variety of heavy, hard timber species, some of which are rather poisonous

There are no data available on the quantity of Rengas wood available in the peat swamps, and no data on the breakup of the Rengas grouped into individual, botanical species.

This is most regretable, since some of the Rengas timbers have the chance to become a luxury highly decorative commercial species in the roosewood class which could fetch up to M$1,200 per ton f.o.b. on the world market, while a mixed parcel of Rengas would fetch less than M$60 per ton f.o.b. and does not cover the cost of extraction.

Practical knowledge of the Rengas group is lacking. It was found that few of the forestors in the field were able to identify the valuable Rengas species.

One of the Rengas (Melanorrhoea beccarii) was tried for veneer slicing and was found suitable for this purpose. Some of the Rengas susu (Parishia species and Melanochyla species) seem to offer better properties for decorative sliced veneers.

## 21.12 THE HILL FORESTS

### 21.120 Extent of Hill Forests

There are 28,577 miles or 18,289,280 acres of hill forests in Sarawak. * The bulk of this is in the

III Division with 14,417 square miles (Upper Rejang)
and IV Division with 10,745 square miles (Upper Baram)

Considerable Hill Forests relatively close to the coast are in the Fifth Division which has about 2,392 square miles while First and Second Divisions contain together only 1,022 square miles.

The KERANGAS Forests which stocks an area of about 1,412 square miles in Sarawak were not considered, since the wooden stock is of poor quality and logging there appears not only uneconomical but also problematic in regard to side protection.

The F.A.O. Forests Resources Inventory Project undertakes some forest inventories in strategic regions of Central Sarawak. The results were not available while this report was written. Some discrepancies between the various reports make it impossible, at this stage to estimate the quantity of timber available from hill forests.

* Planimetric Measurement of Land Use Map - Sarawak 1966

The Song Logging Company, working in the Rejang Valley above Kapit state an exploitation of 5-6 tons per acre.

The stand of timber per acre in some working plans is summarised in the Table below.

Other loggers working in the Upper Rejang on riverain and hill forest extract less than 5 tons per acre.

Table 2.

Timber stands on Hill Forest Types in tons hoppus per acre

| Working Plan | Forest Type | Total Class 1 - 3 | Total Class 1 - 5 |
|---|---|---|---|
| Niah | 411 | 6.0 | 12.5 |
| Niah | 412 | 14.1 | 22.9 |
| Niah | 413 | 25.8 | 36.3 |
| Niah | 422 | 12.6 | 22.1 |
| Niah | 423 | 26.4 | 39.3 |
| Niah | 431 | 6.0 | 11.9 |
| Niah | 432 | 16.0 | 24.0 |
| Niah | 433 | 28.8 | 40.9 |
| Niah | 442 | 14.2 | 22.2 |
| Niah | 443 | 31.3 | 40.6 |
| Sunjan Tubau | 412 | 14.8 | 25.3 |
| Sunjan Tubau | 413 | 32.6 | 45.7 |
| Sunjan Tubau | 423 | 33.3 | 41.9 |
| Sunjan Tubau | 433 | 34.6 | 47.3 |
| Sunjan Tubau | 443 | 34.9 | 44.1 |

It should be noted, that the Table above contains low hill-forests which are considered within the best in Sarawak. Class 1-3 contain species which fetch f.o.b. prices often inferior to the actual logging and rafting costs in some of the hill forests. These hill forests should, therefore, be considered as "not exploitable under present conditions".

The F.A.O. Report page 145 is based on the assumption that 15 tons net industrial volume per acre could be harvested. This figure was questioned by loggers working in the hill forest and surpasses the actual yield of similar operations in Indonesia. (12.6 tons per acre).

As long as the precise inventory data are not available on:

(a) total stand;
(b) proportion of the various timber species;
(c) proportion of defect material;
(d) minimum dimension and minimum quality;
(e) requirement of intake;

estimations on the potential yield remain guesswork.

It was observed that the present hill forest operation is unnecessarily wasteful. With efficient operation, more than 5-6 tons per acre could be harvested. But the extremely steep and dissected terrain would not allow for a commercial logging operation covering 100% of the area. Reviewing air photos, it was estimated that 34.3% of the Rejang catchment areas are virtually inaccessible for profitable logging operation based on projected logging costs and the level of prices for round log for 1971.

Since then the level of prices has dropped considerably and did not reach the bottom, while this report was written.

Below is a projected level of prices for the various timber species, based on graphical forecast:

index figures:

| | |
|---|---|
| Meranti f.o.b. | M$105/- per Hoppus Ton |
| Kapur & Keruin f.o.b. | M$ 65/- |
| Selangan Batu | M$ 52/- |

and assumed logging costs:

(A) Slope exceeding 35°
Distance to navigable river more than 25 miles
Logging cost plus transport to port and loading M$128 per ton/hoppus

(B) Slope exceeding 35°
Distance to navigable river 10-25 miles
Logging cost (see above) M$105 per ton/hoppus

(C) Slope exceeding 35°
Distance to navigable river 5-10 miles
Logging costs (see above) M$85 per ton/hoppus

(D) Slope exceeding 35°
Distance to navigable river between 1 and 5 miles
Logging costs (see above) M$78 per ton/hoppus

(E) Slope exceeding 35°
Less than 1 mile from navigable river
Logging costs M$54 per ton/hoppus

(F) Slope 20°- 35°
Distance to navigable river more than 25 miles
Logging costs (see above) M$114 per ton/hoppus

(G) Slope 20°-35°

Distance 10 - 25 miles to navigable river

Logging costs (see above) M$90 per ton/hoppus

(H) Slope 20°-35°

Distance 5 - 10 miles to navigable river

Logging costs (see above) M$71 per ton/hoppus

(I) Slope 20°-35°

Distance 1 - 5 miles to navigable river

Logging costs (see above) M$64 per ton/hoppus

(J) Slope 20°-35°

Distance less than 1 mile to navigable river

Logging costs (see above) M$51 per ton/hoppus.

Based on the above projection, only a very small proportion of Sarawak's hill forest could be logged economically unless:

(a) logging costs are reduced drastically;

(b) more timber per acre can be utilised;

(c) cost of transport are reduced;

(d) the f.o.b. prices are improved.

During a recession of the Timber Market in South East Asia, many logging operations in more favourable conditions than those prevailing in some of Sarawak's hill forests are closing down. It is debateable, therefore, whether heavy investment in opening new forest area are justifiable at this stage. New markets should be established first by applied market research and aggressive market promotion.

It is not predictable how long and how severe the recession on the South East Asian Timber Market will be. But the price of heavy tropical hardwoods decreased permanently in relation to general index of prices. This decrease of prices affected heavy sawn hardwood very much more than it affects light hardwoods and the products thereof, (plywood, veneer boards, blockboards, etc.), while the prices of tropical coniferous wood increase slightly.

Considering the expansion of the devastation of natural tropical forests, as a result of growing pressure of population onto the remaining forests, one should expect that the supply of tropical hardwoods should eventually become short, thereby resulting in higher prices. But tropical hardwoods are open to competition by other materials and are substituted in an increasing manner.

Typical examples are:

Substitution of hardwood flooring for which the heavy and hard tropical hardwoods were particularly suited - by concrete, synthetic flooring material, wall to wall carpets, terrazzo.

In several tropical countries it was recently found that timber could be produced much cheaper in intensive forest plantations which are established close to the point of consumption, than by logging remote natural forests to which the access is costly and calls for more investment capital, per cubic unit than plantations of fast growing timbers.

This applies as well for wide parts of Sarawak's hill forests. In particular, forest locations as specified on page 29/30 by A, B, F, G.

Summary:

(1) The quantity of wood standing in Sarawak's hill forest is unknown but can be estimated in the range of about 1,000,000,000 tons in total, of which about 72,000,000 tons may be valuable timber species and qualities fetching at present (September 1971) more than M$90 per 50 cu.ft. hoppus, and about 150,000,000 tons of timber may have an f.o.b. value in the range of about M$75 per 50 cu.ft. hoppus.

(2) For the majority of Sarawak's hill forest, costs of logging and road building will exceed the present low value of round wood.

(3) Logging in the hill forests of Central Sarawak may become profitable.

(a) if the price of timber rises to the level of prices of 1970,

(b) if logging costs are reduced considerably by improvement of the logging operation,

(c) if more of the timbers can be utilized economically.

(4) There can be no doubt that fast growing timber species could be produced in plantations for less cost per cubic unit, than by logging in remote mountainous forests.

21.20 Wood production outside of the forests

The planimetric measurement of Land Use Map Sarawak 1966 lists:-

| | |
|---|---|
| 30.9 square miles | Horticultural Lands |
| 1,229.5 square miles | Rubber |
| 8,689.7 square miles | Shifting cultivation |
| 653.8 square miles | Secondary growth |
| 409.8 square miles | Padang Paya |
| 671.3 square miles | Nipah-mangrove swamps |

all of them contain some wooden material.

21.21. Wood production on Horticultural Lands

Although the 19,956 acres of horticultural lands are mostly stocked with fruit trees like:

Durian
Rose apples
Mango
Illipenut trees and others

little or no wood is utilised.

21.22 Rubber

The agricultural statistics (1969) lists 288,420 acres of low yield rubber which should be felled and replaced by high yield rubber varieties. The wooden volume could be taken as approximately 1,650 cu.ft. or 33 tons per acre.

The increment of rubber per acre can be taken to be in the range of about 55 cu.ft./per acre per year.

That means that close to 9.5 million cubic tons of rubber wood has to be felled with in the next few years in Sarawak.

If this material could be utilized economically, it would help to lessen the strain of the rubber farmers and provide some funds for replanting high yield rubber. (Please see hereto chapter 57.32).

21.23 Shifting Cultivation

(Dry padi)

It was observed that considerable quantities of wooden materials were left on the dry padi after the small dimensioned branches have been burned.

There are no records available on

(a) the total quantity of wood cut for dry padi cultivation on first burning or re-burning of fallow land.

(b) the timber species cut for this purpose

(c) the quantity and timber species left on dry padi after burning.

It is estimated that the virgin forest contain at least 55 tons of wooden material (of all species and all dimensions) per acre which are burned or left to rot on first dry padi cultivation, and that fallow land, left for 10 years bears about 10 - 15 cubic tons of wooden materials (all species, all dimensions) and fallow land left for 6 years bears about 5-6 tons of wooden materials (all species, all dimensions) per acre.

If one estimates that 40% of the dry padi is burnt in shorter cycles of 6 to 10 years

15% of the dry padi is burned in cycles of more than 10 years

5% of the dry padi is planted on newly claimed virgin forests,

The quantity of solid wood left half-burned to rot might be estimated as :

| | | |
|---|---|---|
| (a) | 40% = 2,224,563 acres | |
| | burnt per year 1/5 = 444,912 acres | |
| | solid wooden volume : | Nil |
| (b) | 40% = 2,224,563 acres | |
| | burnt per year 1/7 = 317,794 acres | 1,588,970 tons/year |
| (c) | 15% = 834,212 acres | |
| | burnt per year 1/12 = 69,517 acres | |
| | with 12 tons per acre | 834,212 tons/year |
| (d) | 5% = 278,070 acres | |
| | with 55 tons per acre | 14,293,877 tons/year |
| | Total | 16,717,069 tons/year |

That means, the quantity of wood left to rot on dry padi after burning exceeds by far the quantity of wood exported from Sarawak.

If part of this material could be utilised economically its impact on the national economy would be considerable. Utilization of wooden material from dry padi cultivation might help to bring some moderate cash income to those parts of the population, which needed it mostly.

See hereto chapter No. 5.1

## 21.24 Wood Production on secondary growth

Little or nothing is known about the timber species occuring on secondary growth in Sarawak. This is a field where research work is urgently required. The secondary forests are be by no means without potential economical value.

Some of the timber species, which appear spontanously in secondary growths in Sarawak have very high increment. For instance, some of the ALBIZZIA species, would make a good rough material for matches, core veneer, particle boards and fibre boards (see chapters 52, 53,&56) or MAKRANKHA which could be used for woodwool. (see chapter 59 ).

Research on fudder value or applications for medical purposes of species common on secondary growth may offer some interesting proppects.

The area covered with secondary growth is expanding continuously.

## 21.25 Padang Paya

The 262,272 acres of Padang Paya identified in the land use maps were listed as part of the swamp forests. But the poor timber stands on locations, where logging is hampered by the swampy ground and overflooding can seldom be harvested economically. Only timbers of high value per cubic unit could be extracted. This might be the case for Rengas Paya whose economical value could be raised if a veneer slicing plant is installed, which would convert good shaped and good coloured logs into decorative veneers. Since there is no inventory available,which states the

frequency of Rengas Paya and of course no inventory which would indicate the shape of the trees or the colour of the wood, it is not possible to estimate the available quantity of Rengas Paya in veneer-slicing quantity.

The visual impression was that there was a fair quantity of Rengas Paya all along the creek and rivers of the swamp forest area and in the riverain forests upstream. In some areas more than 50 trees per mile were counted, but the shape of the trees, growing direct along the riverbanks were poor. It can be expected, that the shape of the trees would improve further inland, but to make definite statements would have to be based on detailed inventories. (a hereto chapter ).

## 21.26 Nipah-Mangrove Swamps

The planimetric Measurement summarises two types of vegetations which occur close together, but which produce entirely different materials.

### 21.261 Mangrove

Mangrove wood is used in Sarawak for various purposes mainly poles, posts, firewood and charcoal.

Technically, mangrove bark can be used for tannin. But the demand for vegetable tannin has decreased as a result of competition from synthetic tannins and substitution of leather by synthetic material.

The districts with extensive mangroves are:

the Sarawak delta
the Rejang delta
the Lassa swamp east of Matu in the Third Division
the Trusan estuary in the Fifth Division

In the First and Second Divisions, there are about 154,688 acres of mangrove and nipah swamps. Some of the mangrove stands in the Sarawak Delta are licensed out in very small areas and are used for charcoal, firewood and poles for local consumption. The degree of exploitation is not assessable since records are sketchy and incomplete.

It appears that some of the mangrove forests are over-exploited, as in the case of Sungai Santubong, while others are hardly touched like the Batang Rambungan area.

This uneven exploitation and the scattered distribution along the coast and various estuaries between Batang Kayan in the West and Batang Samarahan in the East and the isolated mangrove swamps on Batang Saribas render the mangrove forests of the two Divisions economically unsuitable for an exploitation similar to the Sarawak Woodchip operation, which is based a stationary chipping and loading facilities.

There may be chances for mobile chipping operations (see hereto chapter 57 page ). But former inventories would have to be re-checked and recent changes would have to be considered.

No mangrove exploitation should be allowed without the approval of the Fishery Department Since mangrove swamps form an important part in shrimp and prawn regeneration as well as for some fish species.

The Third Division has about 54,412 acres of Mangrove Forest Reserves, and 50,707 acres of Mangrove State Land. The total area of Nipah plus Mangrove swamps was about 229,500 acres. *

* Land and Survey Measurement 1966.

The export of wood chips, as stated by Messrs. Sarawak Wood Chip are in the range of 160,000 - 180,000 tons per year. If one takes 40 tons per acre as average stands, about 30 tons per acre would be harvestable. Or 5,200 to 6,000 acres would be cleared per annum. The 105,119 acres would last for about 20 years of operation. The cycle of mangrove operations is in other parts of the tropics 30 - 35 years. Whether an additional 90,000 acres of Mangrovs close to Kuala Rejang could be found to cover the period between the years 1990 and 2005 is questionable. (see hereto chapter

21.262 Nipah

The extent of nipah stands as opposed to mangrove forests is unknown. Often, both mangrove and nipah grown inter-mixed, but there are wide areas which have either pure stands of nipah or pure stands of mangrove, which could be clearly distinguished by air photos. Nipah is used for various purposes viz:

for thatched roofs
light construction
and for sugar juice tapping

Sugar juice was formerly used extensively for alcohol distillation. Nipah distillation has declined during the last years and had probably never utilized the whole potential of the nipah stands.

How much of the nipah stands are tapped for rural sugar consumption is not assessable. (see hereto Report on Agro-industries).

The same applies to rural utilization of the nipah leaves and ripe. Nipah ripe would make an excellent material for insulation boards and could be used for cardboard production, if available in quantity of 120,000 tons (air dried) per annum.

Before definite recommendations for any kind of nipah based-industry could be made further, investigations would be required on:

(a) extend of Nipah stands;

(b) yield per annum;

(c) quantity required for local demand of sugar and fibres;

(d) area of nipah to be preserved for river banks - protection and protection of animal life;

(e) cost of harvesting and transport.

There seem to be prospects that it may be economical to utilize Nipah to produce insulation boards for local consumption and export. A full feasibility study would be required. Subject to the above investigations, a plant with an investment of approximately $1.8m on machinery, $0.6m on water crafts and lighters and $0.5m on buildings, may produce insulation boards in the range of 11 million M$ per annum and employ 300 - 400 men in harvesting and transport and 80 men in the factory.

## 21.27 Bamboo

In the world there is a wide range of handicrafts based on bamboo. Industrial plants utilize bamboo for paper, cardboards and garden furniture.

In Sarawak's grow several different species of bamboo. Some are found in rather concentrated areas, as for instance, between Bau and Lundu, some are scattered along the sandy banks of small streams or on secondary bushland.

Bamboo pulping appears to be economic only under exceptional conditions. Whether such exceptional conditions exist in Sarawak could not be investigated during the short assignment.

Considering the various factors in Sarawak, in particular:

(a) cost of transport on land;
(b) cost of energy;
(c) cost of labour;
(d) local demand for low quality cardboard;
(e) and for chemical pulped paper;

prospects for industrial pulping of bamboo do not appear to be very promising at present. Feasibility studies for bamboo pulping could probably be treated as of second priority.

Table No.1
(to Chapter 21.112)

UTILIZATION OF Alan and Alan Bunga wood in Sarawak
in 50 cu.ft./tons/hoppus

| Year | Removed from Forest | Exported as Logs | | Exported as Sawnwood in roundwood equivalent | | Export Total | Not recorded for | | Equivalent in Sawnwood |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons | % | | % | | Tons | % | |
| 1970 | | | | | | | | | |
| 1969 | 364,779 | 111,322 | 32.0 | 13,406 | 3.9 | 124,728 | 222,051 | 64 | |
| 1968 | 208,308 | 2,103 | 1.0 | 3,240 | 1.5 | 5,343 | 202,965 | 97 | |
| 1967 | 251,003 | 8,702 | 3.4 | 2,306 | 0.9 | 11,008 | 239,995 | 95 | |
| 1966 | 208,876 | 29,164 | 13.9 | 3,146 | 1.0 | 32,310 | 176,566 | 84 | |
| 1965 | 136,792 | 13,972 | 13.8 | 1,196 | 0.8 | 20,168 | 116,624 | 84 | |
| 1964 | - | 1,184 | - | 2,178 | - | - | - | - | |
| 1963 | 90,280 | 2,063 | - | 190 | - | - | - | - | |
| 1962 | - | 409 | - | - | - | - | - | - | |
| 1961 | - | 629 | - | - | - | - | - | - | |

% of total production

## 22 REGIONAL DISTRIBUTION of timber resources

### 22.0 Introduction - General Notes

Timber is a transport intensive merchandise. A high proportion generally more than 33% - of the "free-factory prices" represent costs of transport. Therefore, the cost of transport from forest to the factory or to the port of shipment, must be considered. Costs of transport depend on :

(a) means of transport;
(b) weight per cubic unit;
(c) distance.

### 22.1 Means of Transport

#### 22.11 Round logs

In the Swamp Forests round logs are transported

(i) from felling place to rail-line on wooden slipway by manual labour.

Construction of slipways and towing by manpower are included in the felling price and amounts to 11-15 M$ per ton. A team of nine men will extract about 5 tons per day. This gives an income of about M$7.25 per day per man.

No break-up of this was available. Based on time studies from Indonesia applied to a daily wage in the forest of Sarawak (M$8 per day).

Tree hunting = access to the tree,
and clearing of shrubs should cost about

| | |
|---|---|
| | M$0.42 per ton |
| Tree felling | M$1.23 per ton |
| Cross cutting | M$0.80 per ton |
| | M$2.45 per ton |

That means, more than M$10 per ton are paid for building "Djraya Pesar" slipways and towing the logs out.

Extraction by cableway-skidding (VILLACH SYSTEM) under swamp forest conditions would cost about M$6.27 per ton and could reach 1,500 from the main railline for logs of 6-8 tons and 3,000 for logs between 2-3 tons. Using this system of extraction would not only avoid a "slave-like" work, which for political reasons should be abandoned, it would also allow for the extraction of longer logs - resulting in higher outturn and better export prices.

More wood per acre would also be obtained since low quality wood could still be extracted economically with less damage to regeneration. This kind of operation, being more lucrative, would offer more jobs for the rural population since more timber will be felled, extracted and converted. It allows for a less wasteful forest operation. Suitable steel cables are now produced in Malaysia [illegible] see heretc chapter

(ii) by rail from forest to mill.

Although the extraction by rail is now abandoned in nearly all other tropical forest operations of the world, it still appear to be the most adequate technique for swamp forests in Sarawak. Rail extraction costs about M$2.30 per ton, including depreciation of rolling stock in four yeare.

This comparatively low cost of rail transport would allow for the economical transportation of low quality wood, like hollow Alan batu. Weight per cubic unit hardly matters ae far as coet of rail transport is concerned. Transportation cost of per cubic unit of "sinkers" from forest to the mill or to the river bank is about the same as per cubic unit of "floaters."

Considering general overheads and royalties the price "free mill site" is about M$28 per ton;

(iii) Transport of round logs from the bank of the river to mills outside of the forest or to porte of shipment.

| | Cost of raft binding | Towing or rafting | Air Seasoning |
|---|---|---|---|
| Floater logs | $0.30-1.60 per ton | $2-6 per ton | |
| Sinker logs | $2.40-4.20 | $2.40-6.40 | $1.44 |

## 22.12 Round logs transported by road

Information on cost factors for the transport of wooden raw material on land in Sarawak differ very much. By far the lowest costs per ton/mile were given in the F.A.O. Report, page 215 and page 170 which are about 17% to 56% below the level of road hauling costs in Western Malaysia.

Based on information from sawmillers in the Fourth Division working along the Miri-Bintulu Road and on forest roads in the Kapit area, cost of transport of logs for more than 30 miles on roads exceeds the market value of species like Kapur, Keruin and Selangan Batu. Therefore, cross country tranport of round wood other than by river seems not feasible at present.

An expansion of the network of roads in Sarawak would assist short distance transport of logs but would most probably not serve as a means of transport on long distance except for high value timbers for veneer slicing. (See hereto Chapter 22.11.92

Therefore, Sarawak will remain divided in certain "influx areas" for timber, associated with watersheds, and whose industrial structure will have to be considered as separate units.

## 22.1 INFLUX AREAS

### 22.21 REJANG INFLUX AREA

The Rejang influx area contains the :

22.211 Rejang Delta

22.212 The Rejang River below the Pelagus rapids including the Baleh watershed.

22.213 and is connected with the Oya watershed.

22.214 the Mukah watershed must be regarded as an isolated influx area, although it belongs to the Sibu Forest District.

22.211 Rejang Delta

Apart from the Mangrove forests (See page 26) there are no un-committed timber resources available in this influx area.

Logging is rather heavily done in this area. Round wood production is decreasing rapidly. A shortage of raw material was reported by nearly all established timber industries. Five sawmills had stopped operation recently for lack of logs. Round logs and sawn timber is imported to this area from other influx areas in Sarawak as well as from Indonesia. The export cleared by the Tanjong Mani Customs Department includes:

(a) logs from Oya and Upper Rejang;

(b) sawn wood from Miri, Suai, Bintulu, Tatau, Balingian, Mukah, Oya, Saratok, Saribas and occassionally Lingga and Simunjan.

## Forests in Rejang Delta

in acres

| District Sub-District | Mixed Swamp Forests | Alan Forests | Padang Paya | Swamp Nipah and Mangroves | Hill Forests | Kerangas | Riverain |
|---|---|---|---|---|---|---|---|
| SARIKEI | 19,680 | - | - | 179,250 | 1,530 | 1,840 | 510 |
| BINATANG MATU | 75,920 | 4,240 | 3,620 | 2,070 | - | - | - |
| BINATANG DARO | 122,670 | 21,210 | - | 9,930 | - | - | - |
| BINATANG | 62,060 | 6,040 | - | 5,210 | 420 | - | - |
| SIBU | 222,720 | 125,380 | 2,530 | 21,190 | 10,540 | 3,340 | 710 |
| ROBAN (near Selalang) | 9,340 | - | - | 1,540 | 1,540 | - | 1,230 |
| Total | 572,390 | 156,870 | 6,150 | 219,190 | 14,030 | 5,130 | 2,450 |

## Export of Timber from ports in Third Division

| SIBU | | | SARIKEI | | | TANJONG MANI | | |
|---|---|---|---|---|---|---|---|---|
| Year | Hoppus Tons Round Logs | Cubic Tons Sawn wood | Hoppus Tons Round logs | Cubic Tons Sawn wood | Plywood and Veneer | Round logs | Sawn wood | Wooden chips |
| 1965 | 9,616 | 8,367 | - | 173 | - | 325,294 | 158,922 | - |
| 1966 | 12,968 | 4,071 | - | - | - | 446,696 | 127,914 | - |
| 1967 | 12,455 | 5,310 | 83 | 141 | - | 451,467 | 158,382 | - |
| 1968 | 17,142 | 3,312 | - | 24 | - | 483,254 | 176,839 | - |
| 1969 | 10,699 | 1,147 | - | - | - | 597,377 | 182,040 | - |

22.212 The Upper Rejang Influx Area

Not much logging is done up till now in this influx area and much of the forests is not licenced out for forest operations. Dry padi cultivation is expanding eastwards.

The sub-districts Julau and Kanowit are about 66% under dry padi cultivation with rotations of 6 to 10 years. (Dry padi operations in parts of the Second and First Divisions, fallow land is sometimes burned in 4 to 5 years rotations). (See hereto Chapter ).
The Song sub-districts was only about 26% under dry padi cultivation. Since then, hill padi cultivation has spread further inland. The Kapit sub-district, which had 3,269,410 acres of hill forest and only 540,410 acres of hill padi holds a vast nearly untapped supply of timber.* (See hereto Chapter 21.23).

The 4,325,930 acres of hill forests in the Belaga Sub-district cannot be added to the Upper Rejang influx area, as long as the various rapids, in particular the Tibang and Pelagus Rapids prevent rafting and navigation on the Batang Rejang.

Forests in the Upper Rejang influx area (exclusively Belaga sub-district) in acres

| Sub-District | Hill Forests | Swamp Forests |
|---|---|---|
| Julau | 198,790 | - |
| Kanowit | 185,400 | 1,760 |
| Song | 706,230 | - |
| Kapit | 3,269,410 | - |
| Total | 4,359,830 | 1,760 |

* Planimetric Measurement of Land Use Map-Sarawak,1966

22.213 Oya Watershed

The Oya sub-district has 22,170 acres of mixed swamp forests, and Dalat sub-district had

76,450 acres swamp forests
49,280 acres of Alan forests
8,470 acres of Padang Paya *

Regeneration in these swamp forests is better than in other forests of the type 3.1 and exploitation appears to be fairly in balance with the increment.

The Dalat sub-district had 148,350 acres of Hill Forests and 5,790 acres of Kerangas Forests (Land and Survey Measurement 1966).

Random comparisons (by air) of the 1966 Land Use Map with the present state indicates a rapid expansion of hill padi cultivation and rubber plantation and a decline of hill forests. The remaining hill forests south of the Sibu-Bintulu Road may find a better outlet if forest roads are constructed to the Rejang. The hills between the Upper Oya watershed and the Song-Kanowit valley of the Batang Rejang are not high and could be crossed on passes below 450' altitude.

There is no timber industry in the Upper Oya Watershed.

22.214 The Mukah Influx Area

The division between the Lower Oya and the Lower Mukah Watershed is not clear, as a pronounced direction of drainage is not apparent. The swamp forests between Dalat and Kenyana drains to both sides. As a result of this, disputes on forest operation arose. Considering the inland water connection which links the Oya to the Rejang Delta and hereby to better harbour facilities, it might be advisable to

open the swamp forests between Mukah and Oya river in the direction to the Oya river, rather than to the Mukah, where shipping facilities are poor.

As soon as heavy traffic will be allowed on the new Oya-Bintulu Road, Sawn timber, high value veneer logs and stere wood * from dry padi could be brought out from the Upper Mukah watershed. The costs of road transport for low-price logs, for export purposes would be prohibitively high.

A short cut forest road from the hill forests of the Upper Mukah watershed to the Rejang Valley near Song might probably become cheaper, although it would have to cross high (approximately 900' ) and steep terrain.

To make future exploitation of this region feasible, the remaining forests of the Upper Batang Song, the Upper Oya and the Upper Mukah watershed should be regarded as one unit.

Forest destruction in these three watersheds seem to proceed rapidly. To make use of the timber resources before it is destroyed for dry padi cultivation, and to establish the forest roads as a road connection between the Song district and the new Oya-Bintulu Road, the exploitation of this area should be given priority over other new hill forest operations.

In order to attract contractors to this area, royalties should be suspended for the first seven years, under the condition that each year at least four miles of main forest roads are constructed, as aligned by the P.W.D. and in accordance with the P.W.D. standards for "all - season rural feeder roads."

* Stere wood is wooden material which cannot be used for sawmilling or veneer production. It can be used for pulping, particle board, fibreboard, chemical conversion, charcoal, hydranlization, fuel and similar

All possible assistance should be given to the contractor in order to have a good road built. The assistance may be :-

(i) supply of detailed survey maps;

(ii) delegation of road building engineers from voluntary service schemes to assist in supervising the constructional work;

(iii) rock blasting by members of the armed forces, if licence for dynamite cannot be granted;

(iv) pioneer status and suspension of import duty for road building equipment;

(v) suspension of royalties on 2,000 gallons of diesel oil, for every mile of road, transferred to P.W.D.

Forests in the Mukah Influx Area:-

| | |
|---|---|
| Mixed Swamp Forests | 188,030 acres - all under licence |
| Alan Forests | 20,190 acres - all under licence |
| Hill Forests | 184,300 acres unalisnated |
| Kerangas Forests | 7,870 acres |

22.22 THE BARAM-MIRI INFLUX AREA

This is the second largest influx area in Sarawak. It is composed of :

22.221 The Miri area;

22.222 The Niah area;

22.223 The Lower Baram and Medium Baram

In future:

22.224 The Upper Baram and the Plateau which might be connected to the Baram-Miri Influx area.

22.221 The Miri Area

The Miri area is comparatively small, but well developed, as far as infrastructure and timber industry is concerned. The mixed swamp forests and the Alan forests are under rather heavy exploitation. The hill forests have been exploited or have been destroyed during the last year. The Planimetric Measurement of Land Use Map 1966 recorded:

91,160 acres Swamp Forests;
40,220 acres Alan Forests;
9,800 acres Padang Paya;
41,040 acres Hill Forests;

and no Kerangas Forests.

Today very little hill forests and a large proportion of Kerangas forests could be seen from the plane.

The remaining hill forest stocks on low, but rather steep hills. The industrial capacity exceeds the supply of raw material. Round logs, sawn timber, mouldings, furniture and constructional timbers were brought to Miri partly from the sawmills along the Miri-Bintulu road, partly from lower Baram or by road from mid-Baram (Beluru Road) and more sawn wood shall be brought to Miri as the construction of the road to Long Lama proceeds.

22.222 **The Niah Area**

The sub-district Suai-Niah-Sibuti was formerly a sub-divided area, as long as the three rivers provided the only lines of traffic. The relatively well developed network of roads now link the watershed of the three rivers. High cost of road transport prevents logs to be carried from one watershed to the other, but allows for the transport of sawn wood from Sibuti Watershed to Miri town and harbour. Apparently, cost of lorry transport are preventively high to allow for sawmill operation in the Niah Forest Reserve.

The transport of one ton of sawn wood from Niah Forest (Galo) to Miri harbour costs M$80 or more than M$1.50 per ton/mile.

The F.A.O. Report (page ) calculates the transportation and sales cost for the Tatau project as $17.85/ton. Sawn wood would have to be transported either:-

(a) 20 miles on sawmill access road, and 110 miles by road to Sibu plus lighterage from Sibu to Tanjong Mani; or

(b) 20 miles on sawmill access road, and 30 miles by road to Bintulu plus coaster transport to Tanjong Mani.

According to information from sawmills in Bintulu, coaster transport Bintulu/Tanjong Mani costs $21/ton.

The Niah area holds some of the best lowland hill forests of Sarawak. (See Table Page 2v )

The quantity of wooden material growing in secondary forests of this area is considerable. Much wooden material has been wasted in connection with the oil palm project in the Lambir Subis area due to lack of industrial capacity to utilise small dimensioned wood. (see hereto chapter 51 )

The Suai watershed, which is rich in timber resources is not yet linked to the road. Cost of transport prevents the development of timber processing industry in this area.

The forests of the Suai-Niah-Sibuti sub-division according to Planimetric Measurement 1966 contains:

135,250 acres Mixed Swamp Forests, all under operation,

10,820 acres of Alan Forests, all under operation, and

640,470 acfes of Hill Forests, from which a part has been converted for agriculture purposes, ons part been declared as National Park, and the majority has been licenced for logging operation,

22.223 The Lower and Mid-Baram Area

The Planimetric Measurement of Land Use Map - Sarawak, 1966 lists the Lower Baam area together with the whole Baram District:

319,960 acres of Mixed Swamp Forests

17,750 acres of Alan Forests

205,880 acres of Padang Paya

4,067,180 acres of Hill Forests

129,760 acres of Kerangas Forests

One may assume that:

all 319,960 acres of Mixed Swamp Forests;

all 17,750 acres of Alan Forests;

all 205,880 acres of Padang Paya;

about 550,000 acres of Hill Forests and

about 85,000 acres of Kerangas Forests

could be opened in the lower and mid-Baram area. This area includes Beluru Forest Reserves, the Sungai Tinkar watershed up to the Bukit Selihan, the hill forests north of a line Long Miri (on the Baram River) - Batu Malam Rapids (on the Sungai Tutoh) and the remaining hill forests along the Brunei frontier, East of Marudi.

22.25 Summary estimations

Reference is made to page 146 paragraph 5.4 of the F.A.O. Report. The Baram/Miri influx area should have promising prospects if harbour facilities could be improved.

Subject to the results of the F.A.O. Forest Inventory, it may be estimated that the Baram-Miri influx area has the following forest resources, in acres:

| Area | Mixed Swamp Forests | Alan Forests | Hill Forests |
|---|---|---|---|
| Miri | 91,160 | 40,220 | 41,040 |
| Niah | 135,250 | 10,820 | 640,470 |
| Lower & Medium Baram | 319,960 | 17,750 | 550,000 |
| Total | 546,370 | 68,790 | 1,231,510 |

Estimated annual yield of roundwood.

400,000 tons 125,000 tons 6,155,000 tons

Total = 6,680,000 tons per annum

With improved harbour facilities at Kuala Baram, about 60% could be exported as logs = 4 million tons and about 30% could be exported as sawn wood = 1 million ton and about 10% could be exported as board products = 0.5 million ton

This would add $590,000,000 to the national economy per annum calaulated on the basis of :

$200,000,000 export value of logs
$260,000,000 export value of sawn wood
$130,000,000 export value of board products

$590,000,000

At present, logs are rafted over the sandbar, at $4.60 per ton. Additional costs caused by the sandbar can be estimated at $2.60 per ton.

Loading is interrupted during monsoon or rough sea. Shipping lines decline to call at Kuala Baram, due to the usual delay and the lack of harbour facilities there.

This handicaps the timber trade of this area.

Sawnwood is brough by coasters to Tanjong Mani which costs about M$22-24 per ton.

Board industries cannot be established in this area, as long as the harbour facilities are not improved.

Direct government revenues from forest royalities (in addition to the present revenues) may be expected in the range of about M$24,000,000 - M$60,000,000 per annum.

The timber export trade could contribute:

about M$2 per ton of roundwood = approximately M$8 million p.a.
about M$8 per ton of sawnwood = approximately M$8 million p.a.
about M$16 per ton of plywood = approximately M$8 million p.a.

in the form of special harbour charges for the goods loaded in an improved Baram port.

A more precise feasibility study based on the results of the present forest inventory may help to raise the capital required for the construction of a deep sea harbour.

It should be noted that the above estimates for the possible production of timber logs and processed goods as a result of developed deep sea harbour at Kuala Baram represents at this stage only a guess work based on available data.

## 22.23 THE KUCHING INFLUX AREA

Forest resources in the Kuching Influx Area are relatively small and are very much over-exploited.

(in acres)

| Sub-Division | Mixed Swamp Forests | Alan Forests | Hill Forests |
|---|---|---|---|
| Lundu | 5,200 | - | 122,130 |
| Muara Tuang | 56,650 | - | 720 |
| Kuching | 7,670 | - | 64,470 |
| Upper Sadong | 80,040 | - | 111,750 |
| Lower Sadong | 229,180 | 14,170 | 41,480 |
| Sebuyau | 135,690 | 43,030 | 13,810 |
| Lingga | 85,570 | 10,240 | 20,800 |
| Simanggang | 101,300 | 51,620 | 65,390 |
| Pusa | 63,200 | 9,950 | 1,000 |
| Debak | 14,640 | - | 300 |
| Spaoh | 33,630 | 27,560 | 930 |
| Betong | 9,420 | - | - |
| Engkililli | 11,650 | - | 37,160 |
| Lubok Antu | - | 410 | 120,180 |
| Total | 833,840 | 156,980 | 600,120 |

Logging in the swamp forests has been done for two generations. Swamp forests outside of the protected forests have been reduced to un-exploitable stands.

The prescribed yield from management units in the Kuching Forest District for 1970 - 1976 is 172,085 tons per annum and shall be reduced to 141,885 tons per annum for 1977 - 2010.

It should be noted, that the Kuching Forest District covers forests in the Saratok District which are closer to the Rejang Delta, than to the Sarawak River.

The hills of the Kuching influx area are often steep rocks (lime stone) and, therefore, not exploitable. Forests on accessable hill sides were heavily affected by dry padi cultivation.

The present production of the Kuching Forest District is :-

200,000 tons Ramin per annum
and 284,000 tons other timbers

This production figure shall most probably decline to less than 300,000 tons per annum, which will be lesser than the local requirement.

22.24 BINTULU SECTION

The Bintulu Section covers several influx areas, which are not connected with one another. There are at present no means for economical timber transport from one watershed to another. With the opening of the Oya-Bintulu Road, it might be feasibel to transport some high value products as :

logs for veneer slicing;
high quality (cabinet) sawnwood.

But the price for ordinary round logs and general sawn wood would not cover the high costs of road transport, together with cost of coastal transhipment.

There are three influx areas to be considered in the Bintulu Section:

22.241 The Balingian Watershed

22.242 The Tatau Watershed

22.243 The Kemena Watershed or Bintulu Influx Area

22.241 The Balingian Watershed is a part of the Third Division but is under the Forest District of Bintulu. It contains:

271,610 acres of Mixed Swamp Forests
25,210 acres of Alan Forests
5,600 acres of Padang Paya
196,290 acres of Hill Forests
and 5,400 acres of Beach Forests

There are several Forest Reserves in this area and the forests are in good condition. The exploitation was not destructive and a permanent yield could be expected from the swamp forests as well as an increasing yield from Alan Forests.

The Hill Forests have not been worked yet, but dry padi cultivation is gradually expanding around the foot hills. Convertion of hill forest land for agriculture will probably be encouraged by the new Oya-Bintulu Road. There would be no national-economic justification to prevent the expansion of farming in this area, as long as forestry contributes less per acre to the G.N.P. than agriculture.

22.242 The Tatau Watershed

The Planimetric Measurement of Land Use Maps 1966 recorded:

106,650 acres of Swamp Forests

720 acres of Alan Forests

927,950 acres of Hill Forests

Not all swamp forests are protected as Forest Reserves but the destruction of unalienated swamp forests in this area is moderate and the protected swamp forests are in good condition. A sustaining yield can be expected from mixed swamp forests.

There are indications that Belian wood had been extracted from this area in excess of the increment. This does not constitute any problem. On the contrary, Belian wood is at present in high demand for building purposes, where resistence to rot and termites is required. It can be predicted that the future will have very little demand for Belian wood. Softer, and lighter timber species which can be transported and worked with less costs will be more durable if properly treated. Additional cost for chemical preservation compare favourably with the high cost of sawing, working and transport of Belian wood. There is, therefore, no harm if the proportion of Belian trees is reduced in the forests, as this provides space and opportunity for expanded regeneration of timber species which will meet the increasing demand in the future.

For the purpose of utilization one should distinguish between :

Foothill forests

lowland hill forests

and high hill forests

The Tatau Watershed contains all three types of hill forests. But there are no real mountain forests.

Agriculture has expanded into the Foothill forest area, in particular along the Tatau and Anap River.

Very little of the lowland hill forests in this area have been converted for agricultural purposes, although the soil is not poor. Lowland hill forests are reaching far upstream. (Sungai Kakus). This lowland hill forests would offer interesting prospects for exploitations, if the cost of transport to the center of consumption, or to the deep-sea port would not be so excessively high.

Tho high hill forests of this area are virtually in-exploitable. The high hills (for instance, Bukit Naong, Bt. Mersing, Bt. Buan, Bt. Dabai, etc.) are very steep and isolated summits, wh ich would make the exploitation rather costly.

The hill forests of the Upper Tatau Watershed could be left for future operation, to be opened if the timber prices should rise ov r the high level of 1970 prices. Most probably timber could be produced in plantations close to shipping or consumption centers for much less costs than timber exploited in the Upper Tatau area and carried by road for 110 miles to Sibu and transhipped there to Tanjong Mani.

22.244 The Bintulu Influx Area

This seems to be the most promising area of t e Forest district as far as development of forest industries is concerned.

Forest Area in Bintulu Influx Area (in acres)

| Sub-District | Mixed Swamp Forests | Hill Forests | Kerangas Forests |
|---|---|---|---|
| Bintulu | 46,880 | 293,590 | 26,360 |
| Sebauh | 96,250 | 906,920 | 42,480 |
| Total | 143,130 | 1,200,510 | 68,840 |

The Swamp Forests here appear not only along the sea coast (like southwest of Bintulu) but inland as well. They can be found along Sungei Segan depression, Sebauh Swamp, and Sungai Marak valley.

The proportion of lowland hill forests (about 900,000 acres) in comparison to high hill forests is relatively favourable. Although some of the lowland hill forests are steep most could be logged economically by a combination of tractor and rope-way extraction.

Bintulu is the only area where hill forest area is direct on the coast. (F.A.O. Forest Inventory Unit II).

If this area is to be cleared for agricultural purposes, a considerable quantity of wooden material will become available during a limited number of yeare.

The nature of this "wooden materials" and the quantity shall be shown in the result of the forest inventory. It can be assumed that more than 75% of the total wooden material will be:

(a) small treee below 20" diameter;

(b) branches and tree-crown;

(c) logs of non-commercial timber species.

Economical utilization of such material depends on the following cost factors:-

(i) felling costs;

(ii) extraction costs;

(iii) costs of transport to mill side.

(Please see hereto chapter 51, 11 & 58 )

22.23 LAWAS-TRUSAN INFLUX AREA

It was reported that the Lawas District contains:-

30,190 acres Mixed Swamp Forests
773,300 acres Hill Forests
2,880 acres Kerangas Forests
and 28,960 acres Mangrove and Nipah Swamps

The hill forests seem to be mostly on steep, high mountains, and that the area South of Bukit Tanggoi and Bukit Napunan stand little chances to become economically accessable in the near future.

With improved logging techniques in the mountainous areas, more timber should become available. But the area does not offer a base of raw material big enough for large scale timber industries.

22.24 THE LIMBANG INFLUX AREA

The forest areas were recorded as :-

21,060 acres Mixed Swamp Forests
757,370 acres Hill Forests
9,970 acres Kerangas Forests
9,280 acres Mangrove and Nipah Swamps

Forests along the northern part of the Limbang Road have given way to farming. But the new road to Long Lama shall pass through unspoiled forests of the high hill or mountainous type.

The good harbour facilities in Muara (Brunei) should attract timber industries into this area in the future.

CHAPTER III

## (3) PRESENT STATE OF TIMBER INDUSTRY IN SARAWAK

### 31 INDUSTRIAL SAWMILLS

#### 31.1 Number and Capacity

The breakdown of sawmills as at September, 1971 is as follows:-

| | |
|---|---|
| 73 | sawmills were in operation |
| 32 | sawmills were not operating |
| 11 | sawmills had closed down recently |
| 5 | saws were licensed for other timber industries |
| 1 | sawmill is part of a research institute |
| 9 | sawmills are licensed for domestic purposes only |
| 131 | |

The annual production of sawn wood can be estimated in the range of approximately 350,000 cubic tons (1 cubic ton = 50 cu. ft.) for 1970/71, with roundwood input of approximately 757,000 hoppus/tons. (1 hoppus Ton = 50 cu. ft. hoppus or 39.27 cu. ft.)

The technical capacity of the sawmills in operation is estimated at 480,000 cu. tons output per annum for single shift and 800,000 cu. tons output per annum for double shifts. Some of the smaller mills could not be operated on double shifts.

The capacity of sawmills not in operation during the observation time, could be estimated to be approximately 90,000 cu. tons per annum for single shift.

The export of sawn wood is shown in the Table below.

The difference between sawmill production and export of sawn wood were used for domestic consumption and as raw material for mouldings and broom handles for export.

| | |
|---|---|
| sawmill production | 350,000 cu. tons |
| Less export of sawn wood* | 215,000 cu. tons |
| | 135,000 cu. tons |

31.2 Technical equipment of the industrial sawmills

31.21 Band saws

44 sawmills used a bandsaw for log convertion
1 sawmill uses a gang saw
20 sawmills operate only saw benches
58 sawmills use circular saws with log carrier or slide-tables
2 sawmills use small portable equipment

Of the bandsaws
18 are horizontal travelling bandsaws (Type "Forestor" or "CD4")
27 are fixed installed vertical bandsaws with log carrier
4 are light (too light) vertical bandsaws, with high tables
1 is a modern, highly efficient horizontal bandsaw, with log carrier

(footnote: Some of the sawmills have two headsaws)

31.22 Resaws

Nearly all sawmills use medium size circular saws (42" and 48" diameter) as the first tool for splitting up flitches into boards.

Bandsaws become more popular, but less than ¼ of the boards produced in Sarawak were re-sawn on bandsaws.

*1969 - figures for 1970 export were not available yet.

31.23 Trimming

Trimming is done nearly exclusively on single blade circular saws (12" - 36" diameter).

There seems to be a prejudice against multiblade edgers in sawmills, although multiblade edgers are used in other timber industries in Sarawak. The reasons given against multiblade edging were:-

(a) labour is so cheap it does not matter how often a board is handed through an edger
(b) multiblade edgers are not safe. Apparently multiblade edgers were tried without "safety-combs". (devise to prevent the board to be ejected in the reverse direction)
(c) power requirement of multiblade edger was too high for local conditions. This argument applies to the belt driven mills
(d) operators not capable of adjusting multiblade sawblades accurately.

31.24 Crosscutting

Pendular saws, push or pull saws are used for crosscutting.

31.25 Sawdoctoring

Equipment for sawdoctoring is available in all bigger mills. High quality brands (VOLLMER and INTERWOOD) have been installed during the last years. A marked improvement of saw-doctoring could be observed, where sawdoctors trained by the Kuching training centre are now in charge.

Up till now, no "hard-tipped" saws are used in Sarawak, although such tools are highly recommendable for the convertion of silicate containing timber species (Selangan batu and others).

(See hereto proposals in chapter 21.11.83)

31.26 Power supply

Most of the sawmills have their own powerplant. Only the few mills in the vicinity of cities (Sibu, Kuching, Miri, Bintulu) use electrical power, supplied by SESCO plants.

There are no steam-based or hydro-power plants used in Sarawak's timber industry, since diesel oil is available at comparatively low costs. (72 - 86¢ per gallon)

Nearly all circular saw mills are still belt driven. Therefore much energy is wasted unnecessarily, in as much as there is often a lack of proper tensioning devices for belt transmissions. Some of the belt transmissions are faulty and nearly all the belt transmissions used in the older sawmills do not comply to modern safety regulations.

Wear and tear of belts is exorbitant. Productivity of the sawmills is often hindered by insufficient energy, or un-economical loss of energy in transmission.

Horizontal, travelling bandsaws driven directly are popular among sawmillers. FORESTOR Mark VI and C.D.4 have been proved to be suitable tools for medium sawmills and semi-mobile Djungel mills.

31.27 Cranes and loading devices

Most of the sawmills in Sarawak use Cable-slipways for the extraction of the logs from log ponds. Only a few (11 sawmills) use chain conveyors.

31.28 Interior Transport

As a rule, rail transport is used to carry the sawn material for air seasoning. There are only two sawmills with seasoning kilns.

31.3 Sawing techniques

The traditional "break-up" sawing technique is the only sawing technique used in Sarawak:

The log is sawn up into flitches on the head saw; the flitches are split rectangular into boards on resaws.

Slabs are resawn individually on single-stroke saws.

Quarter sawing techniques and through sawing techniques are unknown.

31.4 Waste

31.41 Out-turn factor

The waste factor in Sarawak sawmills is remarkably high. The true out-turn is as low as 34 - 42% (the out-turn from 100 cbft Hoppus roundwood is about 45 to 52 cbft (true) sawn wood). Normal out-turn of sawmills converting tropical hardwood is about 62% in mills applying metric system and 56 - 58% in mills applying foot/inch system.

31.42 Reasons for low out-turn

(a) Wide kerf

Big circular saws produce a wider kerf than bandsaws. Circular breakdown saws in Sarawak were found to cut kerfs up to 16 mm (about 5/8") broad while a bandsaw could convert the same diameter of logs with a kerf of only 5-6 mm(less than 2/5").

Circular resaws (48" diameter) produces a kerf of 9.5 mm instead of 2.6 mm a bandsaw would cut.

It can be assumed that about 20,000 to 25,000 cubic tons of sawn wood, worth at least four million Malaysian Dollars, are wasted unnecessarily for this reason.

(b) Standard size

It was found that some of the sawn wood was cut into unnecessarily narrow standard widths. Materials which could have been sawn technologically into widths of 12" - 16" was ripped into standard sizes of 8". Therefore, the proportion of "narrows" and "strips" which fetch prices for 10 - 30% inferior to broad material is unnecessarily high.

(c) Sharp edged

All material is produced as "sharp edged" regardless of the purpose for which the sawnwood will be required for. For many purposes it would be sufficient to have the sawn wood:

"one side edged"

or "one side edged, one side tucked"

or "50% - 75% sharp edged" etc.

as the material will be sawn or moulded lengthwise in a later state of processing. The lack of direct contact between the producer and the consumer of the sawn wood is the reason for this.

For certain uses, as for instance sawn wood for decorative purposes in furniture, panelling and cabinet-artwork, mixed grain, sharp edged standard width are not usable. This does not apply for ramin, but does apply for timber species as Meranti, Rengas, Medang Sepetir paya, Keruntum.

(d) End splits and cracks

Some of the more valuable timber species are liable to develop splits and cracks on the crosscut face. Improved felling technique and protective painting of the crosscut as obligatory by law in many tropical countries could reduce unnecessary waste.

(e) Inaccurate cut

It was observed that few sawmills paid sufficient attention on precise cut and precalculation of required allowances.

Data are available on the degree of shrinkage for all commercial timber species from Sarawak. It is therefore possible and comparatively easy to precalculate the allowances for air-seasoning. One of the sawmillers was of the opinion that in Sarawak, timber is so cheap that ⅛" or 1/16" allowances do not matter. 1/16" allowance represents 6.25% on 1" boards. Considered on an annual production of 350,000 tons sawn wood per annum, this is more than 20,000 tons or M$3.2 million in value.

Other courses of inaccurate cuts which have to be compensated by wider allowances are:

shaking of roller tables on head rags;
resawing by hand without steady pressure onto the guide;
wrong saw-setting;
lack of precise guide settings;
lack or wrong measurement tools.

The sawmiller requires micrometer callipers or micrometer screws, not a ruler with inches on it.

(f) Defects and Decay

Defects and decay were often quoted as reasons for the low out-turn in Sarawak's sawmills. Decay is considered in roundwood measurements adequately and therefore does not concern the out-turn factor. On the contrary, the justifiable practice to deduct the diameter of a centre hole from total diameter "undermeasures" the true volume. The proportion

of defective logs (with the exception of Alan batu) is not higher in Sarawak than in other tropical forests.

(g) Lack of outlet for small dimensioned sawn wood.

There is at present no market for small dimensioned sawn wood other than ramin. Therefore it does not pay to resaw the offcut material and to salvage from waste:

strips

shortlings

un-parallels

small blocks, etc.

(See hereto paragraph 52.112)

31.5 Technical Management

With the exception of few bigger enterprises, intensive technical management is lacking in Sarawak's sawmills.

31.51 Balance of Capacity

Very few sawmills have a balanced capacity among the various sets of machinery. This is the most serious handicap against full utilization of the installed capacity. Parts of the mills - installed machinery and manpower - are permanently waiting for other parts of the plant to produce the material for the next stage of production, or to remove the semi manufactured products from predescending stage of processing.

Therefore the staff cannot produce enough and consequently their salaries become unsatisfactory.

Foreign currency was spent on importing machinery, which runs only to 60 - 70% of its capacity.

To establish the optimum balance of infra-capacity is a comparatively easy job in sawmilling and seldom calls for heavy additional investment.

31.52 Training

Very few of the workers, technicians and the technical management in Sarawak's sawmills have been trained for this job. Although there are about 7,000 people working in Sarawak's sawmills, there are no training facilities on:

vocation level

technical level

professional level

Saw sharpeners courses are organized by the timber research department. Sawmilling is by its nature, an industrial activity calling for knowledge and skill in:

(1) industrial management

(2) mechanical engineering

(3) steel working mechanics

(4) general technology

and (5) to a lesser degree timber technology

Therefore personnel for running, supervising, managing and government's administration of sawmills should be trained in the first five directions. If problems in No. 5 (timber technology) should arise, there is the timber research department with highly competent staff, which can be called upon to render all the advice in timber technology which might be required. The line between forest activity and industry is definitely the point where the log is loaded on a truck bundled into a raft or delivered on to the rail-line. If the forest administration is in the favourable position to have an expert on heavy transport (which is not the case in Sarawak) forest activity may reach up to the yard of the timber industry but not beyond that point.

The Sarawak Forest Department is one of the most efficient forest administrations in the world, in so far as it has by far the smallest number of staff per 1,000 cubic tons of timber produced, and as well as per square unit of forest. More than six times the present staff (on all levels) would be required for the forest department to comply with the forest ordinance.

There is no - and there is little hope that there will be in the near future - sufficient and adequate trained staff in Sarawak's Forest Department to administrate - not to speak of "to develop" - the timber industry in Sarawak.

31.6 Problems in Sawmilling

31.61 Marketing

31.611 Species

The main problem of the sawmills in Sarawak is marketing. There seems to be insufficient demand for sawn timber species except ramin.

31.612 The price obtainable for sawn wood (except Ramin) is inferior to the price of sawn hardwood from other origins with similar technological properties.

31.613 There is no direct connection between the consumer and the producer of the sawn wood. The producer does not know (and therefore cannot produce and select) the best suitable material for the intended purpose.

31.614 Some of the main cost factors for sawmilling are rising considerably, and will continue to rise in the range of the devaluation factor in the industrial countries (which is between 2.8% and 9.6% per annum). The prices of machinery and subsequently the depreciation costs and

capital cost on invested capital are increasing correspondingly. In addition, the freight rates are moving parallel to the devaluation in the industrial economics as well.

The prices for sawn hardwood are not growing in the same range of the deflation factor. Therefore sawmilling becomes less and less profitable, if the whole register of rationalization is not applied in:

(a) better use of the installed machinery (more production of the installed machinery)

(b) better use of the raw material (higher out-turn)

(c) better use of the labour forces (more production per head)

(d) better sales price - improvement of marketing.

There are no long term prospects to justify projects in sawmilling which has a tendency of increasing costs. There might be some political justifications for projects which include sawmilling on higher cost factors. But it should be considered that the difference between economical prospects and political motivations will have to be borne by the national economy.

Sawmilling of hardwoods is in general a declining industry in so far as its growth factor is smaller than the growth factor of other industries. (For instance, board industry, paper industry, chemical industry, etc.)

31.62 Raw Material

31.621 Shortage of material

Nearly all sawmills which have closed down during the last year, gave "lack of round logs" as one of the main reasons for closing the mill.

Shortage of round logs of the desirable species - in particular Ramin - is the "number one" problem of the sawmills in Sarawak. All sawmills could double their production if they had more roundwood and better market outlet.

31.622 Short term forest licences

Potential investors quoted the present system of licensing forest concession areas and sawmills as the main reason for not investing in Sarawak's timber industry.

Modern sophisticated timber industries must be planned 35 years ahead. That means the continous supply of raw material must be assured for at least 35 years before any heavy investment could be justified.

The present licenses for logging operations are all short term licenses. More than 80% of Sarawak's present timber production hails from "MINI TERM LICENSES", i.e. licenses which will expire before six years. No investor could be expected to build a modern sawmill-installation (starting time at least 30 months from drawing the capital up to full operation) if the period for assured Amortization of the invested capital is only five years or less.

The longest forest license in Sarawak runs for ten years with possible extension to twenty years. This is the absolute minimum license period required for a small sawmill. For a medium sawmill with integrated capacity for the utilization of wood-waste a full license for twenty years would be required. The constitutional insecurity of short-term licenses ("possible extension to") disqualifies the forest license as a security bond for long term investment. In other words, the term "with possible extension to" instead of a fixed license

up to the full period costs about 2% additional bank charge for the whole invested capital, or applied to all long term forest concessions in Sarawak approximately 4 million Malaysian dollars per annum additional banking costs for the imaginary right of the forest department to refuse renewal of long term forest licenses after the expiration of the first ten years.

The short term forest licenses was the reason why some of the biggest tropical forest industries of the world were not built in Sarawak, but in countries with long term forest licenses. The investors regretted this very much since the economical and political stability would allow for investments in Sarawak which surpass by far the ten years license period.

Full integrated timber industry (with the exception of pulp and paper plants) require a guaranteed continous supply of raw material for at least 47 years. Usual in the trade are 65 years.

An integrated timber industry complex including pulp and paper production would require a minimum of 65 years - usually 45 - 99 years license.

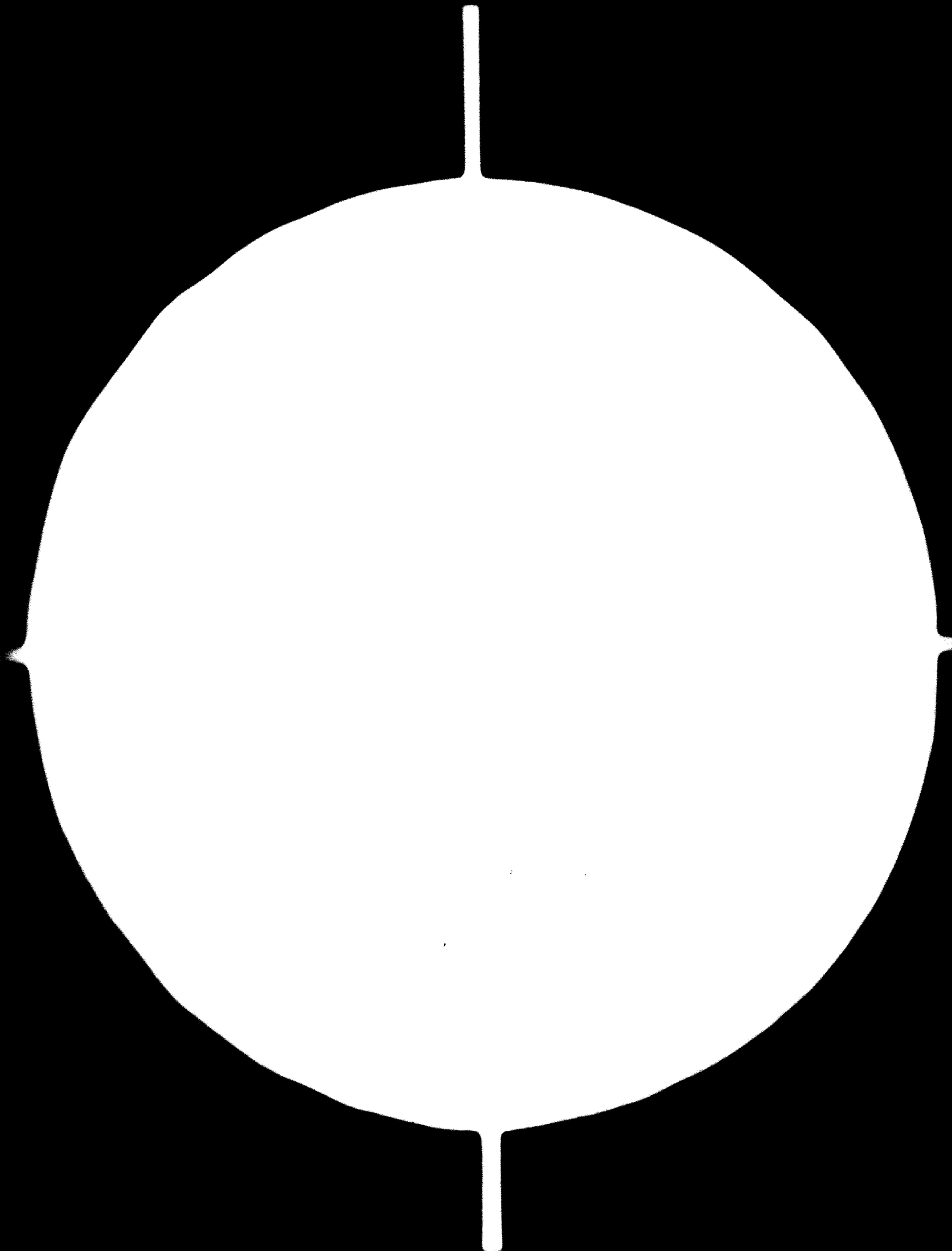
Timber industries with their own plantation programme - and this must be the eventual aim of Sarawak's development in timber industry - require full rights of land use for at least 85 years.

31.63 Land disputes

Several sawmills were out of production due to disputes on land, either felling rights on land with uncleared customary property titles or disputes over "right of way" for access roads, log ponds, rafting sites, etc., or even for property titles on land the sawmill had reclaimed on inundated swamps, which were shown on older maps as "water".

C-572

84.12.03
AD.86.07
ILL 5.5+10



As far as timber industries are concerned, the undersigned supports the recommendations which were made for a reform of landed property rights by other consultants.*

31.64 General overheads

The costs for "general overheads" which have to be considered for industrial sawmilling, appear to be comparatively high in Sarawak. Part of this is due to the kind of forestry control in the mill, which is not usual in other countries of the tropics. This forestry control in the mill, instead of a control in the forests is necessary and unavoidable as long as the forest department is so much under-staffed.

Other overheads are due to lack of traffic connections. Most of the sawmills are not linked to a road.

Some overheads are due to the floods, which inundate sawmills on the banks of the rivers.

In spite of surplus of labour forces in Sarawak generally, there appears to be, occasionally, temporary and local shortage of labour force. As a rule technical personnel has been brought to the forest-based sawmills from urban areas. The problem of partial shortage of labour forces was more grave in newly established hill forest operations than in the older sawmills in the swamp forests. Technical staff often prefers to leave their families in the urban areas, while working in the rural sawmills.

*Regional Planning Study of The First Division Sarawak.

Most of the sawmills provide some social facilities to the staff, such as:

(a) shopping facilities with special credits for employees;

(b) sport grounds;

(c) housing;

(d) free transport of staff and families to the cities;

(e) medical dispensary service;

(f) electrical light;

(g) free fuelwood for the members of the staff

Some of the bigger sawmills have built schools, club houses small hospitals and prayer houses.

31.69 Racial distribution

All sawmills in Sarawak are owned and operated exclusively by members of one race only. It appears that members of this racial group are preferably considered for any kind of managerial or technical occupation. Members of indigenous races are rarely found in higher positions in Sarawak's sawmilling industry. Some of the enterprises have nominal "local participation" or some local names on their list of directors. None of this local directional or managerial personnel was actually met working in the sawmill or in the office.

All three sides: the presently under privileged ethnical groups; the group presently dominating Sarawak's timber industry and the government are anxious to find a solution to this problem. In the small society of a sawmill village, racial and social differences add up dangerously. There is a remarkable "off-flow" of potential investment capital from Sarawak's timber industry for this reason.

All sawmillers, with whom this problem was discussed showed a remarkable goodwill to overcome the racial inbalance of the trade. The readiness to have indigenous races participate in sawmilling exceeded the goodwill of other branches of timber industry. The problems to be solved are rather complex. Lack of entrepreneurs activity; lack of technical training; lack of co-operation among themselves are the main handicaps of the under priveleged group. Shortage of capital was the most quoted reason but appeared not to be the primary handicap since most of the sawmills have started with very little or no self-owned capital few years ago. Credit facilities provided by the government for the indigenous population were not fully utilised.

Therefore means will be proposed by which entrepreneurs activity can be encouraged, technical training be provided and the spirit of co-operation shall be fostered for the participation of racial groups, which are at present not participating in the sawmilling trade.

(See Chapter 51)

31.66 Lack of harbour facilities

There are at present no quay facilities in Sarawak for ocean going ships to handle bundled or containered sawnwood efficiently. The only deep-water quay near Kuching is suitable for the former system of handling sawnwood. But stevedoring and loading techniques for sawnwood have been changed or are at present changing considerably. They are techniques, which could not have been predicted, while the Kuching quay has been designed. The new sawnwood harbours: Amsterdam-Houtven, Rouen-Repels, Hamburg-Wallerehef, Riyaka-Z are interesting samples of modern ports but the conditions in Sarawak are so different that they cannot be copied. A completely new technique

for the trans-shipment of processed timber goods has to be developed. A study is at present being done for trans-shipment facilities of the Amazonas. The technique, which will be proposed and the equipment which has been developed for Amazonas seems to be more adequate than some of the more conservative proposals, which have been made recently for Rejang port.

The lack of harbour facilities is the primary handicap of the sawmilling industry in the Baram area and hampers sawmills between Miri and Oya considerably. In many sawmills more than 15% of the f.o.b. price must be considered for coastal transport and trans-shipment.

Approximate calculations indicate promising and highly profitable prospects for specialised coastal shipment and loading devices. Investment in the range of approximately M$11.6 million may be feasible, and a detailed feasibility study can be recommended. The timber trade would be willing to participate financially in any feasible venture, which would reduce coastal shipping costs for sawn wood. Coastal shipping facilities have to be adjusted to make use of modern harbour facilities recently opened in the immediate vicinity of Sarawak's border.

## 9 Handicraft Sawmills

### 9.1 Number and capacity

There are 9 sawmills licensed for domestic purposes only. 11 sawmills are registered as "Belian mills". There are several hundred gangs of handsawyers, converting mainly Belian wood for the local market and self construction.

32.2 Equipment

The mechanised "small-saws" are usually equipped with a simple table-mounted circular saw, belt-driven by an under-powered diesel engine.

The hand sawers use fox-tail type one-man saws or bow-saws. The latter saw, although old-fashioned in its appearance is a highly efficient tool in the hand of a skilled sawer. Handsawn Belian was not inferior to circular sawn material, but both must be considered as "sub-standard" in comparison to industrially produced sawn wood.

The last four years have witnessed a new development of equipment for "dwarf-sawmills". This new equipment allows the economical production of high quality sawnwood on handicraft level, which can stand up to the competition with industrial sawmills for the supply to the local market and of sawnwood for special purposes as: boat building, wood carving, musical instruments, upholstery, and high class cabinet work. The dwarf-sawmills are not feasible to produce low-price sawn wood for export purposes.

(Compare Chapter 51)

32.3 Present Production

There are no data available on the total production of the handicraft sawmilling in Sarawak. The Annual Reports of the Forest Department lists the production in form IX of SAWN in cubic tons and SHINGLES in number (see table below) for which Forest revenues were collected. But most of the handicraft sawing is done for local consumption. Taking the value of 400M$ per ton of sawn Belian and M$350 per 10,000 shingles as basis, the registered production of handicraft sawing contributes more than M$5 millions to the G.N.P. The

actual production could be estimated to be six times as much or exceeding M$30 million per annum, exceeding the (value) production of industrial sawmilling in Sarawak.

The handicraft sawing is done nearly exclusively by the rural population. Its development deserves Government's attention and should be treated with priority over capital intensive partly foreign dominated timber projects.

Production listed in annual reports of Forest Department

| Year | Sawn in cubic tons (assessed for royalties in sawn form. Most of this was sawn in the forests) | Belian logs in Hoppus Tons round | Shingles Number converted into cubic tons Hoppus |
|---|---|---|---|
| 1969 | | | |
| 1968 | 10,455 | | 3,783,918 1.513 |
| 1967 | 14,406 | | 6,382,550 2.553 |
| 1966 | 10,786 | 75 | 7,291,550 2.916 |
| 1965 | | 96 | |

Note: 2,500 shingles = 1 ton (Hoppus)

32.4 Problems faced by the sawing handicraft

32.41 Licensing and Control

The establishment and improvement of "dwarf-sawmills" was seriously hampered by the licensing system for sawmills. To a rural sawer, formal application for a sawmill license is a very considerable obstacle, which only a few could overcome, in as much as the older files of the forest department are proof enough for the way in which forest department discouraged and hindered applicants to establish themselves as small sawmillers.

It is an undeniable fact, that control and prevention of illegal felling by dwarf-sawmillers calls for a much more intensive forest guarding, as the Forest Department could possibly execute with the present number of staff. Therefore increase of forestry staff is a pre-requisite for the development of "small-sawmilling" which appears to be desirable for

(a) economic reasons - (use of wooden material, which is wasted at present);

(b) political reasons: provide income and material to the low income section of the population;

(c) ethnical reasons: to develop skill and business experience with people, who are not at present not sufficiently participating in timber trade;

(d) environmental protections Dwarf sawmills do not disturb the environment as much as industrial sawmills;

(e) educational reasons.

If people learn to appreciate the value of trees - also of single standing tree, which have no commercial value for industrial utilisation, but should form the basis for handicraft sawmills - they will not destroy trees unnecessarily. In Sarawak where enforcement of laws for the protection of forests and environment is technically and politically difficult, the voluntary co-operation and the understanding of the people is necessary to protect trees.

Experiences in other less sophisticated tropical countries has shown that "small-sawing" had on the long run more forest protective influence than forest laws which

could not be fully enforced. In the first state of "small-sawing" some forests were destroyed by over exploitation. But this deprived the local "small-sawmill" of its raw material base. The "small-sawmill" collapsed. People were too quick to understand this. Contrary to industrial sawmilling, whose only tie to the country is the amount of investment, and which is often based on a "hit and run" mentality, small-sawers have roots in the country. They know, that even their grandchildren will live in the same area.

The rural population in Sarawak is - in the economical-geographical term "residential" (in opposition to "nomadic" or "semi-nomadic"). Development of "small-saws" can therefore be recommended. "Small-saws" have a devastating effect wherever used by people who are basically nomadic or semi-nomadic orientated. But this applies only to a very small minority of Sarawak's population, (Sea-Arabs, Migrating Indians, Gypsies and (with much reservation) Punans).

32.42 Marketing

The lack of marketing facilities hampers small sawmills considerably. The Government should help here. (See chapter 51.0)

32.43 Wrong equipment

Some "small saws" have been set up in the past with massive support by the Government. None of the enterprises seems to succeed well. This is partly due to the equipment. The selection of the most suitable tool for "small-saws" considering all the local factors, is a very difficult job and calls for a specialised experience, which foresters or experts in industrial sawmilling do

not possess. There are very few experts in the world (less than ten) and no comprehensive litrature on modern "small-sawing" techniques and tools. For the conditions in Sarawak, special types of equipment and a special technique must be developed. Various machines and techniques should be tried out practically, before they could be handed to the people.

32.44 Lack of training.

"Small-sawing" is a handicraft art in the same way as artisan or blacksmith. It has some connection with carpentry, but it was found, that trained carpenters seldom made good "small-sawers". There are no training facilities for "small-sawers" in Sarawak. Some of the rural people have developed a remarkable skill in hand sawing, but they would need to be trained on more efficient tools in order to compete with industrial sawmills. (Proposals see Chapter 51.5)

33 Moulding plants

33.1 Export orientated moulding plants

There are three big export orientated moulding plants operating in Sarawak. Two are in Sibu which employs more than six hundred people. One is in Kuching; two smaller plants in the second division.

All work nearly exclusively in RAMIN. All are trying hard to introduce other timber species for moulded products as ramin wood becomes increasingly rare in Sarawak. The three big factories depend at least partly on import of raw material.

The main products are at present:

(a) broom handles, and round sticks

(b) wallpaper ledges

The machines for this production are fully occupied in one shift, and work as far as local conditions (curfew) allow even sometimes two shifts.

Machining capacity for

(a) hand rails
(d) dove tails
(e) bannister - rounds
(f) parquetry
(g) laminated flooring
(h) wooden bowls
(i) furniture mouldings

are partially idle for lack of demand.

Competition on the market is hard. But the three enterprises succeeded (and worked with a handsome profit) due to:

(i) exceptional good technical management which is far above standard of other timber industries in Sarawak;
(ii) high productivity and efficient tools (WEINIG, DAENKERT);
(iii) low cost of raw material, since they buy waste products - narrows and strips - from local and Indonesian ramin mills, which fetch a low price on the export market.

All three enterprises employ about 160% of the technically required personnel in order to provide as much jobs as possible. They will have to reduce their staff to the economical optimum if new moulding capacity is established in Sarawak without a prior expansion of the market in both respects:

(i) market inlet for the supply of raw material (which is limited) and
(ii) market outlet for the products

The moulding industry is a very delicate branch of the trade. Government's interference or creation of more capacity as the supply of raw material (Ramin scantlings) or the export market allows, would initiate the establishment of moulding plants across the border outside of Sarawak. Indiscriminate expansion of moulding capacity would do harm to the National economy. But expansion of this trade in co-ordination with aggressive marketing seems to offer the best prospects for development of Sarawak's timber industry.

Moulding plants should not be established in the hill forests as long as there is so much material wasted in the swamp forests (Alan batu, offcuts from Ramin, poorly shaped Jong-Kong and Keruntum) which cannot be exported in the round or utilised for veneer production. After additional demand for mouldings has been established and the utilisation of waste products in the swamps has been assured, moulding plants could be considered for hill forests but only for material which could be produced for less than M$120 per cubic ton sawn f.o.b.; but there will be very little material in this class of prices, considering the high logging and transport costs in the hill forests.

In any case it will be more economical to float logs down from hill forests to establish moulding plants in the vicinity of export facilities, than to produce the mouldings in the hill forest area and transport the mouldings in riverboats downstream.

Experience has shown that one cannot transport mouldings together with raw sawn wood in the same boat on longer distances without several costly precautions.

The packing paper was damaged. The moulding kiln seasoned wood (6 - 8% m.c.) - absorbed too much moisture during the journey, moulddings were soiled, etc.

Proposals for spending foreign currency on additional machinery as long as the installed machinery in the area runs only in one shift, instead of the usual three shifts could be debated. (see hereto chapter 53)

All sawmillers in Sarawak with whom these problems were discussed would be interested to set up moulding and seasoning plants in their mill or to participate with other sawmills in a co-operative venture on moulding, as soon as there is the demand and the marketing facility.

## 33.2 Other moulding plants

There are about 52 moulding machines installed in furniture factories, carpentry workshops and boatyards in Sarawak. A few moulding machines or combined thicknerr/ joiners were installed in sawmills. During September, 1971 none of these machines in sawmills were in operation, and it was evident that they had not been used for the last four months. The reason was always lack of market demand.

The marketing channel used for the export of round logs and sawn wood, is not feasible for the marketing of processed wood.

The moulding machines in the other woodworking factories in Sarawak are only used in the range of 8 - 30% of their capacity.

None had space enough for continuous supply of raw material or for the quick off-transport of the mouldings.

All the factories work in "piece-meal" or single-piece production. Serial production and detailed cost calculations were not yet introduced.

Standards - in particular for door frame, windows, staircases, louvres - are not applied.

## 34 Plywood factories

### 34.1 Factory in operation

#### 34.11 General economy

There is only one medium sized plywood factory operating in the Rejang Delta. Alan bunga of very low quality and substandard dimensions is converted there into: plywood for local consumption and two and three ply, which is exported to be face veneered abroad as decorative pannelling material. Quality requirement for such purpose (self-consumption by the producing company) are inferior to standard trade qualities. The expert price is a fixed value, since the material is not sold to another company but transferred from one section to another section of the same enterprise. It is therefore not surprising to find a constant ± 0 profit on the balance sheet of the Sarawak section. The profitability of this plant can therefore not be regarded as indication for the profitability of other future plywood mills in Sarawak.

It could well be possible, that the plant does not make any profit due to the extreme poor quality of raw material. All Alan bunga round logs, seen in the other mills were much superior in quality and dimensions to the material which was peeled in Selalang during the visit of the under-signed.

Also as far as marketing is concerned, the Selalang plant cannot serve as sample, since the production is on order only.

Three-ply 4mm was sold from the retailer for M$6.50 per sheet 4' x 8' in Miri and for M$5.80 per sheet in Kuching.

34.12 Equipment

The plywood mill in Selalang is equipped with one conventional peeler-laith and one small modern peeler-laith with automatic center-device. The capacity of the seasoner is inferior to the capacity of the predecessing machinery. The hotpress can only produce sheets 4' x 8' which is below the present standard. The plant is operated by indigenous races only under supervision of a foreigner. Skill and efficiency of the staff appears to be slightly above world average. Detailed workstudy is not yet applied, but the principle of industrial management and interior cost calculation could well serve as an example. The plant although not optimal in its raw material and some of the machinery could well serve for training management and staff for further plywood mills to be installed in Sarawak. The Managements attitude is most co-operative and other potential plywood producers should accept the standing invitation to visit the plant, disouse the technical problems and to train plywood workers.

Social amenities of this plant can as well serve as examples for other timber industries.

34.13 Problems

34.131 Lay out

The plywood mill was built into the buildings of a former sawmill. This hampered the layout and hinders at present, the flow of production.

In the long run, it is more economical to erect new buildings according to the optimal layout instead of using not fully feasible buildings which were available before.

34.132 Lack of seasoning

The plywood plant was operated for several years without a veneer dryer. Air seasoning was applied. This has proved to be unsuitable under local conditions. Due to various circumstances it could be recommended to incorporate seasoning capacity for plywood mills in Sarawak in excess to the normal layout.

34.133 Raw Material

The plywood production in Selalang converts only material produced in its own forest concession. Therefore logs which are technically or economically not feasible for plywood production have to be peeled into veneers.

Under Sarawak's conditions, the undersigned recommends a division between logging enterprises, which supply those logs which are feasible for veneer slicing factory; logs which could be exported off as round logs for more than M$95 per f.o.b. should be exported (for the time being) as round logs; logs below this export value and of peeling quality should be supplied to independent plywood mills; logs not suitable for veneer slicing or peeling and below the above value may be used for sawmilling. And sawmills should be the only type of timber industry, directly linked to logging enterprises.

The swamp forests have been split up into too small units, to serve as basis for integrated timber industry. Therefore, a system of disintegration in ownership but in co-ordination supply of raw material has to be worked out for Sarawak's swamp forest-based timber industry. For the inland forests which are not yet opened, the undersigned agrees with the F.A.O.'s recommendations that productive forest areas should not be split up into small units but be reserved as bases for big integrated timber complexes.

The forests on low hills and in the watersheds of the smaller rivers (Aya, Mukah, Balasian, Terusan, etc.) should be licensed to the medium-sized industry for a continuous operation, when the swamp forests will be exhausted.

The idea of some of the smaller or medium logging enterprises to establish board industries (and moulding plants) as co-operatives of neighbouring logging enterprises, appears to be the most suitable form for the immediate development of timber industry in Sarawak.

31.434 Alan bunga

From experiences in Selalang plywood factory it appears that Alan bunga is not an "all-round" timber species for all purposes in plywood production. Alan bunga gives a very good core-veneer. The fine pin-hole bore-holes which appear frequently in Alan bunga does not have much devaluation effect on core veneer, but would devaluate the plywood considerably if used as face veneer.

As face veneer Alan bunga is unsuitable. It is too soft and therefore liable to indentation. It does not peel smoothly enough to give a plane, shining surface. If used on the face, it must be sanded considerably, and much volume is lost.

The wide variation in hardness of Alan bunga causes inhomogeneous take-off in the sanding machine. Scrape-finishing of Alan bunga is technically impossible.

Alan batu would give a frist class face veneer, if the hollow legs could be peeled economically.

34.135 Glue

There were some problems with the continuous supply of glue in the past. In future, when more plywood and particle-board factories take up production in Sarawak an emergency stock of supply will be held by the supplier.

It would be essential to have all plywood and particle-board producers to agree on the same type (and process) of glue - one for marine gluing; one for utility gluing; one for cheap economy gluing; before the equipment is ordered. With Sarawak's potential for board industry it will soon become feasible to produce the glue in Sarawak. This will not become possible, if basically different gluing techniques were introduced in the mills.

34.136 Suitability of Machinery

It appears that the brand of peeler-lath used in Selalang (Japan made) is not strong enough to deal with harder timber species than Alan bunga. For new plywood mills, slightly stronger brands (R.F.R. Cremona, T.E.M.S.A., Valette & Garreau) should be recommendable.

34.137 Heating

In Selalang the boiler is fed with rest rollers only. Much of the veneer waste is burnt in incinerators without use. This is due to the type of burner in the boiler. There are new burners on the market which utilise veneer waste pre-dried or green - leaving the rest rollers to be used for blockboards and packing cases. Veneer waste burnt in specially designed boilers do not produce the amount of ash and air pollution as observed from the incinerator in Selalang.

34.190 Booking and Loading

Selalang is very close to Tanjong Manis port but transport of plywood from factory on to board of the ocean vessel is a considerable cost factor.

Container transport and big colly transport will become necessary, if more plywood shall be shipped from Sarawak. Up till now, container barges are not coming up to Kapit on the Rejang and cannot pass the Kuala Baram Sand bar.

35 Furniture Industry

35.1 Number of enterprises

There is no real furniture factory in Sarawak. There is one bigger enterprise in Sibu - 321 employees - producing furniture together with other wooden products and carpentry, but it does not manufacture furniture in series, pre-designed, produced for an anonymous market.

There are 25 mechanised woodworkshops with about 532 employees, producing various kind of wooden products on order:

Windows
Doors
Louvres
Boats
Furniture
panelling
boxes and crates
fences
staircases
bannisters
sign boards
coffins, etc.

35.2 Equipment

All the enterprises are heavily over-equipped. Many costly machinery are cramped into small workshops with no mechanical means to supply the material to the machine, and no mechanical means to carry the manufactured goods away.

The machines are not staffed with permanent attendants but are operated as it comes.

Seldom a machine will be used for more than 15% of its capacity.

Only four factories have exhaustor systems. 11 enterprises have no proper flooring.

There is not a single production line working in Sarawak's furniture industry.

Most workshops have:

several rotary planners or thicknessers

routers

spindle moulders

carpenters band saws

small circular saws

The "INVINCIBLE" and the INTERWOOD combination of wood-working machinery are popular. Older workshops have mostly Robinson or Wadkins heavy, cast iron machinery.

There are no mechanical hot presses for veneering, and only four small, cold, handpresses. But some of the factories have recently enquired for prospects of veneering presses.

35.3 Surfacing

Lacquering and varnishing is done with shellac-lacquer by hand brush in dustry workshops. With the

result that there are no locally made quality furniture on the market and colour and structure of decorative indigenous timber is distorted to an ugly primitive and uniform red-brown.

If better surface is required, the furniture producers in Sarawak apply imported Formica. Formica with very pronounced pattern mainly imitated black-walnut, rosewood or birds-eye maple is applied in 0.4 - 0.8 mm thick sheets and glued roughly on 4 mm plywood.

35.4 Design and Prices

There is no indigenous furniture style in Sarawak. Furniture designs are copies from old fashioned European catalogues with a constant mixture of stylish elements. Box furniture: wardrobes, writing desks, cabinets, are usually frame constructions covered with very thin plywood. A small wardrobe with Formica may cost between M$100 and M$160; a writing desk between M$40 and M$80.

Chairs are heavy, clumsy in design, mostly of the former colonial P.W.D. standard type. They are sold between M$6 - M$14 per piece.

Tables are made entirely from sawn wood. Table plates being liable to split, since the sawn wood is not fully seasoned. Therefore imported table tops; Formica on plywood and imported iron tables, penetrated the market. Formica table tops often show decorative pictures as chinese dragons, flowers, green-tinted landscapes, etc.

Iron chairs with Melamin-faced form plywood are imported or assembled in Sarawak.

There is no industrial production of upholstered furniture; all being imported. Imported locks and fittings are available in wide variety. Manufacturers seem to buy this according to prices only and not according to style and quality. The few well made furniture is often devalued by cheap, not fitting locks and handles. The difference in standard - metric and foot/inch causes much work, as inch-scale fittings are forced in metric machined parts and vice versa.

35.5 Cost Factors

Sawn wood, semi-airdried is bought for M$165 - M$190 per 50 cu. ft. free factory. Plywood is bought between M$3.80 and M$6.40 per sheet.

A workshop employing 18 carpenters consumes per month, electric energy worth M$300 - $420.

A carpenter is paid between M$10 - $16 per day; an unskilled labourer between M$6 - M$8.

Although officially not permitted, children were seen in the workshops. Whether they are paid or are only working on apprenticeship could not be clarified.

35.6 Problems

35.61 Marketing

All workshops could triple their production if there was more demand. Some of the workshops had stores which had an apparent low turn-over. Others would supply their products to "shops", mostly general merchants and quite often in the hands of a family relative.

But the bulk of the furniture are produced on direct order or on tender. The manufacturer complained that handicraft workshops under sell and consequently the the prices for furniture was so low that they could not produce quality furniture.

Customers complained that they could not get quality furniture in Sarawak and have to import furniture from Singapore or via Singapore from Hong Kong.

35.62 All-round competition

There is no co-operation among the furniture producers. They system of government tenders has created an competitive and un-cooperative spirit in the trade. All the enterprises are trying to produce all kinds of furniture. There is no specialisation, as required by modern production techniques.

35.63 Cost of Transport

The cost of interior transport of furniture is prohibitive. For instance: to transport ready made chairs from Miri to Kuching, costs are higher than to bring chairs from Singapore to Kuching. To bring a ready made table from Sibu to Engkilili costs nearly double the amount in freight, than the ex-factory price is. There is not a single furniture van in Sarawak which could transport ready-made furniture without excessive damage.

35.64 Consumers

The demand for furniture is uncertain. There are wide differences in demand in respect of price, design and type of furniture.

The small number of consumers, which are in the market for high quality furniture, travel regularly to Singapore for shopping. Their demand for stylish settees, luxury dining room furniture and drawing room/ private office furniture is met by imports.

35.641 The potential class consumers could be classified in two groups:

(a) Government officers

(b) Businessmen

(a) The government officers utilise to a wide extent P.W.D. furniture and invest in other commodities (cars, radiograms) before investing in furniture. This group seems to fancy a Conservative British style of furniture or moderate Scandinavian style.

(b) The business circles prefer two rather extreme types of furniture:

(i) plush, antique chinese furniture, few rather costly items; or

(ii) 20th century Japanese/American style with much MELAMIN, shiny surfaces and square shape. Steel and Chromium furniture is popular.

35.642 Low income consumers are not yet in the market. The rural low income consumers utilise mainly very rude, self made or locally made items; some chairs and tables (if purchased, metal folding types). The first wooden item of furniture purchased might be a chest of drawers, or a small wardrobe. Wooden beds are not purchased, as there are no cheaper wooden beds produced.

35.643 <u>School and office furniture</u>

There is a considerable demand for school and office furniture. The specification is old fashioned "P.W.D. colonial" Results of recent investigations from UNICEF and UNESCO are not yet applied.

The demand for office furniture is met by imported, partly locally assembled metal furniture.

55.65 Racial participation

The whole trade is in the hands of one ethnical group only. Other races have practically no chance for:

(i) an applied, well planned apprentice training

(ii) marketing of their furniture products through the established retailer trade

(iii) to obtain feasible tools and equipment to the same conditions as the competitors of certain ethnical origin.

Even with a well certified government's training, the established trade gives preference to personnel of a special ethnical group and with a traditional kind of training. (See hereto Chapter 54.15.4)

56 Boat building

56.1 General observations

In Sarawak, boats and ships are the principle means of traffic and transport.

The list of manufacturing establishments 1970 - Department of Statistics, Sarawak - records on Section 48.12, 13 enterprises for "Wooden Boat Building and Repairing". This list might not be complete, as there are many small boatyards in the villages, where it is questionable whether these boatyards could be regarded as permanent establishments or as semi-permanent enterprises, as a kind of "cottage-industry".

The number of yards, which produce bigger water crafts from wood could be estimated in Sarawak in the range between 40 and 60 in operation.

Smaller boats, long-boats, speed-boats, dug-outs, rowing boats are produced by people without any mechanical equipment. Sometimes such boats are produced by the local carpenters, but mostly by certain members of the kampongs or long houses. These boats are built with remarkable skill and a high standard of traditional design.

36.2 Long boats and dug-outs

Long boats in particular racing boats are built by the crew. Design and craftsmanship are of high quality. With aggressive marketing promotion, such boats could be exported economically to meet the growing demand for sport boats. These boarts could stand up to the competition of glass fibre, plastic and rubber boats for the following purposes if redesigned and produced in serials:

(a) Permanent "rent-a-boat" crafts in holiday centres in Europe, Carribean, U.S.A., etc.

(b) Decorative boats for parks and recreation centres.

(c) Racing boats (Malay style) to be introduced as international sport in schools and collages.

36.3 Motor speed boats

Outboard motors are used on types of long boats, which were not designed for this purpose. Adaptation of the design of long boats to mechanical drive would save energy.

Short speed boats are built by non-specialised carpenters. The life and performance of these boats could be improved by more feasible material, improved construction techniques and mechanised production. (See herete Chapter 41.7)

36.4 Tug boats

There is a permanent increasing demand for tug boats; to draw and guide rafts; to serve stations along Sarawak's inland water ways. The boats are at present built with remarkable traditional skill, but are completely out dated and inefficient designs.

The tug boats seen under construction contain more than 300% too much material; were unnecessarily heavy; were inefficient as far as pay load, or tug strength in relation to water displacement was concerned.

There was a waste of material; a tremendous waste of labour costs observed in the construction.

Heavy beams of Belian wood, natural crooks of Belian wood, buried for some years in peat were used instead of laminated or steam bend items, which would cost a fraction and which would weigh less than 10% and have much higher strength and durability. Planking and joining was done in historical but completely inefficient manner which would reduce life and performance of the craft.

Racial predominance, traditional orientation, reluctance to consider modern designs and construction techniques hampers the development of this trade. The undersigned doubts whether the present trade could serve as a basis for a modern tug boat production. (See proposals Chapter 55)

36.5 Fishing boats, small trawlers

Investigations on imperved design and construction have been done by the Department of Fisheries. Industrial application of the results of this investigations require improved boat building facilities. (See chapter 41)

36.6 Lighters

There is at present a permanent increasing demand for lighters in Sarawak. The demand, will increase with industrial development in as much as lighterage will continue to be required on the smaller rivers between Oya and Miri, where small lighters must be used. Lighters for these regions could be built from wooden materials, (capacity 50 - 350 tons) competitive to (imported) steel lighters. For lighterage in the Rejang Delta and in the first and second Division bigger, steel lighters (350 tons and more) could most probably be built more economically from steel while the smaller lighters from wood, if design, construction and production would be improved. (See hereto Chapter 41.72 + 57.3)

36.7 Ocean going ships

Big shipyards abroad still use a wide range of wooden items in ship building:

- wooden decks
- handrails
- hulk covers
- loading pallets
- panelling

In Sarawak there is no workshop which specialises in the production of such wooden items. (See Chapter 41.73)

36.8 Paddles and oars

Paddles and oars are made by hand with remarkable skill and art by individual craftsmen. There are chances for export of:

(a) hand made paddles, fancy and art designed for sport boats;

(b) industrially produced, laminated paddles and oars.

36.9 **Blocks and tackle**

Wooden blocks and tackle are imported into Sarawak but these gears are gradually replaced by metal and plastic products. In fancy yachting there is a continuous demand for such wooden goods, but marketing would be so difficult, that the chances to develop production in this field in Sarawak is not considered to be promising, although there are several timber species in Sarawak which might be suitable for such purposes.

37 **Matches**

There is one small match factory working in Kuching. The factory was established in 1957. Working technique and equipment are out-dated. The production relies on import of semi-manufactured goods from abroad, which could be produced locally more economically. The capacity is inferior to the demand. Quality of the matches is sub-standard.

Listed imports of matches values ½ million dollars per annum. There is a very considerable unregistered import of matches into Sarawak. (See Chapter 56)

38 **Wooden Chips**

The Sarawak Wood Chip company produces wood-chips for export. The enterprise is a daughter-company of a Japanese Viscose factory.

About 4 million M$ are invested in a long conveyor belt leading jetty, drum-debarker, two 480 H.P. chipping machines, front-blade caterpillar tractors, power plant, cranes, a small reduction saw, buildings and maintenance facilities. For M$8/- per weight ton the mixed wood from mangrove swamp forests is felled; extracted; stacked near the banks; by contractors. It costs another M$4/- per ton for:

loading on to small barges,
transport to the mills jetty and
string-wire the rollers.

Loading by crane, splitting the logs exceeding 9" diameter, debarkation, chipping, storage and loading would cost, including depreciation, about M$10/- per ton (out turn).

The plant has a capacity of approximately 280,000 tons per annum, and produces at present ca. 150 - 160,000 tons/annum. The Wood-chip tanker carries about 13,000 tons of chips. One round trip to Japan and back to Sarawak takes, including loading, 21 days. The plant employs about 140 general labourers - daily wages M$6/- 20 skilled labourers, welders and mechanics and 3 engineers.

Best suitable for the purpose is BRUGUIERA, less suitable is SONNERATIA.

About 40 tons of Mangrove is harvested per acre, and approximately 13 tons of woodwaste (stilt roots, branches below 3" diameter, mis-shaped logs are left.

About 20% of the intake is lost on debarking. That means that approximately 40,000 to 45,000 tons of tannin containing mangrove bark are added each year to the amount of waste near the mill. Organic material of high acidity is leaked out to the sea and harasses the estuary environments.

This material must be utilised or stored in a manner which prevents pollution of the coastal waters. Scientific research is required urgently to solve this problem.

The world market for tannin does not allow for additional commercial tannin extraction in such dimensions, although production costs might be competitive.

Potential tannin production in Kuala Rejang is hampered by lack of fresh water. To establish open tanks for sedimentation and neutralisation of waste water would be extremely costly or not practicable under local conditions.

Industrial lime or basalt dust, in the range of 0,6 tons per 1 ton of dry residue, would be required to convert the material into humus. Cost of transport would render such decomposition inseconomical.

The required research work exceeds the potential of the concerned enterprise. Strict regulations for env environmental protection would render the whole operation inseconomical and would harass the income of ca 400 families. Water polution endangers the coastal fishery in particular prawn fishery in which as much or probably more families depend in this area.

Research work may detect means in which water polution could be prevented and additional income could be formed. (For proposals see Chapter 57 and Chapter 49.32)

## CHAPTER IV

## (4) MARKETS

### 41 Internal Market

### 41.0 General Remarks

Sarawak has a population approaching one million, but the whole population could not be considered as potential consumers for the products of timber industries. Part of the population lives in areas not yet linked to the internal traffic. Other parts of the population has a per head income below the minimum rate which would allow for cash expenditures on wooden products.

The minimum income allowing for purchase of wooden products is not a fixum, which could be applied for the very many different types of wooden products but varies with local custom, individual desire and economical circumstances.

### 41.1 Internal market for sawn wood

### 41.11 Consumption

Reliable datas on production and/or consumption of sawn wood per head of the population are not available. It is apparent that the consumption of sawn wood per head of the population is exceptionally high.

41.111 Buildings are nearly exclusively of wood materials in the rural areas, and predominantly wooden in townships as well. Non-wooden buildings, with the exception of very few re-enforced concrete buildings contain substantial quantities of wooden materials, and re-enforced concrete buildings were built under excessive use of wooden shuttering and piling. Most probably more than 70% of sawn wood consumption in Sarawak was used for building purposes. Only primitive buildings were constructed without or with very little sawn wood.

One could assume that in the near future more people's dwellings will pass from primitive buildings (erected without sawn wood) to sawn wood constructions, then from sawn wood constructions to brick and reinforced concrete construction. Since movement from wooden house to masoned house is often associated with an expansion of dwelling space per head, the consumption of sawn wood will not necessarily be much affected by people moving from wooden dwellings to masoned and reinforced concrete constructions.

Therefore increasing consumption of constructional wood could be predicted for Sarawak for the near future. Every increase of population would result in increased demand for sawn wood. The decreasing consumption of constructional wood, which has and is changing the world market for timber products, shall affect Sarawak's internal consumption most probably only after the year of 1995. Up till then, the trend can be assumed to rise, afterwards the positive trend may decline, while the point of transition from whence consumption of constructional wood shall decline might not be reached within the next 50 years.

In the course of this development, the resources of economically available BELIAN wood will be exhausted and other timber species shall be required to fill the gap. This could be some of the indigeneus, lighter, hardwood species which require preservative treatment or a demand for confierous constructional wood shall arise, which did not exist in the past.

It is most unlikely that BELIAN constructional wood shall be replaced in the long run by heavy, hard timber species from the interior forests. Although this might be the case for a transitional period. Cost of transport and cost of convertion and installation into the building will increase more for heavy species from the interior than prospective costs for rising fast growing timber species close to the centers of consumption.

The tendency of increasing standardization, disfavours in the long run, mixed hardwoods from virgin forests in comparison to plantation species.

The limit of feasible logging costs which could be met in timber trade for general construotional woods, declines rapidly and can be assumed to decline in the range of -0.8% per annum in comparison to the average retail prices for other commodities.

Consumption of constructional hardwoods in Sarawak shall not grow simultaneous to the potential export market for board products or materials for board products. Economical disposal of (that means sale) heavy, hard, mixed construotional sawn timbers will beoome increasingly difficult. Since Sarawak's forests and in particular the hill forests contain a higher proportion of such heavy, hard species, than the market shall require, industrial potential shall be required, to utilise materials (previously converted into heavy constructional sawnwood) for products with a tendency of growing demand. These are pulp and paper and board products.

41.112 Sawn wood for harbour piling and bridges. There shall be a steady demand in sawn wood for harbour piling, jetties and bridges. Well treated hardwood is more feasible for such purposes in Sarawak than imported steel. It was observed that imported steel was used for bridges where indigenous hardwoods could have been applied. Civil engineers, trained in countries where steel is cheaper and timber more costly, are usually not familar with timber construction techniques. There is sufficient capacity in the two vacuum-pressure "preservation plants" to treat all required constructional timbers and there is a huge surplus of suitable timber species as for instance Selangan Batu.

One or two civil engineers, specially trained in timber-engineering, could save for the national economy a considerable quantity of foreign exchange, spent on imported steel

and concrete. Scholarships could be obtained under bilateral schemes. (Canada, Sweden, U.K., Australia, West Germany, Austria).

If the Government does not encourage the use of indigenous wooden constructional material, the internal demand for heavy and strong constructional timbers will decline. Such material stands little chance for export in the future. There would be no market outlet for the heavy, strong timber species.

41.13 Sawnwood for boat building

The demand in sawnwoods for boat building purposes is bound to decline. If better material sawing designs are not introduced in boat and ship building, wooden crafts will not be competative to crafts made from steel, aluminium, fibre glass or plastics. If modern designs are introduced in the wooden-boat building, very much less sawnwood and more board products and laminated wood shall be required. One may estimate that at present between 8,000 cubic tons and 11,000 cubic tons of sawn wood are used for boat and ship building in Sarawak. Less than 3,000 tons of sawn wood will be required for this purpose in the future.

41.114 Sawn wood for furnitures

One may estimate that about 9,000 tons of sawnwood are at present converted for furniture in Sarawak. The total demand for furniture is likely to double within the next ten years. The quantity of sawnwood consumed per unit of furniture-piece is likely to decline to 85%, while the proportion of board products per unit of furniture shall increase with improved production technique. A declining demand in sawnwood for furniture production can be anticipated. The future consumption of sawn wood for furniture production (home consumption, excluding furnitures for export) may be expected in the range of about 3,000 cubic tons per annum.

41.115 Sawnwood for vehicle body building

The consumption of sawn wood for the construction of truck-bodies and coaches is negligibly small in Sarawak. Only two small handicraft enterprises had some work done in this field. The trend runs against the application of sawn wood in motor vehicle construction. Laminated wood and high-stress plywood may find a chance in this field.

41.116 Sawn wood for windows and doors

There are little chances, that wooden window frames and doors produced from sawn wood could compete in quality with metal window frames (in particular aluminium) and panel-flash doors, if production techniques are not improved.

In spite of an increasing demand for window-frames, less sawn wood will be required for this purpose in the future.

Interior doors will be made in the future from board products exclusively. No sawn wood will be required for interior doors in the future, except for door frames, where a growing demand of the interior market and for export can be predicted.

Exterior doors made from sawn wood are in competition with metal doors. On the low price sector, metal (outside) doors shall substitute doors made from sawn wood. On the luxury sector (decorative exterior doors) Sarawak's sawn timbers could compete with metal and sawn wood from other countries( teak, oak, etc.) if design, production techniques and mainly preservative surfacing could be improved.

41.117 Sawn wood for household implements

The demand for sawn wood used for domestical purposes is likely to decline. This sector of timber consumption does not not play an important role in the timber market.

41.118 Sawn wood for carving and arts

Although economically important, the quantitive consumption of wood for art purposes is negligibly small.

41.119 **Sawn wood for waste for foundations**

Sawn wood waste is used in the swamp areas, for instance in Sibu, as supports for foundations. Wood waste is sold for M$0.60 - M$1.20 per ton to fill up the ground for building sites. If this material would be treated with preservatives it could well serve this purpose. Untreated material endangers the stability of the ground. Such material does not require vacuum pressure treatment but could be preserved in simple hot-cold dipping process with waste material from the petro-industry. The petro-industry should conduct the required research, in as much as the same treatement could be used to increase the life of railways in the swamp forest. About 150 - 200,000 tons per annum of wood waste is used for rail-lines and other foundations in the swamp forests.

If this problem can be solved economically, it might become feasible to build permanent rail lines or roads into the swamp forest. This would be a considerable factor for the feasibility of "re-logging" operations in the swamp forest and of using logging to pioneer for the rural infra-structure.

41.2 **Internal market for board products**

41.21 **Plywood**

21,343 cubic tons of plywood were consumed in Sarawak in 1969. The break down of the figure is as follows:

| | | |
|---|---|---|
| Local production | 13,859 | cubic tons |
| Less export | 12,600 | " " |
| | 1,259 | " " |
| Import | 20,084 | " " |
| | 21,343 | " " |

This consumption of board products is likely to increase steadily. By 1975 the consumption of plywood shall be in the order of 45,000 tons and in 1995 it would exceed to 150,000 tons.

The five main types of wood board products are:

fibre boards

particle boards

plywood

block boards

lamin boards

They are partly substitutional among another.

Which kind of board products will eventually be used for a certain purpose depends on a wide variety of economical and technological factor and cannot be predicted in detail.

If the timber consumption in Sarawak follows the pattern of development in industrial and semi-industrial countries with a surplus of wooden material, plywood consumption will rise steeply during the first phase of development (perhaps till the end of the decade).

This should be followed by a slow growing demand in black-boards and lamin boards, to be substituted in phase two by particle boards.

The consumption of fibre boards stands in competetion with plywood. In the above economies the expansion for the demand on fibreboards preceded the demand for cheap utility plywood, but maintained a constant proportion of the market afterwards.

41.22 Fibre boards

The consumption of fibreboard in Sarawak is remarkably small. Only about 1,000 metric tons per annum are consumed at present.

The consumption may rise to 8 - 12,000 tons per annum, but shall remain below the minimum capacity for a fibre board production. Therefore, about 70 - 80% of fibre board production capacity in Sarawak would depend on the export market.

41.23 Particle boards

The import of particle boards into Sarawak is negligibly small. Particle boards are used for:

a) prefabricated houses

b) industrially produced furnitures

c) mechanised building industry

d) industrial packing and crating

There is no industrial production in Sarawak at present on these four fields.

Particle board is not very suitable as a material for handicraft type of furniture production.

The local climate would call for special particle boards to meet the technological requirements of the building trade.

Therefore, local demand would not justify the production of raw particle boards in Sarawak at present.

41.24 **Blockboards**

Blockboards have preceeded the use of particle boards in industrial furniture production. Blockboards are less susceptible to the influence of the humid climate and are more suitable for furniture production in small and medium sized enterprises.

Although the present consumption of blockboards in Sarawak is rather small, it can be assumed that 14,000 to 16,000 cubic tons of blockboards, faced with Melamin, Plastics or veneers shall be required in Sarawak by 1975/76. There is promising chance that export production of blockboards shall find an open market (see chapter ).

41.25 **Lamin boards**

There is a confusion of the term for the word, "Lamin-board". Old literature uses the word for a kind of block board, composed out of vertical strips of veneer or narrow strips of blocks covered with veneer on both faces. This kind of board processes nearly all the technical properties of blockboards and is here regarded as such.

Lamin board are panels composed out of smaller parts of solid sawn wood, but not veneered. The strength is derived from solid longitudinal and cross-face lamination often combined with dove-tailing, grooving or other mechanical joinings.

The technique of lamin-board production was developed during the last few years. The development is not yet closed. Lamin-boards, formerly restricted to flooring (lamin-flooring, parquettary, marquett-flooring, mosaic flooring, etc.) is now entering new fields of application as:

concrete shuttering
containers
boxes and crates
furniture production (mainly school and office furniture)
doors (mainly outside doors)
cooperage
boat building

An internal demand can be expected to be developed. Probably 4,000 to 6,000 tons per annum of lamin-boards should be consumed in 1975/76 in Sarawak, if produced in the country.

41.3 Interior demand for pulp and paper

The present demand in Sarawak for the various types of pulp and paper products would not allow for an industrial production in any field at present. The demand for pulp and paper products increases rapidly and shall continue to grow. The feasibility study on hand in West Malaysia covers this field and therefore no market prognosis was made for this report.

41.4 Interior demand for boxes and crates and other wooden packing material

In 1969 more than 6 million boxes are imported.

41.41 **Fruit boxes**

There is no steady internal transport of fruits and vegetables. There is no permanent export of fruits and vegetables, which would require boxes. Therefore the internal demand for fruit boxes in unreliable and depend on single contracts only.

41.42 **Bottle boxes**

Internal transport of bottles is considerable. Wooden bottle boxes are in common use. But the bottle-boxes are of old-fashioned design and construction. They will be susceptible for strong competition from plastic bottle boxes in the near future, if the production is not improved considerably.

The bottle boxes on the market are:

a) too heavy;

b) not accurate enough (the bottles shake too much);

c) cannot be loaded with cranes without much damage;

d) do not fill together for vertical and horisontal stacking.

The local demand should initiate the technical development of bottle boxes, which could stand competition on the export market.

41.43 **Travelling boxes**

There is a demand for chests and travelling boxes in Sarawak. The wooden boxes available are of such poor design and workmanship, that they cannot stand the competition of imported metal boxes.

Well designed and well made wooden boxes should stand chances for export in the neighbouring countries. Wooden travelling boxes are required also for permanent storage of textiles and other personal properties.

41.44 **Cooperage**

There is no local demand for wooden cooperage at present. Quality cooperage could probably compete with large earthen pottery, being virtually unbreakable. Design and construction would have to differ considerably from traditional western cooperage for which no market could be seen so far in Sarawak. Modern lamin cooperage should be competitive to metal, plastic and pottery for larger vessels exceeding 10 gallons.

41.44 **Wood wool**

There is a potential demand for wood wool to transport pottery, p.t.o. With the development of infrastructure and industry in Sarawak, more fragile products shall be transported. In 1969 only M$541 wood wool was listed as imports, but much more wood wool was brought in, together with other imports. Re-use of wood wool is quite common.

41.45 **Pallets**

Mechanisation of loading shall create a considerable demand for pallets in Sarawak. About 15,000 tons of pallets shall be required in 1975/76 in Sarawak, the majority of this, as disposable (non-returnable) pallets for export.

41.46 **Containers**

There can be no doubt, that container transport shall expand all over the world and shall be introduced to Sarawak as well.

Demand for wooden containers shall be (and are) on the increase. But the demand shall be only for those containers which are well designed and well manufactured.

Containers made from heavy sawn wood stand no chance in competition with metal containers. Containers made from lamin-board and kraft plywood will have a rapidly increasing demand.

41.5 Internal demand for furniture

42.51 Chairs

There is a potential demand for industrially produced chairs in all three sections:

a) the low price sector

b) the medium price category

c) the luxury sector

In 1969, 88,810 chairs valued at M$270,366 and parts of chairs for M$44,703 were imported into Sarawak.

In the low price sector M$4.80 till M$7.50. About 18,000 chairs should be required annually in the low price sector ($4.80 - $7.50 per chair).

In the medium price level for chairs between M$7.50 and M$36 per piece, about 2,400 pieces shall be required and in the luxury sector (carved chairs, gilded, stylish, antique, etc.) costing more than M$50 per piece about 600 pieces should be required per annum for the local demand, exclusive of the tourist trade.

41.52 Tables

The annual demand for tables may be estimated as:

a) 4,000 tables in the low price category up to M$35 per piece. The demand shall be mainly for Melamin or other synthetic resin topped tables.

b) 650 tables in the medium class: Veneered table top with high quality, polyester surface.

c) 180 luxury tables (carved, antique style, guilded), marquettery, etc.)

41.53 Chests of drawers

About 6,000 to 10,000 chests of drawers in the low price category;

500 to 700 chests in the medium class and 150 to 250 luxury chests shall be required per annum in Sarawak.

41.54 **Wardrobes**

About 7,000 cheap wardrobes and combination wardrobes/chests of drawers shall be required per annum.

The demand for medium class wardrobes might be less than 500 pieces per year, if built-in wardrobes are provided within new urban dwellings.

Not much demand for luxury wardrobes can be predicted while some luxury file cabinets and bookcases might be required.

41.55 **Upholstery**

There is a demand for some 10 to 15,000 cheap upholstered arm-chairs per year. Steel pipe constructions with polythene upholstery shall be more feasible in this class of prices than wooden easy chairs. Mass production of cheap easy chairs calls for an out turn for more than 24,000 pieces per year to be economic.

In the medium class of prices a competition between rattan and wooden arm-chairs can be expected. The production of rattan arm-chairs is a highly labour intensive production which does not require imported material, as the production of upholstered arm-chairs. For this reason, the undersigned hesitates to recommend the establishment of a factory for arm chairs of the medium price class.

Luxury and high price upholstery is not any more in competition with the rattan industry. Production of high quality upholstery in Sarawak could save imports and provide new jobs.

41.56 **Writing desks**

There is a demand of approximately 1,200 writing desks per annum, probably 900 in the medium category and three in the high category of prices.

Wooden board products, mainly blockboards, have to compete with imported metal sheets.

In 1969, office furniture for M$168,000 were imported into Sarawak.

41.57 **School furniture**

An increasing demand can be expected for quality school furniture of improved design.

41.6 **Coffins**

The demand for coffins in Sarawak is considerable, both in quantity and value. About 40% of the population is prepared to spend heavily on coffins, about 25% of the population does not use costly coffins, the rest of the population would not use coffins.

Therefore about 7,000 to 8,000 coffins are required per annum.

41.7 **Wooden boats and marine vessels**

In 1969, 34 vessels were imported valued at more than M$200,000.

41.71 **Light boats, long boats, speed boats**

About 4,000 light boats shall be required for low speed outboard motors and 600 to 700 speed boats should be required per annum between 1975/76.

41.72 **Wooden lighters and tug boats**

About 24,000 tons of litherage capacity may be required per annum between 1975/76 and 7,000 to 8,000 tons capacity might be required for tug boats and fishing boats. It shall depend on the development of the boat building industry as to which proportion wood will be used in competition to imported metal and plastics and glass fibre.

(Please see chapter )

41.8 **Matches and toothpicks**

41.81 **Matches**

The present consumption of matches can be estimated to be about 800 to 900 million pieces per annum of which less than a quarter is at present locally produced.

Up till 1980 the consumption should pass 1,200 million pieces per annum.

41.82 Toothpicks

The import of toothpicks in 1969 into Sarawak is valued at M$1,385.

Toothpicks could be produced as a side line production in a match factory.

41.9 Other wooden articles

41.91 Coat hangers

In 1969 wooden coat hangers valued at M$4,803 were imported. The plastic coat hangers on sale in Sarawak are of substandard quality and often break under the load of a coat.

41.92 Walking sticks

Although high quality walking sticks are exported from Sarawak mainly as unregistered export connected with the tourist trade, walking sticks for M$10,233 were imported in 1969.

41.93 Tool handles

There was a wide variety of tool handles imported but it seems, that none of the items are required frequently enough to justify industrial production.

41.94 Brooms and brushes

The 1969 statistics lists an import of 26,497 dozens of brooms and brushes of vegetable materials (Code No. 899230) and 4,288 dozens of brushes for toilet use and 95,043 dozens of other brooms and brushes (Code No. 899249).

Some brooms and brushes are made locally by cottage industry but the products are of substandard quality.

(See chapter )

42 External Market

42.1 Sawn wood

42.10 General remarks

The international statistics (F.A.O. Forest Products Yearbook) lists all sawn tropical hardwoods in one class, but the trade clearly distinguishes the various timber species and even provinces. It appears that the market for the

various species and group of species developed particular tendencies. The GATT publication: "Major Markets for Tropical Sawn wood in West Europe" (Geneva 1967) demonstrates how different the development of the various regional markets and how different the demand for the various timber species developed in the past and indicates as well; the broad divergence of market prospects according to timber species (respective group of species) or according to geographical position and economical orientation.

It would surpass the times of reference for this industry orientated investigation, to make a full prognosis for the development of the sawn wood export. Major tendencies have to be observed to indicate:

a) which of Sarawak's timber species would find favourable export markets as sawn wood and in which way this material should be sawn, graded, seasoned, packed, measured and marketed.

b) which of Sarawak's timber species could not be exported as rough sawn wood, and must be further processed to gain a chance for export.

If in the course of this brief market survey, elements of the rough material market (log export) have to be mentioned, this was only done in connection with problems of raw material supply or utilisation for timber industries.

42.11 Types of sawn tropical hardwoods

42.111 Technological groups

The term "hardwood" may be misleading in particular for Sarawak, where some of the "hardwoods" are in fact very soft and nearly all of the indigenous "softwoods" (coniferous) are at least moderately hard.

The term "dipterocarps" is the most accurate one, but are often not understood by the trade.

The term "broad leaved woods" might be misleading, as some of Sarawak's dipterocarpes (for instance Ru) have no broad leaves.

The FAO forest products Yearbook lists these timbers as "non-coniferous woods".

Sarawak's dipterocarp timber species could be classified according to the weight as:

a) very light and soft timbers
b) light timbers
c) medium heavy timbers
d) heavy and hard timbers

But the English term light: for light in weight and light: for light in colour may cause confusion.

Or the timbers could be classified according to the decorative value:

I) Non-decorative timbers
   I/i -light coloured timbers
   I/ii -dark coloured timbers

II) Semi-decorative timbers
   II/i -Mahogany-Meranti group
   II/ii -Ramin-Limba group

III) Highly decorative timbers
   III/i -Teak/Walnut class
   III/ii -Rosewood class
   III/iii-Ebony/boxwood class

Sawn timbers could as well be classified according to their prospective use. This classification was formerly often applied assuming that there was a kind of permanent relation between technological property, decorative value and utilization.

The development during the last twenty years has shown that utilization of a certain timber species depends as much on the technological and mechanical property as on the ever changing economical condition. For example: A European timber species which was in 1914 regarded as the sample of a "fuel wood" species, became around 1932 one of the major sawn woods and in 1950 the main species for plywood. Today, it is mainly used for pulp and fibre boards.

For a market prognosis all three classifications must be applied.

42.12 **Regional Markets**

Sarawak's sawn timber was exported to various regional markets:

| | 1965 | 1968 | 1969 |
|---|---|---|---|
| Western Europe | 72% | 64% | 66% |
| East Asia | 8% | 5% | 7% |
| North America | 1% | 14% | 12% |
| Australia & New Zealand | - | 9% | 7% |
| | 81% | 92% | 92% |

Western Germany was by far the most important market for sawn wood from Sarawak in value as well as in quantity. Some of the exports for Western Germany were shipped via Netherland, U.K. or Italy and were subsequently listed under those countries in the import and export statistics. One may estimate that about 22% of Sarawak's sawn wood was consumed in Western Germany.

The majority of Sarawak's sawn wood export is consumed in countries with metric system of measurement and grading rules according to the Central European Standard.

42.121 **Tendencies in the Western European Market for tropical sawn woods**

42.1211 General Tendency

The demand for tropical sawn wood in Western Europe shows clearly a tendency to favour light timber species

(Chapter 42.111 class b) and medium heavy timber species (Class c).

The demand for (Class a) very light and soft sawn woods is only expanding, slowly, while the demand for the same timbers as round logs expands rapidly.

The demand for (Class d) heavy and hard sawn timbers - except for highly decorative species (Class III ) declines.

42.1212 Non-decorative sawn wood

There is some demand for non-decorative tropical sawn wood, of the class I/i = light coloured timbers, but a declining demand for class I/ii = dark coloured, non-decorative sawn wood.

42.1213 Ramin/Limba sawn wood

The most expanding demand in quantity for sawn tropical timbers is in the Ramin/Limba group (class II/ii). In spite of the increasing demand, there is a growing pressure on the price for rough sawn wood of this category. Processing costs and freight rates to Western Europe are increasing and the competitive pressure of other materials; Sawn Coniferous Wood; Metal, concrete and Plastics; may soon reach the point where end products could be manufactured more economically from other materials.

Western European consumers - contrary to consumers in East Asia - are willing to import these classes of timbers in a higher processed form, but the present marketing channels set as serious handicaps.

Importers, agents and brokers specialised in the traditional round-wood trade:

i) usually do not have the customers for manufactured goods;

ii) often discencourage the export of manufactured goods, in order to

protect the interests of their traditional clientele who convert raw materials into the same goods, which could be produced in Sarawak with less costs;

iii) often lack of facilities for handling and storage of manufactured goods;

iv) do not receive commission, high enough to cover the costs involved for real aggressive marketing of new products;

v) have not realised the change of industrial demand. Due to the shortage of labour forces in Western Germany, Italy, Scandinavia, Switzerland and France, the sawn wood consuming industry is interested to obtain the wood in a processed form which answers wholly to the standard.

42.124 **Meranti**

On the Western European Market sawn Meranti is in competition with sawn Mahoganies from other parts of the world. Although there is an increasing demand, there is also an even faster increasing offer. The sawmilling industry producing mahogany type timbers expands rapidly in South America, West Africa and South East Asia.

Sarawak's sawn meranti is hampered on the European continental market by the following factors:

1. **Mixed Species**

Parcels of sawn Meranti exported from Sarawak are not uniform. They contain various timber species, usually non-meranti species, sawn and numbered in a manner which makes it impossible to sort the material out according to species and structure.

West African Mahogany sawn wood is divided according to the species and shipped in parcels which contain only one timber species and often even only one kind of grain of a particular species.

2. **Mixed sawing**

The Mahogany sawn wood which gains higher prices than Meranti is sawn "through and through" and numbered or shipped accordingly. Hereby the boards can be re-arranged according to the logs or trees from which they were produced. The consumer - for instance a cabinet maker - will buy the sawnwood of a certain tree. He will be sure that all boards will be of the same species, the same colour and structure and that the furniture produced here of will match together in this respect. Sawn wood can be joined in such a way that the pattern of structure matches favourably.

Meranti's lumber, sawn in the present way in Sarawak cannot be re-arranged and therefore is not suitable any more for decorative matching. Because of the difference in colour, structure and cutting direction from board to board, the attractive natural colour and structure of Sarawak's Meranti brings no benefit. It can only be used for non-decorative purposes - a class lower in value - and surfaced with varnishes which conceal the differences. But this also simultaneously conceal the beauty of the wood.

3. **Non-metric system**

The difference between inch and metric system causes some high waste which devaluates, of course, the material.

4. **Width**

Meranti sawn wood is not exported from Sarawak in boards as broad as technically possible, but in standard widths which are contrary to European standard requirements and much too narrow for an optimal utilisation.

The sawmiller in Sarawak does not know to which country high products shall be exported and was not informed of the purpose for which the lumber will be used.

42.125 **Decorative sawn wood for Western Europe**

Western Europe is the biggest consumer of decorative sawn wood. There is an acute shortage in the rosewood class (III/ii) and a steady increasing demand in the Teak/Walnut class (III/i). The prices of highly-decorative sawn wood rose during the last twenty years in an average of 6 - 7% per annum, while the prices for sawn wood in the "II" group rose only between 4 - 5% per annum more or less parallel to the deflation factor.

The prices for non-decorative sawn wood increased only in the range of 2 - 3% per annum and therefore increased less than the deflation factor. This means the value of non-decorative sawn wood decreases in comparison to average wholesale prices for other commodities.

Sarawak has only few highly decorative timber species as:

Rengas

Medang

Simpoh

but none is offered to the consumer aborad. Highly decorative timbers are usually traded in rather small parcels of 10 to 50 tons.

With the help of marketing promotion and steadily supplied Rengas sawn wood should fetch a price of about M$600 to M$650 per ton c.i.f.

24.122 **East Asiatic market for sawn wood**

The East Asiatic market for sawn wood has the highest potential of development. But the East Asiatic market is less uniform than the European market. There is a broad difference between the Japanese market and the potential markets of Mainland China, with Korea, Taiwan and Hong Kong somewhere in between.

42.1221 The Market for sawnwood in Japan

Japan has a surplus of sawmilling capacity and a considerable surplus production of sawn wood. More than four times as much "non-coniferous" sawn wood is produced in Japan than in Malaysia, and about twelve times more than in Sarawak. The Japanese sawmilling industry does not suffer as much under the shortage of labour forces and raw materials as the Central European sawmilling industry. The equipment in Japan's sawmills have not been depreciated to the same degree as in the European sawmilling industry. Therefore in the Japanese market there is more interest in round logs for sawmilling than in sawmill products. The saving in freight costs for the shipment of sawn products instead of 185% of its weight in log form brings a different advantage for the Japanese market than for the European market.

Due to the stronger competition by inland production, the hampering factors of Sarawak's sawn wood have a stronger effect:

1) The difference between the Japanese system of measurement, grading and sawing technique and the Sarawak trade rules virtually prevent the expansion of Sarawak's lumber export to Japan. The introduction of the Malayan grading rules may add to the handicap on this market.

2) The highly mechanized timber consuming industry found it difficult to use the mixed sawn wood from Sarawak.

   Therefore Japan imported sawn Alan wood which is only one species, but no Meranti (mixed different species) and no mixed sawnwood.

There is an open demand in Japan for highly decorative timber species sawn according to instruction, but the present sales system does not allow for direct contact between potential producers and potential consumers of this product.

If one could initiate a transfer of Japanese saw milling capacity to Sarawak, more sawn wood could be exported in this direction. Such enterprises would call for a high measure of independence and would react sensitively on nearly all kinds of government's interference in the trade.

42.122 The market for sawn wood in Taiwan

Sawmilling capacity in Taiwan has been expanded in excess to the internal demand. About 26% of Taiwan's production of non-coniferous sawnwood has been exported as such. A high proportion of the remaining sawnwood was exported in the form of ready-manufactured goods. The Taiwanese lumber market depends largely on re-export. Know-how, capital and equipment of Taiwan's export orientated timber industry seems to drain out at present, particularly to Singapore. It would be hard to distinguish here between a "short period reaction" and a lasting trend, as the motivation is entirely of a political nature.

Taiwan as a potential market for Sarawak's sawn wood remains questionable.

42.123 South Korea

Some of the points mentioned about for the lumber market in Japan and Taiwan apply as well for Korea:

a) a timber consuming industry which depends on export;

b) sawmilling capacity which cannot be written-off in the near future;

c) costs of labour partly inferior to Sarawak;

d) short distance over sea, which allows for the import of raw materials containing waste material.

The South Korea market could probably be developed for cheap sawn wood of hitherto non-commercial species for constructional purposes and flooring, but the export might not involve bigger quantities. Never-the-less, South Korea seems to be recommendable for a limited, but highly concentrated, marketing promotion.

Proposed timber species: Keruntum.

42.124 **Hong Kong**

Although a limited market for sawn wood, the Hong Kong market deserves the attention of Sarawak's timber trade.

In the past Hong Kong mainly bought mixed, low grade timber and was sometimes treated as a dumping place for surplus timbers.

These tactics ruined the market in price as well as in reputation and good name for Sarawak's timbers.

Hong Kong's timber market required in the past almost exclusively low price, sawn wood for general purposes, building and construction and boxes. Although the demand for such lumber pertains, the industrialisation caused a new demand for well selected quality lumber, sawn to order and often graded for a special purpose.

The present way of marketing does not provide for the direct contact between the producer of sawn wood in Sarawak and the consumer in Hong Kong.

Several of the hithero "non-commcerial timber" species could be sold to Hong Kong, if offered tc the trade by a well stocked permanent lumber yard in Hong Kong dealing exclusively only in Sarawakien wood products. The purpose of such an institution would be the market promotion of Sarawak's lesser known timber species. Sales representatives should visit the wood-consuming enterprises in Hong Kong regularly and serve as links between the wood-producing industry in Sarawak and the timber consuming industry in Hong Kong.

The dumping and "under-selling" tactic ruined the market. Self control and oo-ordination within the export trade shall be required to stabilize the Hong Kong market. Exporters who under sell below a minimum price fixed by the Sarawak Timber Association should be reported to the State Financial Secretary, who may initiate intensive investigations and examine all government regulations, in particular taxes, minimum labour wages, bumiputra participation, forest royalties, export duties, grading rules, etc. violation of which might have allowed for the dumping. Enterprises acting against the interests of Sarawak's national economy by dumping should be entered in a "black list" and should not be granted forest licenses, government credits, pioneer status, immigration permits and similar government assistances.

Export of goods on a sub-self-cost level of prices should be prevented.

42.125 <u>Mainland China</u>

Mainland China is on long term the most promising market for Sarawak's timber products. This market may grow on rates, unparalleled in the history of the international timber trade. It needs well-ahead planning and oe-ordination to work out a market and industrial structure to serve the interests of both economies favourably.

It must be agreed how far preprocession shall be done in the exporting country and which stages of procession

should be left to be done in the importing country. In a few years, very much additional industrial capacity will be required, probably more than the economy of Mainland China can afford in the first years.

Co-ordinated industrial planning should reduce the impact of requirement for industrial investment in China and allow for new additional industrial capacity to be installed in Sarawak.

In principle, those timber industries which are raw material intensive; capital intensive but labour extensive should be left in an agreement between Sarawak and China to the first, while the latter should concentrate on the promotion of timber industries which are labour intensive; raw material extensive and capital extensive.

Timber industries which are labour intensive; capital intensive and raw material extensive might be claimed for the time being by third partners on the regional timber market as Hong Kong and Singapore. Before Sarawak can embark in the long and difficult negotiations she must ensure full co-operation with Sabah. The interests of West Malaysia are of a different nature, as far as the future timber market in Mainland China is concerned.

While the export market for timber products in western economies would be only by Government's interference and its development should be done entirely by the trade, the development of the China market calls for strong centralised actions of the Government.

Considering the high importance and the confidential nature of the problem involved, it may be preferable to discuss the technical particulars verbally and omit further details from this report.

42.126 **The North American Market**

While the export of processed timber goods (mouldings) and plywood to North America expanded rapidly, the export of sawn wood was left behind and declined even temporarily.

This has politic-economic reasons as well as technical and structural reasons.

Import restrictions, uncertainity on the rate of exchange, disturbed the market during 1971.

Sarawak's sawn timber export stands in direct competition with Indonesian, Philippines and West Malaysia's growing sawmilling industry. The sawmilling industry in the tropical rain forests of South America: Columbia, Amazonas, Venezuela, Ecuador and Bolivia expands very rapidly aiming for the market in U.S.A and Canada.

The export of sawn timber from West Africa to North America increases steadily. Demand per head of the population for sawn wood of tropical dipterocarp species has passed the summit in both Canada and U.S.A. and must be expected to decline in the long run. While the demand for board products can be expected to grow, the demand for sawn tropical hardwood will not increase as much in U.S.A. as the sawmilling capacity of the exporting countries.

The development of prices for raw sawn, tropical hardwoods was inferior to the development of the average wholesale index and must be expected to decline more in the future.

Mixed tropical hardwoods and heavy tropical hardwoods will probably be more affected by the declining market than tropical hardwoods of identical species.

Increasing costs of seafreight and manufacturing will hamper heavy and hard timber species more than light and moderate hard timbers.

Production capacity for hard and heavy sawnwood as by-products of logging operations for plywood materials will increase in the rate of the expanding board industry (World average about 7% per annum) while consumption of sawn hardwoods grows world wide only in the range of about 1.2 - 1.4%.

While the chances to export raw-sawn hardwoods to U.S.A. and Canada decline, chances to export manufactured goods (made from tropical hardwood) improve.

(See chapter 42.5 )

40.167 The Market in Australia and New Zealand

During the last years a steadily increasing quantity of sawn wood was exported from Sarawak to the Australian market. Contrary to the development in other industrial countries, the consumption of sawn hardwood in Australia shows a high rate of increase per head of the population as well as in total.

This trend will most probably continue. Sarawak's sawn timber species often has superior qualities for industrial purposes, than some of the indigenous sawn wood species in Australia. The well organised market promotion for timber in Australia helped to expand the demand for timber goods in general.

To assure a steady export of sawn wood to Australia, Australian enterprises should be invited to participate in joint ventures of integrated timber industries in Sarawak. Although the market is limited, it might be possible to triple the present export of sawnwood to Australia.

New Zealand is comparatively new on Sarawak's list of export for sawnwood. New Zealand has consierable natural resources in wood and shall be able to continue the increase of its timber production due to intensive and progressive forestry.

The high standard of sawmilling industry in New Zealand made the market conscious of quality. Only sawn wood of high quality could stand a chance of competition with New Zealand's home production.

Recommendations to invite New Zealand's sawmilling industry to Sarawak is aimed in the first instance to

introduce some of the sophisticated sawmilling (and logging) techniques rather than to open a new export market.

41.25 **The undeveloped markets for sawn wood**

While the consumption of sawn hardwoods in the industrial countries had passed (or shall be passing soon) the summit, the consumption of sawn hardwoods in the "third world" is bound to increase in the future.

These are basically NEW MARKETS. There are neither traditional trade links nor established markets. The new, potential markets should be opened mainly for those timber species which did not fit the traditional markets.

To develop new markets calls for:

a) long term planning

b) co-ordination of activity

c) aggressive market promotion

and last but not least

d) capital investment

The development of new international export markets for Sarawak's timber products are usually beyond the capacity of individual enterprise.

Intensive market surveys abroad are necessary before it could be decided which areas of the world could be developed into export markets and for which kind of timber products from Sarawak.

The areas mentioned here under seem to offer promising aspects for further market surveys and investigations.

41.251 **Persian Gulf Area**

The Sheikdoms along the Southern Coast of the Persian Gulf are entering the timber market. There is a considerable demand for sawn wood for building purposes, harbour piling, prefabricated houses. Similar demand exist in Bahrein, Doha, Dubai and Kuwait.

But the trade is difficult. The potential importers are not familiar with rules, customs and technicalities of the international timber trade. Hazard of payment is considered high as non-established timber importers start transactions.

There are no established agents and brokers in this area, and the traditional Western sales techniques does not fit into the market.

It should become necessary to establish in this are our own sales organization (probably with a central lumber yard) to promote the export of sawn wood, plywood and processed timber goods in this area.

41.252 Israel

The International Trade statistics recorded the steady increase of Israel's timber import. In comparison to the neighbouring countries, Israel has by far the most expanding import of sawn hardwoods of the area. Akkaba has been developed into a modern port, with special facilities to handle sawn wood.

Whether the strengthening of trade relations between two countries is politically desirable or not is not a matter of a report of this nature. This applies as well to the potential market for sawn wood in South Africa. This country imports more non-coniferous sawn wood than any other country outside of Europe and North America and more than all other African countries together, or more than twice the total of all other African countries south of the Sahara.

Similar in some respects to the Australian market, the South African demand for sawn hardwoods is likely to increase for the next ten or twenty years. There are better prospects for marketing heavy and hard sawn timbers in South Africa than on the traditional markets in Europe, Japan and U.S.A.

A very detailed market survey in South Africa is required before it could be decided in which way Sarawak's export might be expanded in this direction. This should be done by either:

a) Appointment of special brokers and advertising campaigns;

or b) Establishment of direct facilities for the sale of sawn wood, as lumber yard, own sales representatives, etc.;

or c) Inviting South African companies to invest in Sarawak;

or d) Through political channels with non-racial groups and companies

This cannot be decided on technical level only.

The South African Market has a potential to absorb 70,000 or 80,000 tons of sawnwood from Malaysia per annum.

41.254 United Arab Republic (U.A.R.)

There is a potential demand for sawn hardwoods in all parts of the U.A.R. The basis of international transaction for the time being maybe a system of barter. There is a direct connection between the value of import from - and the dimensions of export to - the U.A.R. Compensative imports for sawn wood, exports of plywood and other timber products might be: rice, raw cotton, products of petro industry.

Development of the market should be initiated by political contacts. The potential for export is in the range of about 15,000 to 16,000 tons of sawnwood per annum.

41.255 Iran

Iran imported in the last year 100,000 cubic meters of sawn wood. The import of sawn hardwood is at present restricted by government's regulations. Iran's mountain forests produce hardwoods of temperate species only. There is an undiscovered demand for tropical hardwoods in the range of about 8,000 to 12,000 tons per annum. But the trade rules and

conditions in the timber industry of Iran differ considerably from international standards. The Iranian timber market required only so called

(Travers) (Alvar) or flitche-like planks:
2.65 m x 15 cm x 35 cm
or 3.65 m x 13 cm x 25 cm

There is also demand for plywood which is at present imported from Israel.

For the completion of the railway linking Pakistan to Turkey and the various rail lines required for the ore-mining and steel plant, railway sleepers (-raw and impregnated) are urgently required.

Negotiations on government's level should precede direct commercial contacts, as import restrictions, respectively government's purchases (railway sleepers) are important factors.

Petro-chemical products also synthetic resin for plywood production could be imported from Iran. Potential investors in Iran might be interested to participate in plywood factories and sawmills, if the barrier of import restrictions would be lifted.

There are prospects for co-operation on the field of "knock down furnitures" and furniture parts as well.

41.256 **Pakistan**

Pakistan imports per year about 120,000 cubic meters of sawn, non-coniferous timbers. The timber export trade complained about problems encountered in transactions on this market. The present system of marketing does not appear to be fully suitable to serve this market.

Trade rules, demand and importers attitude appears to differ between East and West Pakistan considerably. There is of course much competition from Indonesian and Ceylon on this market and recently more from East Africa (Tanzania) as well. Therefore aggressive marketing promotion connected with actions on diplomatic level (preferential import licenses) would be required to develop the market.

(If the Israelian and South African market should be developed from Sarawak, the Pakistanian market might be better handled from Trengganu and Kelantan).

All the timber markets in the Western part of the Indian Ocean are seriously hampered by the lack of direct shipping connections from Sarawak.

To use chartered vessles, the export must be co-ordinated.

42.2) Export market for plywood products

42.20 General remarks

Plywood products could be classified into the following groups:

1) Thin plywood sheets
2) Multi-ply sheets
3) Forms ply
4) Elasto ply
5) Special plywoods

42.21 Distinctions and applications of plywood products

42.211 Thin plywood sheets are three or five layer plywood sheets, usually 4mm to 6mm thick in sheets 4' x 8' or 5' x 9' or 6' x 12'. Formerly plywood was produced in 4' x 6' as well. Thin plywood stands in competition with hard fibre boards (B.S.1. term: "building boards") with paper boards, sheet metal and asbestos sheets (ETERNITE).

The trade distinguishes between:

a) Utility-ply
b) Marine-ply
c) Decor-ply
d) Roofing-ply - Shuttering-ply
e) Special-ply

(a) "Utility-ply" is cheap plywood, on which no special properties are required concerning:

(i) smoothness of the surface
(ii) colour or structure of the surface
(iii) resistance of the glue to humidity temperature of chemicals
(iv) precision of thickness

Utility ply is used for: packing, boxes and crates, interior parts of furniture, and similar purposes.

(b) "Marine-ply" is the trade name for plywood glued together with water and humidity resistant glues, and produced from timber species with special hygroscopical properties. The application of marine-ply is not restricted to marine purposes only but is used for various purposes, where the plywood is - or could be - exposed to humidity.

The various standards (I.S.O.; B.S.I.; U.S.St.; D.i.N.; J.St.; Norme Francaise, etc.) apply different testing techniques and call for different properties or differ in the degree of technical requirements. For the lay-out of a plywood production it is imperative to decide for which market the production is intended. The production technique to be used depends largely on the requirement of the "standards" applicable to the country of destination.

The crisis of the plywood industry in East Asia 1971/72 is partly due to the fact that factories produce plywood according to a standard which is not valid on the potential export-market. Narrow specialisation or exclusive orientation to one market only causes dependency. Wide flexibility in this respect increases cost of production.

The market (general trend and regional development) for utility ply differs considerably from the market for marine plywood.

(c) Decor-ply is a thin board material which is at least on one side faced with a decorative material. The term "decoratives ply" is subject to individual interpretation. The kind of wooden material, its colour, wood structure, smoothness/glance/shine/ and even smell, which can be regarded as "decorative" depends on:

(i) individual taste
(ii) fashion
(iii) style

as well as on processing techniques such as:

(iv) lacque - spreading techniques

(v) sanding or scraping methods

or on technological properties of the wood such as:

(vi) sensitiveness to light

(vii) absorption of varnish

and on production techniques as:

(viii) matching of face veneers

(ix) size of joints, etc.

No general standard can be applied for decorative ply. Trade margin for decor-ply is wide, and marketing prospects are difficult to determine. Long-term market prognosis for a particular type of decor-ply cannot be made, but margins of profit are highest on this section of plywood production.

(d) Roofing-ply - Shuttering ply

During the last years several new techniques have been developed to produce plywood products which could stand a particular kind of stress. Roofing-ply for instant, is a plywood which is resistant to humidity, one-sided radiation, sound penetration (drum effect) and has some (limited) decorative properties.

Shuttering-ply is a board product which has high mechanical strength-properties, a water repellent surface, high resistance to surface abrasion and standard dimensions according to building standards, applied in re-enforced concrete constructions.

Such plywoods are usually compositions of peeled veneers with other materials such as synthetical resins, uretan or formaldehydes, polyvinly materials (PVC, PV.d.F etc.)

metal sheets or metal components (such as aluminium folia, tin-dust impregnation, steel reinforcements), inorganic-chemicals (treatments) for fibre calcination, asbestos impregnation, gypsum-facings) etc.

(e) Special thin plywoods

Thin plywood is specially produced for purposes such as:

(i) for aircraft construction (in particular for gliders);

(ii) for semi transparent or "opaque" purposes (lamp shades, decorative windows, etc.);

(iii) for plywood-springs ("Laetti-beds, elasto-chairs, etc.)

42.212 Multi-plywood sheets

Thick plywood usually exceeding 6mm up to 3" is produced in flat pannels as well. Standard sizes are 4' x 6'; 4' x 8'; 6' x 9',etc. It stands in competition with other board products like:

Particle boards

Blockboards

Lamin-boards

Sawn-boards

It could be classified similar to thin-ply in the group (a) - (e) in chapter 42211 but the application and prospects of marketing would differ considerable from that in the thin-plywood groups.

42-213 Forme-ply

Plywood which is produced in forms other than plane sheets or boards has to compete with:

plastics

ceramics

sheet-metal etc.

Forme-ply is used for:

a) containers, boxes, barrels;

b) moulded furniture parts: chair seats, arms, backs;

(c) radio boxes;

(d) in motor body building (dash boards, decorative covers);

(e) boat building;

(f) construction of machinery (hoods for sewing machines);

(g) bath tubs for special purposes (spas, fancy bathrooms);

(h) electrical appliances (switch boards, insulator);

and many other purposes.

42.214 **Elasto ply**

Elasto-ply specially designed for elasticity, is used for:

(a) modern style furniture (mainly arm chairs)

(b) as support for Mattresses

(c) for sporting goods (hockey clubs, paddles, gymnastic apparatus)

(d) low-tension springs

(e) insulating springs for electrical fittings

42.215 **Special Plywood**

Besides the above mentioned groups there are special purposes for which wooden veneers are composed to plywood, blocks, sheets or other forms and glued or impregnated with synthetical materials. There are the:

(a) Ligno plys, where the lignin content of the plywood is altered for instance by compression under high temperature or by impregnation with additional lignin.

(b) Silicated plywoods

(c) Oil (tempered) plywoods

(d) COMPREG wood

(e) Sandwich constructions with various materials.

There are more than 7000 patents internationally registered in this field.

42.22 Trends of market development

42.221 World wide

42.22.11 Utility Plywood

The demand for cheap utility plywood growth in quantity, (mainly for packing pruposes), is in the range of 8 - 12% per annum There is a constant pressure on the price of this type of plywood as the material has to compete with other sheet materials. Utility plywood has been produced in the past in highly mechanised plants in Japan, Taiwan, Israel and USA from materials which was partly imported from Sarawak, and exported to U.S.A., Hong Kong, West Asia, Europe and other markets.

Such material can be produced economically only in well equipped, highly mechanized plants. Under the premises that production costs and general overheads do not exceed the level of costs in Formosa there should be an open market by 1974/75 for utility plywood in the following countries:

| | | |
|---|---|---|
| North America: | | |
| | U.S.A. | 220,000 $m^3$ |
| | Canada | 12,000 $m^3$ |
| Central America: | | 14,000 $m^3$ |
| Europe: | U.K. | 22,000 $m^3$ |
| | West Germany | 16,000 $m^3$ |
| | Netherland | 14,000 $m^3$ |
| | Italy | 6,000 $m^3$ |
| | Belgium | 12,000 $m^3$ |
| | Denmark | 14,000 $m^3$ |
| | East block countries | 21,000 $m^3$ |
| West Asia and North Africa | | |
| | Libya | 12,000 $m^3$ |
| | Somali | 1,000 $m^3$ |
| | Soudan | 3,000 $m^3$ |

| | |
|---|---|
| Tunesia | 3,000 $m^3$ |
| UAR | 8,000 $m^3$ |
| Iran | 6,000 $m^3$ |
| Jordania | 4,000 $m^3$ |
| Kuwait | 15,000 $m^3$ |
| Saudi Arabia | 4,000 $m^3$ |
| Dohar, Dubair ) Bahrein ) | 16,000 $m^3$ |
| East Asia | |
| Hong Kong | 37,000 $m^3$ |
| Singapore | 4,000 $m^3$ |
| Australia | 8,000 $m^3$ |
| New Zealand | 2,000 $m^3$ |

42.22.12 Marine Plywood

The demand for marine plywood has been expanding for a longer period but with a lower increase per annum. Low price marine plywood is in high demand, while the demand for high price - high quality marine plywood-remained below expectations.

Potential markets are the developing countries. The market for marine plywoods in the industrial countries appears to be rather brand conscious. It would be costly to introduce new, unknown brands on this market. A potential market for marine plywood would be Mainland China.

42.22.13 Decor Plywood

The demand for decor-plywood increases rapildy in the industrial countries as well as in the non-industrial countries. In the industrial countries more decorative plywood will be required in the higher category of prices, where the value per square unit exceeds the value of Formica boards. The demand for the lower grades, where the square unit of decor-ply could be obtained for less than Formica boards.

Sarawak has a shortage of raw material for the first class of decor-plywood, but a surplus or material for the production of the latter class.

The potential export market could be estimated in the range of about 38 - 54,000 $m^3$ per annum for decor-plywood faced with dark red Meranti - "striped" veneers

42.22.14 Export markets for Roofing ply

Roofing ply had not been traded on the international market. The material had been developed only recently and the building trade is not yet aware of its technical properties.

If produced for the expected prices, roofing ply may find a virtually unlimited market for bungalows and holiday houses, replacing wooden shingles, tiles and metal-sheets in the tropics.

42.22.15 Plywood for Concrete Shuttering

Ten years ago, very little plywood had been used for concrete casting. Now more than 21% of the total plywood consumption is used for this purpose in some of the industrial countries.

It can be expected that the demand will increase rapidly. Malaysia should be able to find in 1974/75 export markets for 300 - 400,000 $m^3$ of plywood for concrete shutters mainly in the industrial countries (together 280-320000 $m^3$ per annum)

42.22.16 Export markets for multi-ply sheets
(Please see chapter 42.21.2)

Although world consumption of thick plywood increased in total, thick plywood was displaced by other board products in some regional or technical markets.

Demand for thick plywood has grown - and could be expected to continue in growth - for the following purposes:

(a) containers
(b) Railway carriages
(c) Concrete shuttering
(d) Tool boxes
(e) Ammunition boxes

Thick plywood lost ground in the production of furniture, radio cases, aircraft construction.

Detailed market surveys are recommended for Australia, U.S.A. Italy, Southern Brazil, South Africa, U.A.R. and Iran.

42.22.2 Western Europe

There may be a market for cheap utility plywood in Western Europe of approximately 80,000 $m^3$ per annum; Marine ply 5 - 10,000 $m^3$ per annum; Decor ply, only highly decorative material which cannot be produced from Sarawak's raw material alone; Roofing ply circa 20 - 30,000 $m^3$; Concrete shuttering circa 200,000 $m^3$; Other plywood products 15,000 $m^3$.

42.22.3 America

In 1974/75, there may be a market for: circa

230,000 $m^3$ of cheap utility plywood

25,000 $m^3$ of marine ply

25,000 $m^3$ of decor ply

180,000 $m^3$ of roofing ply

430,000 $m^3$ of concrete shuttering

and 70,000 $m^3$ of other plywood products in U.S.A. and Canada.

42.22.4 East Asia

A forecast on the plywood market in East Asia is not possible at the present moment since there seems to be no homogenous pattern of development. Future demand depends, more than in other regions, on political decision. Future plywood consumption in mainland China, (the biggest potential market of the region) cannot be pre-estimated.

Demand for plywood in the export orientated economies of Japan, Hong Kong, Formosa, Singapore and South Korea was so much disturbed by the politic-economical development in 1971 that prognosis seems to be rather hazardous at the present moment.

But no other regional market of the world holds development potentials as wide as the East Asiatic market.

Permanent survey of the plywood market in East Asia is essential for Malaysia's industrial development.

42.22.5 Australia

Australia imported: 1967 - 26,400 $m^3$ plywood
1968 - 33,000 $m^3$ plywood

and can be expected to import in 1974/75 about 82,000 $m^3$ mainly utility ply for packing purposes.

42.22.6 New Market

The most expanding demand for all sorts of plywood can be expected in those economies which move from agriculture to industrial economies. West Malaysia's rising demand for plywood is symptomatic for this development.

Forecasts cannot be based on consumptions in the past since this transition indicates a structural change of consumption and demand.

The following markets may offer outlets for Sarawak's plywood industry in the future:

Persian gulf states
Iran
India
Pakistan
Trinidad and Tobago
Greece
Lebanon
Saudi Arabia
Libya
Chile
Argentina
South Africa

42.3 Export market for board products

42.31 Particle board

42.31.0 General Market situation

Although production of particle board expanded with the highest growth factors of all timber products, international trade of particle boards remained insignificant.

42.31.1 Comparison of production factors

Raw material for the production of particle boards are available in surplus in all countries of the world.

Development of particle board industries is usually limited by the market and not by the lack of raw material. Therefore countries with an open demand for particle board would establish production capacity instead of importing a material which is costly and difficult to transport. The minimum economical capacity of particle board factories is so small, that even for the smallest market a factory could be established. (Example: Particle board factory in Kuwait.)

Particle boards are rarely exported on longer distance since the proportion of transport costs often exceeds the production manufacturing costs.

Particle boards are used mainly for:

a) prefabricated houses

b) industrially produced furniture

c) mechanised construction

For all these purposes, special equipment is required which is usually not available with a handicraft carpenter or artisan. Particle board consumption is therefore directly related to the degree of industrialisation of the building trade and of the furniture production.

42.31.2 Types of particle boards

In principle, there are two main types of particle boards:

42.31.21 Horizontally compressed particle boards

This board is used for general purposes and has the same strength in the two direction. The most costly item of machinery for the production of such boards is the hot press, for which more than 40% of the investment is required.

The critical point of mechanical strength for this board is the horizontal cleavage strength. Screws, nails or bolts entering the board from the edge may cause the board to split. Therefore, special screws have to be used or a frame of solid wood is glued around the edges of the board, to provide a hold for connections on the edge.

The surface of horizontal compressed boards is plane, as the particles are pressed into a more or less vertical orientation.

More than 84% of the world's particle board production are horizontal compressed boards.

42.31.22 Extrusion boards

The particles are pressed vertically through a gap producing an endless tape of particle boards which has no mechanical strength in the stuffed direction. There is no interlace between the particles which were compressed by subsequent piston strokes of the press.

Such an extrusion press requires very much less investment capital, less stable foudations and less mechanical energy. Therefore the extrusion board is cheaper than the horizontal compressed particle board.

Extrusion boards are used mainly for:

i) Prefabricated houses. Reinforcement rods are inserted into the board to provide additional strength. There is no danger that the board shall split, if screwed from the edge. Screwing from the edge will find a good hold.

ii) as core for veneered particle board where according to the double T carrier system, the shell of veneers provide the required bending strength.

42.31.3 Potential markets

As the proportion of freight costs limits the market, only the South East Asian region could be considered as potential market for export.

The regional market lacks industrial capacity in furniture production and prefabricated houses. It has no demand for raw particle boards.

The potential consumer of particle boards in this region is the handicraft carpenter or artizan who required the particle board in such a state of production that it could be used in the same way as blockboards, plywood or sawnwood. Therefore veneering, cutting to size and sanding must be done by the particle board industry.

Particle boards faced with veneer, melamin or poly-vinyl sheetings should find markets as:

Table tops
Furniture parts
Pannelling materials
Concrete shutters
Sound muffling doors
Switchboards
Construction elements

The potential demand for such board products in the region exceeds 280,000 Tons/per annum.

42.32 Export market for fibre boards

42.32.1 World market

Contrary to the expectations, the demand for particle boards did not shrink as a result of the expanding particle board and plywood production.

Regionally (and temporarily) there was an over production of raw standard hardboards, but this was compensated by a fast increase of demand for faced fibre boards.

The consumption of:

(i) Enamelled fibre boards (burned-in lacquered)

(ii) melamin faced fibre boards

(iii) oil tempered fibre boards

(iv) dry processed fibre boards

(v) fibre boards re-enforced with glass fibres

and other processed fibre boards rose all over the world.

42.32.2 Export market for hard fibre boards in South East Asia

South East Asia imports fibre boards from North America and Europe. The per capita/income consumption of fibreboards in South East Asia is still below world average, but increases rapidly. Since all three factors:

(i) Number of consumers

(ii) Income per head

(iii) Consumption of fibre boards per capita/income

shall rise in South East Asia, a tremendous rise of demand for fibre boards can be expected in the region. It can be assumed, that the world's pattern of fibre board consumption shall apply in South East Asia and that more processed hard-fibre-boards (see 42.32.1 (1) - (v)) shall be required in the future than raw hard boards. There should be export chances for about 120,000 tons per annum of processed hardboards in South East Asia in 1974/75.

42.32.3 Export Market for hard fibre boards in West Asia

There is a shortage of wooden raw material in West Asia. Countries in this region with rising income are - or shall soon be - in demand for fibre boards. The oil states on the Persian Gulf imports a steadily increasing quantity of fibre boards (1967 about 6,000 tons & 190 about 16,000 tons). Iran

has at present a surplus of hard fibreboards but the rising internal demand should absorb the surplus within the next six years.

Pakistan imports about 7,400 tons of fibre boards per annum. Imports are limited by import licenses and are below the demand.

42.33 Export market for fibre insulation boards

42.33.1 World market

Only about 15% of the world trade in fibre board concerns "non-compressed fibre boards" known by the trade as "fibre-insulation boards.

The competition between the various kinds of insulation boards caused diverse developments on the various markets. Gypsum boards, Styropore, foamed plastics, woodwool/cement boards, glass fibre-mats, rattan and reeds, gas-beton and many other insulation materials are in constant rivalry on the market.

While a rising demand in insulting boards can be foreseen, it is not predictable, which kind of insulation board shall be required in the future. World consumption of fibre insulation boards declined from 1967 to 1969.

Some governments are trying to force the development in a particular direction by import restrictions, preventive standard regulations, tender specifications, etc. This adds to the unpredictability on the market for insulation boards.

42.33.2 Regional Markets

42.33.21 The South East Asian market

At present about 6,000 tons of insulation boards are imported to this region. Malaysia and Singapore being the biggest importers. There are good chances for an expansion of the market. Hong Kong and Mainland China should require considerable quantities of insulation boards in the future. The import requirement should pass 15,000 tons per annum by 1977/78.

42.33.88 West Asia

Informations on the consumption of fibre insulation boards in West Asia are incomplete. The general hot and dry climate, with extreme changes of temperature in West Asia should cause a demand for insulation boards, as housing changes from traditional clay hut to modern standards.

42.33.4 Export market for prefabricated houses

Fibre insulation boards are often used for prefabricated houses and partition walls. Although by far not the only material for this purpose, the market chances for prefabricated houses and partition walls must be considered for a comprehensive picture of the market.

Sarawak, hampered by adequate port facilities stands little chances in developing an export orientated industry for the production of prefabricated houses. The demand for prefabricated houses, and partition walls increases within many countries, but the international trade remained insignificant.

42.34. Export markets for Blockboards

42.34.1 Types of blockboards and applications

Formerly the term "BLOCKBOARD" was used for a veneered board with a core of larger strips of wood, glued together. (See G.H. Love: PAN Handbook of Woodwork - page 95) Nowadays the term covers a wide range of board products with various kinds of cores as:

Lamin-wood
roll-coll chips
particle-boards
wooden-lattrice construction
honey-comb paper
foamed plastics
trellised metal sheets

and others covered on both sides with veneers or other sheet materials.

More correctly the term "sandwich board" should be used. But the trade used the word "blockboards" to distinguish sandwich boards of ¼" - 2½" thickness from sandwich-ply below ¼" thickness and "sandwich boards" = sandwich constructions about 2½" thickness.

Blockboards are used for:

pannelling

furnitures

containers

boat building

concrete shuttering

42.34.2 Regional markets

The development of blockboard industry has been neglected in comparison to the plywood industry in South East Asia. The furniture trade of this region is entering now the stage of semi-mechanized production which replaces the sawn board used in traditional handicraft by premanufactured blockboards, but does not yet dispose of all the equipment, which would be required to use raw particle boards.

Also in the building trade, the blockboard fits well into the pattern of consumption which can be expected for the next years.

Container transport shall cause a sudden demand for strong board products not only for containers, but as well for accessories of container transport. Containers in the range of several million cubic meter content will be required. On this field along 20-30,000 tons of blockboards per annum shall be required in South East Asia.

42.34.3 Market prospects for various types of blockboards

42.34.31 Utility blockboards

Demand for non-decorative blockboards with high mechanical strength, faced with a hard face veneer (resistant to indentation) and glued with humidity resistant glues, stands good prospects to be used for containers and "return-crates" and for concrete shutters.

42.34.32 Decorative blockboards

Blockboards, faced on one side with high and medium price face veneer has prospects for expanding demand for furniture production and pannelling.

42.34.33 Formica - blockboards

The demand for Melamin or Formica faced blockboards is high in all tropical countries and rises constantly.

42.34.34 Soft faced blockboard

The traditional type of blockboards faced with a non-decorative, soft veneer (subject to abrasion and indentation) is likely to decline.

42.34.35 Low price blockboard

Low quality blockboard - blockboards liable to be demaged by humidity-will be displaced by particle boards.

42.34.36 Sandwich Blockboards

Blockboards combing wooden materials with sheet metal, aluminium folia, foamed plastics, etc. are likely to meet with an even increasing demand.

42.35 Export market for flash doors

42.35.1 Types of flashdoors

The trade distinguishes between three categories of flashdoors:

a) light interior flash doors

b) medium heavy flash doors

c) outer doors

42.35.2 Trends on the world market

After the world war a boom for prefabricated flashdoors ruled the market. Industrial capacity has been installed in excess to the demand in the industrial countries in 1950-1960. As the result of this light flashdoors were exported - partly for dumping prices - to the developing countries. The sudden

increase of door imports caused many of the developing countries to impose import restrictions for doors and to establish door factories within their own boundaries. Mostly investment capital was short and the market was spoiled by low grade products. Therefore production of light and cheap doors were established, regardless of local requirement.

During the last year consumers became conscious of the quality. The public desired doors:

(i) which provided protection against noise;

(ii) which were reasonablly stable and safe against burglars;

(iii) which could stand the local climatic conditions;

and last but not least:

(iv) which were decorative and handsome.

Of course, there was still a demand for the cheap, light doors, but the industrial production exceeded this demand.

The regional markets were rocked by political dumpings. Many producers of light and cheap doors went out of production.

Meanwhile, demand for quality doors increased and continues to expand. Light doors are material and labour extensive products, while quality doors are material and labour intensive products. Production of light doors was therefore excess in the industrial countries, with a raw material and high labour costs deficit. The production of heavy doors is more feasible for countries with surplus of raw materials and labour forces.

Lack of know how, in particular knowledge of the market and of technical production process had hampered the development of a door industry in the raw material countries.

42.35.3 Potential markets

There are no good prspects for the export of cheap, light doors except to China.

There seems to be promising chances to export:

a) Sound restraining doors to U.S.A., Western Europe, Argentina, Brasil, South Africa, Japan, Isreal, Hong Kong.

b) Decorative quality doors to West Asia, U.S.A., South Africa, Western Europe, in particular Scandinavia, Netherland, Germany, Italy.

c) Solid doors for schools and hospitals to U.S.A., Great Britain, Australia, South Africa, Iran.

42.4 Export markets for Mouldings

42.41 Types of mouldings

Many different shapes of mouldings are produced and only few shapes can be regarded as "standard types", while the majority is shaped according to the order. One may classify the mouldings according to the shape into:

a) Frames, mouldings of basically triangular cross-cut shape;

b) Roundlings, mouldings of round cross-cut shapes;

c) Window and Door frames, usually standard shapes, with a cross-cut in variations of a square or trapezoid.

42.41.1 Frames

Frames are used for; picture and mirror frames decorations on furnitures, ornamental ledges, borders for wall paper wooden rules, banisters, hand rails and similar articles.

Many former applications of wooden frames, have been substituted by aluminium and plastic nowadays. Traditional production techniques are used only where:

(i) wood is cheaper;

(ii) wooden grain is required for decorative or technological purposes;

wooden frames maintain their share of the market. But the range of applications for wooden frames is shrinking. Wooden frames can stand competition with other frame materials, only if produced in the most economical way and if marketed as efficiently as the competiting materials. The aluminium industry spends per annum more than 72 million U.S. dollars on marketing promotion, the wood moulding industry spends almost nothing. No figures on the budget for marketing promotion of the plastic moulding industry were available, but the amount may exceed the above figure of the aluminium industry.

In spite of the declining consumption, of wooden mouldings the international trade in moulds expands rapidly. There is a shift of production from the industry countries to the wood producing countries. This trend shall be strengthened by the introduction of container transport and expanding industry standardization.

The potential markets for wooden frames should be in those industrial countries with a shortage of labour forces and deficiency of wooden material.

Sarawak's moulding industry is orientated to the U.S.A. The demand is by far not satisfied and shall expand in the future as more of the moulding plants in U.S.A. shall go out of production due to the rising cost of labour.

Although some frames were exported to Europe, the market chances are far from being exhausted. About 87% of the wooden frames consumed in Europe compel to the metric system of standardization grading and measurement.

Sales promotion for wooden frames from Sarawak virtually does not exist in Europe. A broker in Europe, supposed to sell mouldings along with round logs and sawn wood from Sarawak, went out of his way to discourage a potential importer

of Sarawak mouldings in order to protect the interests of the local moulding industry which is his customer for sawn wood and logs.

In 1974/75 there should be a market for about 110,000 $m^3$ (metric standards) and 123,000 cubic foot (about 3,500 $m^3$) (non metric standards) of wooden mouldings in Europe.

Potential export markets for wooden frames are:

Israel

South Africa

Libya

Bahrein

42.41.2 Roundlings

The bulk of mouldings exported from Sarawak were round handles, in particular broom handles, curtain sticks and similars.

These were exported mainly to U.S.A. and Great Britain.

The biggest potential market for broom handles lies in Italy, West Germany and France. (Population together about 170 millions) Metric standards and aggressive marketing promotion are required.

42.41.3 Window and Door frames

The bulk of the wooden window and door frames used in the world were made from coniferous wood. Tropical hardwoods have been introduced but become popular only on certain markets.

Helped by massive advertising, the use of aluminium window frames and door frames expands rapidly and several experts hold the opinion that wood will be displaced soon in this field.

Detailed comparison of technical properties and economical factors have revealed that wooden window frames were fully competitive with aluminium. As a matter of fact, for standard size windows, up to 1.6 $m^2$ wooden frames are more feasible for windows between 1.6 $m^2$ and 2.6 $m^2$. Both materials are competitive while

aluminium is more feasible for windows exceeding 2.6m$^2$ in size. This depends of course largely on climatic and economic conditions. There is at present virtually no export of wooden window frames from Sarawak. Indigenous timber species suitable for window frames are not used in the moulding plants. The present trade is not capable of exploring and developing potential markets.

The following markets should be investigated: Australia, South Africa, Pakistan, Spain, North Africa, Persian Gulf Area, Mainland China.

42.41.4 Wooden Ladders

The trade distinguishes between:

(a) long ladders, for construction scaffolding, etc.

(b) folding ladders for household purposes;

(c) industrial ladders;

(d) small pairs of steps.

Long ladders were produced formerly from coniferous or poplar poles which were (due to their sizes) seldom internationally traded. Patent scaffoldings from steel pipes replaced long ladders widely.

Foalding ladders had been produced mainly from beech wood or elm and have been exported from C.S.R. and Poland all over the world. At present, there is a competition between aluminium ladders and wooden ladders. The market for wooden ladders is shrinking.

Industrial ladders, as ladders for fire engines, mobile ladders and similars have been constructed formerly from elm, teak, or hickory wood. Metal constructions have displaced wood almost entirely.

Small pairs of steps, in particular types which could be folded into kitchen chairs are popular all over the world. More of such small pairs of steps shall be required, as more people move in apartment houses with limited storage space.

Chances for export of such small pairs of steps, assembled and dis-assembled shall increase. Subject to a feasible design and well organized marketing it should be possible to export about 30,000 or 40,000 small pairs of steps to U.S.A., Western Europe, Australia, South Africa and Israel.

42.5 Export market for Furnitures

42.50 Classification of furnitures

There are two levels of classification used in the furniture trade:

a) Classification according to the standard of value and quality;

b) Classification according to the production technique;

(a) Classification according to value and quality

(i) Substandard furniture

Very cheap furniture, used by people of the minimum income class, produced by untrained people, using waste materials and boxes, off cuts and similars. This furniture is sold direct from the producer to the consumer, sometimes by hawkers.

(ii) Utility furniture

Cheap furniture, industrially produced in large serials for the low-income part of the population. Utility furniture is sold through department stores, mail order houses or a furniture trade (discount houses) specialised on this level.

(iii) Raised level furniture

Industrially produced furniture of good quality; durable but produced in large quantities. Marketing through the furniture trade only.

(iv) Art craft and luxury furniture

Individually produced furniture of high quality. Marketing is through art and antiquity trade.

(v) Handicraft furniture

Individually produced furniture of unequal standard of quality, usually of traditional design. Produced on order. Sales price exceeds the level of quality.

(b) Classification according to production techniques

(i) Box furniture

Wardrobes, cabinets, chests of drawers, office writing desks, cupboards, house-bars, kitchen cabinets, beds and other furniture produced mainly from board products.

(ii) Tables

Dining tables, coffee stands, side table, open writing desks, garden tables and furniture which contains about as much board products as solid wood.

(iii) Chairs

Not only chairs are classified under this group but other furniture produced mainly out of solid wooden blocks as flower stands, pedestals, tray stands etc. as well.

(iv) Small furniture

Items produced mainly from solid wood such as cloak room sets, drinking stools, wall mounted toilet tables, ornamental boxes, book shelves, room divider, etc.

(v) Upholstery

Arm chairs, chaise lounges, settles, sofas, mattresses, couches, which are produced from a composition of textiles, leather, metal springs, rubber, kapok, wood and others.

Marketing prospects differ considerably according to both classifications. For instance: Chair furniture (class b(iii)) of standard a(i) stand no chance of export.

Standard a(ii) may find markets in countries where chairs standard a(iv) could not be sold.

Luxury furniture a(iv) could be sold in connection with the tourist trade in group b(iv) but not b(i) and b(v).

International statistics do not list the import and export of furniture according to the above classifications. Therefore there is no reliable background on which a marketing prognosis for furniture export could be based, except by direct investigations in the various countries.

In the following chapters (42.51 - 42.52) potential export markets for furniture types which could be produced in Sarawak shall be identified for further investigations only and not as final results of a market survey, which could not be done under the terms of reference.

42.51 Chairs (see b(iii))

42.51.1 <u>World trade in Wooden Chairs</u>

The volume of international trade in wooden chairs is steadily increasing in spite of the heavy competition by metal chairs and increasing local production in nearly all countries.

The bulk of the international trade in wooden chairs concerns the "utility" (class a(ii)). More than 97% in weight and 81% in value of the world import and export of wooden chairs, were cheap beech, birch or platane wood produced in Czechslovakia. Poland, Roumania, Yugoslavia and Italy. Formerly, Germany, Netherland, U.S.A., Finland and Denmark were exporting such chairs as well. Importers were mainly developing countries. Underdeveloped countries and highly industrialized countries did not import wooden chairs in the same ratio per head of the population.

42.51.2 Under-developed countries require much chairs of the class a(i), which are not feasible for export. Highly developed countries have an unsatisfied demand for chairs in the class a(iv) and a(iii) which are not yet offered on the international market.

International trade in chairs class a(iii) - a(v) is hampered by import restrictions and was formerly hampered by the means of transport.

42.51.3 Marketing

Chairs in the class a(ii) are traded by the general imports and export trade and not by the timbertrade. Retailing is done by the hardware retailing trade and occassionally by department stores. Chairs for offices are sometimes offered by the stationery - and office - machinery trade.

The specialized furniture trade seldom handles chairs in the a(ii) category.

There seems to be good chances to export dis-assembled chairs category a(iii) to Southern Europe, Australia, South Africa, Central Europe, Carribean and West Asia.

For category a(iv) chairs, export chances may exist to North America, (U.S.A. and Canada), United Kingdom, West Germany, Persian Gulf states, Israel, Brazil and Argentina.

For category a(v) export chances may exist in New Zealand. Hawaii and South Africa, but quantities required should be very small.

42.52 Knock-down Furniture

42.52.1 Types and Classes

Knock-down furniture is mostly in the a(ii) and sometimes in a(iii) class, rarely in a(iv) or a(v).

Knock down furniture has been designed for:

b(i) box furniture

b(ii) tables

b(iii) chairs (dealt with above in chapter 42.51.3)

b(iv) small furniture

International trade in knock down furniture is in its first stage of development. Knock down furniture is offered on the international market in quality a(i) and lower a(ii) by some East block countries. The proportion of freight costs on the end price hampers long distance export.

Knock down furniture in category a(ii) and a(iii) for which there is a big potential demand, have been produced exclusively in the industrial countries, where the costs of labour and raw material are high. Therefore imported knock-down furniture in category a(ii) and a(iii) often could not stand the competition by locally manufactured conventional furniture. Preventive import duties also hampered the international trade. Formerly, means of transport hampered the trade in knock-down furniture. Container transport is ideally suited for the export of knock down furniture.

Potential export markets for Sarawak's knock-down furniture category a(ii) could be expected in Japan, Hong Hong, West Coast U.S.A., Hawaii, U.A.R., East Africa, Persian Gulf states, South Africa, Great Britain, Southern Europe mainly Italy, Greece, Spain and Portugal.

Category a(iii) should find an open market all over U.S.A., Central Europe, Australia, South Africa and Isreal.

Category a(iv) may be bought in U.S.A., Canada, Scandinavia, Germany, Iran and Chile.

42.52.3 <u>Market promotion</u>

It should pay to launch an intensive market survey as to:

i) style
ii) dimensions
iii) material and
iv) category of quality

simultaneously with the trading of designers and manufacturers, before embarking on the development of the industry. But time is short. The undersigned holds little doubt, that knock down furniture shall be traded much in the future. Any country which possesses the raw material and cheap and efficient lanour forces and is the first in this field should win the market. This is a matter of months, not years and should be done swiftly but thoroughly and with as little publicity as possible, otherwise the market might be cramped before the demand has developed.

42.53 Art-craft furniture

42.53.1 The North American Market

The market for art-craft is rather unhomogeneous as individual taste is as strong a factor as fashion and tradition.

In Canada, it seems that the demand for antique style art fruniture is somewhat more pronounced than in the West states of the U.S.A. where rural Spanish style is at present "en vogue".

Art-craft furniture for export must be orientated according to the taste and style of the country of destination, while art-craft furniture for the tourist trade must be based on local tradition and style. Interest in a certain style shown by the tourists does not necessarily indicate a demand in the tourists homeland. A tourist may buy a kayan-styled carving during his holidays in Sarawak, but would not buy the same item from a furniture shop at home.

The North American market for art-craft furniture is known to be subject to "fashions", which were often "made" artificially by market promotions. For this market an art-craft furniture must look and must be costly. Lower prices would result in declining demand. Although the item should have individual character, it should be offered in sufficient quantities to become "popular".

This kind of furniture is brought into the U.S.A. mainly by ladies above 35 years of age, who take little interest in genuity, degree of artistic workmanship and are open to good salesmanship. For the export of art-craft furniture, it is important to consider through which channels the retailing is done. Trade margins of more than 180% are usual. Marketing through cheaper channels may ruin the export.

Furniture in category b(iv) are often bought far away from the residence of the buyer and should be made suitable for re-packing and transport.

Marketing and production of art-craft furniture for the North American Market must be rather flexible and fast reacting. Changes of style and type are frequent. Margins of profit are very interesting. The Philippine Government is aiming to develop this export to U.S.A. on government's lines, a system which did not yet produce satisfactory results. In Costa Rica, Jamaica and Mexico, the private trade had more success, where the government helped in the training of artizans but did not interfere in the trade.

42.53.2 **West Asian Market**

The countries around the Persian Gulf, Lebanon and Libya imported during the last years mainly "empire-styled" guilded or carved furniture from France and Italy. In both countries, costs of labour rose exorbitantly and much of the traditional skill has been lost. Carved tables were on sale in Teheran for US$11,000 a piece. A hand carved dining room set imported from Italy to Bahrein for US$23,000 was sold within one week.

A fake Napoleon-styled mirror fetched US$2,300 in Beirut.

Art-craft furniture for this market must "show", must have a taste of "fairy tale past" and "royal glory". Price is not a matter of interest but turn-over in quantity will be small. Trade margins would be very considerable and the right approach of sale imperatively important.

42.53.3 **The European Market**

The European market for art-craft furniture is the least appealing for exporters. The demand is much less homogenous than in North America. Quality requirements are often exaggerated, competition (for instance from East Block countries) is high.

In spite of this situation, the market should be under permanent surveyance. The permanent rise of cost of labour and an excessive growth of demand for art-craft furniture should sooner or later improve the situation. In the last year, art-craft furniture was exported from Finland and Denmark to Central Europe valued more than 64 million D. Mark (approximately M$60 million). A detailed analysis of costs for the imported art-craft furniture revealed that besides marketing costs (63.1% of the retail price), cost of labour (36.3%) was by far the most important cost factor. Comparing the cost of labour in the exporting countries with labour costs in East and West Malaysia, there should be good chances of competition for Malaysia.

42.54.4 Australian and South African Market

The market for art-craft furniture in both countries is under-supplied. Art-craft furniture is imported from Europe and relatively few from Hong Kong. The latter often via Singapore to Australia.

Taste in both countries seem to be stable and less subject to fashions than in U.S.A,, though the demand in Workmanship is higher. Clean, conservative carving and decent-coloured marquettery is in demand. Extreme fancies or exotic folk-lore is not much in demand. Antique appeal - gotic till Queen Anne - are more favoured than "French cabriole". But there is a steadily increasing demand for artisan-made high quality "Danish style".

42.54 Furniture Parts

42.54.1 Types, uses

The international trade in furniture parts is still under-developed, hampered by the traditional channels of trade and by the difference in standards and measurement systems.

Many furniture industries in West Europe, the Persian Gulf states, U.S.A. and Canada would like to import pre-manufactured furniture parts, if they were offered on a reliable standard of quality direct from the producer to the consumer.

42.54.2 East Asiatic Market

A market survey would be required for Japan, Hong Kong and China.

42.54.3 American Market

Discussions with American furniture producers during the ITERZUM (Cologne 1971), the Trade Fair in Milan and Hannover, indicated the interest of the medium sized furniture industry to use pre-manufactured furniture parts.

The very big enterprises showed little interest in the subject. Their links with the local timber industry were so strong that they were not interested in importing pre-manufactured parts from abroad.

The medium-sized enterprises apprehended at the risk to invest abroad and were often short of investment capital. They could not think of another way other than direct participation to assure the required standard of quality and precision.

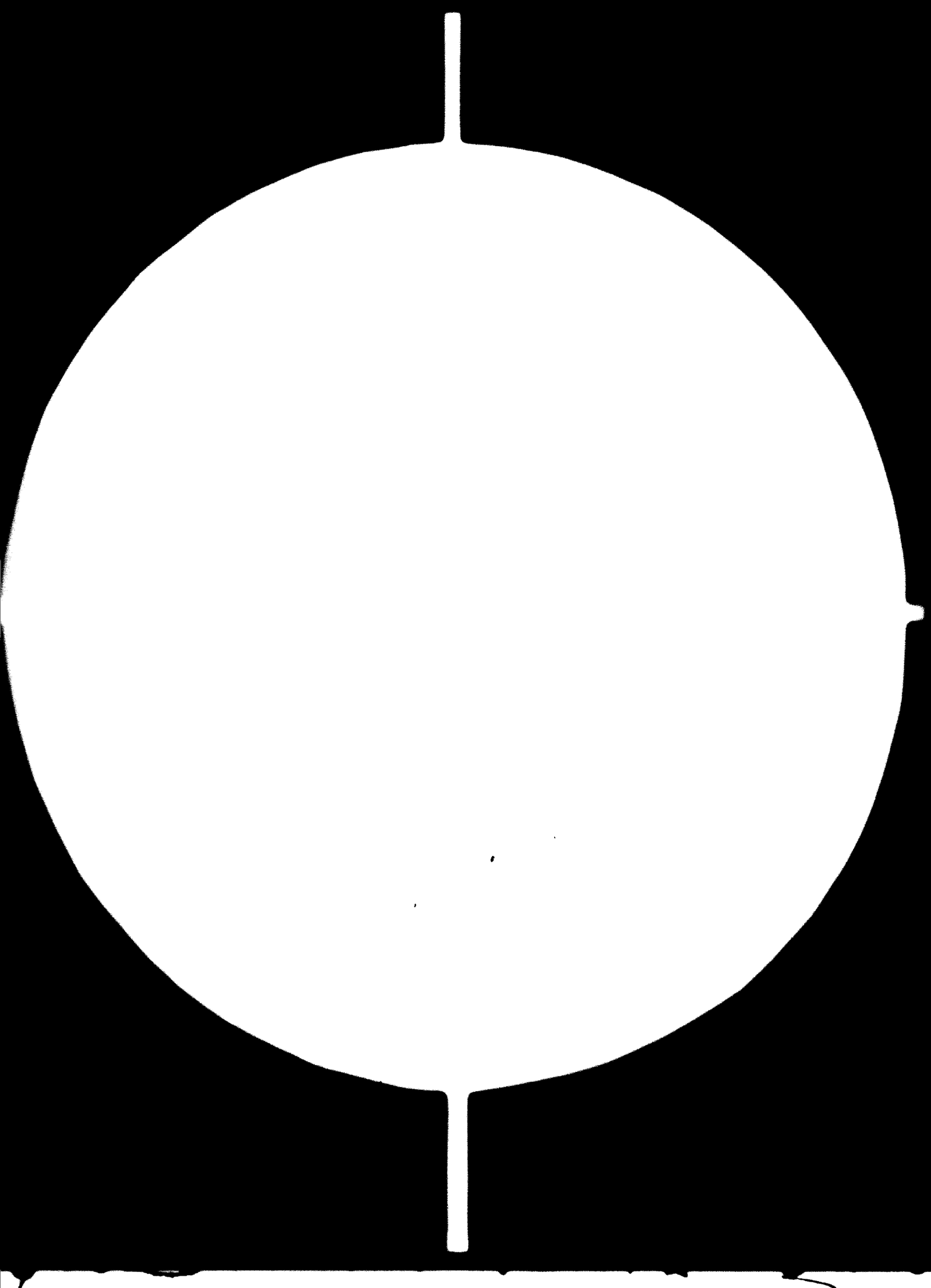
Nearly all potential buyers of prefabricated furniture parts were prepared to train the personnel for their potential suppliers and to assist in the initial period with know-how and equipment. The interest was concentrated on prefabrication of labour intensive parts as:

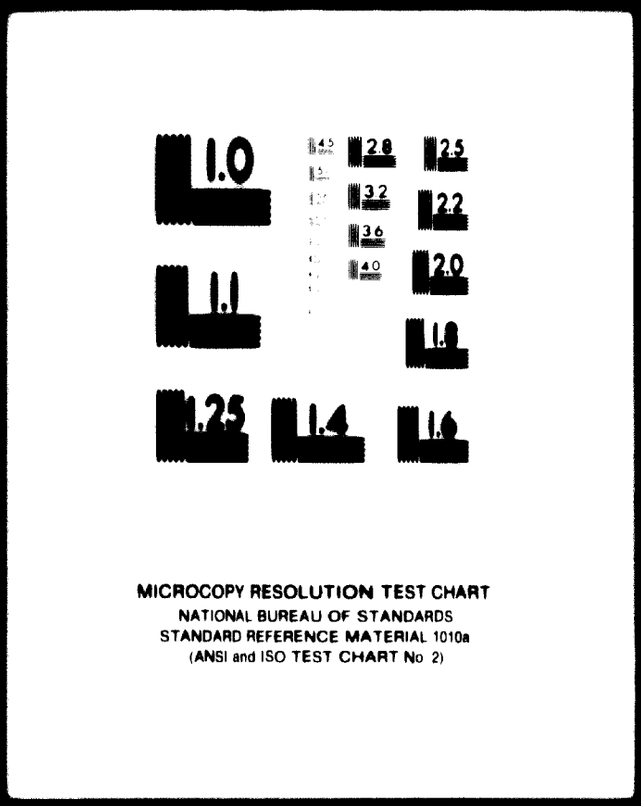
hand-carved embellishments
cabriole-chair-and table legs
marquettery veneers
cross-cut table tops
embroideries
hand woven Rattan-seats for chairs
pre-bent rattan parts

All complained about the primitive surfacing or gluing offered from producers abroad. In many developing countries, protection (pioneer status) of local lacquer and glue production had a negative influence on the development of surfacing and gluing technique.

C-572

84.12.03
AD.8G.07
ILL 5.5+10





42.54.4 The European Market

Furniture producers in Denmark, Sweden and Western Germany were interested to import pre-manufactured furniture parts. Some of the potential importers were prepared to supply even the required machinery and training.

With producers of furniture in the categories a(ii) and a(iii)/b, little or no interest was met in the subject. Producers of furniture in the categories a(iii)/b, a(iii)/b, a(iii)/b, were interested.

In category a(ii) only few producers of (b) (small furniture) were interested to import pre-manufactured parts.

The following proposition was discussed. Instead of replacing labour intensive machineries by automatic machineries, the partly or fully off-written machinery should be technically overhauled and shipped to a country with surplus of labour force and supply of suitable raw material together with the key personnel for instruction. Cost of machinery, shipment and advisory/training services should be deducted within five years from the value of imported furniture parts.

Several furniture producers were interested in the proposals, but were reluctant to join in governmental or public co-operative ventures. The potential importers preferred to work with private persons mainly because the potential counterpart became known in the course of training in their factory, previous to a formal agreement.

The associations of furniture producers in the above mentioned countries, the associations of machinery producers and governments departments assured their co-operation and assistance for such ventures.

42.54.5 Australian Market

The above enquiries and interviews included only two Australian fruniture producers, both working on level

a(ii), which were - similar to the European furniture manufacturer of this level - not interested to import pre-manufactured furniture parts. Their opinion cannot be taken to be representative for the market and further enquiries are recommended.

42.54.6 New Market

Many countries of the world imposed very high import duties on "furnitures" which virtually prevented the import of ready made furniture and caused comparatively high local prices for furnitures, as the local furniture industry is not working efficiently or takes advantage of the monopolistic situation.

Furniture parts, listed and produced to meet the staff as "wood roughly shaped" - Tariff GATT No. 24299 or 2439 and not as "Furniture" Tariff GATT 82 should find an open market in such countries as Iran, Pakistan, Tansania, Venezuela, Panama, Chile, Brazil and Argentina, if the exporter organises an assembling plant in the country of destination.

42.6 Export market for boats

42.60 International Statistics of import and export of boats are still incomplete and not homogenous as some statistics classify boats only according to the water-displacement, while others according to the material or value.

42.61 "Do-it-Yourself" boats

42.61.1 Principles

Packing and transport of boats is costly. A considerable proportion of sporting boats are purchased by people with leisure time or by boating fans who like to "build" (more correctly - assemble) their boats, rather than to buy a ready made craft and to pay the high costs of transport.

"Do-it-yourself" boats became popular during the last years and are now in the programme of many mail order houses.

42.61.2 The American market

There is a wide range of "do-it-yourself" boats on the market in U.S.A. It seems to be questionable whether a new brand should be accepted. But it is sure, that many of the parts presently offered in various programmes, could be produced for less costs from Sarawak.

Contact with the producers of "do-it-yourself" boats and a detailed market survey is likely to reveal chances of export in this field.

42.62.3 The European Market

There is at present a booming demand for sport boats in Europe.

Only very few "do-it-yourself" models are on the market, mainly produced in Great Britain and using inch/feet system, which is not acceptable to the continental market.

The matter was discussed with purchase representatives of some continental mail-order houses in Germany and Italy, who would be interested to place substantial orders in the range of several hundred "do-it-yourself" boats, to be assembled by the customer.

42.61.3 Carribean and South American market

The Carribean islands are (outside of Europe), the biggest impoters of sport boats. In order to support the local industries some Carribean Government imposed import restrictions for ready made boats, while pre-manufactured parts for the boat building trade could be imported.

Costs for raw materials and labour costs are very much higher in the Carribean than in Sarawak.

42.61.5 Other markets

Market surveys for the export of "do-it-yourself" boats should be done in New Zealand, Australia, South Africa, Israel and Japan.

Market surveys for the export of pre-manufactured parts for the construction of boats should be done in Caspian region of Iran, Lebanon, Greece, Lybia, Algeria, Kenya, Hawaii, Ireland and Island.

42.62 **Speed boats**

42.62.1 **Competition**

There is a considerable local market for speed boats in Sarawak. On the international market, there is a strong competition for speed boats between aluminium, marine plywood, glass fibre, rubber and plastics. Wooden boats still stand good chances on the market, but only first class designs and of high standard workmanship.

42.62.2 **Potential markets**

Wooden speed boats could probably be exported to countries which do not have their own boat building trade as Bahrein, Kuwait, Doha and Dubar. But the number required will be small and sales expenditure high.

High costs of transport may be prohibitive for the export outside of South East Asia, because other countries in South East Asia could produce - or are producing - wooden speed boats for the same costs as in Sarawak.

Therefore chances to export wooden speed boats are small.

42.63 **Fancy boats**

42.63.1 **Types**

The traditional long boats with decorative carvings and paintings attract the interest of tourists. Could this indicate chances to export such boats? This question was discussed with experts working with National Park and Tourist Authorities abroad.

42.63.2 Potential Market

It appears that original Malay boats could be used in recreation parks, providing sporting facilities and decoration at the same time. Export promotion should be done through the national advisory boards for parks and recreation.

Potential markets: Western Europe, U.S.A., Canada.

42.64 Oars and paddles

42.64.1 Types

Carved paddles and oars are in common use in Sarawak. Some are real pieces of art in design and decoration.

Modern laminated paddles and oars are not yet available in Sarawak, but it could be produced from local materials.

42.64.2 Potential market for carved paddles and oars

Light carved paddles should find an open market as accessories to rubber boats mainly in Italy, West Germany, France, Israel, South Africa and U.S.A.

Decorative carved paddles should find a market for the decoration of buildings.

42.64.3 Potential market for laminated paddles and oars

With the booming demand for sport boats, there is bound to be a demand for good oars and paddles as well. A market research should reveal details of the potential markets as to: types, sizes, construction and potential markets.

42.65 Wooden lighters

42.65.1 Problems of marketing

Wooden lighters are usually constructed where they are required. The standard of workmanship and construction varies very considerably. Many of the traditional types of lighters are unsuitable for mechanized handling of cargo and cannot be adjusted to the forthcoming container transport.

Therefore new types of lighter shall be required in several parts of the world.

Total quantity of shipment is continuously expanding and expanding more than quay facilities. Therefore a rising demand for lighters can be expected.

But it seems either technically or economically impossible to transport ready-made lighters over a long distance. Pre-manufactured, but dis-assembled lighters, should find an open market.

42.65.2 **Potential Markets**

A market survey should be conducted in the United Arab Republic, Iraq, Tanzania, around the Persian Gulf, Singapore, Hong Kong, Macau, Brunei, etc.

42.7 **Export market for matches**

42.71 **World trade in matches**

The world trade in matches is rather monopolized in the hands of few economical strong enterprises.

In spite of growing consumption of matches in the world international trade appears to have regressive tendencies. This is due to the fact that nearly all developing countries who had imported matches in the past, have by now established match productions of their own, often with capacity in excess to their own consumption. These industries were granted pioneer status or other public incentives.

Only countries too small to justify the establishment of a factory still continue to import matches, taking advantage of the dumping policy of some match producers in East Asia.

42.72 **Brunei**

Only Burnie could be considered as a potential export market for Sarawak's match industry, where it could meet international competition. At present, matches are smuggled into

Sarawak, presumably via Brunei or Singapore. Both countries showed a balance of import and export in matches which exceeds by far the usual consumption per head of the population.

42.73 Not registered export

Due to excessive royalties on matches in all countries of South East Asia, illegal trade seems to be considerable. This "not registered" market is fed from sources where production costs exceed the cost encountered in Sarawak. Matches destined for consumption abroad should therefore be exempted from royalties.

42.8 Import market for wood chips

42.81 Types and utilization

International trade in wood chips is compartively new and developed as a result of the growing demand for pulp and paper. The advantages of mechanized handling and transport were employed to raw materials for the rayon and fibreboard industry and recently also for particle board production.

There is demand for:

(i) Chips of debarked coniferous wood (Canada-Japan trade);

(ii) Chips of certain non-coniferous timber species, pure, not mixed with other species or bark;

(iii) Chips of non-coniferous timbers in standard mixtures, containing fix standard proportions of the various species;

(iv) Chips of wood fibrous materials from certain agriculture crops (for instance: bagasse, cocoa fibre);

(v) Chips from reeds or bamboos.

The value declines from (i) to (v).

42.82 Prospects and tendency on the world market

The international forecasts on the consumption of products made from wooden chips, indicate a steadily rising demand for:

pulp and paper

viscose products

panel board products

Industrial capacity has been created in certain countries in excess of the raw material resources.

The industrial productions mentioned above are all capital intensive processes. The factories were established in countries with prospects of long lasting political stability. Nationalization of industries in some of the developing countries had the effect that the above industries were concentrated in few countries only.

Formerly, only coniferous wood was used for pulping. The proportion of hardwoods used for pulping increased during the last year and had passed the 50% mark some years ago.

Pulping of standing mixtures of hardwoods shows at present the highest rate of expansion.

Pulping of mixed tropical hardwoods (except standard mixtures) is not yet feasible. Mixed tropical hardwoods can be used for fibre board and under certain conditions can be utilised for particle board production as well.

Up till now the quantity of internationally traded chips from agriculture crops and reeds / bamboos is till insignificantally small. There are good prospects that this shall change as soon as collection and harvesting of the fibrous materials can be organized.

42. 83 Quantitative aspect and transport

The transport of wooden chips on long distance is only feasible, if handled in big quantities.

A wood/chip tanker takes not less than 10,000 tons (usually between 13,000 and 24,000 tons) which must be loaded within two maximal five days.

The round trip from arrival of the empty wood-tanker, including loading time, journey from Sarawak to Japan, off loading and return to Sarawak takes twenty two days. That means that more than 10,000 tons of wood chips have to be prepared within twenty two days and storage facilities would be required for the same quantity.

A round trip to Akaba (Israel) or Red Sea Port U.A.R. would take 27 - 30 days.

A round trip to southern part China would take 16 - 18 days. For this destination, smaller wood tankers of 6,000 - 8,000 tons loading capacity might be considered.

A round trip to Italy or Spain via Suez Cannel - loading capacity 15,000 - 16,000 tons would take 32 - 36 days via Cape Town (24,000 - 28,000 tons) about 40 - 45 days.

42.84 Japan market

Japan is the best developed market for wood chips. Nearly all bigger factories are in the reach of a port with special discharging facilities and storage bunkers for the chips.

But the market is subject to wide fluctuation of prices, except where chipping is done by a subsidiary of a consuming factory.

In addition to the present import the market could presumably absorb per annum about:

250,000 tons of mixed hardwood chips

420,000 - 480,000 tons of pure or standard mixture hardwood chips and

630,000 - 740,000 tons of coniferous chips.

42.85 **Israel**

Israel has a high demand for pulp and paper as well as for fibre and particle boards. Intensive plantations of Eucalyptus and Pines cannot as yet produce sufficient raw material for the expanding demand.

Circles in Israel might be interested to participate in a joint venture for the production and export of wooden chips from Sarawak.

Quantities in question: 150,000 tons per annum.

42.86 **Australia**

Australia has a well developed pulp and paper industry. Since techniques were developed for the pulping of certain Eucalyptus species, the prospects for an open demand in hardwood chips has dwindled.

An open demand pertains for long fibred pulp wood which shall be met by plantations of fast growing pines. Subject to the results of forest research, there are chances that tropical pines could be raised in the First Division or near Bintulu for this purpose. The Australian paper industry should be invited to participate in the industrial aspect of the research.

42.87 **Mainland China**

In one generation the demand for pulp and paper products in China may have passed the present demand of the whole Asian Continent. Referring to chapter 42.12.25, industrial planning on the pulp/paper section should be co-ordinated. It appears that Mainland China would be interested in a long term agreement for the supply of wooden chips for a pulp/paper projects, which is at present under study.

For other than economical reasons it should be desirable to organise harvesting collection, packing and shipment of the chips by an enterprise which is fully controlled by the exporting country and not - as in the case of the Sarawak - wood chip company - handled by a subsidary of the importing industry.

## CHAPTER V

## 5) IDENTIFICATION OF POTENTIAL TIMBER INDUSTRIES

### 5.1 Small Saws

### 51.0 Pre-note

Apart from the potentialities for industrial sawmills, based on logging projects which were or shall be proposed by the Economic Planning Unit of the Government of Malaysia in co-operation with the F.A.O. Forest Inventory and Forest Industries Development Project, there are chances to develop a kind of sawmilling industry based on the timber production outside of the forests.

### 51.1 Type, raw material and production

### 51.11 Development of Small Saws

During the last years new machinery, new sawing and logging techniques were developed and tried out under tropical conditions. These techniques allow for the commercial operation of small, semi-mobile sawmills. In spite of more labour intensive operations, these small saws could stand the competition of the big, fully mechanised industrial sawmills.

### 51.12 Comparison between industrial sawmills and small saws

The reasons why small saws are competitive vis-a-vis industrial sawmills are mainly due to the following factors:-

(i) Better utilization of the raw material. In series of trials using small saws in several tropical countries an out-turn between 63% and 81% was achieved. This compares favourably to 45% - 62% out-turn in industrial sawmills;

(ii) lower cost for the raw material. Small saws could convert economic dimensions and qualities of round wood, which are unsuitable for industrial conversion. Tropical timbers from 12" diameter and above can be sawn economically on small saws, while the lower limit of diameter for big tropical sawmills in Sarawak are about 28".
Defect logs and logs of inferior quality (below quality grade B/C) can be better utilised on small saws than in full mechanized plants.

(iii) less cost of transport. Small saws are moved to the sources of raw material, while the raw material has to be brought to the mill for mechanized conversion.

(iv) less demand of resources. Small isolated forests and trees outside of the forests could be utilised for small saws, where it would be uneconomical for industrial logging operations.

(v) less demand for capital investment. The requirement of investment capital for small saws is in such a small order (see chapter 51.3) that it could be financed outside of the capital market.

(vi) less demand for technical and management know-how. Training for the efficient operation of small saws could be achieved in short courses of 6-9 months duration.

Training for management and engineering of industrial sawmills must be much more pretentious. Expatriate staff is not required for the operation of small saws, but might be required for the initial organization during a limited period of time. Practical operation of a small saw, appears to be superior to academic training for the management of sawmilling industries.

(vii) Particular local conditions. Small mobile saws can utilise the wood felled for dry-padi plantations where industrial sawing is unsuitable.

(viii) Seasonal operation. Small saws can be operated seasonally to complement with the agricultural demand of labour. No industrial saw mill can stop operation during padi season, without serious economical damages. Small saws with low capital investment and subsequently low fixed costs can be stopped while the staff attends to their farms.

(ix) Less damaging effect on the environment. The few tons of sawdust left over on the site or burned or thrown in the river from a small migrating mill, does not do any harm to the environment as the residues of a big industrial sawmill does.

51.13 Raw Material

It is proposed that small, semi-mobile sawmills should be based on wood production outside of forest reserves, in particular:

(a) for sawing over mature rubber trees (see chapter 21.22);

(b) for utilising wood, which was felled in shifting cultivation (see chapter 21.23);

(c) for converting trees from secondary growth (see chapter 21.24);

(d) to be mounted on to barges or rafts to saw logs from Padang Paya (see chapter 21.25);

(e) to saw mangrove logs, exceeding the maximum diameter required for wood chips (see chapter 21.26.1 and chapter 38);

(f) to saw occasionally over mature fruit trees in the kamponge (see chapter 21.21).

These saws shall be technically incapable to convert valuable forest trees (maximum through lett limited).

Therefore no license from forest administration should be required.

In order to prevent illegal felling, no small saw should be allowed to operate in the vicinity (½ mile distance by land, or 1 mile distance by river or road) of registered forest reserves.

51.14 Production

The proposed small saws have an intake capacity of a maximum 20 cubic tons per day, with an cut-turn of up to 15 cubic tons per day.

51.2 Equipment, Staff

Three alternative standard sets of equipment can be recommended for the conditions in Sarawak.

51.21 Moped-saw

It is a small full portable, horisontal bandsaw, saw blade width 2½". The motor of a normal chain saw drives over a bicycle tyre chain transmission, a light horisontal

bandsaw which is pushed by hand on a small rail wagon over a light rail, which is nailed on the log. The saw is operated by two men and produces 4-5 tons of sawn wood per day, out of logs not bigger than 22" (exceptional 26"). Sawing kerf is 1.8 - 2.1 mm. Petrol consumption is less than 1 gallon per day. The saw is carried to each individual tree. Logs exceeding 22" in diameter can be split longitudinally by the motor chain saw previous to sawing. Saw sharpening can be done by hand filing.

51.22 **Floating unit**

The unit consists of:

(a) one horisontal travelling sawmill mounted on a barge or a raft. (Types: Wehrhahn BT 1000; CD4; Schutte F13)

(b) one small carpenters bandsaw

(c) one GREIFZUG rope which has a 1.5 tons capacity.

Capacity intake: maximum 20 tons/day

out-turn: maximum 15 tons/day

Saw blades to be sharpened and maintained in a central saw doctors workshop or on contract with a stationary sawmill in the area.

Staff requirement:

4 men to bring the logs on to the saw

1 saw operator

2 men to remove the sawn wood

2 men for re-sawing

1 man for removal of waste

1 supervisor/manager

51.23 **Semi mobile unit**

Equipment: (a) one horisontal travelling bandsaw as 51.22 (a)

(b) one two/four blade circular saw as type: WITTE-KL II; LINCK DS4; ZICNICA; TATRY, etc.

Staff requirement:

4 men to roll the logs onto the saw

1 saw operator

2 men to remove the sawn wood

2 men for edging

1 man for removal of waste

1 man for charcoaling

1 supervisor

4 men for site preparation

52.24 Mobile sawmills have been tested and considered unsuitable for the conditions in Sarawak.

51.241 Circular rag bench (Corinth, The American Forester, etc.). Waste factor and energy consumption of this machine is too high.

51.242 Graf saw (mobile dimensional): too low out-turn.

51.243 Sorbeau saw: too low out-turn.

51.244 Circular chain fed saw: cuts inaccurately; too wasteful.

51.245 Horisontal chain saw: Operation is too slow and too much waste is involved.

51.3 Capital requirement

51.31 The Moped saw costs c.i.f.

| | M$ |
|---|---|
| Kuching about | 1,400 |
| A motor chainsaw approx. | [illegible] |
| | 2,000 |
| Working capital | [illegible] |
| Total about | 2,500 |

51.32 Floating saw:

| | M$ |
|---|---|
| Horisontal travelling bandsaw | 6,000 |
| Carpenters bandsaw | 1,200 |
| Motor to above | [illegible] |
| "Greifzug" | [illegible] |
| Sawblades (spares) | [illegible] |
| | 10,260 |
| Float | [illegible] |
| | 12,260 |
| Working capital | [illegible] |
| | 16,760 |

51.33 Semi mobile unit:

| | M$ |
|---|---|
| Horisontal travelling bandsaw | 6,800 |
| Multiblade circular saw | 4,400 |
| Sundry small equipment | 600 |
| | 11,800 |
| Working capital | 6,000 |
| | 17,800 |

51.4 **Cost calculation**

51.41 Moped saw:

| Costs per annum: | M$ |
|---|---|
| Wages of 2 men for 250 days @ M$64/day | 16,000 |
| Petrol and oil | 695 |
| Sawblades | 420 |
| Sundries | 400 |
| Depreciation of Machine 3 yrs. | 833 |
| Sawing costs total | 18,348 |
| Round logs | |
| 6 tons intake per day = 1500 tons/annum | |
| Felling, cross-cutting and clearing the site @ 4.20 M$/ton | 6,300 |
| Royalties @ M$6/-* | 9,000 |
| | 15,300 |
| Transport of sawn wood to the customer @ M$16/- per ton | 16,000 |
| Sales expenditures | 4,000 |
| | 20,000 |
| Total costs per annum | 54,148 |

| Gains: | M$ |
|---|---|
| 1000 cubic tons of sawn wood @ M$90/- ** per ton | 90,000 |
| Less costs | 54,148 |
| Profit before taxes | 45,852 |

Notes:

* Royalties class "C" where assumed although it is expected that the saw converts mainly Class D timber species.

** The market price for sawn wood was in Kuching M$50/ton - M$170/ton. The low price of M$90/ton was taken to cater for the market of the low income, rural population.

51.42 Floating sawmill:

| Costs: | M$ |
|---|---|
| Wages of 10 general labourers @ M$7/day | 17,500 |
| Wages of 2 skilled attendants @ M$15/day | 7,500 |
| | 25,000 |
| Petrol and oil | 2,200 |
| Saw blades | 4,600 |
| Depreciation 5 years | 2,452 |
| Total sawing costs | 36,252 |
| Round logs 16 tons/day = 4,000 tons/year | |
| Felling and extraction to river M$21/ton | 84,000 |
| Rafting M$3/ton | 12,000 |
| Royalties M$6/ton | 24,000 |
| Raw material Total | 120,000 |
| Transport of sawn wood 2,800 tons/annum @ M$10/ton | 28,000 |
| Sales expenditures 8% | 26,000 |
| | 54,000 |
| General overheads and others | 6,000 |
| Total costs | 214,252 |
| Gains: | |
| 2,800 tons sawn wood @ M$110/ton | 308,000 |
| Less Costs | 214,252 |
| Profit before taxes | 93,748 |

51.43 Semi mobile unit:

| Costs: | M$ |
|---|---|
| Wages of 14 general labourers @ M$8/day | 28,000 |
| Wages of 2 skilled attendants @ M$15/day | 7,500 |
| | 35,500 |
| Petrol and oil | 2,600 |
| Saw blades | 4,600 |
| Depreciation 5 years | 3,760 |
| Sundries | 2,500 |
| Sawing costs total | 48,900 |
| Round logs 4000 tons/annum | |
| Felling and skidding M$14/ton | 56,000 |
| Royalties M$6/ton | 24,000 |
| Raw materials total | 80,000 |
| Transport of sawn wood 2,800 tons @ M$16/ton | 44,800 |
| Sales expenditures 8% | 26,000 |
| | 70,000 |
| Total Costs | 199,700 |
| Gains: | |
| 28,000 tons sawn wood @ M$110/ton | 308,000 |
| Less costs | 199,700 |
| Profit before taxes | 108,300 |

51.5 Organisation

51.51 Aims

The promotion of "small saws" was proposed for the four main reasons:

(1) to utilize wooden materials which are wasted up till now;

(2) to help local Bumiputras to enter the timber trade and gain the necessary technical and managerial experiences;

(3) to provide cash income to the local, rural population;

(4) to provide cheap building material for the hinterland.

51.52 Training Project

With the assistance of international (U.N.I.D.O. or I.L.O.) or/and bilateral (voluntary service, West Germany, Sweden, Denmark, Austria, Netherland, France) and in co-operation with the Australian timber research and training projects a vocational, practical training course should be organized. About 30-35 young men from rural areas should be trained on the three proposed sets of machinery in technical operation and management of mobile sawmills. The course may be held in Kapit (Third Division) or Long Lama (Fourth Division) with a short course in saw doctoring at Kuching Timber Research Training Centre.

Duration of course: 6 months

Duration of the Project: 2½ years

51.53 Initial Assistance

The best third (10 or 12 men) of the Trainees should be given each a set of equipment on hire purchase basis. There is no personal right of property until the terms of payment are completed. Before this, the right of property should be preserved for the particular project.

The small saws should be exempted from forest royalties and taxes for the first five years of operation, but should be liable for royalties if they commit an offence against the forest law during this period.

The instructors of the course should visit the small saws regularly and provide guidance and technical help during the first two years of operation.

The saw millers should pay 3.3% of the invested capital per month on the hire purchase agreement for three years, beginning two months after the start of the operation.

If a sawmiller fails to meet the agreed terms of payment the machinery should be seized without a court procedure and handed over to the next candidate on the list. The project manager with the consent of the 51% of the trainees, should have the right to allow postponement of the monthly payment if he considers this justified by circumstances.

Sawmillers should be bound to form a cooperative or join an existing association for marketing purposes. However, they should be allowed to sell 60% of their production without going through the co-operative.

51.6 **Marketing**

The "small saw" enterprises should form a co-operative for the marketing of surplus sawn wood which cannot be sold locally direct from the mobile saws.

During the first two years, the co-operative should work under the guidance of the project manager, who should establish permanent sales connections and maintain strict quality control of the products.

The co-operative should invite domestic sawmills and handsawers in marketing.

P.W.D. and other government departments should buy from the cooperative with preference, as long as price and quality are competitive.

51.7 Finance

There are two parts of the proposed project which are to be assisted financially: 51.71 Funds for the training and assistance project; and 51.72 Funds for the establishment of the enterprises.

51.71 Training and assistance project

| | Personal costs: | MK |
|---|---|---|
| (a) | Team leader | 130,000 |
| (a) | 2 Voluntary service assistants | 70,000 |
| (b) | Co-manager | 75,000 |
| (b) | Secretary, messenger, watchman | 20,000 |
| | | 295,000 |
| (b) | Housing for instructors | 18,000 |
| (b) | Housing for trainees | 4,200 |
| (b) | Classroom & Workshop | 1,000 |
| (b) | Office room | 7,200 |
| | | 28,300 |
| (a) | Equipment | 52,000 |
| (a) | Operational Costs (2 x 6 months) including salaries for trainees | 140,000 |
| (b) | Local travelling | 11,000 |
| (b) | Postal charges and sundries | 9,000 |
| (a) | Costs to be met by foreign demand | |
| (b) | Costs for government | |

51.72 Incentives Assistance to Small Savers

Guarantee for hire purchase of

| | | |
|---|---|---|
| (b) | 10 sets of machinery Loan-cash-working capital | 20,000 |
| (b) | MK(10 x 4000) @ 10%/annum (4% bank charges; 6% "decredere") | 12,000 |

52. Board Production

52.1 Blackboards (See chapter 42.34)

52.11 Pulp, raw material, production.

52.11.1 **Description** -

Panels 4' x 8' and 6' x 12' wide; ½" - 1½" thick, standard ¾".

Lumber core: 16mm or other thickness; composed of wooden sawn strips 1" wide (or other standards)

Crossband veneers: 2 x 2.2mm, or 2.8mm or 1.8mm or 3.2mm

Boards sanded and cut to sizes.

52.11.2 **Raw materials**

Lumber core: Strips sawn from sawmill waste of various timber species mainly -

ALAN BATU (including semi decayed)

ALAN BUNGA (including soft material)

and strips produced from light, extreme light, and medium hard non-commercial species as MAKRANGA, FICUS, ALSTONIA PUNAI and many others.

Trees which have been dead before felling and are not deteriorated can be used for this purpose.

52.11.3 **Production**

Strips of exact size are sawn on light multi-blade saws from seasoned lumber. The strips are fed into a block composer, in which the strips are glued together under heat and pressure. Protruding strips are cross cut.

The lumber core is allowed to stabilise before it passes a thickener/planner.

Crossface veneers can be purchased from veneer peeling plants in Sarawak who possess the surplus capacity on their peeling gears.

The lumber core is covered with glue on both faces as it passes the glue spreader laid on a face veneer and covered with another face veneer.

In a hydraulic hot press the board is glued together under hot compression.

After maturation and cooling, the board passes a set of rectangular cross-cut saws and is cut to size.

Finishing is done in a sanding machine. The boards are bundled in packets and despatched.

52.12 Equipment, Staff

52.12.1 Machinery

The plants are proposed as parts of existing sawmills.

| | MS |
|---|---|
| Seasoning kiln | 120,000 |
| Small boiler for above | 42,000 |
| Thickener | 36,000 |
| Multiblade saw | 51,000 |
| Lumber core composer | 115,000 |
| Crosscut saw with conveyor | 27,000 |
| Wide planer | 67,000 |
| Glue spreader | 36,000 |
| Hydraulic press 4 plates | 70,000 |
| Glue mixer | 7,000 |
| Trim saw | 65,000 |
| Sander | 61,000 |
| f.o.b. value | 695,000 |
| Transport and installation | 123,000 |
| | 818,000 |
| Building 50' x 90' | 115,000 |
| Fork lift van (only 1/3 employed in blockboard factory) | 86,000 |

52.12.2 Staff: Production:

| | | |
|---|---|---|
| General labourers: | males | 16 |
| | females | 16 |
| Skilled labourers | | 4 |
| Boiler attendant | | 1 |
| Mechanic | | 1 |
| Technicians (Workstudy 1/6) | | 1 |
| Administration and Sale | | |
| Managerial | | 1 |
| Clerical | | 2 |
| Sales representative (travelling) | | 1 |

52.12.3 Capacity

750 panels per day can be produced in three shifts, which is 187,500 panels per year. This is approximately 10,000 cubic tons in three shift operations or 3,600 tons in one shift operation.

52.13 Capital Requirement

| | M$ |
|---|---|
| Machinery | 818,000 |
| Building | 115,000 |
| Interior transport | 86,000 |
| 6 month working capital | 165,000 |
| Marketing investment | 28,000 |
| | 1,212,000 |

52.14 Cost calculation

Cost factors shall depend largely on specific local conditions as:

(a) calculatoric value of wood waste
(b) cost of shipment
(c) cost of interior transport
(d) cost of construction which varies considerably between sides in the peat swamp and sides on solid soil

Pre-calculation for a blockboard plant showed profits for:

(i) Kuala Baram

one shift operation:
17.20 M$/ton = 58,200 M$/annum
three shift operation:
22.71 M$/ton = 227,100 M$/annum

(ii) Bintulu

one shift operation:
26,84 M$/ton = 91,250 M$/annum
three shift operation:
32.35 M$/ton = 323,500 M$/annum

(iii) Rajan delta

one shift operation:
32.57 M$/ton = 107,250 M$/annum
three shift operation:
38,00 M$/ton = 380,000 M$/annum

The calculatoric value of the sawn wood was taken as M$110 per cubic ton for sharp edged material and M$32 per chubic ton of sawmill waste.

The value of cross veneers in standard sizes was taken to be M$4.00 per sheet.

52.15 Ownership, Finance

Blockboard productions should be established as part of sawmilling and logging enterprises. Several sawmillers are prepared to take up blockboard production if their forest licenses are expanded to assure constant supply of raw material for at least twelve years ahead. In this case, investment capital would be available from private sources and commercial resources.

52.16 Locations

Blockboard productions may be established in connection with ALAN sawmills. Most promising locations are:

(i) Rajang Delta
(ii) Simunjan area
(iii) Mukah/Oyd area

Other potential locations are:

iv) Lower Baram, if port facilities are improved for export via Brunei
(v) Limbang and Lawas for export via Muara
(vi) Bintulu

Less promising locations:

(vii) Miri-Bintulu and Bintulu-Oya road
(viii) Upper Rajan river (Kanowit-Kapit)

52.17 Marketing

(Ref. chapter 42.34)

Channels of marketing for blockboards differ from those for sawn wood. Central co-ordinated marketing and marketing promotion for all board products from Sarawak must be recommended to avoid destructive competition which affected the board production in West Malaysia in 1971. (see chapter 62)

52.2 Veneered Particle Boards

52.21 Type of product

(see chapter 42.31.2)

52.21.1 Composition of the board

The core is made from an extrusion particle board.

Standard thickness for full cores: 12mm, 16mm, 22mm, 24mm, 28mm, 32mm.

Thickness for cores with pipe holes: 34mm up to 82mm.

The particle board core is on both sides faced with a longitudinal veneer. Standard thickness: 2.2mm, 2.4mm, 3.2mm or both sides with sheets of FORMICA 0.3mm to 0.8mm, or one side faced with a sheet of FORMICA counter-matched with a veneer about 4-5 times the thickness of the FORMICA.

For doors the particle board is placed into a moulded frame of solid wood.

52.21.2 Raw material

Raw material for the particle board; mixed sawmill waste of timber species not exceeding 40 lbs/cubic ft. in weight plus 6.8% synthetic resin.

If sawdust is mixed with the chips; for every 4% sawdust, 1% more resin would be required.

Raw material for the face veneers: Alan bunga, thickness not less than 2.4 mm, Alan Batu, Meranti, Keruing Kapur, Jongkong, Gerongang and Pulai.

Raw material for the frames: Alan batu, Kapur, Keruing other non-commercial species between 32 lbs/cubic ft. and 45 lbs/cubic ft. gravity. Treatment against termites is recommendable.

52.22 Equipment, Staff

Particle board plant:

Wood chopper (chipping machine)
Seasoning kiln (rotating drum)
Storage tanks for raw chips
Conveyors
Glue mixer
Glue spreader
Storage tank for glued chips
Conveyor
Forming and extrusion machine (press)

Drum sander
Cross cut saw
Boiler with dust burning yet
Storage tanks for glue
Water purifying set

Preparation of frames:

Seasoning kiln
Ripp-saw
Moulding machine
Air-tucker, with compresser

Veneering plant:

Glue spreader
Assembling type conveyer
Hot press
Dimensional saw
Sanding machine
Sygnode packer
Forklift van

Staff:

2 technicians
6 skilled labourers
2 fitters
1 electrician
1 boiler attendant
48 general labourers (males)
1 fork lift driver
6 general labourers (females)
3 watchmen, guards
3 clerical assistants
2 travelling salesmen
1 sales manager
1 general manager

79

52.23 Capital requirement

| | M$ |
|---|---|
| Machinery equipment | 3,200,000 |
| Installation & Transport | 480,000 |
| Buildings | 480,000 |
| Working capital | 500,000 |
| | 4,600,000 |

52.24 Cost Calculation

A detailed feasibility study would be required to consider all local factors.

There is no established market price for the product in South East Asia.

A plant of this kind established in a tropical country with higher cost of labour, made in the second year

of operation a net profit of about M$1,260,000 but had invested about M$643,000 in market promotion during the two previous years (marketing promotion commenced simulatneously with the construction).

The sole producer of the patented machinery, Messrs. OKAL, 3215 LAUENSTEIN, Germany, could provide further information and arrange for visits to plants in operation.

52.25 Finance, Ownership

Several sawmillers are interested to set up the above plant as a joint venture.

The group in the lower Baram area would require financial assistance from the Government and concessions in regard to customs clearance and export formalities for products to be shipped via Muara.

A group of sawmillers in the third Division would require prolongation of forest licenses to obtain the required long term loans from their banks.

An industrial group in the first and second Division is planning to add a particle-board plant to their existing timber industries in few years time. This group requires time to consolidate the production of a timber factory, which is at present under construction.

The formation of a joint venture in the Oya/ Mukah area would deserve Government's financial assistance.

The above projects depend entirely on marketing research and marketing promotion which cannot be undertaken by an individual prospective investor.

The proposals of chapter 62 are of outstanding importance for the development of a particle board industry in Sarawak.

52.3 Plywood

52.31 Type of plywood production

(Ref. chapter 42.2)

Two different types of plywood are required by the world market:

(a) cheap utility plywood (42.22.11)
(b) decor plywood (42.22.13)

52.31.1 Utility Plywood

This can be produced only in large, highly mechanized plants, based on a permanent supply of homogenous raw material. Only Alan appears in homogenous, pure forests in Sarawak.. Therefore production of cheap utility plywood must necessarily be based on this timber species, until plantations of other suitable timber species have been established.

Factories for the cheap utility plywood are capital intensive which require few labour forces in relation to the invested capital.

52.31.2 Decor Plywood

Sarawak has not sufficient timbere of high decorative value (see Chapter 21.1) but a surplus of moderately decorative species, mainly Meranti and Keruin.

Production of decor-plywood calls for smaller or medium sized, less mechanized plywood mills.

Combination of cheap core-material from swamp forests with decorative face material from hill forests favours locations between hill and swamp forests as prospective sites.

The demand are mainly for three plys, in which the center core should be as thick as technically possible:

| Thickness of plywood | of inner core | of faces |
|---|---|---|
| 3.4 mm | 1.8 mm | 0.8 mm |
| 4 mm | 2.5 mm | 0.75 mm |
| 5 | 3.0 mm | 1.00 mm |

Five or multi-ply principally cemented with face veneers 0.6 mm or 0.75 mm.

Utility ply may be produced with face veneers of 1.2 mm or more.

Gluing of the plywood must be done by synthetic resin. Uretan, vegetable or protein glued plywood is under dumping pressure on the world market.

52.32 Equipment, Staff

52.32.1 Equipment for the production of utility plywood

Log ponds with clean water (concrete ponds or ponds in rocks or sand, not in clay or lime); Crane, Debarker prepeeler; Chain saw for crosscutting; Log conveyor; Automatic centering device; High speed lath*; automatic reeling devices; long seasoning kilns; auto-clips, photo-clips, photo-electric guidance; high speed veneer joiner; lifting tables; two fork lift lift trucks; glue spreader; conveyor; automatic charging and dis-charging devices; hallpress; more than 18 openings; cooler for metal sheets with return conveyor (alternatively: pre-press - roller); multi-sheet dimensional saw; scraper; 5 - 7 drum sander; automatic packer (suction packer); electronic production control; boiler, water purifying set; capacity about 1,200,000 cb. ft./annum.

Staff:

2 engineers
2 technicians
21 Artisans (fitter, welder, electricians, boiler attendant, carpenters, saw and knife sharpener, etc.)
24 Skilled labourers
26 General labourers

* A special lath is under construction which allows for the peeling of hollow Alan batu logs. (Details through Messrs Getz Brothers & Co. Kuala Lumpur)

52.32.22 Equipment for the production of Decor plywood

Veneer plant:

4 steam pits
crane
gantry
lath for excentric peeling (see foot note on page
lath for core-peeling with reeling device
two dry kilns, one for face material, the other for core material
one clipping machine (manuel)
one gurantine

Marquettery plant:

3 veneer joining machines
two hand presses for marquettery
machine for repairing veneers (knolls)
machine for repairing veneers (triangular splits)

Plywood plant:

2 glue spreaders
2 hydraulic hot presses (4-12 openings) (one a "moulding press"; both hand charged)
2 belt sanders
1 scrap sander
1 diamensional saw
1 chamber for impregnation (resin impregnation)

Capacity: about 700,000 cb. ft./annum

Staff:

1 engineer
2 artist-draughtsman
4 technicians
11 artizans (carpenter, fitter, electrician, boiler attendant, saw-sharpener, etc.)
8 skilled labourers
32 general labourers (males)
24 general labourers (females)

52.33 Capital requirement

52.33.1 Utility-ply production

Due to the instability of the prices for highly sophisticated machinery in autumn 1971, only approximative figures could be given. The capital requirement for the above plant exceeds the figures for conventional plywood plants considerably but the ration of production capacity per invested capital as well as production capacity per head of staff exceeds the figures for conventional plants as well.

| | M$ |
|---|---|
| Machinery | 3,124,000 |
| Transport and Installation | 183,000 |
| Spare-parts | 72,000 |
| | 3,389,000 |
| Buildings | 242,000 |
| Starting and Training | 333,000 |
| Marketing Promotion | 18,000 |
| Working capital | 380,000 |
| | 4,362,000 |

52.33.2 Production of Decor-ply

| | M$ |
|---|---|
| Machinery | 1,460,000 |
| Transport and Installation | 120,000 |
| Spare parts | 38,000 |
| | 1,618,000 |
| Buildings | 263,000 |
| Starting & Training | 226,000 |
| Market promotion | 65,000 |
| Working capital | 420,000 |
| | 2,592,000 |

52.34 Ownership, Finance

52.34.1 General

Both types of plywood production should be independent commercial enterprises, connected to (but not dominated by) a group of logging enterprises, not to an individual logging operation. Partnership with a potential marketing organisation would be an advantage. A foreign timber concern with own plywood production abroad is not considered to be ideal partner. Participation by the State or Federal Government can be recommended. There is capable management personnel available with the timber industry in Sarawak. The plant buys the logs from logging enterprises on long term contracts.

Both types of plywood productions are new industries for Malaysia. They are not comparable to conventional plywood factories in West Malaysia. Pioneer status should be granted to the first two plants for utility ply production, and the first five plants for decor-ply production.

Additional pioneer status to conventional plywood productions might be considered for certain areas of Sarawak such as:

Upper Baram River
Upper Rajang River
Trusan River

52.34.2 Ownership and Finance of Utility Ply production

Proposed Partners:

(a) Group of logging enterprises holding long term licenses of Alan forests in the swamp areas.
(b) Logging enterprise due to work in the hill forest.
(c) International importer and exporter established in West Malaysia (U.S.A. company)
(d) State Government as permanent partner
(e) Federal Government initial financial assistance (not permanent)
(f) Pernas participation (see 52.36.1)
Initiative and Management by (b)

52.34.3 Ownership and Finance of Decor-ply production.

Proposed partners:

(a) One potential logger with long term license on Alan Forest in the swamp areas.
(b) Group of logging enterprises working in the low land hill forests.
(c) International Producer of sliced veneers (Danish, German, British or Italian enterprise)
(d) Local bank or Singapore Bank.
(e) Local personality with political background.
(f) Federal Government initial financial assistance, not permanent partner.
(g) General shareholders
Management by (a) and (c)

52.35 Locations

The most suitable locations for the production of utility plywood are:

(i) Near DURIN: Third Division, between Sibu and Kanowit, close to Ferry crossing between the main road.
(ii) Batang Igan, about 18 miles north of Sibu.
(iii) Kuala Baram, if port facilities are improved.

Locations, which could be considered as sites for utility-ply production in the future:

(iv) Bintulu
(v) Mukah near Oya-Bintulu Road.

The most suitable locations for the production of Decor plywood would be:

(i) Near DURIN (see above)
(ii) Near Miri (Miri Niah road)

52.36 Marketing

52.36.1 Marketing of utility plywood

Rationalization in marketing is an essential part of the proposed project. There is no market for utility plywood unless it is produced and sold for less costs than in the conventional way.

As far as sale to Mainland China and State, directed economies are concerned Pernas should handle the export.

For Hong Kong a sales office would be required which maintains a stock of merchandise.

For the Persian Gulf area, sale of utility plywood must be combined with the sale of sawmill products.

For the other parts of the world marketing should be done by the partner 52.34.2 (e)

Internal marketing should be done by partner 52.34.2 (b).

52.36.2 Marketing of decor plywood

The marketing of decor plywood and of blockboards (52.17) should be combined, using the marketing facilities of the partner (52.34.3 e)

Decorative face veneers should be exempted from import duty, as they will be re-exported as parts of the decor-ply.

53 Moulding plants

53.0 General Note

There is a shortage of Ramin wood (strips and shortlings) which is the main material for mouldings at present.

Until a market has been developed for mouldings of other timber species no additional moulding plants should be established.

53.1 Type of products

Frames and Roundings as described in chapter 42.41.1 (ii) may find an open market for export. The wood should show a destinct grain with small pores, light coloured (white, yellow, lightbrown or light pink).

Metric standard of measurement (Millimenter) and quality grading according to the principles of the "NORME FRANCAISE" or D.I.N. The established moulding plants have sufficient capacity and experiences to supply the potential market for inch standard (B.S.I. and U.S. Standard).

Subject to the results of a detailed market survey abroad the production of the following could be recommended.

(a) Decorative frames for the furniture industry;
(b) Hand rails for staricases;
(c) Roundlings for broomhandles (low-stress handles)
(d) Roundlings for tool handles (high bending strengths)

53.2 Equipment, Staff

53.21 Assumption

The moulding plant converts planks, sawn "through-and-through" (see chapter 31.3) air seasoned to 14% - 24% m.c.

53.22 Equipment

4 seasoning kilns
2 multi-blade saws
4 table bandsaws
1 thickener
4 Unimat 17
2 Unimat 22
2 light spindle moulders
4 crossout saws
1 polishing (swabbke) machines
1 drum sander
2 light electro fork lift trucks
64 pallet tables
1 heavy fork lift truck
16 hand-lift trucks

2 moisture meters
2 longitudinal gluing presses
1 boiler
1 knife grinder
1 saw grinder
2 welding sets (1 electro & 1 autogene)

52.23 **Staff**

2 Technicians
8 Artizans (Carpenters, fitters, etc.)
42 General labourers (male
58 General lanourers (females
21 Skilled labourers

131

53.3 **Capital Requirement**

| | M$ |
|---|---|
| Machinery | 1,280,000 |
| Transport and installation | 162,000 |
| Buildings | 184,000 |
| Starting and Training (including market promotion) | 210,000 |
| Working Capital | 820,000 |
| | 2,676,000 |

53.4 **Cost factors**

Sawn wood M$ 90 - 110 per ton (see chapter 51.4)

| | approx. M$5,000,000 per annum |
|---|---|
| Wages | 400,000 |
| Energy | 323,000 |
| Spare parts, tools | 177,000 |
| Depreciation | 535,200 |
| General overheads | 460,000 |
| | 6,895,200 |
| Sale of Products | 9,380,000 |
| Profit before taxes* | 2,484,800 |

* Calculated for Sarikei
Expected profit for Miri would be about M$900,000 less.

53.5 **Locations**

The most suitable locations for additional moulding plants are:

(i) Sarikei
(ii) Binatang
(iii) Durin
(iv) Kuala Baram, if port facilities are improved.

Less profitable

(v) Simunjan
(vi) Oya
(vii) Mukah
(viii) Trusan (export via Mukra)

[illegible] but

Less profitable but can be considered for other reasons:

(ix) Kapit
(x) Long Lama

53.6 Ownership

Experience in Sarawak has shown that moulding plants have developed best, if organised as individual enterprises and not (as often done in other parts of the world) as integrated parts of combinated wood factory. Attempts of logging enterprises to take up moulding as side-lines of raw sawmilling have not succeeded well in Sarawak.

An independent enterprise organised by a group of sawmillers (Regional Sawmillers Association) appears to be the most feasible form for the moulding industry in Sarawak.

54 Furniture Production

54.0 Remarks

Industrial production of furnitures for the internal market would destroy the local handicraft. Therefore industrial furniture production must be aimed for export until local demand increasée substantially. In order to protect the local handicraft, certain sectors of the market should be preserved for handicraft production.

Referring to chapter 41.5 it appears that handicraft cannot supply furniture for categories (42.50) a ii/b i-iii to meet the local demand.

Up till now no handicraft artisan has specialised in producing furniture of the category a/iv.

54.1 Knock-down Furniture

54.11 Type of products

Dieassembled furniture of the quality a ii and a iii categories; b i box furniture,
b ii tables
b iv small furnitures
should be produced.

54.12 **Equipment and Machinery**

54.121 **Equipment for the production of box furniture are:**

Dimensional saw for board products
Veneer assembling machines
Veneer guiautine
Glue spreader
hott press
automatic double end moulder
multi-spindle boring machines
scrap sander
belt sander
several courtain lacquer
conveyor system
Dust exhaustor
Assembling line
Surface printer
Packing line
Carcass presses

54.122 **Equipment for the production of tables.**

(a) Table tops

Dimensional saw for board products
Circular cutting, dimensional saw
Veneer assembling machine for patterns
Veneer guiautine
Glue spreader
Hott press
Edge veneerer
Sheet facing roller

(b) Solid wood work (legs, drawers)

Seasoning kiln for sawn wood
Multi blade rip saws
Carpenters band saws
Cross cut saw
Thickener
Four side moulding machine
Devetailing machine
Router
Chain chissel
Drum sander
Belt sander
Hand lift trucks
Pallet tables

(c) Surfacing

Lacque dipping and seasoning chamber
Polyester coating line with courtaine laque-
spreaders, and continuous seasoning kiln
Fine sander
Swabble machines

(d) Packing

Packing and wrapping machine for legs
Polyvinyl coat packer for table tops
Steel tape strupper
Air tucker

54.123 Equipment for the production of small furniture (Mass production)

2 Seasoning kilns for sawn wood
1 thickener
1 multi-blade saw
2 carpenters band saws
1 four side moulder
1 moulding machine (roundings)
2 dove tailing machines
1 hand press (veneering press)
2 pneumatic carcass presses
1 mortizer
1 chain chissel
1 universal wood working machine
1 belt sander
1 sanding disk
2 spraying chambers exhaust
small steam boiler
several conveyor belts (assembly line)
1 seasoning kiln for lacque drying

54.124 Staff requirement for box furniture production

3 Technicians
8 Artisans
4 mechanics
32 general labourers (males)
22 general labourers (females)
---
69
---

54.125 Staff requirement for table production

4 Technicians
6 Carpenters - Artisans
5 Mechanics
68 General labourers, males
18 General labourers, females
---
95
---

54.126 Staff requirement for small furniture production

2 Technicians
11 Artisans
3 Mechanics
36 General labourers, males
24 General labourers, females
---
46
---

54.13 Investment

54.13.1 Box furniture

| | | M$ |
|---|---|---|
| 5. | Machinery | 1,125,000 |
| | Transport and Installation | 176,000 |
| | Working capital | 365,000 |
| | Buildings | 124,000 |
| | Initial Marketing promotion | 72,000 |
| | | 1,842,000 |

54.13.2 Investment for Table factory

| | M$ |
|---|---|
| Machinery | 1,487,000 |
| Transport and Installation | 238,000 |
| Buildings | 124,000 |
| Working capital | 330,000 |
| Initial marketing promotion | 64,000 |
| | 2,243,000 |

54.13.3 Investment for small furniture production

| | M$ |
|---|---|
| Machinery | 873,000 |
| Transport and Installation | 130,000 |
| Buildings | 86,000 |
| Working capital | 260,000 |
| Initial marketing promotion | 95,000 |
| | 1,444,000 |

54.14 Profit

54.14.1 Based on prices for furnitures in USA, it is estimated that the potential profits before taxes (including depreciation of 7.5 years)

| | M$/annum |
|---|---|
| for box furniture production | 283,000 |
| tables | 305,000 |
| small furniture | 291,000 |

54.14.2 Based on prices in Central Europe

| | loss |
|---|---|
| box furniture | 343,000 |
| tables | 398,000 |
| small furnitures | |

54.14.3 Based on prices in Singapore

| | |
|---|---|
| box furniture | 123,000 |
| tables | 241,000 |
| small furniture | 426,000 |

54.15 Development of industry

54.15.1 General Remarks

The success of industrial furniture production depends on:

i) Marketing - between 40 and 75% of the consumer price are trade margins and transport.

ii) flexibility - there are "fashions" in furnitures which change in cycles of 4 - 10 years

iii) design - design in furniture industry is based on a compromise between the desire of the customers and optimal production techniques.

(iv) efficient management - industrial furniture production without applied work study cannot succeed.

(v) good workmanship

These five factors can only be achieved by practical experience. Schooling or training cannot substitute practical experience.

54.15.2 Present situation - Summary

There is a surplus of machinery capacity, labour force and raw material within the furniture workshops in Sarawak. There is a lack of technical know how, a lack of marketing facilities and market connections for export, a lack of market information and no cooperation among the furniture industry. (see chapert 35)

54.15.3 Proposal for a Development Project

Co-ordinated with the marketing research and development project (see chapter 62) a co-operative of the furniture producer in Sarawak and Sabah should be formed.

Under the guidance of an expert, assisted by the two junior instructors, knock down furniture as described in chapter 42.52.1 (a ii - a iii/b iii) should be developed.

Sample sets shall be produced and offered to potential customers as adviced by the marketing project. (chapter 62)

Parts of this furniture are to be produced on contract by the established furniture workshops or the moulding plants. Technical supervision to be provided by the experts.

The co-operative acts as:

Co-ordinater of the production
Exporter and
Technical Instructor

As soon as the market is established, Pernas and the private export trade shall be invited to take the trade up.

The local furniture producer are willing to specialise in certain productions, as soon as the market is assured and consequently will establish the above mentioned plants.

54.15.4 Organisation of the proposed Project

Such project could be undertaken under a bilateral assistance scheme. The best experience would be available form Denmark (Association of the Danish Furniture Producers). Other countries with experiences in such kinds of organizations are: Sweden, Finland, C.S.R., Roumania, Poland, Austria, Fed. Republic of Germany and Belgium.

As business transactions, (on behalf of the proposed co-operative) are to be undertaken by the experts as an essential part of the project, the experts must come from the trade and not from administration or teaching. International civil servants are not allowed to be involved in commercial transactions.

After three years the co-operative should be self sufficient and does not require further Government assistance.

Such project would help substantially to foster participation of bumiputras in the furniture trade.

54.15.5 Required funds

| | Personal Costs: | M$ |
|---|---|---|
| (f) | Foreign Experts | 540,000 |
| (l) | Counterparts | 160,000 |
| (l) | Office and Accommodation | 15,000 |
| (l) | Local travel and transport | 16,000 |
| (f) | Equipment and Machinery | |
| | Working Capital 50% (f), 50%(l) | 280,000 |
| (l) | Postal services and shipping | 110,000 |
| | f = foreign contribution | 900,000 |
| | l = local contribution | 445,000 |

5.

54.15.6 **Gain for the National Economy**

It is expected that the expert of furniture parts from Sarawak rise from the present zero to about

M$ 1,300,000 in the second year of operation,
M$ 4,000,000 in the third year
and M$ 7,000,000 in succeding year without much additional investments.

The small and medium sized furniture producers in West Malaysia may be initiated to follow the example later on.

54.2 **Production of Chairs**

54.21 **Crisis in Chair factories abroad**

Due to the rising cost of labour and wood in Western Europe and North America many small and medium sized chair factories in France, Western Germany, Italy and the Mid Western States of America are faced with economic problems.

54.22 **Organisation**

The associations of the chair manufacturing industry should be approached through the Government.

Local saw millers are prepared to participate in such ventures.

In this exceptional case import of used machinery free of import duty should be allowed.

54.23 **Acting body**

If the above steps do not provide results, the project proposed in chapter 54.15 should take this up and approach flexible clarifications on commercial level.

55 **Boat building**

55.1 The development of boat building industry in Sarawak is hampered by: lack of know how
lack of marketing organisation
lack of industrial equipment and
shortage of suitable material

55.2 **Training**

Training courses for modern boat building are required urgently. Regarding the constitution of the boat building trade in Sarawak a practical vocational training is required more than training on technical level.

Training courses should be held in Malay with the aim to encourage participation of bumiputras in the trade.

Technicians of the boat building industry should visit industrial boat yards and an international trade fair of the branch.

55.3 **Marketing**

55.31 **Internal Market**

Every second year a trade fair and exhibition of boats should be organised by the Sarawak Government in which water-crafts made by the cottage industry, handicraft boats yards and boat industry in Sarawak could be compared with imported models.

55.32 **Export Market**

The marketing organisation proposed in chapter 62 shall include boats in their marketing research and promotion project.

55.4 **Equipment**

The machinery and equipment required, depends entirely on the type and size of boats which shall be produced. Therefore a detailed market survey is required previous to layout and pre-calculation.

The production of fibre-glass boats seems to offer promising aspects and should be investigated in detail. the required investment may be taken in the range of 160,000 to 240,000 M$, for a production of 220 boats a year, employing 10 - 20 men.

## 96 Match Factory

### 96.1 Equipment and Staff

For a factory with a capacity of 10,000 boxes per hour (or 650,000 matches per hour) the following staff would be required:

1 manager
2 Gatemen/watchmen
3 fitters
1 boiler attendant
2 clerks
15 general labourers - males
20 general labourers - females

A building 250' x 75' for the factory and the technical offices and 15' x 36' for the administrative office would be required.

The machinery:

1 gantry
1 log pond
1 chain saw
1 peeling lath
1 guillotine
3 box folding machines
1 splint drum seasoning
1 box seasoning kiln
2 splint directors
1 match-head, dipping and seasoning machine
1 set mass mixer
2 balances
1 set laboratory equipment
1 etiquetting machine
1 spraider for rubbing face
1 packing machine
sundry small equipment
office machinery
hand trollies
boiler
water pump and water purifying set

### 96.2 Capital required

| | M$ |
|---|---|
| Building | 200,000 |
| Machinery | 1,400,000 |
| Transport and Installation | 120,000 |
| Starting capital inclusive raw material for 6 months | 120,000 |
| | 1,840,000 |

### 96.3 Technical Requirements

| | |
|---|---|
| Electrical Power (without light) | 50 KW/h |
| Water inclusive cleaning | 10 $m^3$/day |
| Wood | 12 $m^3$ ob.ft/hour |

56.4 **Profit**

The production costs for 10,000 boxes shall be about M$180 - M$171. The present sales price in Sarawak is about M$450. The international price is about M$280.

With reference to chapter 41.81, a profit of about M$330,000 per annum can be expected.

56.4 **Finance**

A foreign producer of matches declared his interests to participate with 50% in a joint venture if a protection against dumping from abroad can be granted. Governments participation in match production is feasible.

West Malayan commercial enterprises might be interested to operate a match factory on lease agreement.

The calculation was based on data supplied by Messrs. A Hering A.G., 8500 NUERNBERG (Germany) Hermhuette Str. 33, with whom the undersigned had co-operated in the past in several successful projects in Africa and West Asia.

56.5 **Location**

Wood is available near the upper Sarawak river. Potential plantation areas for GMELINAARBOREA and AFZELIA species are available near Bau.

Glass dust can be produced from waste glass in Kuching.

Water and Energy are available in Kuching. Industrial Estate is available in Pending Peninsula, in Kuching.

Other chemicals would be imported via Kuching port.

More than 48% of the consumption shall be in the first and second division.

Mechanical service facilities and labour forces are available.

## 57 Floating Chip plant

### 57.1 Principles of operation

Two floating chipping plants, one for chipping sawmill waste, the other for debarking and chipping round wood (Rubber trees, Mangroves, Branches of Alan) are mounted on two barges. The barges are towed to the sources of raw material, or the sawmills close to the felling area of the above wood. A belt conveyor carries the wood to the chipper, or to the debarking drum. The wood chips are blown into lighters, which serve as well as storage for the chips up to loading on the ocean going wood tanker. Trans-shipment from lighter to wood tanker by exhauster.

### 57.2 Capital requirement

| | M$ |
|---|---|
| Machinery chippers | 817,000 |
| Barges and lighters | 2,254,000 |
| Pneumatic loader | 431,000 |
| Small boats, office equipment sundries | 184,000 |
| | 3,686,000 |
| Working Capital | 288,000 |
| | 3,974,000 |

### 57.3 Cost Calculation of Costs

#### 57.31 Chipping of sawmill waste (Referring to chapter 21.11 and 31.41)

Approximately 104,000 tons of pure (not mixed) sawmill waste of the following timber species is available from sawmills operating on the bank of a navigable river in Sarawak.

Ramin
Alan
Jong Kong
Gerongang
Pulai
About 67,000 tons in the lower Rejang
21,000 tons on the Sadong and Lupur

The present price for sawmill waste is M$0.40 - M$1.20 per ton. Most of it is burned in incinerators without utilization. It can be assumed that the material would be

| | | |
|---|---|---|
| available for | 3 - | per ton |
| chipping would cost about | 4.43 | per ton |
| storage and towing would cost about | 6.21 | per ton |
| transhipment would cost about | 2,11 | per ton |
| | 15.75 | per ton |
| loss 10% | 1.60 | per ton |
| Cost per ton f.o.b. | 17.35 | per ton |
| present price (see chapter 38) is about | 30.00 | |

annual production is about 80,000 tons.
expected profit from sawmill waste M$1,012,000 per annum.

57.32 **Chipping of Mangrove wood**

| | M$ | |
|---|---|---|
| Felling, extraction to the bank | 8.00 | M$/ton |
| Royalties | 6.00 | M$/ton |
| | 14.00 | M$/ton |
| Chipping | 4.43 | M$/ton |
| Storage in lighters and towing | 6.21 | M$/ton |
| Trans-shipment | 2.11 | M$/ton |
| Loss 15% | 4.03 | M$/ton |
| | 30.78 | M$/ton |
| Present price f.o.b. | 34.00 | M$/ton |
| Profit per ton | 3.22 | M$/ton |

Estimated production: 70,000 tons per annum
Expected profit: 225,400 M$/per annum

57.33 **Chipping of Rubber trees**

| | | |
|---|---|---|
| Felling, extraction and transport | 9.20 | M$/ton |
| Payment to plantation | 4.00 | M$/ton |
| Chipping | 4.43 | M$/ton |
| Storage in lighters and towing | 6.21 | M$/ton |
| Transhipment | 2.11 | M$/ton |
| Loss 15% | 3.89 | M$/ton |
| | 29.84 | M$/ton |
| Present price f.o.b. | 37.00 | M$/ton |
| Profit per ton | 7.16 | M$/ton |

Estimated production (see chapter 21.22)
30,000 tons/annum
Expected profit 214,800 M$/annum

57.34 **Total profit**

| | M$ |
|---|---|
| 80,000 tons sawmill waste | 1,012,000 |
| 70,000 tons mangrove wood | 225,400 |
| 30,000 tons rubber trees | 214,800 |
| Profit per annum | 1,452,200 |

57.5 **Potential Partners**

The venture shows such promising prospects that it should be financed predominantly from the local-money-market to prevent off-flow of high profit margins out of Malaysia.

To assure a continuous sale it might be commendable to accept two potential consumers from different countries as partners. Referring to chapter 42.8 potential partners may be approached in Mainland China, Israel and Japan.

To assure the cooperation of the sawmilling trade, the following main group of sawmills should be invited to participate:-

Borneo United Sawmills
Sarawak Sawmillers Association
K.T.S. group
W.T.K. organisation
Kion Seng Timbers

Proposed distribution of shares:

20% Government
24% local sawmillers
20% local bank
36% importers of chips (each 18%)

57.6 Feasibility Study

The above figures are approximate values which should be counter-checked by a detailed marketing research and feasibility study.

Quotations which had been asked for did not arrive in time before this report was written. A full feasibility study of a similar nature was recently presented by Messrs GOPA, 638 HOMBURG.

58 Wood wool plant

58.1 Principles of operations, raw material

Wood wool for packing purposes is produced mainly from Spruce, Pines or Poplars. Other hardwoods have been used occasionally.

In Sarawak's secondary forests are several timber species which would make light high quality woodwool. Although these species have not been counted in the various forest inventories, it is obvious that there is an abundant supply of:

MAKRANGA
ALBIZZIA
AFZELIA
TERMINALIA
FICUS and others

Round logs 6" - 15" diameter with no or very few knotts, are crossout into rollers between 15" and 22". The rollers are fixed into supports. A kind of sledge is moved longgitudinal over two or six pairs of rollers by a crankshaft motion over pairs of knives. The woodwool falls on conveyors moving the wet material through seasoning kilns.

The woodwool - 14-16% m.c. is bundled by a bundling press and taped with wire or steel tapes.

The same machine can be used to produce longitudinal sliced "planchetts" (small boards for fruit boxes). Since no sawdust is produced, thé cut-turn is much higher than conventional sawn "planchetts" and the sufface is ready planed and smooth. Material for fruit boxes can be produced out of raw material which is not utilised at present.

58.2 Equipment

1 chain saw
means of transport for roundwood
wood-wool slicer, with hooper feed,
conveyorseasoning kiln
bundling press
ripping saw

capacity = 2,5 Tons/per shift

58.3 Investment

| | M$ |
|---|---|
| Machinery | 160,000 |
| Transport and installation | 20,000 |
| Buildings | 65,000 |
| | 245,000 |
| Working capital | 60,000 |

58.4 Cost calculation

| | M$ | |
|---|---|---|
| cost of wood per factory | 8,00 | ton |
| outturn of 85% | 9.40 | ton woodwool |
| cutting | 12.30 | ton |
| seasoning | 2.10 | ton |
| packing | 1.26 | ton |
| costs fee factory | 25.06 | ton |
| shipping | 14.25 | ton |
| f.o.b. costs | 39.31 | ton |
| estimated f.o.b prioe | 58.00 | ton |
| Gross profit | 18.69 | ton |

Annual Production
in two shifts 1,300 tons

Expected profit per annum
before taxes M$24,294

59 Fibre board production

59.1 Type

The production of general fibre boards (building boards) and insulation boards (soft fibre boards) has been proposed for other parts of Malaysia. Referring to chapter 42.32 it was felt that:

enamelled fibre boards, formica faced
fibre boards p.v.c. faced fibre boards

may have better markets, than additional general fibre boards.

59.2 Equipment, Staff

59.2 Equipment

59.21 Transport of sawmaterial require the following:

24 barges

3 conveyor belts for charging barges

3 cranes

rails and rail tracks for lumber yard 1.)

1 rail mounted crane 1.)

river jetty

debarker

59.22 Fibre production requires

wood chipper

screen

desintegrator for oversize chips

elevator

conveyor

storage tank for chips

pre-heater

---

1.) proposed for swamp area. For location near Durin 2 forklift vans - 2,8t capacity would be required.

defibrater

epelone

hollander

raffinator

pulp-chests

59.83 Surface material requires

storrage tanks for chemicals

milling machine

mixer

pre-heater

reactor

heated storrage-epelone

chemical laboratory

59.84 Forming and facing

Wet hap forming machine

pre-compression

facing machine

charging hoist

hydraulic press

discharging

cooling - maturating chamber

tempering chamber

trimming saws.

59.85 Stor and Humidities

conditioned storrage hall for maturation

2 fork lift vans

sygnode-pneumatic packer

p.v.c. sealing soft

crating

cranes

container loading devices to lighters

container barges

59.86 Boiler

water pumps

fuel tanks

tanks for dust fuel with conveyers

water purifying sets for boiler

boiler

59.87 Water processing

water purifying for production

water pumps

waste water purifying tanks

sedimentore

bagger

conveyer

59.88 Power plant

diesel generator

switch boards

fuel tanks

oil tanks

59.89 Service facilities

a) Mechanical workshop

steel lath, hacksaw, autogen-welding,

electro-welding, defibrator grinder,

knife sharpening,

saw sharpening,

sundry hand tools.

b) Electrical workshop

coiling and winding set

battery charging and maintenance

ampermeters, ohms-meters etc.

d) Plumbers workshop

pipe welder, pipe cutter,

grinding machine for large valves

grinding machine for fine valves

mechanical hacksaw

hand press, hand tools

d) Carpenters workshop

universal wood worker

hand press

hand tools

e) Laboratory (mechanical)

Tensometer

Hygrometers

mechanical micrometers

clima chamber

microscope

microtome

balance (electro)

binocular lenses

calculating machine

f) Laboratory (chemical)

Standard equipment of pulp laboratory

99.22 Staff sections

99.22.1 Production

1 Production manager (grad. engineer)

1 Assistant "

5 Headmen

62 labourers

8 mechanics and artisans

99.22.2 Laboratory and Research

1 Technologist

1 Chemist

4 Assistants

1 Secretary

99.22.3 Supply of Raw material (wood)

1 Forest officer

2 Head men

46 labourers

4 boat drivers

2 drivers

99.22.4 Sale and Purchase

1 Sales manager

3 travelling salesmen

4 clerical assistants

1 purchase manager

1 purchase engineer

2 clerical assistants

99.22.5 Administration

1 General Manager

1 Chief Accountant

16 Clerical and Secretarial employees

99.22.6 Summary of Staff requirement

It will be noted that a relatively small number of general (untrained) labourers are required in relation to the number of trained personnel.

| | |
|---|---|
| General Labourer | 108 |
| Artisans | 89 |
| Clerical personnel | 89 |
| Technical personnel | 9 |
| Professional staff | 6 |

59.3 **Investment capacity**

Due to the insecurity of prices observed in 1971 and to the special machines required for this highly sophisticated process, figures for investmentcan only be indicated as to the order and have to becalculated in detail for a full feasibility study.

| | |
|---|---|
| Investment total approx. | M$14,600,000 |
| Production capacity | 85,000 tons/annum |
| Valuad at about | 24 million M$/f.o.b. |

59.4 **Profit**

There is up till now no factoryof this kind operating in a tropical country. Factories producing "faced" or "enamelled" fibreboards in Europe paid more per share than general fibre-board factories during the last 3 years. After an initial operation of two years in which technical problemsand problems ofmarketing must be considered,a profit before taxes in the range of M$3.2 - 3.8million could be expected. (Depreciation - 7.5 years - of the investment was considered.)

59.5 **Location**

The most suitable site for a fibreboard factory appears to be near Durin, on the bank of theRajang river between Kanowit and Sibu, near the ferry crossing in the Third Divieion.

Another favourable site for a fibreboard factory may be Mintulu in connection with the Lambir Lubis clear-felling project and as a predeceseor for a pulp and paper factory to be established later on in thisarea based on plantation of fast growing coniferous. About M$ 4.2 million would have to be considered here for improved shipping facilities and about M$600,000 for piping less acidic or neutral freshwater to the plant.

59.6 Ownership

Such a factory could be operated as a Government enterprise, or as a joint venture with one of the big international chemical concerns, who are interested in expanding their market for synthetic resins, formicas and similar products.

59.7 Raw materials

1) Mixed sawmill waste
2) Mixed small dimensioned woods from dry padicultivation
3) Nipah mid-ripe
4) Wood from second growth

Logs exceeding 20" in diameter, are not feasible for this purpose.

## CHAPTER VI

## 6) RECOMMENDATIONS

### 61. Principles

### 61.1 Considering the raw material situation

From Chapter 2 it can be seen that there is a surplus of wooden raw material in Sarawak, though Ramin logs will be in short supply.

The potential supply of "non commercial" timber species and dimensions surpasses by far the supply of logs from marketable species.

The potential production of wooden materials outside of the forests in particular in the course of dry padi cultivation deserves further investigations.

### 61.2 Summary of the existing Timber industries

There is much idle industrial sawmilling capacity in Sarawak.

The problems of sawmilling are:

a) Inefficient marketing

b) Too short forest licenses

c) Disputes over land property

d) Lack of harbour facilities

Handicraft sawmilling deserves Government's attention. Proposals for a project to establish handicraft sawmills for the rural population were made.

The moulding plants in Sarawak could serve as samples for good management. They are hampered by lack of Ramin wood and lack of markets for mouldings produced from other timber species.

The furniture industry in Sarawak is under-developed and heavily over-equipped. The central problem is marketing, co-ordination of production and lack of technical know-how.

The boat building trade works with old fashioned out-dated methods and needs modernisation. Lack of trained personnel, technical guidance, market development and co-operation are the negative features. A high standard of traditional craftsmanship and the expanding demand for modern watercrafts make industrial boat building one of the most promising aspects for the timber industry in Sarawak.

61.3 The Market

The internal market for wooden products is satisfied or the open demand too small to justify industrial production.

The export market is frustrated by the inefficient marketing system, which was formerly suitable for the explorative trade in raw materials, but is unsuitable for industrial market development and handling manufactured goods.

61.4 Investment Capital

It is apparent that the timber trade in Sarawak disposes its financial reserves out of the country, if the trade is not encouraged to reinvest in timber industries.

The present short term forest licensing system hampers the development of timber industries and does not allow for full utilisation of the credit facilities of commercial banking.

The regional money market has free investment capital which flows into projects of timber industries in neighbouring countries (mainly Singapore).

Big international timber enterprises declared their desire to invest in Sarawak but demanded a dominating position in the country's economy, which the undersigne would not support.

Sarawak's timber industry is almost entirely the property of local residents and it is hoped, that the states Government prevents the entrance of big foreign enterprises with monopolising interests.

The racial participation in Sabawak is out of balance. In Chapter 51, 54 and 55 proposals were made on how bumiputras could be assisted to enter the timber trade.

Government's participation in the proposed ventures (chapters 56, 57 and 59) shall assure a just participation for all racial components of Sarawak's population.

62. Marketing Promotion

62.0 Marketing is the central problem of Sarawak's timber industry. Without marketing promotion no timber industry can be developed in Sarawak. Without co-ordination of marketing efforts, an unlimited competition among Sarawak's and Sabah's timber producers will result in dumping in the buyers market which will ruin not only the timber trade but shall affect the whole economy.

Expansion of production without preceding expansion of the market is extremely hasardous, in particular if foreign capital which has other interests on the international timber market is involved.

62.1 Organisation

The formation of an Ehot Malaysian Timber Project is strongly recommended.

62.11 Guidance

For an initial period of three years the project should be guided by an expert on industrial marketing, while indigenous personalities selected by the trade and approved by the State Government (not Governments Officers) should be trained in the related fields for industrial marketing.

The project shall combine the following aspects:

62.12(a) Market research

This is to discover potential markets for Sarawak's (and probably Sabah's) timber products, mainly processed timber goods and non-commercial timber species.

62.13(b) To co-ordinate the marketing of the existing timber industry

(See chapter 42, in particular paragraphs: 42.12.24; 42.12.51; 42.12.52; 42.22.6; 42.34; 42.35.3; 42.4; 42.52; 42.53; 42.54; 42.6).

62.14(c) To co-ordinate production for export purposes

(See paragraphs 51.6; 52.17; 53.7; 54.11) and co-operate closely with:

(d) The proposed project for the development of "small saws".

(e) The proposed project for the development of furniture-export (Chapter 54).

(f) The proposed project for the improvement of boat building.

(g) The (Australian) Timber research and training Project.

(h) The F.A.O. Forest inventory and Forest industries development project.

(i) Lambis/Subis Project (BINTULU)

(j) The training projects proposed in Chapter 64.

(k) And last but not least with Pernas and West Malaysian Marketing development projects.

The triple aims should be reflected by a three team organisation.

62.12 **Market Research Team**

62.12.1 **Activity**

The activity of this team will be mostly outside of Malaysia.

After a period of two months in which the experts become familiar with the potential and operating timber industry in Sarawak (and probably Sabah) and in whixh their counterparts are being trained in basic sciences for marketing research, the experts accompanied by their counterparts should visit the potential markets abroad.

They carry sample products and should be authorised to accept sample orders on behalf of certain timber companies in Sarawak.

The visit to a potential market shall last about a month and shall be repeated by their counterparts later on at least every second year.

Reports on the market situation and the prospects for future development shall be written immediately after the return and submitted to the trade without delay. The State government should be informed accordingly.

62.12.2 **Reports**

The reports must contain:

i) List of potential importers with details on names of managers, purchase officers, bank connections, type of production, import capacity details on requirements - species, qualities, dimensions, degres of procession, assumed limit of prices - postal addresses, suitable means of approach, etc.

ii) Total quantity of goods imported in the past, divided into categories, qualities, sources of supply. This information could be based on the general statistics of import and export but must be complemented by detailed informations from importers and consumers.

iii) A list of potential consumers for Sarawaks wooden merchandise, although they might not be direct importers, specifying the channel of purchase, the technical and commercial requirements. This is particularly important as future investors for Sarawak's timber industry might be found in this group.

62.12.3 Marketing Promotion

While doing the market research as the main object, some marketing promotion should be done as a trial operation, to see how the market reacts on offers and how the transaction is performed later on, including experiences on trade disputes, settlement of claims, answers to conditions of payment, etc.

A public advertising campaign does not fall under the terms of reference of the market research team, though proposals as to feasible means of advertising and indication of advertising costs will be expected from the team.

62.12.4 Training and testing of counterpart

Salesmanship is an art which can be studied only partly. It is largely based on a natural gift.

During the trips the expert shall learn to know his counterpart very well. He will know whether the counterpart is a salesman at heart, and could represent

Sarawak's timber industry abroad and can be trusted with the difficult job of market research.

62.12.5 Markets to be investigated

The market for round logs and sawn wood in countries which have imported such commodities from Sarawak in the past are known to the trade, and do not require market research in the first instance. This market shall be in the programme for the permanent market observation.

The market which shall be investigated are; markets for processed timber goods from plywood to furnitures as well as potential market for less manufactured timber goods in the "third world" and the East block countries including Mainland China.

62.13 Co-ordination of the timber trade

62.13.1 Aims

The self-organization of the timber trade needs strengthening by financial and technical assistance from outside.

Five groups of logging enterprises dominate the trade in Sarawak while others, particularly small enterprises and the timber manufacturing industry, are under represented.

The second part of the proposed project aims at the formation of a strong organization, free from political influences and bureaucratic procedures (as some of the foreign Timber Marketing Boards are).

Therefore, the Term "MARKETING BOARD" was carefully avoided.

62.13.2 Functions

The function of the strengthened Sarawak Timber Associations should be seen in the following fields:

62.13.21 Technical and Commercial Advice to the timber industry.

62.13.22 Co-ordination of interests of the individual enterprises.

62.13.23 Organisation of training for the technical staff.

62.13.24 Representation of the trade to the Government.

62.13.21 Technical and Commercial Advice

During the visits to the timber industry in Sarawak, the need for technical advice was expressed repeatedly. Most questions concerned modern manufacturing techniques outside of the conventional line of sawmilling, mainly process of plywood - and particle board production. Improving of sawmilling by carbid-tipped tools, jet-sawing, double face sawing and chip and saw techniques were also discussed.

The field of saw-doctoring is competently and successfully covered by the saw doctors training courses in Kuching.

The undersigned proposes, that a team of the following experts:

1 mechanical engineer or mechanical technician
1 workstudy man
2 counterparts-technician (background mechanical engineering)

should tour regularly the timber industries of Sarawak (perhaps of Sabah as well) and supply practical assistance and "on-the-spot" advice to the smaller and medium sized enterprises. With practical assistance ranging from tightening some transmission belts up to complete lay-out plans for new factories, the productivity of Sarawaks timber industry can be raised considerably without spending foreign exchange on new machinery.

It is hoped that one of the counterparts should continue the advisory service to the timber industry, while the other specialises in repairs - and maintenance of wood-working machinery. He may later on set up his own (or on joint venture) workshop for this and eventually produce some of the required wood-working machinery in Sarawak. (Several companies are prepared to supply the required financial means and machinery for this purpose to a technician who holds the above experiences and connections.)

The team would require the following equipment:

(a) Mechanist Equipment

Portable (on a Motor boat)
Auto gene welding
Electro welding
Electro hand tools
Electro meters (Ampere, Ohm, Volt)
Micrometers
Moisture meters
Electro-Grinding set
Equipment to pull pullies from a shaft
Two sets of mechanics tools
One set of plumbers tools
One set of electricians tools
Spirit levels, levelling-gauge, and
Sundry equipment.

(b) Work-study equipment

8 stop watches (also to be lent to the enterprise)
Calculating machine
Work-study forms
Literature on work study and technical management to be supplied to the enterprises

Micrometers (to be given to the enterprises where necessary) and

Sundry small equipment.

62.13.22 Co-ordination of interests and Strengthening the Sarawak (and Sabah's) Timber Association

Requirements:

1 expert on organizing co-operatives (probably the project manager)

1 his counterpart, elected by the association as the managing secretary of the association (full time employment)

and the elected chairman of the Association, a member of the trade (part time working for the Association)

1 accountant

1 driver/messenger

1 secretary

1 timber technologist

Tasks:

(a) Organise the Association

(b) Lead the team

(c) Co-ordinate Marketing Research and industry development

(d) Approach potential investors

(e) Establish the basis for a marketing promotion organisation

(f) Advice on and initiate specialised training (timber technologist)

(g) work out standards for timber products and prevent the application of out-dated grading rules

62.14 Training

62.14.1 Technical training

As a part of the project, scholarships should be awarded for industrial engineering (timber industry). Proposed places for the training:

University level: U.B.C. Vancouver (Canada)
New Brunswick (Canada)
University of Wisconsin/
Forest Products
Research Institute in Madison.

as sandwich courses, supplemented with practical work in timber industries. Duration 3½ years.

College Level: HOLZTECHNICUM (Technical College for the Timber industry in ROSENHEIM (Germany)
Traevaru Instituten (Timber goods research and training institute) Stockholm (Sweden)

supplemented by practical work in timber industries. Duration: 3 years

62.14.2 Training in Management and Salesmanship

Management: Short week-end seminars for Managers. 3 weeks for workstudy.

Salesmanship: Scholarships for 1½ years for young salesmen, to be associated to agents abroad and brokers, handling timber from Sarawak.

All personal emoluments should be borne by the Scholarship. The host broker (agent) supplies only the office facilities and guidance.

This scholarship has a dual purpose:

1) to train salesmen;

2) to act as a permanent reminder to the broker to promote the sale of Sarawak's timber products.

If required an assurance can be given to the broker that the trainee will not work in the broker's region later on without his approval.

64.14.3 Vocational Training

It has been approved in other countries that the most suitable vocational training for the timber industry is the "on-the-job training" in comparison to vocational training centers, which are more suitable for artisans training.

The proposed project shall require:

1 instructor

1 counterpart/junior instructor

and machinery valued about M$100,000 to be supplied free of charge to a modern enterprise, which is suitable and prepared to act as "training industry".

Several enterprises in Sarawak declared their readiness to act as training industry even without the contribution of machinery. These enterprises would be ready to supply quarters and full co-operation in return for permanent technical consultation or pioneer status.

68.2 The Project

68.21 Personnel

(e) Project manager } experts on co-operative
(1) Co-manager } organisation and marketing
(e) Expert } on international marketing
(1) Counterpart } research

probably to be sub-contracted to commercial market research enterprise.

(1) Counterpart to be trained on marketing promotion

(e) Expert for technical consultation mechanical engineer

(e) Expert for management consultation workstudy technician

(1) 2 counterparts

(1) Accountant

(1) driver/messenger

(1) secretary

(1) timber technologist

(e) instructor/vocational training

(1) junior instructor

(e) 6 trainees salesmanship

(e) = expatriate staff

(1) = local staff

68.22 Budget M$

| | | |
|---|---|---|
| (e) | Foreign personnel and scholarships abroad, including travelling abroad for 3 years (M$400,000/annum) | 1,200,000 |
| (1) | Personal costs within Sarawak | 600,000 |
| (e) | Equipment and machinery | 820,000 |
| (e) | Office and accommodations | 216,000 |
| (e) | Internal travelling | 180,000 |

68.23 Executing agency

The project must be unbiased by any foreign national, political or economical prejudices. The executing agency should therefore be a supra-national body: UNIDO or World Bank.

The team should be composed of elements of state-owned timber organisations such as:

LIGNA (C.S.A.)

PAGET (Poland)

EXPRO (Bulgaria) etc.

and the big international timber industries as:

Weyenhaeuser (U.S.A.)

St. Regis (U.S.A.)

U.S. Ply (U.S.A.)

Glicksten (U.K.)

East Asiatic Co. (Denmark)

Swenska Zellulose (Sweden)

Wirus (Germany)

Bauer (Germany)

Feld Muehle (Germany)

3 K (Germany)

Isorel (France)

Pijnhout (Netherlands) etc.

There is no need for foresters in this team as the standard of Sarawak's foresters are above world's average.

(There may be need for foresters to assist the understaffed forest department, but this would be only indirectly connected with timber industries)

62.24 Duration of the project

½ year pre-operational preparations

2 years operations

4 years scholarship programme (total)

½ year conclusions and reports

62.3 Marketing Promotion, Finance

62.31 Means of Market Promotion

Marketing promotion is a part of normal industrial investment. This field has been neglected in the past. The leeway must therefore be made up now.

Timber products are often not traded by the brand and are therefore competitive in the region. Marketing promotion must therefore be done on mutual, regional basis. Government should take the initiative to induce the industry to attend to marketing promotion, as all other industries are doing, but shall not be charged to do the marketing promotion itself. Where Governments undertook the marketing promotion in its own hand, it has been a failure. There are two means opened for marketing promotions:

a) to establish an organisation for marketing promotion by the trade, or

b) to use the international marketing promotion trade.

The undersigned had no previous personal experiences with the latter and can therefore not make a statement on the efficiency of market promotion for timber products by the commercial advertising agencies.

The undersigned noted the successful operation of: Office du Bois du Gabon - the Swedish organisation of private forest owners -

- the association of the timber trade on the Ivory Coast

- and other members of the I.T.T.A.

On the basis of the proposed market research it could be decided whether the Sarawak Timber Association should handle the market promotion themselves by its own organisation or sub-contract it to an international market promotion company.

62.32 **Financing**

The undersigned proposes the following way of financing.

A fee for marketing promotion should be levied from all timber exports from Sarawak (and probably Sabah).

| | M$ |
|---|---|
| Round logs Class A | 2.50/ton |
| Round logs Class B (Ramin) | 1.80/ton |
| Round logs Class C | 0.40/ton |
| Sawn wood Class A species | 3.00/ton |
| Sawn wood Class B (Ramin) | 2.00/ton |
| Sawn wood Class C | 0.25/ton |
| Plywood | 1% of the f.o.b. value |
| Mouldings and other wooden products | 0.3% of the f.o.b. value |

The fees should be collected by the Customs Department on behalf of the SARAWAK TIMBER PROMOTION TRUST FUND.

The trust fund shall be administered by a board, composed of:

(a) Representatives of the various branches of timber industries:

- 1 plywood manufacturer
- 1 moulding plants
- 1 furniture industry
- 1 sawmiller/logger

(b) Representatives of the State Government

- 1 State Industrial Department
- 1 State Forest Department
- 1 State Financial Department

(c) Representatives of the Federal Government

- 1 FIDA
- 1 Permas

Auditoring shall be done by the Audit Department.

The funds shall be used to promote the timber industry in Sarawak through marketing promotion, training and technical assistance.

The above proposed project may be the first item, wherein the local contribution (1) in Chapter 62.21 could be covered by the trust fund.

If on the basis of the market research it should be considered necessary to establish a co-operative marketing and sales organisation for manufactured timber goods, a special branch of PERNAS might be established or other adequate marketing organisations established with the financial assistance of the Trust Fund.

63 Development of Timber Industries and Forest Licenses

63.1 Forest Licenses initiating forest industries

As a pre-requisite for the granting of a forest licence the applicant should be bound to establish the industry as in the table.

| Annual Yield of Forest Areas | Industry Required |
|---|---|
| Up to 5,000 tons/annum | Semi-mobile Sawmill |
| 5,000 & 50, 000 tons/annum | Industrial Sawmills with moulding plants |
| 50,000 - 200,000 tons/annum | Industrial Sawmills plus plywood factory |
| Exceeding 200,000 tons/annum | The Government should hold the controlling Share. |

63.2 Duration of Forest Licenses

Licenses for logging in Protected areas should be granted for at least 30 years.

Licenses for logging outside of protected areas should be granted for at least 20 years.

Annual felling rights should be granted only under exceptional conditions and with preference to enterprises with established timber industries.

All new licenses must be subject to public tenders.

63.3 Licenses for sawmills

In none of the industrial countries is a [illegible] license required to operate a sawmill, except for labour security or enviroment protection.

The Forest Department may advice a potential sawmiller on the availability of raw material in a certain area but should not have the power to prevent any commercial and industrial activity outside of the protected areas.

Planning and Co-ordination of industrial activity should rest entirely with the Government's industrial and economic administration, which may consult the Forest Department on technical matters, in the same way as it consults geological department, the agricultural department, marine department or electricity department on their respective fields.

The Forest Department in Sarawak is understaffed. It is faced with tremendous tasks for the future in silviculture, plantations, improvement of logging and enviroment protection and should not be burdened with the responsibilities in the commercial and industrial field.

Wooden or fibrous material produced outside of the forests (see chapter 21.2) provides a substantial proportion of the raw material converted in the timber industry of the world. In many countries, timber production outside of the forests exceeds production from the forest. (Iran, Netherland, France, Jamaica, India).

Referring to chapter 21.23, it appears that this production cannot be neglected in Sarawak.

64. Training for Timber Industries

It is a common problem to the timber industry all over the world, that there are no training facilities to meet the ever changing demand for trained personnel.

64.1 Required Personnal

By 1980 the Timber Industry in Sarawak would require the following:

| | |
|---|---|
| 1 - 3 | timber technologists per annum |
| 12-18 | timber technicians per annum |
| 30-40 | industrial artisans per annum |
| 15-20 | timber merchants and jun. managers |
| 1 - 2 | wood chemists |
| 1 - 4 | instructors for vocational training (timber industries) |

Malaysia as a whole will need more trained "timbermen" in 1980 than U.K. or Netherland at present.

64.2 Training Facilities

64.21 Timber technologists can be trained abroad (Canada, Australia, Germany, India).

64.22 Training facilities for timber technicians shall be required in East Malaysia.

The curriculum might be orientated on the Swedish and German system (Rosenheim).

64.23 Training for industrial artisans differs considerably from traditional training of handi-craft artisans. Probably a compromise between the Burmingham technical course and courses offered by the Danish Cabinet makers training school or the Wildungen sawmillers school and the Detmold school for furniture industry may be found feasible for Sarawak.

This training must be done in Sarawak. Scholarships abroad have been found unsuitable on this level.

64.24 Timber merchants

Some of the colleges in U.S.A. and Vancouver and New Brunswick in Canada offer special courses for timber merchants. The technical college in Rosenheim (Germany) organises special courses in English in this field. Similar courses are held in Netherlands as well. (Prof. Boerhave)

65. Proposals for the administration of timber industries in Sarawak.

65.1 General

One should distinguish between:

a) development of timber industries

and b) administration of timber industries

For the first a branch office of FIDA in Sarawak appears to be desirable.

For the second a states industrial department would be required.

It would be beyond the Terms of reference for this study to comment as to which of the existing state departments the industrial department should be attached.

The organisation of the timber industry will need to be administered by a government industrial agency. The agency cannot be an occasional meeting of a high level administrative "board" as too much routine and day-to-day work has to be done, regulations have to be enforced (security regulations, labour regulations, enviromental regulations, industrial regulations, etc.) and records maintained.

65.2 F.I.D.A.'s role for the development of timber industries in Sarawak

The encouraging experiences of FIDA's role in the development of timber industries in other parts of Malaysia, made it desirable, that the Federal Industrial Development Authority should take the initiative to convert Sarawak's production of raw material into a co-ordinated and in themself a corelated timber industry.

F.I.D.A. appears to be the right organisation to act as a "godfather" for the proposed "self-help" and "self-organisation" project of the timber industry.

FIDA may formulate applications for foreign assistance schemes, approach potential investors and initiate detailed feasibility studies.

66. Measurement and Grading

66.1 Measurement

More than 50% of Sarawak's export of sawn wood and timber products goes to markets with metric system. It can be expected that more countries will change from inch to metric system in the future.

The earlier the change is done, the less it will cost.

66.2 Grading

Quality grading rules are used for those timber goods for which no standards exist.

I.S.O. Standard exists for the products of secondary timber industry and this should be adopted for:

Mouldings; Plywood; Furniture; Fibre and Particle boards; Constructional timbers; Matches; Doors; Door and Window frames; etc.

(I.S.O. = International Standard Organization) = a body established by the national standard organisations or/and departments.)

There is no international standard existing up till now for raw sawn wood. Formerly each region of production introduced their own grading rules. This system had worked well, as long as there was a "sellers market" for sawn wood. That means, as long as the market position of the producer was strong enough to enforce his system of grading upon his customer.

Unfortunately the situation has changed. The importer is not any more interested in a grading according to rules of the supplying country. He wishes to buy a merchandise according to the requests of his customers and according to customs and gradings, with which the consumer is familiar.

The Malay grading rules have been in their time one of the best grading rules for sawn tropical timbers of the world and the markets in Japan, Australia and U.K. are used to it. But the market in Western Europe, West Asia, Mainland China require different quality grading.

As a matter of fact sawn wood from Malaysia had been re-graded in Italy, Netherland, Hong Kong, Taiwan and Iran. Regrading costs about M$ 10- 20 per ton, a value which is deducted from the potential export price.

There are in the world nine approved ways of grading for tropical sawn wood. Four of these dominate the world market, while five have only regional or national importance. One of the four is the Malay grading rule.

The undersigned advocates the training of graders for the export companies (not for the Government) in the first four grading systems.

Each parcel should be graded according to the grading rules of the country of destination and shall be offered and traded accordingly.

This will result to less quality claims and result in expansion of the market, together with an increase of achievable export prices.

Official grading by a Governmental agency has enjoyed little reputation on the international timber market. As a result of obligatory grading by Government graders, the price for Ghanarian sawn wood declined by 11.3% and is today 6.4% below the level of prices for Ivory Coast timbers, where no official grading is required and where the exporters select the material according to the requirement of the customer.

As long as sawn wood was used mainly for building purposes the general grading rules, in particular the Malay grading rules were perfect. But tropical sawn wood is nowadays not anymore imported for constructional purposes. It It is used for furniture, decorative purposes, crating, etc. for which rather different properties and qualities are required. The most problematic is the grading of round wood.

All the older grading rules for tropical round wood were based on the assumption, that the logs will be sawn up for constructional purposes.

More than 70% of Sarawaks timber export has been used for veneers, peeled and sliced, for plywood, veneered furnitures, blockboards and so on.

The undersigned advocates the new formulation of grading rules for round wood in accordance with the resolution of the I.T.T.A.

Parcels of round wood should be graded for the potential conversion:

a) For sliced veneers - Audlity 1 - 10
b) For veneer peeling - " 1 - 10
c) For sawing - " 1 - 10
d) For pulping - " 1 - 10
e) For pyrotechnical - " 1 - 10
and chemical conversion

The undersigned would not favour the imposition of a grading rule to Sarawak, which has every chance to be changed within the very next year.

The system (see chapter 62.12) of closer connections between producer and consumer will allow for grading rules to be dictated by technical requirements and not by written regulations.

67. Summary - Conclusion

Time schedule of Investment

Investment into timber industries must be done as soon as possible. Any delay should be avoided, even for the hasard of a wrong investment.

67.1 Rise in costs of Investment

This is imperative due to the movement of prices.

The price for machinery increases parallel to the factor of deflation in the industrial countries. The prices for woodworking machinery and oversea-freight rates increase between 4.2% and 8.3% per annum.

The f.o.b. price for logs increase only 2.3 - 4.1% per annum for sawn tropical hardwoods 0.6 - 3.1% per annum, for plywood 2.6% - 4.7% per annum, for furnitures 3.7% - 7.8% per annum.

That means the true value (in relation to the average of the retail prices) of raw wood declines.

A factory which would have cost 1 million dollars in 1970 will cost about 1.35 million dollars in 1974/1975. It would be better to have 20% wrong investments than having the investment delayed for five years for more detailed and better planning.

It is not the intention to advocate "wild" investments, unnecessary delay should be avoided.

67.2 Regional money market

Quick actions are recommended as well for reasons of the regional capital market.

The Capital market in South East Asia was disturbed by the political development during 1971.

Much investment capital became mobile, flowing out one country in East Asia as a result of the USA - China contacts.

Investment capital has drained out from a neighbouring country as a result of racial pressure.

Investment capital has accumulated as a result of the timber boom till 1970. Some of this capital awaits investment. If interesting opportunities of investment are offered soon, some of this capital may flow into Sarawak's timber industry, otherwise much of the capital will have been invested in other projects within the next months.

67.3 The Time factor in the timber market

Quick actions are also recommended in respect to the market. Several neighbouring countries are trying to change from export of raw material to the export of manufactured goods. The first on the market will enjoy an advantageous position which could be compensated later on.

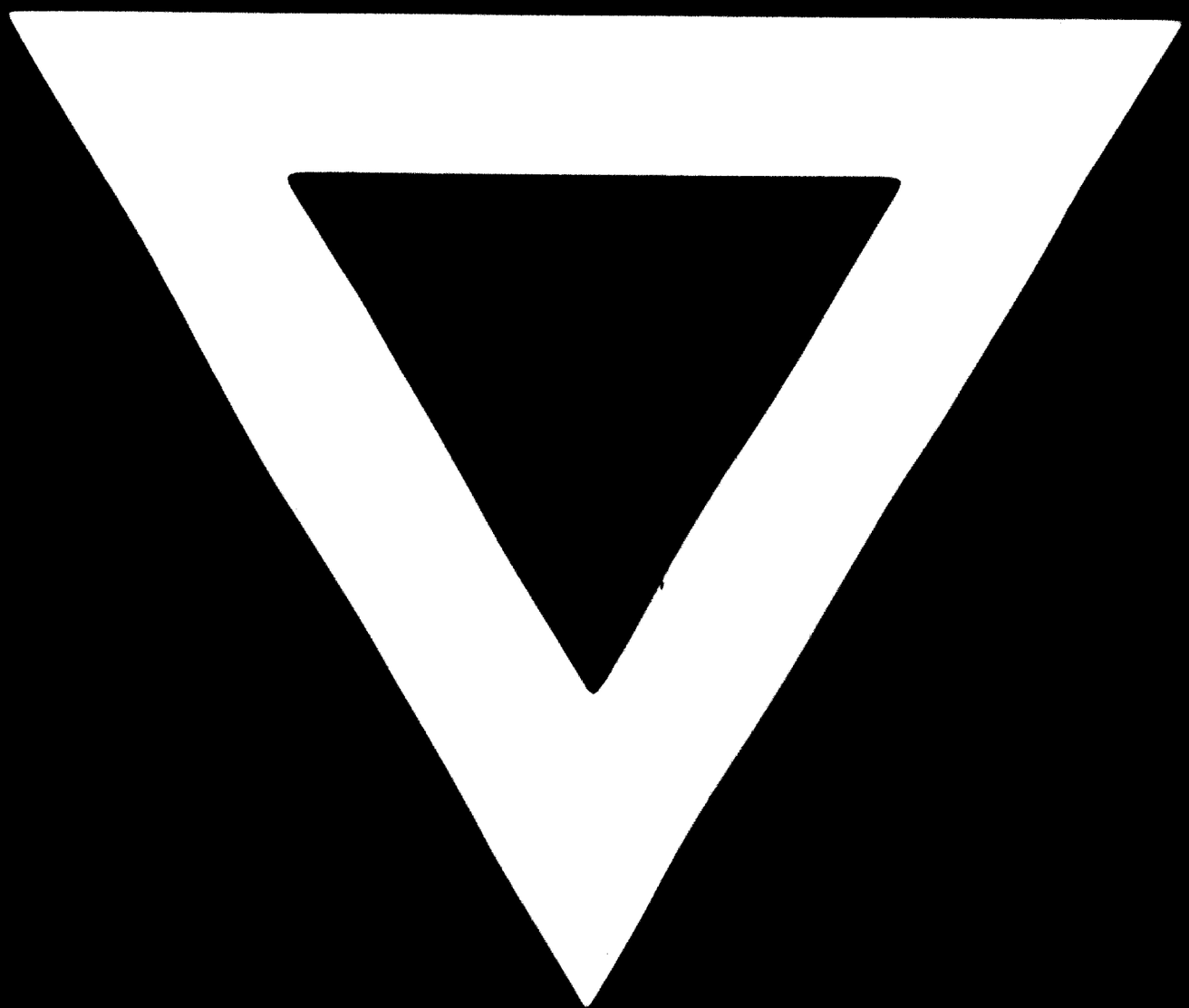
only on high costs. Market promotion must start long before actual production. The first step of market promotion is market research. And this is the field, where immediate activity is required.

67.4 Enterprising initiative

The booming timber market absorbed much of the enterprising initiative in Sarawak. "Why should I spend my time on timber industries when I can earn so much with the export of logs" was a typical remark 1966-1971. This has changed since. F.I.D.A. has proved its capacity to direct enterprising intitiative and it is in this respect, that "market expansion" is also recommended.

High ranking representatives of F.I.D.A. should continue to visit potential capital markets, banking circles, timber consuming industries, commercial associations, etc. abroad, to explain potential fields of investment in Sarawak's timber industry.

# C-572



84.12.03
AD.8G.07
ILL 5.5+10