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ASSISTANCE TO KEJORA AND KETENGAH - PREPARATORY
ASSISTANCE MISSION

DP/MAL/87/008

MALAYSIA

Technical report: Current status and development potentials
for the wood-based industries in Ketengah and Kejora*

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

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United Nations Industrial Development Organization
Vienna

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EXPLANATORY NOTES

The monetary unit of the Federation of Malay States is the Ringgit, Malaysian Dollar (M\$). The current official rate of exchange for the Ringgit is M\$2.35 = US\$1.00.

The following acronyms are used in this Report :

FELDA	-	Federal Land Development Authority, Kuala Lumpur
FRIM	-	Forest Research Institute Malaysia Kepong, Selangor
KEJORA	-	"Lembaga Kemajuan Johor Tenggara" - Southeast Johore Development Authority
KETENGAH	-	"Lembaga Kemajuan Terengganu Tengah" - Central Trengganu Development Authority
MARA	-	"Majlis Amanah Rakyat" - Council of Trust for the Indigenous People, Kuala Lumpur
MARDI	-	Malaysian Agricultural Research and Development Institute, Kuala Lumpur
MIDA	-	Malaysian Industrial Development Authority, Kuala Lumpur
RISDA	-	Rubber Industries Smallholders Development Authority, Kuala Lumpur
UNDP	-	United Nations Development Programme
UNIDO	-	United Nations Industrial Development Organization

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

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

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

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

M\$	-	Malaysian Dollar, Ringgit, currency unit of Malaysia
US\$	-	U. S. Dollar, currency unit of the United States of America

ha.	-	hectare, an area equal to 10,000 square meters
has.	-	hectares
Sdn. Bhd.	-	"Sendirian Berhad", meaning incorporated company (or association of individuals)
Ltd.	-	Limited - a term to denote limited ownership of a business firm
i.e.	-	"id est" - that is
etc.	-	"et cetera" - and so forth
ft.	-	foot, a length equal to 12 inches
cu.m.	-	cubic meter
pcs.	-	pieces
dia.	-	diameter
cm.	-	centimeter
%	-	per cent

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CURRENT STATUS AND DEVELOPMENT POTENTIALS
FOR THE WOOD-BASED INDUSTRIES IN KETENGAH AND KEJORA
UNDER THE NEW ECONOMIC PLAN OF MALAYSIA

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1. BACKGROUND AND MISSION OBJECTIVES

The assistance of the UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO), through the Regional UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP), was sought by the Government of Malaysia, represented by the Ministry of Land and Regional Development, "in the formulation of a draft document, which, after approval, will offer basic guidelines for the industrial development of the two regions which are under the responsibility of KETENGAH and KEJORA, respectively".

The wood-based industry is one of the three industrial sub-sectors chosen as the subject of this study.

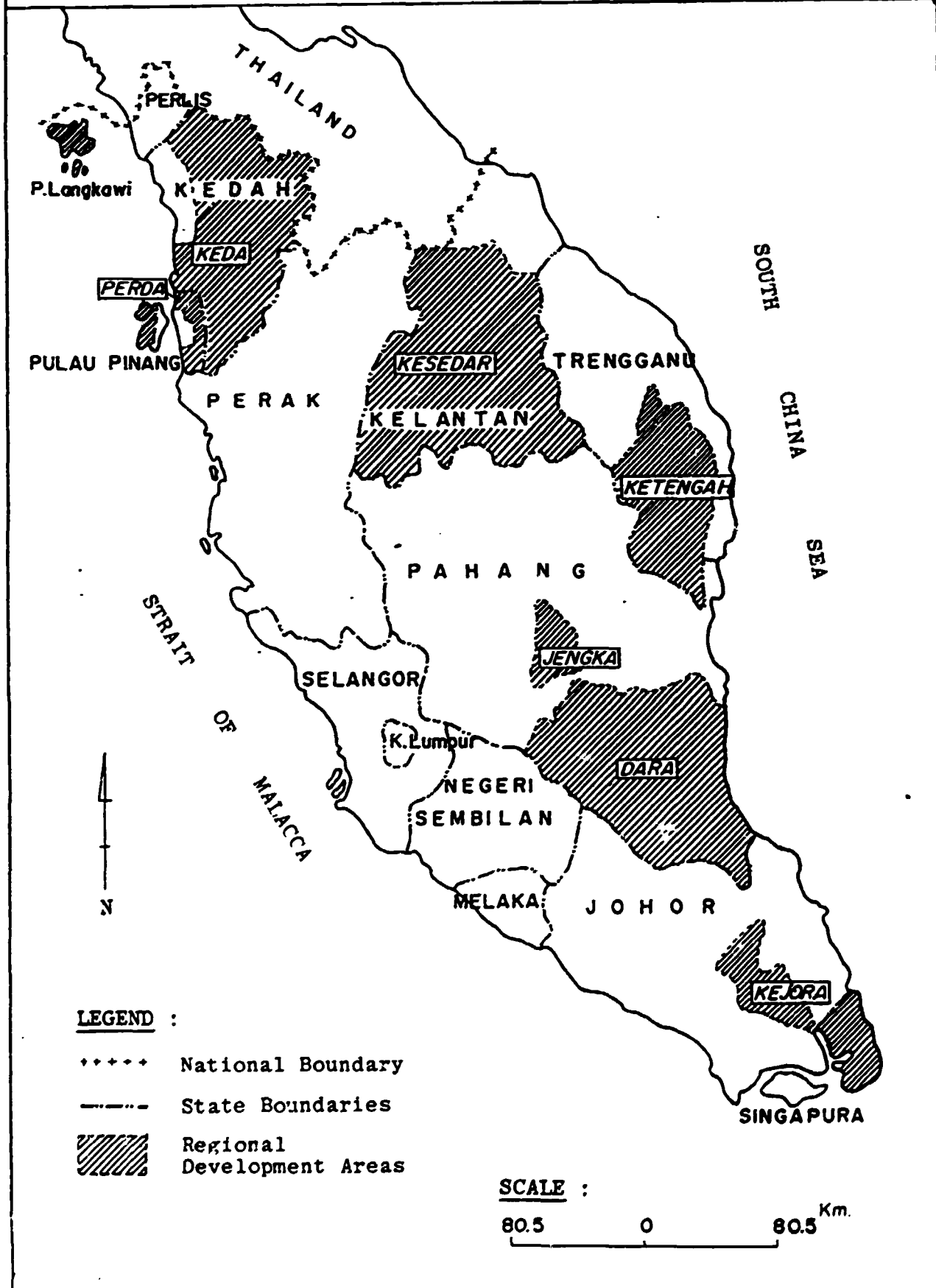
The authorities of KETENGAH and KEJORA, (see Figure 1), both indicated their desire for this Mission to focus its studies on the possible utilization of indigenous raw materials and agricultural products (currently available and planned to be) raised in these areas, under an industrial development programme which is agro-based and resource-based in nature.

In separate meetings with KETENGAH and KEJORA Officers, the following general objectives were agreed upon : -

- to help increase the current income of the under-employed population of each area;
- to help create industrial (or other economic) activities which will encourage emigration into the two areas; and
- to help minimize, if not totally eliminate, emigration out of the two areas at a rate which favors the economic development of the areas.

FIGURE 1

REGIONAL DEVELOPMENT AREAS, PENINSULAR MALAYSIA



In this manner, it is hoped that the manpower needs of any economic development project for the selected areas is better assured.

Furthermore, it was also agreed that wherever possible, development activities arising from these studies may also explore the possibility of establishing linkage arrangements between the wood processing activities in the vicinity of the two development areas and whatever wood-based activities are deemed necessary to attain the above-listed mission objectives.

2. LEMBAGA KEMAJUAN TERENGGANU TENGAH (KETENGAH)

2.1 Forest Resources

The wood industry within KETENGAH is based on forest lands having an aggregate area of 248,700 hectares. Disposition of these forest lands as of January, 1987 (see Figure 2), is as follows :

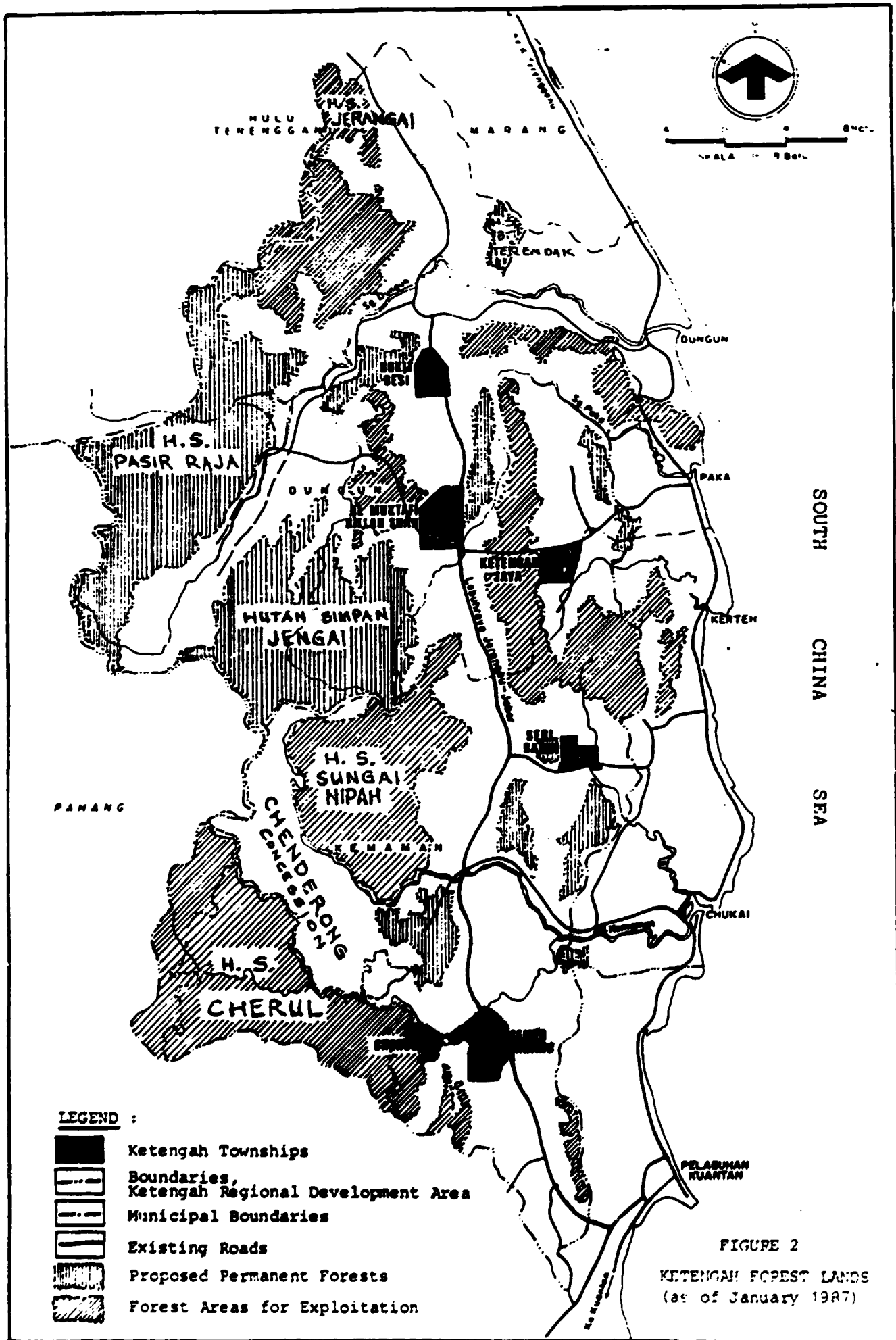
TABLE I

DISPOSITION OF KETENGAH FOREST LANDS
(as of January, 1987)

<u>Nature of Use/Disposition</u>	<u>Area</u>
Licensed for Exploitation -----	121,408 Has.
Reserved Permanent Forest -----	100,987 Has.
Chenderong Concession -----	<u>26,305 Has.</u>
Total -----	248,700 Has. vvvvvvvvvvvvvv

The areas committed for exploitation are licensed to two para-statal firms :

- i - The DUNGUN TIMBER COMPLEX, which has been granted a license to exploit a total of 108,900 hectares in the central part of KETENGAH, with privileges to cut timber at the rate of 3,200 hectares per year. As of the second quarter of 1987, about 11,765 hectares have been logged, leaving a balance of









- LEGEND :**
-  Ketengah Townships
 -  Boundaries, Ketengah Regional Development Area
 -  Municipal Boundaries
 -  Existing Roads
 -  Proposed Permanent Forests
 -  Forest Areas for Exploitation

FIGURE 2
KETENGAH FOREST LANDS
(as of January 1987)

97,135 hectares for future exploitation. The concession has a 25-year term and extends to the year 2006.

- ii - The PESAMA TIMBER COMPLEX has been granted a license to exploit 20,235 hectares of the southwestern forest lands of KETENGAH, with privileges to cut timber at the rate of 809 hectares per year. A total of 8,862 hectares has already been logged, leaving a balance of 11,373 hectares for future operations. The license has a 25-year term and expires in the year 2000.

The DUNGUN TIMBER COMPLEX supplies timber to the PESAKA SAWMILL (TERENGGANU) Bhd. and the PERMINT PLYWOOD PLANT in Al Muktafi Billah Shah. The PESAMA TIMBER COMPLEX supplies timber to the PESAMA TIMBER CORPORATION Sdn. Bhd., also a subsidiary of the Terengganu State Economic Development Corporation. It also operates a moulding and woodworking plant in the same site in Kemaman, Terengganu.

No exploitation activities are allowed in the forest areas reserved as PERMANENT FORESTS.

The Chenderong concession has been reserved for specific purposes and is not available for exploitation.

2.2 Logging Operations

The forest concession of Dungun Timber Complex is operated by the Pesaka Timber Bhd. and another firm which is a subsidiary of the Terengganu State Economic Development Corporation. Current cutting permits allow logging operations in eight logging compartments located southwest of Al Muktafi Billah Shah township. Each logging compartment produces approximately 3,600 cu.m. of logs per month. Local weather conditions allow logging activities for only six to seven months in a year. Felling and skidding compose the major logging operations in the Dungun Timber Complex. The mild terrain characteristics do not require overhead yarding while the soil properties allow skidding operations only during the dry weather months.

A total of 150 workers are employed in the PESAKA logging operations, of whom approximately 60% are married, and have an average family size of five (5) children.

Similar logging techniques and weather conditions characterize the Pesama Timber logging operations west of Cheneh Baharu township.

2.3 Wood Processing

The Dungun Timber Complex provides timber to the PESAKA sawmilling operations and the PERMINT plywood manufacturing activities.

The PESAKA sawmilling operations employ a total of 150 people. On the average, the monthly log input is 3,700 cu.m., with an output of 2,200 cu.m. per month of varied sizes sawn timber products. The sawmill has rated capacity of 3,000 cu.m. of sawn timber. These operating figures indicate that although the Pesaka sawmill is operated on a 2-shift per day, six days per week basis, the operations could attain only 73% of rated capacity and give a log to sawn timber yield rate of 59%.

The PERMINT plywood mill has a rated capacity of 3,000 cu.m. of plywood panels per month. Its Production Manager claimed that current operations output attain the plant rated capacity. The plywood plant equipment complement and lay-out must have been drawn-up by Taihei Machinery Ltd. (Japan), as most of the major pieces of equipment have been supplied by the firm. PERMINT employs about 400 workers, with an average family size of five children.

The PESAMA wood processing complex is located in the town of Kemaman on the eastern coast of Terengganu and is outside of the KETENGAH region, although KETENGAH forests supply PESAMA's timber requirements. Time constraints did not allow a visit to the PESAMA sawmilling and woodworking facilities in Kemaman. However, PESAKA officers stated that Pesama sawmilling equipment and operations do not differ greatly from theirs.

2.4 Wood Residue From Logging and Wood Processing Operations, DUNGUN TIMBER COMPLEX Area

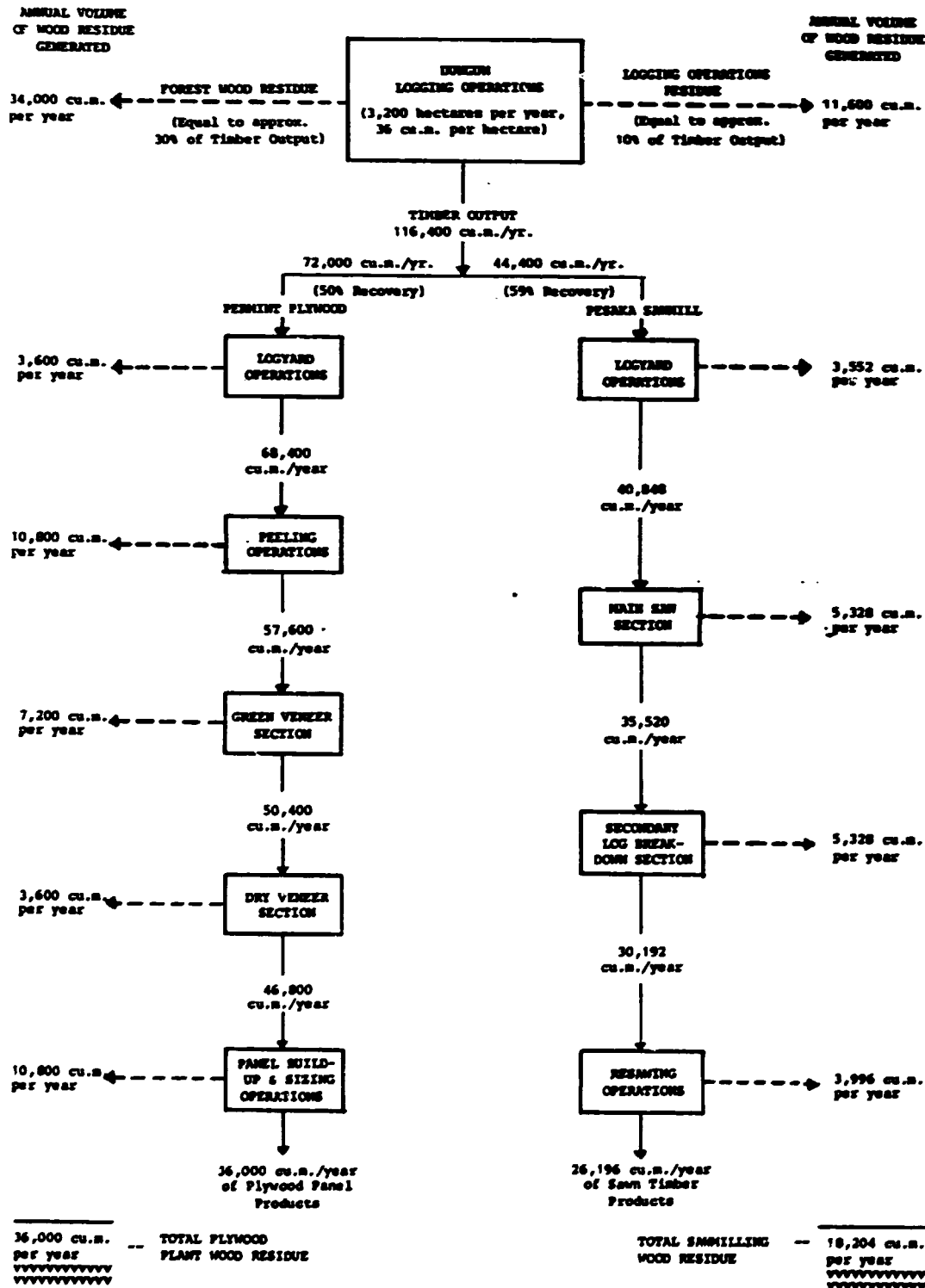
Logging operations in the Dungun Timber Complex produce two general types of wood residue (more commonly but erroneously known as "wood waste"). "Forest Wood Residues" include branches of fallen trees and the stems and branches of under-sized (small diameter) trees which are damaged or fallen unintentionally during logging operations. Whereas, "Logging Operations Residue" are primarily the log-ends and other undesirable off-cuts from fallen timber which develop during "bucking" operations (i.e., cutting the timber into logs with desired lengths).

PESAKA sawmilling operations give rise to industrial wood residue when major defects (rotten core, log-end splits, etc.) are bucked off the log before it is fed to the main saw. With proper handling and equipment, this type of wood residue may still be converted into marketable products. More sawmilling wood residue develops during subsequent operations: slabs and cants are produced during the main log break down operations; while edgings, strips, off-cuts, etc., develop during edge-sawing, resawing and trimming operations. More recent developments in the sawmilling and wood-working industry have shown that these sawmilling wood residues can still be converted into marketable products. Almost all of the above-mentioned sawmilling residues are burned or left to rot in the sawmill's "woodwaste" yard.

PERMINT plywood manufacturing operations also generate a sizeable amount of industrial wood residue. Log-ends develop when logs received from forest operations are bucked into lengths which fit the length capacities of the veneer lathes. Green roundings and log cores arise from peeling operations. Veneer trimmings and edgings develop during both green and dry veneer processing operations. And finally, edgings and trimmings develop during the panel sizing (sawing to the desired dimensions, 4 ft. x 8 ft.) operations.

Figure 3 is a diagrammatic chart of the wood residue generating activities of the Dungun Timber Complex logging operations, the

FIGURE 3
ESTIMATED LOGGING AND INDUSTRIAL PROCESSING WOOD RESIDUE GENERATION,
JUNJON TIMBER COMPLEX AND ITS WOOD PROCESSING PLANTS



PESAKA sawmilling activities and the PERMINT plywood manufacturing operations. The wood residue thus generated in each wood processing activity is summarized in Table II.

TABLE II
DUNGUN TIMBER, PESAKA SAWMILL AND
PERMINT PLYWOOD WOOD RESIDUES, 1987 OPERATIONS LEVEL

<u>Type and Operations Origin</u>	<u>Estimated Volume of Wood Residue Generated Per 100 cu.m. of Logs Produced</u>
Forest Wood Residue	29.210 cu.m.
Logging Operations Residues	9.966 cu.m.
Sawmilling Operations	15.639 cu.m.
Plywood Plant Residues	30.928 cu.m.
Total -----	85.743 cu.m. vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv

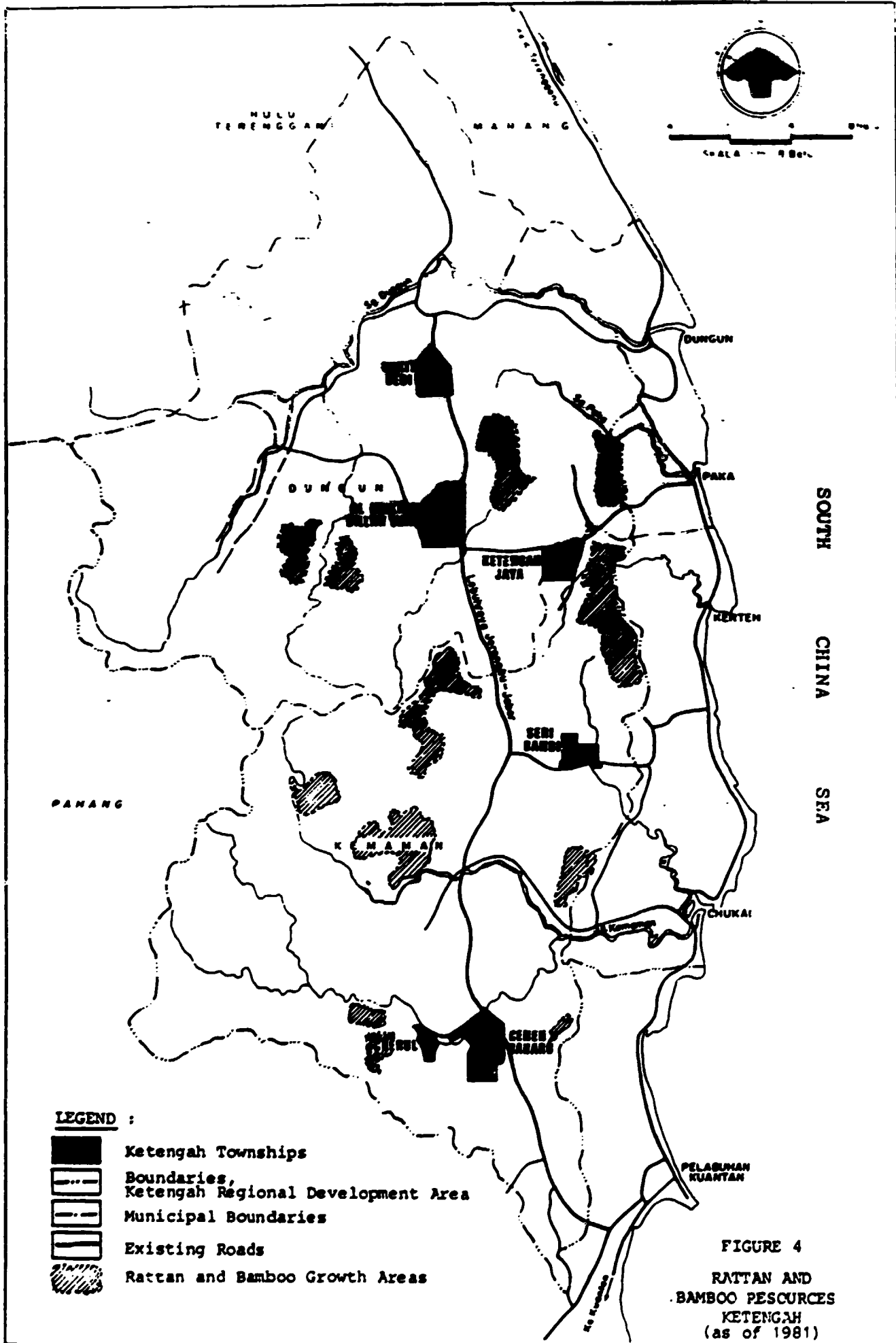
The significance of this high volume of logging and industrial residue, within the context of the objectives of this Mission, is discussed in latter sections of this paper.

2.5 Other Forest Products

Other "minor" forest products such as rattan, bamboo, natural resins, etc., are found in the KETENGAH forests. Current resources and exploitation of these products are discussed in the following sections of this report.

2.5.1 Rattan

Rattan resources of KETENGAH are found in patches scattered all over the west central forests of H.S. Jengai and Sungai Paka, the south central forests of Sg. Nipah, H.S. Pasau Kerteh, some in H.S. Cherul on this southern edges of the Terengannu forests and a number of big areas in the eastern boundaries of H.S.R. Kerteh, H.S.R. Daun, H.S. Bukit Kambing and H.S. Bukit Gong. (See Figure 4).



The estimated growth density of various species of rattan in KETENGAH is indicated in Table III. "Manau" appears to be the most available rattan species followed by "Dahan" and "Dok". "Sega", the most desirable rattan species for the production of split rattan, is also found in more significant quantities in logged-over and damaged forest areas. The rattan resources status given in Table III is based on a 1981 survey and may have changed considerably during the last six years.

TABLE III
RATTAN RESOURCES OF KETENGAH FOREST
(1981 Survey)

<u>Rattan Species</u>	Density of Growth (Clumps Per Hectare)	
	<u>In Exploitable Forests</u>	<u>In Logged-over and Damaged Forests</u>
Manau	5.03	6.01
Sega	0.51	2.15
Semambu	0.79	1.25
Dok	2.14	2.96
Dahan	3.79	2.85
Others (larger than 4 cm. dia.)	4.75	5.58
Others (smaller than 4 cm. dia.)	45.17	48.80

Source: State Forestry Department, Terengganu

There is only one licensed rattan concessionaire in the State of Terengganu. The license covers approximately 20,000 acres of forest lands, about half of which lie within KETENGAH. The rattan concessionaire is Mr. Ibrahim Sazali, Managing Director and owner of Perusahaan Alatan Rotan Sdn. Bhd., which manufactures rattan furniture and furnishings. Rattan gathering operations last about six to seven months of the year, during the dry season, and ceases completely during the rainy part of the year. Mr. Sazali has six to ten rattan gatherers (actual number varies with the volume of current orders for rattan products) and another 11 to 14 workers in his rattan

furniture factory. Table IV shows the quantity and type of rattan products gathered from the KETENGAH forests during a peak month (July, 1987). The quantity of rattan gathered during the low activity period (January and thereabouts) could be 30% to 50% of those gathered during the peak periods.

TABLE IV
SAMPLE RATTAN HARVEST FROM KETENGAH FOREST
JULY, 1987

<u>Type</u>	<u>Quantity</u>
Sega	0.5 tonnes
Dahan	37,500 pcs., (2.5 meters long per piece)
Manau	2,000 meters
Chaw Chang	5,500 meters
Others	16.5 tonnes of round pieces and 33.0 tonnes of split

Source : District Forestry Office, Dungun, Terengganu

2.5.2 Bamboo

The bamboo resources of the KETENGAH forests is given in Table V. The bamboo species locally called "Betong" appears to be the most available growth.

There is no organized bamboo gathering activity in KETENGAH. This explains the absence in the area of a handicraft industry based on bamboo. However, household items made of bamboo have been seen in some of the KETENGAH villages. This indicates that bamboo is gathered whenever and wherever it is needed for the fabrication of kitchen utensils, fixtures and other household items.

TABLE V
BAMBOO RESOURCES OF KETENGAH FOREST
(1981 Survey)

<u>Bamboo Species</u>	<u>Density of Growth (Clumps Per Hectare)</u>	
	<u>In Exploitable Forests</u>	<u>In Logged-over and Damaged Forests</u>
Betong	3.74	1.44
Others (greater than 3 cm. dia.)	0.17	0.77
Others (less than 3 cm. dia.)	3.11	0.45

Source : State Forestry Department, Terengganu

2.5.3 Resins

"Damar Minyak" (Agathis Borneensis) which is the Malaysian source of "Manila Copal", a natural resin used in the ink and textile manufacturing industries, has been reported to grow in significant quantities throughout the KETENGAH forests. However, no official data on the quantity and distribution of "Damar Minyak" is available. Records of the Forestry Checkpoint at the Al Muktafi Billah Shah township indicate that no "Damar Minyak" logs have been delivered to the PESAKA sawmill during January to October, 1987. This was also confirmed by the records of the District Forester in Dungun town, which showed that no "Damar Minyak" was cut during the last five years.

Thus, it is possible that the basis of a "Manila Copal" gathering industry exists in the KETENGAH forests.

2.6 Plantation Species Wood Resources of KETENGAH

Although huge tracts of KETENGAH forest lands have been converted to rubber and oil palm plantations, no data on expected volume of rubber wood or oil palm tree stems generated by replanting schedules of each was made available to the Mission.

It was not possible, therefore, even to speculate whether rubber wood and/or oil palm tree stem could be another reliable source of ligno-cellulose material for the wood processing industry of KETENGAH.

2.7 Manpower Availability

Under-employed unskilled labour is the most available type of labour in the KETENGAH area. Thus, requirements for skilled and highly-skilled labour of any expansion activity which may be planned for the wood processing industry of the area will have to be imported from other areas of the State or from other States of the Federation. The same situation exists to a more serious degree in the availability of industrial technicians, supervisory and management personnel.

Information gathered during a visit to the State Training Centre (a trade/vocational school) in Kuala Terengganu, indicated that the average academic preparation of KETENGAH manpower (7 to 9 years of schooling) will not qualify them to take courses in the training center. This partly explains the very low (no enrolment during the visit to the Center) enrolment for carpentry courses at the Centre.

2.8 Infrastructural Support Facilities

A good road network has been constructed in the KETENGAH area. However, no less than 75% of the system is composed of feeder roads which allow only two-lane vehicular traffic. Any significant industrial development in the area will require widening of the road to allow at least two-lane traffic on each side of the road.

Telephone communications have been extended to selected areas of KETENGAH. It may be presumed that telex facilities using telephone lines can easily be set-up in the area should the need for them arise in the future.

The nearest port to KETENGAH is Kuantan. However, existing port facilities do not allow handling of sea-going vans which is a "must" in export-oriented development of the wood-based industry of KETENGAH, due to its transport cost savings feature.

Electric power is readily available in the area. It has been claimed by the regional authorities that existing electric power generating capacities can still support any significant industrial development in KETENGAH. This expansion of industrial activities would involve the conversion of forest wood residue, logging operations residue and industrial processing wood residues into marketable products.

Existing rattan resources indicate that it can support the most immediate development of the limited industrial processing activities in Paka and Al Muktafi Billah Shah townships into a semi-mechanized level, with liberal use of production jigs and fixtures. The domestic market for rattan products is not yet fully supplied inasmuch as the only current rattan-gathering concessionaire would rather export the rattan as raw materials than convert them to furniture items for local sale.

Development of the bamboo industry still awaits organization of the household level of fabricating bamboo products, and most of all, a more detailed inventory of the bamboo resources of the area.

2.9 Financial Resources

It is deemed impossible to finance any sizeable industrial development of KETENGAH from local resources. Particularly since this exercise aims to uplift the economic level of the lower income groups of KETENGAH residents. Such financial requirements will have to come from outside KETENGAH.

2.10 Industry Aspects to be Developed

The remaining forest resources of KETENGAH are already totally committed to its existing wood processing industry. Any expansion

of medium-scale wood processing will severely strain, if not seriously damage, the existing sustained forest harvest practice to allow a 30-year cutting cycle in KETENGAH forests. Thus, only industrial activities which will optimize the utilization of current timber harvests and industrial processing of wood residues should be established.

Lack of reliable data on the availability and growth density/distribution of "Damar Minyak" precludes any attempt to suggest the development of a natural-resin-gathering industry in the KETENGAH forests.

A similar situation exists in the case of rubber wood and oil palm tree stems which are potential sources of ligno-cellulose materials for the wood processing industry in KETENGAH.

3. LEMBAGA KEMAJUAN JOHOR TENGGARA (KEJORA)

3.1 Forest Resources

The forest resources of KEJORA that exist today, after more than ten years of forest exploitation and its subsequent conversion to oil palm or rubber tree plantations, are principally found in the northwestern (Bandar Tenggara, Kulai) area of the region. This is estimated at 35,000 acres (roughly 14,000 hectares) as of January, 1987. The forest resources in the southeastern portion of the region is composed of scattered patches of water catchment areas with an aggregate area of approximately 6,700 acres (2,680 hectares), which are reserved as Permanent Forests. Forest exploitation in the catchment areas is allowed only on highly selective logging system in a few small outer fringes of the areas. (See Figure 5.)

Traditional timber species found in these forest areas are grouped as follows :

FIGURE 5
KEJORA FOREST LANDS
(as of January, 1987)

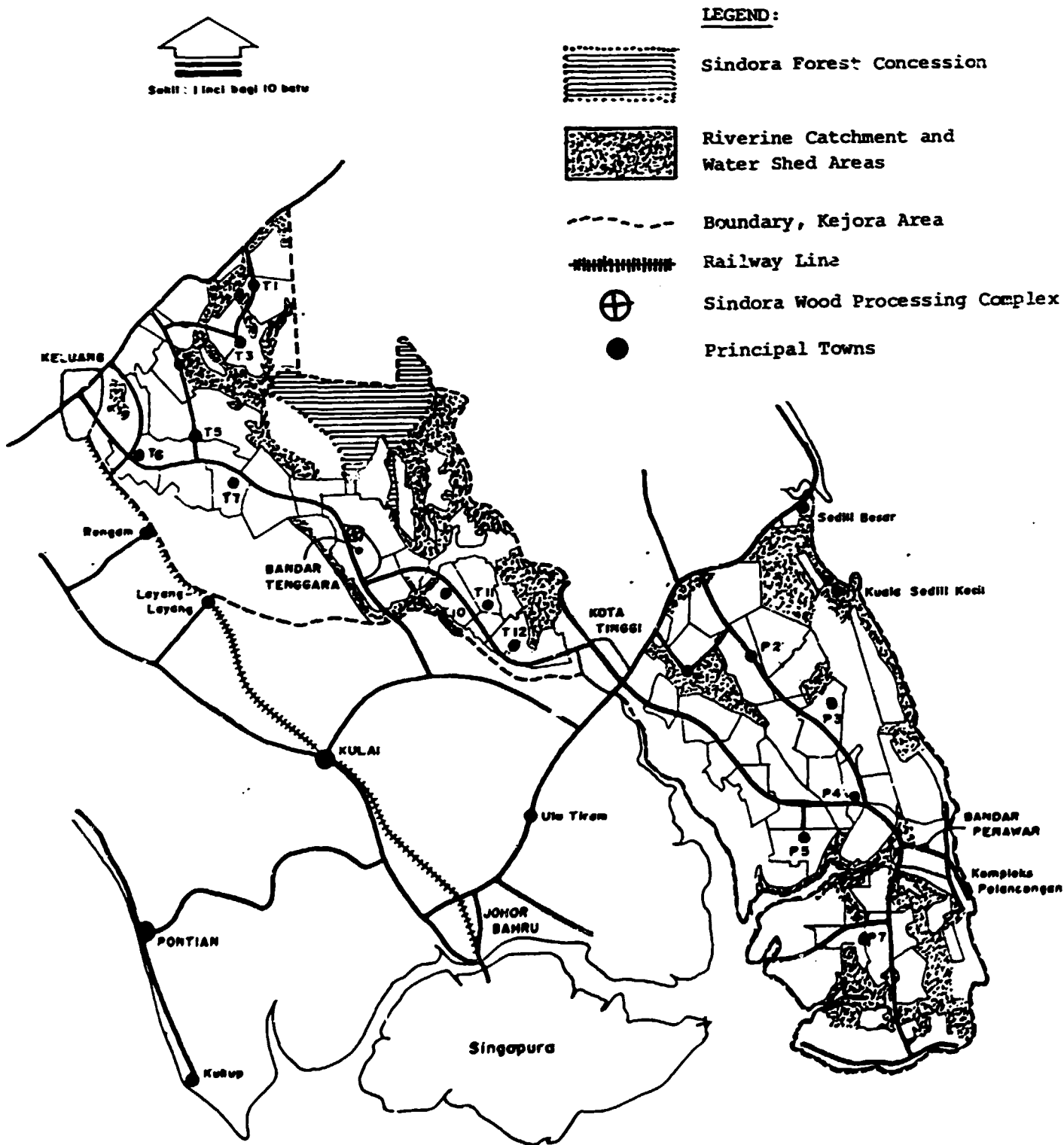


TABLE VI

TIMBER CLASS DISTRIBUTION IN KEJORA FOREST

<u>Timber Class</u>	<u>Percent of Total Timber Stand</u>
Heavy Hardwoods	9 %
Medium Hardwoods	40 %
Meranti Group	30 %
Light Hardwoods and Others	21 %

3.2 Logging Operations

The northeast forest areas in Bandar Tenggara, Kulai, are already committed to SINDORA Berhad, a para-statal firm principally engaged in logging and the manufacture of selected wood products. SINDORA, at present, is licensed to exploit a maximum of 3,000 acres (1,200 hectares) annually. At this rate, it is estimated that the remaining forests of KEJORA will last another 12 years, at most (up to 1999).

Felling and skidding characterize the main activities of SINDORA's logging operations, as this method is allowed by the forest terrain and nature of soil in the forest areas during the dry weather part of the year. The average annual timber harvest is estimated at 132,000 cu.m., produced by a logging complement of 82 workers.

Data on the spotty logging operations in the southeastern forest areas have not been made available to this Mission at this time. However, the Mission was informed that the timber harvest in this area is a very insignificant portion of the region's timber output.

3.3 Wood Processing

The only major wood processing activity in KEJORA is found in the SINDORA complex at Bandar Tenggara, Kulai. The complex is equipped with two main sawmilling plants, one mini-sawmill (re-manufacturing mill), a kiln-drying plant and a moulding plant.

All the timber output of SINDORA's logging operations are processed into sawn timber at the SINDORA sawmilling plants. In some cases, however, a small volume of low grade logs are occasionally sold to wood processing firms in Kluang and Kulai townships.

There are current plans to recover a portion of the industrial wood residue generated at the moulding plant, convert these into laminated or composed boards, which are then manufactured into joinery products such as window and door jambs, window frames and doors, etc. This new plant is expected to be operational sometime in 1988.

SINDORA Bhd. has a total of 268 employees (factory workers, office personnel, supervisory and management staff). 70% of the employees are married, with an average family of three children. The labour turn-over is high: 15%.

3.4 Wood Residue From Logging and Wood Processing Operations

SINDORA's forest exploitation activities produce the same two types of wood residues produced in KETENAGAH logging operations :

- i - Log-ends which are generated when the fallen timber is bucked into desired lengths (see timber pieces marked "X" in Figures 6 and 7); and is named "Logging Operations Residue", in this paper ; and
- ii - Under-sized (i.e., small diameter) timber, which include large branches coming from trees from which regular-sized logs are produced, and the stems and branches of trees which are damaged or felled as a result of the regular tree felling operations, and is named in this paper as "Forest Wood Residue", (see Figures 8, 9 and 10).

Wood residues are also generated during sawmilling operations. SINDORA's sawmilling log input is on a "net basis", i.e.,



FIGURE 6
SINDORA Logging Operations Residues
(residues are marked "X")



FIGURE 7
SINDORA Logging Operations Residues
(residues are marked "X")



FIGURE 8
SINDORA Forest Wood
Residue (small
diameter trees
accidentally fallen
during logging
operations.)



FIGURE 9
SINDORA Forest Wood
Residue (branches
and small diameter
stems of fallen
trees)



FIGURE 10
SINDORA Forest Wood
Residue (under-
sized stems of trees
cut during road
construction
activities)

major log defects such as rotten core, end-splits, etc., are trimmed off and log bolt before it is fed to the sawmill. However, with proper handling, this type of sawmilling residue can still be converted into marketable products. More sawmilling wood residue is generated in subsequent operations, such as :

- i - Slabs and cants during the main log break-down operations ; and
- ii - Edgings, strips, off-cuts, etc., during subsequent milling operations.

These sawmilling wood residues are better identified in Figures 11 and 12.

A very small portion of the above-described sawmilling residues are occasionally sold to private entities. No less than 90% of the total sawmilling residues burned in the wood complex's burning yard. See Figures 11, 12 and 13.

Again, proper handling of the sawmilling wood residue described above will allow its conversion into marketable products.

Edging (rip-sawing) and trimming (off-cuts) residues are also generated in the moulding plant. This type of industrial wood residue is already kiln-dried and therefore, lends itself to a wide variety of marketable products, if properly handled and processed. (See Figure 14.)

Referring to Figure 15, the total wood residue, for every 100 cu.m. of logs produced during logging operations generated by SINDORA Bhd. operations may be summarized as follows :



FIGURE 11
SINDORA's sawmilling residue
in the "Burning Yard"

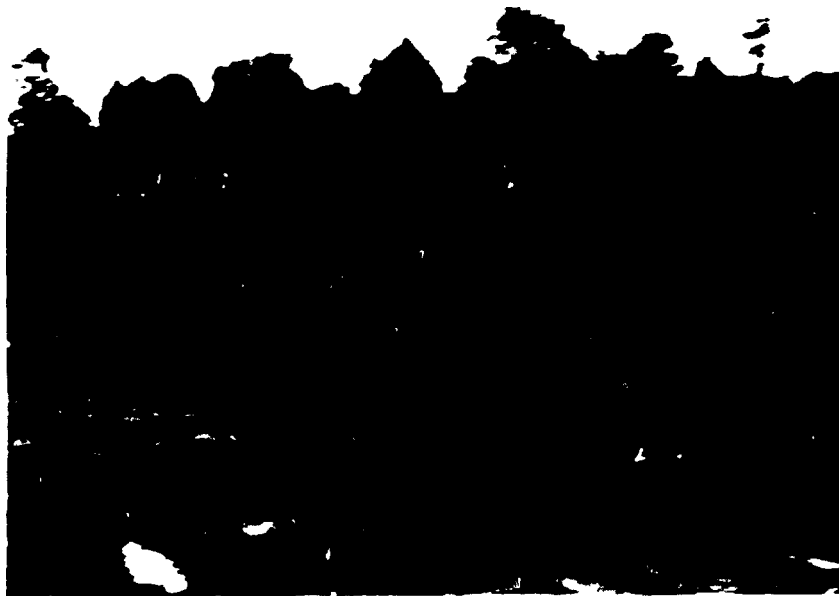


FIGURE 12
Another section of SINDORA's
"Burning Yard" for sawmilling residue

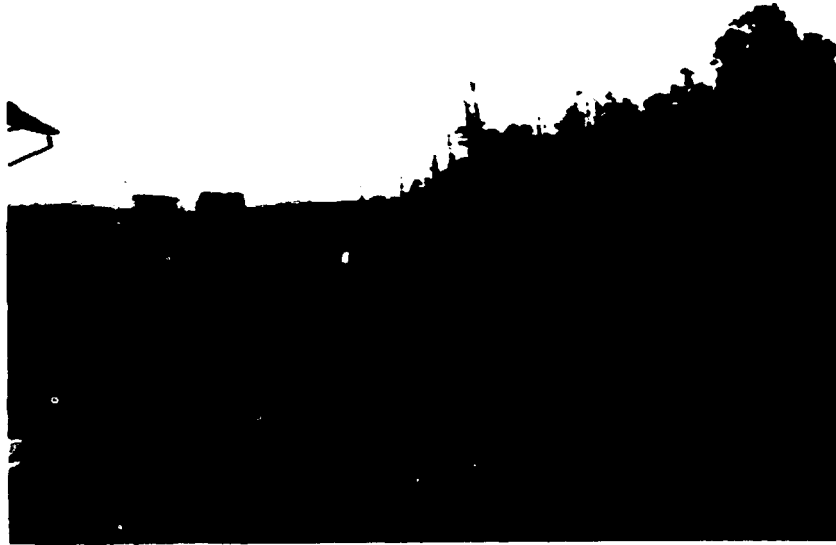


FIGURE 13

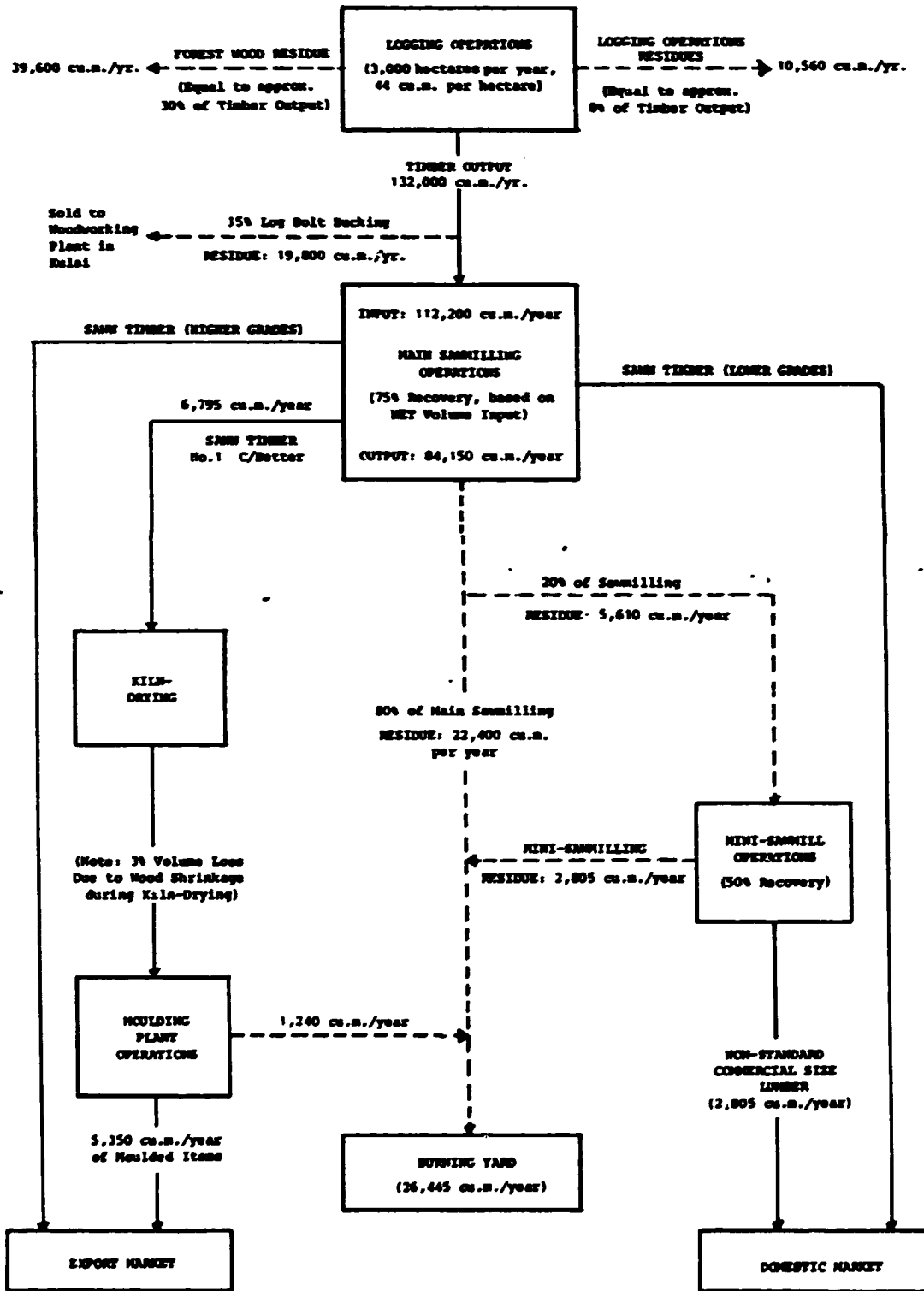
Another view of sawmilling residue being burned
in the SINDORA "Burning Yard"



FIGURE 14

Kiln-dried wood residues from
SINDORA's Moulding Plant

FIGURE 15
ESTIMATED LOGGING AND INDUSTRIAL WOOD RESIDUE GENERATION,
SINDORA BHD. OPERATIONS



(Note: All material recovery data were supplied by SINDORA Officers.)

TABLE VII

SINDORA OPERATIONS WOOD RESIDUES
(Based on Current Operations Level)

<u>Type and</u> <u>Operations Origin</u>	<u>Estimated Volume of Wood</u> <u>Residue Generated Per</u> <u>100 cu.m. of Logs</u> <u>Produced</u>
Forest Wood Residues	30.000 cu.m.
Logging Operations Residues	8.000 cu.m.
Sawmilling Operations Residues	34.095 cu.m.
Moulding Plant Residues	0.939 cu.m.
Total -----	73.034 cu.m.
	vvvvvvvvvvvvvvvvvvvvvvvvvvvvvv

Thus, current SINDORA Bhd. operations generate approximately a total of 73.034 cu.m. of wood residues (forest, logging and industrial processing) for every 100 cu.m. of logs produced during logging operations. The significance of this volume of wood residue in terms of the objectives of this Mission is discussed in later sections of this Report.

3.5 Other Forest Products

Related to current marketability of their end products, "minor" forest products of KEJORA such as rattan, bamboo, natural resins, etc., are discussed in the following paragraphs.

3.5.1 Rattan

The rattan resources of KEJORA are not sufficiently exploited to form the basis of a visible furniture industry. A visit to the logging areas of SINDORA indicated a possible reason for this situation. The rattan growth in the forest areas visited appeared to be young and are not yet ready for gathering. In fact, some areas did not show evidence of existing rattan growth. This was explained by the SINDORA Logging Manager as due to the fact that two years before an area is opened up by its logging crew, rattan gathering

people are allowed to cut rattan but had to clear out of the area when logging equipment starts moving into the area. Thus, this method of rattan resources exploitation does not allow a sustained rattan yield from the forests and therefore can not reasonably give rise to a rattan furniture manufacturing industry. It is, therefore, understandable that most of the rattan furniture shops visited in the area get their supply of rattan materials from outside Johore; some even go to the extent of importing from Singapore a significant portion of their rattan material needs.

No estimate of rattan growth in the KEJORA forests could be made available to the Mission during its visit to KEJORA.

3.5.2 Bamboo

Bamboo has been reported to grow in reverine areas of the KEJORA forests. Although no estimate of the bamboo resources of KEJORA could be made available to this Mission, an indicative situation was encountered during a visit to the Rantau Panjang riverside areas of Sungai Johor.

The bamboo area visit was made with the assistance of a certain Mr. Kamad whose daughter has recently ventured into the production of handicraft items from bamboo and rattan found in the area. The handicraft products are sold in the urban areas of the State. Presumably, some of these items are eventually exported to other states or to Singapore by some of the local buyers.

There are about 500 people living in this village, but only 10 people work in the bamboo industry on a full-time basis, assisted by 15 to 20 people who work on a part-time basis, having regular work assignments in the nearby rubber or oil palm plantations.

There is only one specie of bamboo grown in this area, known as Sungai Johor (Johore River). Each bamboo clump

covers about 10 sq.m. with about 100 poles, more or less, in each clump. According to Mr. Kamad, this bamboo growth extends along the riverside for about 16 km. on both sides of the river. The local people use this type of bamboo mainly for fabricating fish traps. It was only recently that they were able to shift their attention to the production of handicraft products from bamboo poles, which, fortunately, helped increase their income. There is no regular or systematic bamboo pole gathering system. The bamboo poles are cut only when needed and from areas more accessible and convenient to the user. The bamboo growth along the river may be estimated at 15 to 20 clumps for every 100 meters along each side of the river. The clumps grow mostly on a single line along the riverside with an occasional second line of growth about 20 meters from the river bank. According to Mr. Kamad, there is also a site of bamboo growth covering about five acres of riverside in an area located approximately 1 km. downstream from this village.

The village chief is Mr. Omar bin Langka. Mr. Kamad has lived in this area since 1921 and knows more or less the location and size of growth of all the bamboo clumps along the 16 km. length of the river.

It was also known that a specific type of rattan, known locally as "Tawar" is also found in the same vicinity as the bamboo clumps. The density of rattan growth is about the same as that of the bamboo clumps.

The bamboo resources in this village is deemed to be of significant relevance to the objectives of this mission. It can provide additional income to the under-employed population of the villages, as it is now doing to the family of Mr. Kamad, if properly handled and exploited. It is possible to expect that similar conditions exist in other villages contiguous to riverine areas of KEJORA.

3.5.3 Resins

Existence of "Damar Minyak" in the the KEJORA forests, which is the primary source of "Manila Copal" in the tropical forests of Southeast Asia, is not readily ascertained. Reports from officers of the logging staff of SINDORA indicate the existence of the tree, but only in isolated areas of the forest. This situation can not be developed to support a viable resin ("Manila Copal") gathering industry in the KEJORA forests.

3.6 Plantation Species Wood Resources of KEJORA

Two species of ligno-cellulose based materials, currently available in significant quantities from plantation estates in KEJORA are rubber wood and oil palm tree stems.

3.6.1 Rubber Wood

A total of approximately 8,500 hectares in KEJORA area is planted to rubber trees. On the basis of the rubber tree replanting schedule furnished by the offices of FELDA, Johore Bahru, and using the nationwide average yield of rubber wood logs calculated by MIDA's Mr. Ooi Seng Hock (i.e., 40 cu.m. per hectare) the following data on the availability of rubber wood as a possible material for the wood-based industries of KEJORA is derived for the period 1987 to the end of this century.

The data obtained from FELDA indicated a 20-year replanting cycle for rubber trees. No planting was done in 1969, 1970, 1976, to 1980. Thus, no rubber wood is expected to be available in 1989, 1990, 1996 to 2000, from the KEJORA area.

TABLE VIII

AVAILABILITY OF RUBBER WOOD FROM KEJORA PLANTATIONS,
1987 to 2000

<u>Year</u>	<u>Total Area of Rubber Plantation for Replanting, (Hectares)</u>	<u>Available Volume of Rubber Wood, (cu.m.)</u>
1987	731.71	29,268 cu.m.
1988	731.71	29,268 cu.m.
1989	n i l	nil
1990	n i l	nil
1991	2,024.23	80,969 cu.m.
1992	2,277.33	91,093 cu.m.
1993	1,698.67	67,947 cu.m.
1994	253.10	10,124 cu.m.
1995	253.10	10,124 cu.m.
1996 - 2000	n i l	nil

Source : FELDA, Johore Bahru

Note : More rubber plantations are scheduled
to be replanted beyond the year 2000.

The volume of rubber wood logs that will be made available as a result of replanting activities is interesting and may lead to the development of a new aspect of the wood-based industry of KEJORA.

3.6.2 Oil Palm Wood

A total of approximately 80,000 hectares within the KEJORA area is planted to oil palm trees. Regular replanting activities in oil palm plantation estates generate sizeable quantities of ligno-cellulose material in the form of stems of the oil palm trees. Using data on oil palm plantations furnished by FELDA, Johore Bahru, and data on average oil palm tree stem wood content from the Forest Research Institute of Malaysia (FRIM), Kepong, Kuala Lumpur, the following schedule of availability of oil palm tree stem is derived for the period 1987 to the end of the century, for the KEJORA area.

TABLE IX
 AVAILABILITY OF OIL PALM TREE STEMS, KEJORA AREA,
 1987 to 2000

<u>Year</u>	<u>Total Area of Oil Palm Plantations For Replanting, (Hectares)</u>	<u>Available Volume of Palm Wood, (cu.m.)</u>
1987	315.88 has.	75,811 cu.m.
1988	1,864.54 has.	447,489 cu.m.
1989	1,228.90 has.	294,936 cu.m.
1990	4,360.00 has.	1,046,400 cu.m.
1991	2,785.68 has.	668,563 cu.m.
1992	6,689.13 has.	1,605,391 cu.m.
1993	6,314.11 has.	1,515,386 cu.m.
1994	6,676.97 has.	1,602,473 cu.m.
1995	4,730.33 has.	1,135,279 cu.m.
1996	5,080.52 has.	1,219,325 cu.m.
1997	5,558.48 has.	1,334,035 cu.m.
1998	3,398.02 has.	815,525 cu.m.
1999	4,793.39 has.	1,150,414 cu.m.
2000	2,349.67 has.	563,921 cu.m.

Note : More areas are scheduled for replanting beyond the year 2000.

Source : FELDA, Johore Bahru and FRIM, Kepong, Kuala Lumpur

Again, it is interesting to note that the volume of ligno-cellulose material that will be made available from oil palm plantations to the wood processing industry of KEJORA is significantly large. Proper handling and subsequent processing of the material could contribute to the economic development of the KEJORA area.

3.7 Manpower Availability

Unskilled manpower is still available in the KEJORA area. However, any significant development involving operations expansion in industrial activities will be met by a lack of skilled and highly-skilled manpower. Training locally available manpower in existing vocational (trade) schools to up-grade their labour skills will require two major drastic moves on the part of the training institution :

- (a) Revision of course curricula (or syllabi) to bring down the level of instructions within reach of the potential trainees' academic preparation, which on the average is less than 11 years schooling; and
- (b) Opening of night or early evening school sessions to accommodate the under-employed segments of the area's population who wish to up-grade their skills. Initial phases of the industry's development programme will have to rely on importation of skilled and highly-skilled labour from other areas of Johore State, or from other states in the Federation.

3.8 Infrastructural Support Facilities

The KEJORA area has a good road network connecting it to the rest of the State. However, most of these are feeder roads allowing only one-lane vehicular flow on each half of the road. Significant industrial development in the area will require widening of these roads to accommodate a heavier traffic load involving transport vans and trailers of heavier tonnage than the vehicular traffic now plying those roads.

Telephone networks provide the most immediate communication system within the area and with other parts of the country. Presumably, should the need arise for it, telex facilities can be easily set up using some of the telephone lines (existing or to be installed).

The nearest port and harbor facilities in the southern section of the KEJORA area is Johore Port. However, the use of this port by transport vehicles from the KEJORA areas is seriously impeded by the heavy road traffic on the Johore Bahru - Kota Tinggi branch of the main highway system. Opening of a ferry service for commercial and industrial cargoes between the port and Tg. Belungkor will surely help solve the transport problem between the southern areas of KEJORA and nearest port of Johor. Aside from the road system, the transport needs of the northern

KEJORA areas will have to be served by the railroad service through its station in Kluang township on the north or its depot in Kulai township near the central areas of the KEJORA region.

Electric power is currently available to the KEJORA areas. Present electric power generating capacities are still large enough to be able to adequately provide the power required by any expansion of the wood-based industries in the KEJORA area.

3.9 Financial Resources

As the object of this exercise is the economic uplift of the lower income group of the KEJORA area, it will be difficult to expect financial support of any industrial expansion from within KEJORA areas. These needs will have to come from outside KEJORA, most possibly from existing financial institutions in the State and the country.

3.10 Industry Aspects to be Developed

The limited raw material resources available from the existing exploitable forests within KEJORA preclude the establishment of wood processing activities on a medium-scale level. In fact, whatever forest resources are currently available in KEJORA are committed to supply SINDORA Bhd. with its wood requirements only up to the next 12 years. Thus, any expansion of activities in the KEJORA wood-based industry will have to involve down-stream processing activities directed at converting its present wood products to more advanced state of manufacture; coupled with the optimization of the use of the basic wood raw material through the conversion of forest, logging and industrial processing residues into marketable products.

The rattan resources of the area do not indicate significant advantage for development into a full-grown industry. However, this does not preclude the establishment of cottage industry type of activity converting rattan into marketable goods such as furniture, furnishings and handicraft items. A more reliable

inventory of the area's rattan resources should help in any effort to rationalize this aspect of KEJCRA's industrial sector.

The existence of significant quantities of bamboo groves in riverine areas of KEJORA promises a good source of raw material for a new industrial activity in the area. The beginnings of industrial efforts using bamboo as a raw material is already in place (Rantau Panjang, as an example) and is worthy of being developed into a more advanced state of semi-mechanization, thus providing the under-employed in the village with another source of income.

The development of the rubber wood and oil palm wood as distinct segments of the wood-based industry sub-sector of KEJORA still depends on the solution of some technical problems or adaptation to local conditions in order for their use to be exploited in the KEJORA area in the immediate future. Recent talks with FRIM authorities indicate :

- (a) Possible development of the rubber wood processing industry, provided a mechanism can be developed to synchronize the seasonal rubber tree cutting schedule with the rubber tree stem processing activities ;
and
- (b) No immediate break-through is expected from efforts to find industrial use for oil palm tree stems, but optimistic estimates look forward to the use of oil palm tree stem as a major source of ligno-cellulose material for processed wood products in the next five to ten years.

4. RECOMMENDED DEVELOPMENT PROGRAMMES

Limited development of the wood-based industries of KETENGAH and KEJORA are recommended for immediate implementation. The following paragraphs discuss these development programmes.

4.1 The Rattan Industry of KETENGAH

The estimated rattan resources of KETENGAH and the current state of its exploitation and industrial processing of the rattan materials indicate the possibility if its being developed into a semi-mechanized level (with liberal use of production jigs and fixtures) within the most immediate future.

The recommended development scheme is presented in Annex I, while the corresponding Job Description of the required Project Expert is given in Annex II.

4.2 The Bamboo Industry of KEJORA

For similar reasons the bamboo industry of KEJORA, starting with the Rantau Panjang area, is recommended for immediate development to a semi-mechanized level (with liberal use of production jigs and fixtures).

The recommended development programme, together with the Job Descriptions for the required Project Experts, are given in Annexes III and IV, respectively.

4.3 Further Processing of Wood Residues
in KETENGAH and KEJORA

A more detailed study of the possibility of converting forest wood residue, logging operations wood residue and industrial operations wood residues in the wood industries of KETENGAH and KEJORA is required in order to enable the formulation of a development programme for each of the timber harvesting and wood processing industries of the two regional development areas.

The recommended development programme is given in Annex V and the corresponding Job Description for the Project Expert is given in Annex VI.

4.4 Other Aspects of the Wood-Based
Industries of KETENGAH and KEJORA

Other wood-based processing activities of KETENGAH and KEJORA may be included in future development programmes if the constraints discussed in Section 3.10 of this paper are solved.

ANNEX I

SUGGESTED DEVELOPMENT PROGRAMME FOR THE KETENGAH
RATTAN PROCESSING AND FURNITURE MANUFACTURING INDUSTRY

1. GENERAL OBJECTIVES

- (a) To up-date the inventory of rattan resources of KETENGAH, in order that this may be used as the basis for an industry development programme ;
- (b) To up-grade the existing rattan processing and furniture manufacturing techniques and facilities to a level which will permit semi-mechanization and the use of production jigs and fixtures ; and
- (c) To provide a Pilot Plant and Training Center in KETENGAH which will serve as the vehicle for up-grading and promoting the area's rattan processing and furniture manufacturing industry.

2. ACTIVITIES INVOLVED IN THE DEVELOPMENT PROGRAMME

- (a) Inventory of existing rattan resources of KETENGAH, prior to the arrival of the Project Expert ;
- (b) Design and establishment of Pilot Plant/Training Centre for rattan processing and furniture manufacturing ;
- (c) Technical assistance to existing rattan processing and furniture manufacturing establishments in KETENGAH and nearby towns on the basis of an extension service programme to be set up by the Expert ;
- (d) Training of qualified workers from the nearby villages at the Pilot Plant/Training Centre ; and
- (e) Periodic review of project progress and adoption of revised techniques and procedures to help accelerate the attainment of project objectives.

3. PROJECT KEY PERSONNEL REQUIREMENT

- (a) Inventory of material resources
 - i - State Forestry Department Staff
- (b) Design and Establishment of Pilot Plant/Training Centre
 - i - Specialist in Rattan Processing and Furniture Manufacture ; and
 - ii - Local Civil Engineer and/or Architect, preferably from a Federal Government or State agency.

4. PROJECT MACHINERY, TOOLS AND BUILDING REQUIREMENTS

- (a) Adequate ground area for rattan scraping and treatment facilities ;
- (b) Adequate ground area, with a simple drying shed, for air-drying rattan poles ;
- (c) Adequate workshop building to house Pilot Plant machines/tools and Training Centre facilities; appropriate stock of processed rattan poles and display area for finished rattan products ;
- (d) Gasoline (or diesel) fuel electric generator, if required, capacity and specifications to be recommended by Project Expert;
- (e) Project vehicle (preferably of the van type) which can be used to carry teaching aids and materials for extension services trips ;
- (f) Hand tools, as required, to be specified by Project Expert ; and
- (g) Such other training aids and fixtures which may be designed and fabricated under the supervision of the Project Expert.

5. PROJECT TIMETABLE

<u>Stage</u>	<u>Activity</u>	<u>Time Duration</u>
1	Inventory of existing rattan resources of KETENGAH forests -----	3 months
2	Visit of Rattan Processing and Furniture Manufacturing Expert, to : -----	2 months
	(a) evaluate the up-dated data on rattan resources of KETENGAH ;	
	(b) design Pilot Plant/Training Centre ;	
	(c) draw up list of project machines and tools ; and	
	(d) specify building requirements to serve as basis for the workshop building design and construction.	
3	Procurement of machines/tools and construction of workshops building -----	4 months
4	Design and fabrication of production jigs and fixtures for rattan processing and furniture manufacture -----	2 months
5	Selection of initial batch of trainees -----	1 month
6	Trial run of Pilot Plant and conduct of first training course -----	3 months

<u>Stage</u>	<u>Activity</u>	<u>Time Duration</u>
7	Review and up-dating of basic trianing programme and facilities to provide extension services to other rattan processing areas in and near KETENGAH -----	1 month
8	Extension service programme implemented -----	3 months
9	Review and improvement of extension service programme-----	1 month
10	Evaluation and review of project achievement -----	1 month

ANNEX II

JOB DESCRIPTION
(Rattan Expert)

Project No.

- POST TITLE : Specialist in Rattan Pole Gathering/
Processing, and Furniture Manufacturing
- DURATION : First Phase - 2 months
Second Phase - 12 months
- DUTY STATION : Al Muktafi Billah Shah township, with travel to
other townships of KETENGAH and other nearby
towns of Terengganu State and Kuala Lumpur.
- PURPOSE OF PROJECT : To establish a Pilot Plant and Training Centre for
rattan processing and furniture manufacturing; to
train KETENGAH villagers in rattan processing and
furniture manufacture; and to provide technical
assistance to existing rattan processors and
furniture manufacturers.
- DUTIES : 1. To provide technical assistance to KETENGAH in
the choice of location design and specifications
for the workshop building and Training Centre ;
2. To provide technical advice in the selection
and specification of project machines and tools ;
3. To design and supervise the fabrication of
production jigs and fixtures and such training
aids as are required by the Centre ;
4. To draw up a training course/syllabus for the
processing of rattan, and its manufacture into
furniture and furnishings ;
5. To train the first batch of trainees in the
rattan industry ;
6. To provide technical assistance to existing
rattan processors and furniture manufacture in
KETENGAH and nearby towns ; and
7. To recommend revisions and other measures to
make the training programme more relevant and
responsive to the needs of KETENGAH's rattan
industry.

- QUALIFICATIONS** : Rattan Specialist with at least five years experience in rattan gathering/processing and ten years in rattan furniture manufacture at supervisory or managerial levels.
- LANGUAGE** : ENGLISH. Knowledge of Bahasa Malaysia will be an asset.
- BACKGROUND INFORMATION** : The assistance of the UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO), through the Regional UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP), was sought by the Government of Malaysia, represented by the Ministry of Land and Regional Development, in the formulation of a draft document, which, after approval, will offer basic guidelines for the industrial development of the region under the responsibility of KETENGAH. The wood-based industry is one of the three industrial sub-sectors chosen as the subject of this study. The authorities of KETENGAH indicated their desire for this Mission to focus its studies on the possible utilization of indigenous raw materials and agricultural products (currently available and planned to be) raised in these areas, under an industrial development programme which is agro- and resource-based in nature. The significant rattan resources of the area, together with the existing rattan industry, indicate its potential for development.

ANNEX III

SUGGESTED DEVELOPMENT PROGRAMME
FOR THE RANTAU PANJANG (KEJORA)
BAMBOO AND RATTAN PRODUCTS INDUSTRY

1. GENERAL OBJECTIVES

- (a) To up-grade the bamboo processing techniques currently being used in Rantau Panjang (KEJORA) area, by introducing limited mechanization and the use of simple jigs and fixtures ;
- (b) Based on a more reliable estimate of the bamboo (and rattan) resources of the area, develop the small bamboo handicraft industry into small industry scale, if the resources would allow it ; and
- (c) To provide a Pilot Plant and Training Centre which could serve as the vehicle for up-grading the area's bamboo/rattan industry from cottage industry level to small scale industry.

2. ACTIVITIES INVOLVED IN THE DEVELOPMENT PROGRAMME

- (a) Inventory of existing bamboo and rattan resources of Rantau Panjang Village, Kulai, KEJORA, Johore ;
- (b) Design and establishment of Pilot Plant/Training Centre for the primary processing of bamboo and rattan into components for furniture and other household/office fixtures or furnishings ;
- (c) Training of selected village inhabitants in the improved fabrication operations to be derived from the use of simple industrial machines and the design, fabrication and use of production jigs and fixtures ;
- (d) Propagation among the people in the nearby villages, of the newly developed techniques for the fabrication of bamboo/rattan furniture items and other furnishings and fixtures, through the setting-up of an extension service system, using the services of the newly-trained villagers as much as possible ; and
- (e) Periodic review of project progress and adoption of revised techniques and procedures to help accelerate the attainment of project objectives.

3. PROJECT KEY PERSONNEL REQUIREMENT

- (a) Inventory of material resources
 - i - State Forestry Department Staff

- (b) Design and establishment of Pilot Plant/Training Centre
 - i - Specialist in bamboo processing for furniture and furnishings items ; and
 - ii - Specialist in rattan processing for splits and mat weaving purposes.

4. PROJECT MACHINERY, TOOLS AND BUILDING REQUIREMENTS

- (a) Simple machines/tools for splitting and peeling bamboo (as recommended by Specialist) ;
- (b) Simple machines/tools for rind peeling and core splitting of rattan (as recommended by Specialist) ;
- (c) Gasoline (or diesel) fuel electric generator, if required, capacity and other specifications to be recommended by Specialist ;
- (d) Project vehicle (preferably of the type which can be used as a delivery van for finished goods and/or raw materials) ;
- (e) Hand tools for bamboo and rattan processing (as recommended by Specialist) ; and
- (f) Workshop building of simple design, to house project equipment, demonstration room and limited quantities of raw materials and finished goods.

5. PROJECT TIMETABLE

<u>Stage</u>	<u>Activity</u>	<u>Time Duration</u>
1	Inventory of bamboo and rattan resources, Rantau Panjang area -----	3 months
2	Visit of Specialists in bamboo and rattan processing for raw material input of furniture and furnishings fabrication to evaluate bamboo and rattan resources; assist in the design Pilot Plant/Training Centre; draw up list of project requirement for machines and tools and specify building needs -----	2 months
3	Procurement of machines/tools; construction of workshop building -----	4 months
4	Selection of initial batch of trainees -----	1 month
5	Trial run of Pilot Plant and conduct of first training course, under the supervision and direction of bamboo/rattan Specialists -----	3 months

<u>Stage</u>	<u>Activity</u>	<u>Time Duration</u>
6	Review and up-dating of basic training programme and facilities to make possible the conduct of extension services outside of Rantau Panjang area -----	1 month
7	Training of trainers for extension services programme, using qualified graduates from the early batches of basic course trainees -----	4 months
8	Review and improvement of extension service programme -----	1 month
9	Continuation of basic training course and evaluation of extension service programme -----	6 months

ANNEX IV

JOB DESCRIPTION
(Bamboo Expert)

Project No.

- POST TITLE : Specialist in Bamboo Processing and Furniture/Furnishings/Handicraft Manufacturing
- DURATION : First Phase - 2 months
Second Phase - 12 months
- DUTY STATION : Rantau Panjang, Kulai (KEJORA), with travel to Johor Bahru and Kuala Lumpur
- PURPOSE OF PROJECT : To establish a Pilot Plant and Training Centre in Rantau Panjang, for the processing of bamboo and its manufacture into furniture, furnishings and handicraft items; and to train the villagers in semi-mechanized manufacturing process of the above products making extensive use of jigs and fixtures.
- DUTIES : In cooperation with the Rattan Processing Specialist :
1. To provide technical assistance to KEJORA in the design of the workshop building, training course syllabus, selection of trainees and machine and tools for the Pilot Plant/Training Centre for the bamboo industry of Rantau Panjang ;
 2. To direct and supervise the training of the first batch of trainees and subsequently trainers, in the semi-mechanized technique of producing furniture, furnishing and handicraft items out of bamboo ;
 3. To assist in the review and revision of the course syllabus with a view to making them more responsive and relevant to the needs and resources of the community ; and
 4. To advise KEJORA on the formulation of a marketing strategy and programme for the bamboo products produced by the villagers.

QUALIFICATIONS : Engineer (or equivalent professional) with at least five years experience (both technical and managerial) in the processing of bamboo and its subsequent manufacture, into furniture, furnishing and handicraft items.

LANGUAGE : ENGLISH. Knowledge of Bahasa Malaysia will be an asset.

BACKGROUND INFORMATION : The assistance of the UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO), through the Regional UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP), was sought by the Government of Malaysia, represented by the Ministry of Land and Regional Development, in the formulation of a draft document, which, after approval, will offer basic guidelines for the industrial development of the two regions which are under the responsibility of KEJORA. The wood-based industry is one of the three industrial sub-sectors chosen as the subject of this study. The authorities of KEJORA indicated their desire for this Mission to focus its studies on the possible utilization of indigenous raw materials and agricultural products (currently available and planned to be) raised in these areas, under an industrial development programme which is agro- and resource-based in nature.

Among the wood-based industries of the KEJORA area, the manufacture of handicraft items and fish traps is gaining ground in the Rantau Panjang village. All manufacturing activities are purely manual. In view of the vast amount of bamboo resource in the area, it is deemed that the organization of the industry along more modern methods, through the use of simple machines and jigs and fixtures, will greatly boost the development of the industry, not only in Rantau Panjang, but also in the other nearby villages along the Johore River. A Pilot Plant and Training Centre is deemed vital for this purpose.

ANNEX V

JOB DESCRIPTION
(Rattan Expert)

Project No.

- POST TITLE : Specialist in Rattan Processing and Furniture/
Furnishings/Handicraft Manufacturing
- DURATION : First Phase - 2 months
Second Phase - 12 months
- DUTY STATION : Rantau Panjang, Kulai (KEJORA), with travel to
Johor Bahru and Kuala Lumpur.
- PURPOSE OF PROJECT : To establish a Pilot Plant and Training Centre in
Rantau Panjang, for the processing of rattan and
its manufacture into furniture, furnishings and
handicraft items; and to train the villagers in
semi-mechanized manufacturing process of the
above products making extensive use of jigs and
fixtures.
- DUTIES : In cooperation with the Bamboo Processing Specialist:
1. To provide technical assistance to KEJORA in
the design of the workshop building, training
course syllabus, selection of trainees and
machine and tools for the Pilot Plant/Training
Centre for the rattan industry of Rantau
Panjang ;
 2. To direct and supervise the training of the
first batch of trainees and subsequently
trainors, in the semi-mechanized technique of
producing furniture, furnishing and handicraft
items out of rattan ;
 3. To assist in the review and revision of the
course syllabus with a view to making them
more responsive and relevant to the needs and
resources of the community ; and
 4. To advise KEJORA on the formulation of a
marketing strategy and programme for the rattan
products produced by the villagers.

QUALIFICATIONS : Engineer (or equivalent professional) with at least five years experience (both technical and managerial) in the processing of rattan and its subsequent manufacture into furniture, furnishings and handicraft items.

LANGUAGE : ENGLISH. Knowledge of Bahasa Malaysia will be an asset.

BACKGROUND INFORMATION : The assistance of the UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO), through the Regional UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP), was sought by the Government of Malaysia, represented by the Ministry of Land and Regional Development, in the formulation of a draft document, which, after approval, will offer basic guidelines for the industrial development of the two regions which are under the responsibility of KEJORA. The wood-based industry is one of the three industrial sub-sectors chosen as the subject of this study. The authorities of KEJORA, indicated their desire for this Mission to focus its studies on the possible utilization of indigenous raw materials and agricultural products (currently available and planned to be) raised in these areas, under an industrial development programme which is agro- and resource-based in nature.

Among the wood-based industries of the KEJORA area, the manufacture of handicraft items and fish traps is gaining ground in the Rantau Panjang village. All manufacturing activities are purely manual. In view of the vast amount of bamboo resource in the area, it is deemed that the organization of the industry along more modern methods, through the use of simple machines and jigs and fixtures, will greatly boost the development of the industry, not only in Rantau Panjang, but also in the other nearby villages along the Johore River. A Pilot Plant and Training Centre is deemed vital for this purpose.

ANNEX VI

SUGGESTED INITIAL STAGES OF DEVELOPMENT PROGRAMME FOR
THE OPTIMIZATION OF WOOD UTILIZATION IN
THE KETENGAH AND KEJORA WOOD INDUSTRIES

1. GENERAL OBJECTIVES

(a) To obtain more reliable figures on the respective volumes and rate of generation of wood residues in the wood-based industry of KETENGAH and KEJORA, such as :

- i - forest and logging operations wood residues ;
- ii - sawmilling wood residues ;
- iii - plywood plant wood residues ; and
- iv - woodworking plant wood residues

in cooperation with existing firms engaged in such activities within the KETENGAH and KEJORA regions ;

(b) Identify the marketable wood product which can be manufactured at small scale or cottage industry level from such wood residues, availing of the assistance of existing Government agencies and private trade organizations ;

(c) Drawing up the draft of an industry development programme using wood residues as the object raw material input, based on the results of previous preparatory activities, (a) and (b) above; and submitting the recommended programme to pertinent UN and Malaysian Government Agencies for review and possible implementation.

2. PROJECT PERSONNEL REQUIREMENTS

One Specialist in Wood Processing, with adequate exposure to logging operations and at least 10 years experience in primary and secondary wood processing activities.

One Counterpart Officer each from KETENGAH and KEJORA.

Clerical support from each of the two development regions.

3. PROJECT CAPITAL ASSET AND SUPPORT REQUIREMENTS

None. However, transport vehicles and office facilities should be made available to the expert and his counterpart, for the entire duration of the Project.

4. PROJECT TIMETABLE

<u>Stage</u>	<u>Activity</u>	<u>Time Duration</u>
1	Preparatory activities such as arrangement for and facilitation of required data and visits to wood processing sites/factories, etc. -----	1 month
2	Arrival, initial exposure to and briefing of Expert on Malaysian conditions, Kuala Lumpur -----	2 days
3	Visit to KETENGAH logging operations and wood processing plants; interview with key operations officers of firms visited; gathering and collation of required data -----	3 weeks
4	De-briefing by KETENGAH Officers -----	2 days
5	Visit to KEJORA logging operations and wood processing plants; interview with key operations officers of firms visited; gathering and collation of required data ----	3 weeks
6	De-briefing by KEJORA Officers -----	2 days
7	Interview with key officers of Government agencies involved in wood products marketing (domestic/export) activities -----	1 week
8	Preparation of Report -----	1 week
9	Exit interview with pertinent Federal agency officers -----	2 days

ANNEX VII

JOB DESCRIPTION
(Wood Processing Expert)

Project No.

POST TITLE : Expert in Wood Processing

DURATION : Ten (10) weeks

DATE REQUIRED :

DUTY STATION : Kuala Lumpur with travel to KETENGAH and KEJORA regions

PURPOSE OF PROJECT : To formulate a development programme for the optimization of use of the wood resources of KETENGAH and KEJORA, based on current logging and industrial processing wood residues as input for the new manufacturing activities which may be domestic- and/or export-market-oriented.

DUTIES :
1. The Expert will gather, collate and analyze data on logging and industrial wood residues in KETENGAH and KEJORA regions ;
2. In cooperation with existing Government agencies engaged in product sourcing and market development, the Expert will identify the end products to be manufactured from each type of wood residue ; and
3. Formulate and recommend an industry development programme based on his findings in the previous groups of activities above-listed.

QUALIFICATIONS : Wood Processing Engineer (or equivalent professional attainment) with ample exposure to logging operations and the manufacture and marketing of secondary and/or tertiary wood products.

LANGUAGE : ENGLISH. Knowledge of Bahasa Malaysia will be an asset.

BACKGROUND INFORMATION : The assistance of the UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO), through the Regional UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP), was sought by the Government of Malaysia, represented by the Ministry of Land and Regional

Development, "in the formulation of a draft document, which, after approval, will offer basic guidelines for the industrial development of the two regions which are under the responsibility of KETENGAH and KEJORA, respectively". The wood-based industry is one of the three industrial sub-sectors chosen as the subject of this study. The authorities of KETENGAH and KEJORA, both indicated their desire for this Mission to focus its studies on the possible utilization of indigenous raw materials and agricultural products (currently available and planned to be) raised in these areas, under an industrial development programme which is agro- and resource-based in nature.

Since the current forest resources of both KETENGAH and KEJORA are already committed to existing primary wood processing facilities, under a sustained yield exploitation basis, attention is now centered on activities to optimize the utilization of the timber harvest of both regions. It is hoped that down-stream processing activities would lead to the development of a small scale industry utilizing wood residues as the basic input.

ANNEX VIII

UNDP, GOVERNMENT OFFICERS AND INDUSTRY LEADERS
INTERVIEWED

<u>Name</u>	<u>Title</u>	<u>Office/Firm Name</u>
Azhar, Nor	Forest Manager	Pesaka Terengganu Bhd.
Azziz, Abdul	Assistant Production Manager	Pesaka Sawmill Bhd., Al-Muktafi Billah Shah, Terengganu
Soon, Teck Hong	Managing Director and Proprietor	Teck Hong Industries Bhd., Kulai, Johor
Chan, Akau	Agricultural Officer	RISDA, Kuala Lumpur
Che Kah, Che Ghazali	Director, Finance and Administrative Department	Permint Plywood Sdn. Bhd., Terengganu
Dato, Leong Hing Nin	Director	Forestry Department, Johore State
Embong, Abdullah Norhaddi bin	Deputy General Manager	Lembaga Kemajuan Terengganu Tengah
Hong, Lay Thong	Senior Research Officer (Wood Protection)	FRIM, Kepong, Selangor
Idrus, Roszehan bte Mohd.	Director, Planning and Development	The Malaysian Timber Industry Board, Kuala Lumpur
Jamaludin, Ahmad	Forest Operations Manager	Sindora Bhd., Bandar Tenggara, Kulai
Kanny, S.	Manager	MIDA State Office, Terengganu
Kassin, Mahmud Mohd.	Branch Officer	Syarikat Permodalan dan Perusahaan Industri Kampung (SPPIK), Johore Bahru, Johore
Kayat, Idham	Project Manager	KEJORA
Latif, Mohd. Abdul	Research Officer (Bamboo and Rattan)	FRIM, Kepong, Selangor

<u>Name</u>	<u>Title</u>	<u>Office/Firm Name</u>
Lau, Chen Mai	Manager	Bormill Wood (Terengganu) Sdn. Bhd., Terengganu
Lee, Thiang Kuok	Operations Manager	SPL-Sentosa Corp., Bhd.
Lew, Wing Hing	Director	ASEAN Timber Technology Center, Kuala Lumpur
Mathialakan, Chelliah	Economist	Malaysian Industrial Development Authority, Kuala Lumpur
Mohmad, Shaid Taufek Mohd.	Deputy General Manager (Operation)	KEJORA
Muhamad, Baharudin	Production Executive, Moulding Plant	Sindora Bhd., Bandar Tenggara, Kulai
Muri, Abd. Rahman	Counterpart Officer, Wood Based Industry	KEJORA
Najib, Mhd.	Industrial Officer	Forest Department, Terengganu State
Noor, Nor Supardi Md.	Asst. Research Officer (Rattan)	FRIM, Kepong, Selangor
Ooi, Seng Hock	Forest-Based Industries Specialist	MIDA, Kuala Lumpur
Razak, Abdul Mohd. Ali	Director, Chemistry Div.	FRIM, Kepong, Selangor
Saad, Aziz	General Manager	Kumpulan Pengurusan Kayu Kayan Terengganu Sdn. Bhd., Kuala Terengganu
Sazali, Ibrahim	Owner/Managing Director	Perusahaan Alatan Rotan Sdn. Bhd., Paka, Terengganu
Shukari, Midon Mohd.	Senior Research Officer	FRIM, Kepong, Selangor
Sii, Tung Hu	Export Officer	Bormill Wood (Terengganu) Sdn. Bhd.
Sudin, Ab. Aziz B. Mohd.	Branch Officer	MARA -Johor, Johore Bahru, Johore
Suri, Shahrar	District Forest Officer	State Forest Department, Dungun District
Tan, Cheng Boon	Managing Director	SPL - Sentosa Corp., Bhd.
Tan, Julie (Mrs.)	Director	SPL - Sentosa Corp., Bhd.

<u>Name</u>	<u>Title</u>	<u>Office/Firm Name</u>
Van Hulsten, Michael	Regional Representative	UNDP - Kuala Lumpur
Versluis, Anthonie	Junior Professional Officer	UNDP - Kuala Lumpur
Zainal, Ahmad	Deputy Director	Forest Department, Terengganu State

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