

**Preliminary Survey for  
Utilization of Lesser-Known  
Wood Species in Indonesia**

**December, 1981**

**Japan International Cooperation Agency**

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# Preliminary Survey for Utilization of Lesser-Known Wood Species in Indonesia

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## PREFACE

It is with great pleasure that I present this report entitled Preliminary Survey for Utilization of Lesser Known Wood Species in Indonesia to the Government of the Republic of Indonesia.

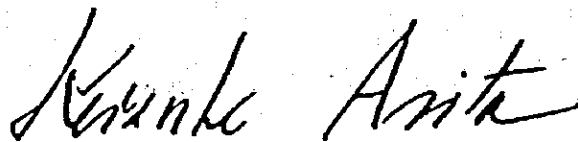
This report embodies the result of a preliminary survey which was carried out (in Sumatera and Kalimantan Regions) from February 3rd to February 22nd, 1981 by the Japanese survey team commissioned by the Japan International Cooperation Agency following the request of the Government of Indonesia.

The survey team, headed by Mr. TAKASHI ENDO, Executive Director, Japan Wood Chips Manufacturers Association, had a series of discussions with the officials concerned of the Government of Indonesia and conducted an extensive field survey and data analyses.

I sincerely hope that this report will be useful as a basic reference for development of the country.

I am particularly pleased to express my appreciation to the officials concerned of the Government of Indonesia for their close cooperation extended to the survey team.

December, 1981



Keisuke Arita

President

Japan International Cooperation Agency





Forest type immediately after felling (Kalimantan)



Yarding by tractor (Sumatra)



Loading at field yard (Kalimantan)



Transportation by truck (Kalimantan)



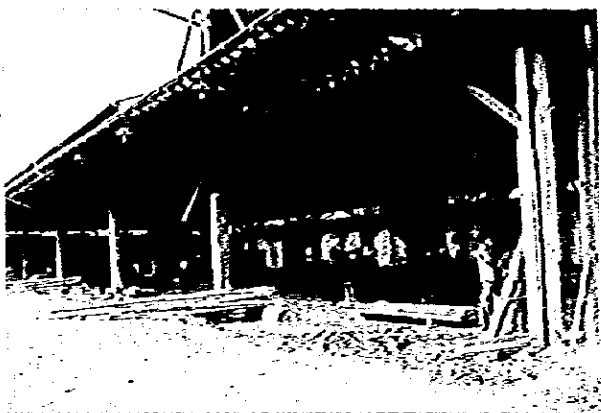
Floater logs flowing down stream (Sumatra)



Sinker logs being shipped by barge (Kalimantan)







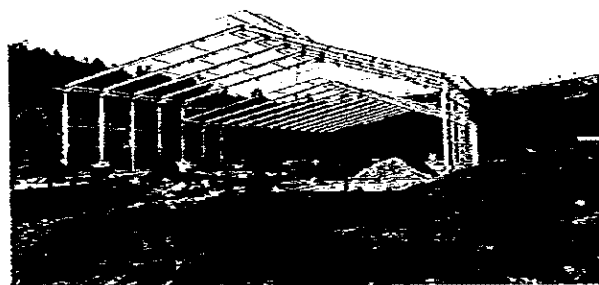
**Large-scale saw-mill  
(Sumatra)**



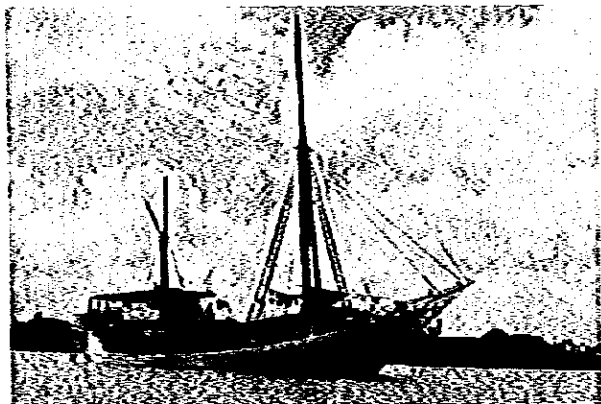
**Hand-saw mill  
(Kalimantan)**



**Lumber shipped for local demand  
(Kalimantan)**



**Plywood plant under construction  
(Kalimantan)**



**Lumber transport ship between islands  
(Sumatra → Java)**



**Lessen-known wood being used as  
lumber for temporary work  
(Java)**



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## 1. Purpose and Outline of Survey

### 1-1 Background and purpose of survey

The most important issues in the development of forestry and forest industries in developing countries are 1) insufficient utilization of forest resources, and 2) difficulties in reforestation caused after exploiting the forest resources.

The former means that only commercially valuable trees are cut, and cutting areas are extended while leaving, as a result, a large difficult to rehabilitate such cut-over areas to well stocked forests by ordinary means of afforestation.

In industrialized countries, although lumber prices vary according to quality, reforestation of cut-over areas is carried out linked with cutting, because most tree species can be utilized and the areas cut are ready for replanting. In developing countries, however, improper management of forest still remains, because unclear technical characters and low economic values of many tree species prevent a full utilization of the resources.

In Indonesia too, as stated in the Terms of Reference, only 60, out of over 4,000 species, are recognized as commercial. The reasons are as follows:

- Incomplete information of technical properties and possible uses of the lesser-known species.
- Insufficient data on standing stock by species and their distribution.
- Lack of information concerning prospective markets and consumer preferences and endeavours.

To improve the utilization of lesser-known woods by clarifying the above issues would contribute to the development of Indonesian forests and forestry and would also facilitate other developing countries. Furthermore, proper utilization of forest resources is very important in view of the prospect that global shortage of forest resources will occur along with oil and food.

The purpose of this survey was to investigate possible means to effectively utilize lesser-known timber resources in Indonesia and thus contribute to the development of forests and forestry in Indonesia.

The investigations covered the following areas:

1. Quantity, quality, distribution, etc. of lesser-known wood.
2. Their technical characteristics;
3. Market conditions both economic and technical, etc. (in and outside Indonesia);

4. Technical problems in producing areas.

1-2 Members of the team

<u>Title</u>	<u>Name</u>	<u>Position held</u>
Team leader:	Mr. Takashi Endo	Executive Director, Japan Wood Chips Manufacturers Association
Planning cooperation:	Mr. Yoshio Hironaka	Deputy Director, Management Div. National Forest Dept., Forestry Agency
Wood distribution:	Mr. Hisaharu Hayashi	Deputy Director, Forest Products Div. Administration Dept., Forestry Agency
Wood processing:	Mr. Ken Ogata	Chief, Wood Anatomy Section Wood Technology Div. Forestry & Forest Products Research Institute
Research of lesser-known wood resources:	Mr. Tadashi Nakamichi	Deputy Director, Forestry Development Div. Forestry & Fisheries Development Dept. JICA
Business coordination:	Mr. Fumio Kikuchi	Officer, First Training Div. Training Affairs Dept., JICA

1-3 Survey itinerary and list of people met

(i) Survey itinerary

<u>Date</u>	<u>Trip</u>	<u>Remarks</u>
1st day, Feb. 3, Tue.	Left Narita JAL 711 Arrived in Jakarta	
2nd day, Feb. 4, Wed.	In Jakarta	Reporting to and discussions with Directorate General of Forestry Reporting to and discussions with Minister Nakamura at the Embassy of Japan Reporting to and discussions with JICA Jakarta Office

3rd day, Feb. 5, Thu.	In Jakarta	Meeting on T/R with Directorate General of Forestry staff (Director, Directorate of Marketing, Director, Forest Products Research Institute; Directorate of Forest Planning)
4th day, Feb. 6, Fri.	In Jakarta	Reporting to Director, Directorate of Marketing (due to delayed arrival of Team Leader) Visit to MPI Office Meeting with the Director of JICA Office
5th day, Feb. 7, Sat.	In and around Jakarta	Visit to and discussions with Directorate of Forest Planning and Forest Products Research Institute (Bogor)
6th day, Feb. 8, Sun.	Departure from Jakarta, GA 102, Arrival in Palembang	Discussions with experts of the Trial Plantation Project in Benakat, South Sumatra
7th day, Feb. 9, Mon.	In Palembang	Meeting with Dinas Kehutanan Propinsi; Inspection tour of Belani Camp (PADECO) in upper reaches of Musi River
8th day, Feb. 10, Tue.	In Palembang	Inspection of Belani logging Camp
9th day, Feb. 11, Wed.	Departure from Palembang, GA 151, Arrival in Jakarta	Inspection of a saw mill of P.T. Kurnia Musi Plywood Co.
10th day, Feb. 12, Thu.	Departure from Jakarta, GA 548, arrival in Balikpapan	Visit to Dinas Kehutanan Visit to B.F.I. Office in Selimbang River Valley

11th day, Feb. 13, Fri	In Balikpapan	Inspection of B.F.I. logging site, cut-over areas and afforested areas
12th day, Feb. 14, Sat.	In Balikpapan	Inspection of B.F.I. saw mill (in Selingbung River Valley)
13th day, Feb. 15, Sun.	Departure from Balikpapan, GA 559, arrival at Banjarmasin	Visit to and discussion with K.T.C. Office
14th day, Feb. 16, Mon.	In and around Banjarmasin	Inspection of a saw mill in Barito River Valley Visit to Regional Forest Office of Central Kalimantan Inspection of P.T. Daya Sakti Timber Corp.
15th day, Feb. 17, Tue.	Departure from Banjarmasin, GA 561, arrival in Jakarta	Discussions within the team
16th day, Feb. 18, Wed.	In Jakarta	Visit to Bogor Forest Products Reserch Institute Visit to Experimental Garden, etc.
17th day, Feb. 19, Thu.	In Jakarta	Summing up discussions of the team
18th day, Feb. 20, Fri.	In Jakarta	Final discussion with Directorate General of Forestry (Directorate of Marketing, Directorate of Forest Planning)
19th day, Feb. 21, Sat.	In Jakarta	Final visit to Directorate General of Forestry, Embassy and JICA Office
20th day, Feb. 22, Sun.	In Jakarta	Summing up of the work
21st day, Feb. 23, Mon.	Departure from Jakarta, CX 710, arrival at Narita.	



## 2. Lines of Possible Cooperation

### 2-1 Problems in utilization development of lesser-known wood species

More than 4,000 tree species grow in Indonesian forests. However, only a small part of them are utilized, leaving other species untouched or very much underutilized. The following reasons for such development conditions of tropical rain forests in Indonesia have been pointed out by the Directorate General of Forestry in the Terms of Reference for cooperation from Japan for this project:

- Incomplete information of the technological properties and the various uses of the species.
- Insufficient data on the volume, the species and the distribution of their standing stock.
- No information which may lead to prospective marketing areas and requirements, and consumer likings.

These are very important issues in the utilization and development of lesser-known wood. Furthermore, for the purpose of clarifying these issues, the following points are to be kept in mind:

1. Forests in Indonesia are considerably different by district in species, tree diameters, distribution, etc. (i.e., Sumatra, Kalimantan, Surawesi, and Irian). Therefore, in defining what are the "lesser-known woods", it is quite difficult to uniformly define them on national basis, thus full consideration should be given to the locality.
2. Among the trees which are generally called lesser-known wood (those left standing in exploited forests), there are many "sinkers" of which the cost of river transport would become too expensive, and others which are difficult to collect up to a commercially viable amount due to their small stock per unit area. Therefore, it is to be realized that, in the utilization development of lesser-known wood, logging systems, processing sites, markets (including overseas, Java, or on-site), etc. are crucial factors.
3. Only limited species, i.e. meranti and the like, are currently harvested in Kalimantan, Sumatra and other areas, therefore, the number of trees cut per unit area is extremely small. Except for the areas opened for the construction of forest roads, exploited forests would soon regain forest cover leaving no problems for environmental protection (although

the regeneration problems of melantis or other useful species remain as economic issues). However, if the so-called "lesser-known wood" currently left untouched are to be exploited, it is necessary to fully study forest management systems including logging and reforestation methods in order not to cause environmental destructions.

## 2-2 Lines of Possible Cooperation

### 2-2-1 General

1. Cooperation requested by the Indonesian Government consists of four areas, i.e., resource survey, wood testing, market research and transportation of lesser-known wood. The specific contents are shown in the Terms of Reference attached. However, more extensive and a larger scale studies seem to be required according to the staff concerned of the Directorate of Forest Planning, Forest Products Research Institute, etc., whose indications are explained in the next paragraph. Further, are some problems which could not be resolved in the framework of this "Development Survey," a system that is different from "Project-Type Technical Cooperation".
2. The utilization development of lesser-known wood will require, as stated in the preceding paragraph, various investigations, such as resource survey, forest management and market research. In view of the expected global shortage of future wood resources, and the need for utilization and development of lesser-known wood which has been an internationally important issue, Japan, a timber importing country, probably should take initiative to resolve these issues in cooperation with developing countries.

### 2-2-2 Specific Areas of Investigation

The four areas appearing in the T/R of the Indonesian Government and an additional question of reforestation in clear-cut areas pointed out by the Director of Forest Products Research Institute have been studied with a view to lines of possible cooperation respectively.

#### 2-2-2-1 Resource survey of lesser-known wood

1. The survey is to be carried out to clarify the tree-species, stock, distribution etc. in 12 States of Indonesia. It has been stated by the Directorate of Forest Planning that the survey would be made by means of

aerial photographs, and, if it was not feasible to take photos of all the 12 states, the photos taken by a sampling method covering major four states would suffice.

2. However, it would not be possible to obtain statistically reliable results within the limited period and cost (According to T/R of the Indonesian Government, the proposed resource survey period is 2 years with total cost of approx. ¥300 million.).
3. The resource survey is not for the purpose of preparing logging plans. Its main purpose is to grasp distribution of lesser-known wood by regions.
4. Therefore, the basic method of this resource survey is to grasp by statistical techniques the various resources composition, namely, species, stock and distribution on the basis of such existing forest survey data as the Green Book of the Directorate of Forest Planning and the working plans of concessionaires, and to be supplemented by the following techniques:
  - i. Remote-sensing techniques by means of existing regional aerial photographs, Landsat data, etc.;
  - ii. Ground survey, survey of logging and utilization conditions.
5. Surveys as described under 4 above could be carried out through cooperation by Japan in the framework of its "Development Survey" system. A prerequisite of this survey, however, is that the above mentioned existing data must be made available to the Japanese Survey Team by the Government of Indonesia. It is imperative to obtain an agreement of the Indonesian Government in this respect especially that of the Directorate of Forest Planning and Air Force.

#### 2-2-2-2 Wood testing of lesser-known wood

1. The Forest Product Research Institute of Indonesia has been carrying out basic wood tests on its own, and is requesting the provisions of modern testing equipment, technical guidance in order to upgrade its operation. It has already completed tests for 120 species, and is planning to test 100 more species within the scope of this project.
2. According to the nature of this project as seen by this Mission, the purpose of the wood test required is not an academic clarification of the basic wood quality but to provide basic data for developing markets

through practical processing tests in collaboration with the market research.

3. Consequently it would be appropriate to select the species to be tested and decide on the test methods in accordance with the following policies.

- i. Species to be tested

Practical tests for processing have yet to be performed for the 120 species for which Indonesian Forest Products Research Institute have already obtained basic data. Additional 100 species proposed include many rare species which, though meaningful from technical point of view, would not contribute much to the development of market of lesser-known wood as a whole. Therefore, it would not be advisable to go on to cover 100 more species as proposed.

Instead, it would be better to select species by region for which future utilization and development is likely in view of their quality, stock and distribution. Such species could be identified from the test results of Forest Products Research Institute, Green Book and other information.

- ii. Test methods

In principle, practical processing tests for plywood and lumber should be given priority, while basic tests could continue as and when necessary.

4. Practical processing tests would be performed in Japan, as its timber market is by far the largest. It will also be effective to test on site as necessary in cases where local use (including Java Island) is expected. This applies also to the rapidly expanding Middle East market. In this respect, cooperation of the Indonesian Forest Products Research Institute for basic tests would be required. In order to meet the wish of the Institute, other forms of cooperation should be explored (e.g. "Project Type Cooperation") or it should be clarified as to whether certain flexibility within the framework of "Development Survey" could be introduced or not to satisfy the needs.

The practical processing tests in Japan should be subcontracted to a private institution which is well accustomed to the market and consumer preferences. It is important to search for an appropriate one.

### 2-2-2-3 Market research

1. According to the T/R, the request for market research by the Indonesian Government is to clarify the development means and potential of the markets for lesser-known wood through surveys on the timber demand and supply situation, forms of consumption, effects of substitutes, distribution routes, etc. within (Java and outer islands) and outside Indonesia (Europe, America, Japan, Middle East, etc.). As to the method, coverage and other details of the surveys the intention of the Directorate of Marketing is not yet concrete.
2. The survey in Japan would entail no particular problems. The survey in Indonesia can be performed mainly by the Indonesian side with some experts or consultants from Japan participating.
3. The survey in industrialized countries could be carried out by employing Japanese consultants. In order to obtain up-to-date data, however, it might be necessary to use consultants in the respective countries.
4. For the Middle East and other developing regions, it would be difficult to carry out a survey as there are many unknown or uncertain factors such as availability of data, etc.

### 2-2-2-4 Transportation system survey

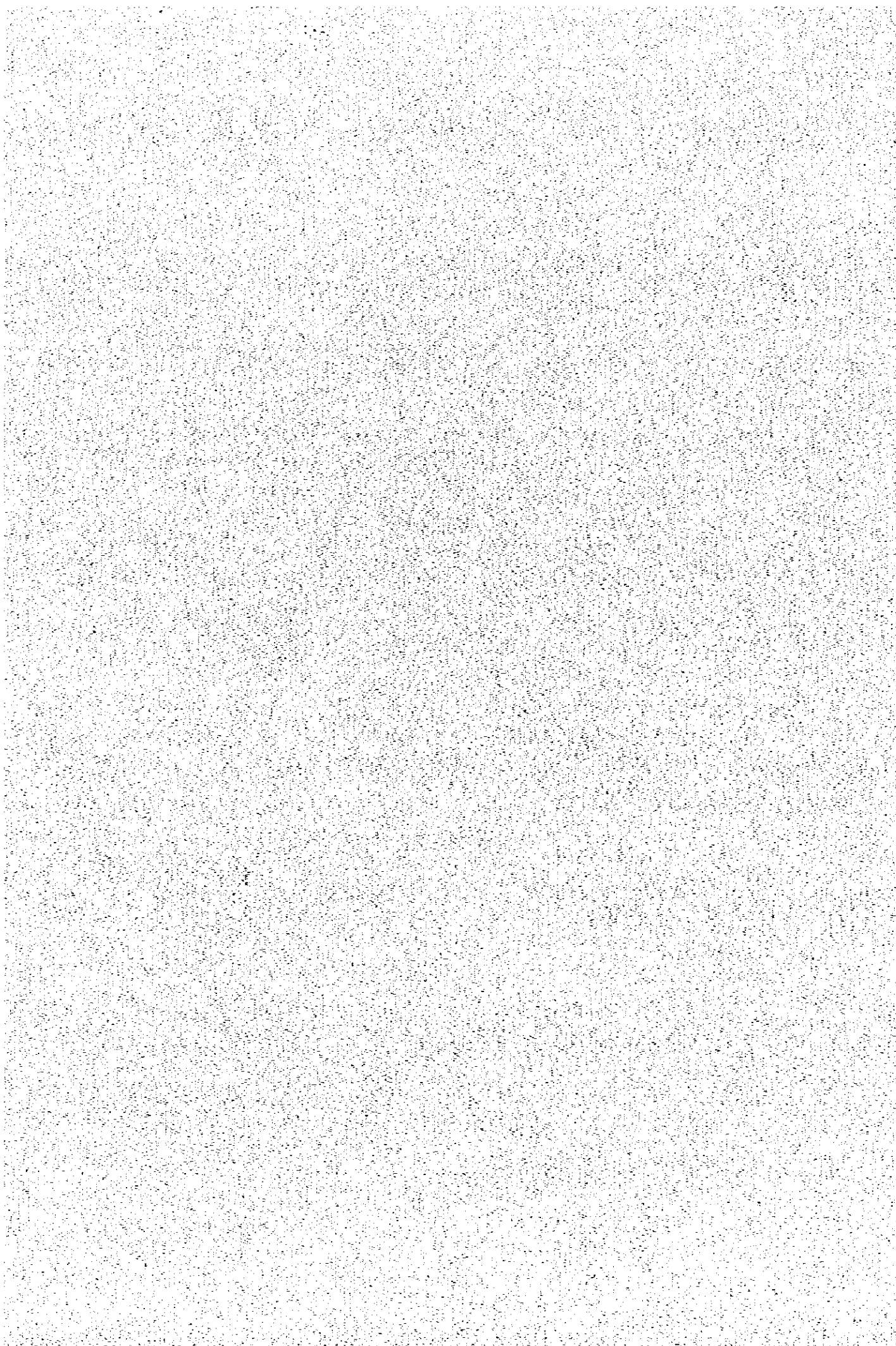
1. According to the explanation by the Directorate of Marketing, the survey is to investigate and clarify various questions in shipping lumber from production area to foreign countries or Java Island. Its method, contents, etc. are still to be decided.
2. In carrying out this survey in order to utilize lesser-known wood, it would be necessary to study the transportation methods from logging sites to shipping ports. Furthermore, the question of where to locate processing sites in relation to consumer centres (local, Java Islands, overseas) and to lumber quality (whether sinker or floater) should be carefully investigated.
3. An appropriate transportation system must be designed for each production area taking into consideration such factors as production area destination, species, extent of processing, etc. These factors vary for each of the 12 States. Therefore, the survey under this subject would have to concentrate on describing general concepts and principles for working out transportation systems so that each case can be derived

after the results of the survey. It might be possible to supplement this survey with a case study including concrete designs for one of the twelve States.

#### 2-2-2-5 Forest Management

1. As stated earlier (2-1-3), in parallel with the utilization and development of lesser-known wood, exploitation of forests will be intensified and come close to clear cut. Tropical rain forests, once clean cut, are extremely difficult to regain its cover. This is clearly shown by the fact that shifting cultivation areas all over the world are creating vast areas of grass lands or deserts because the practice exceeded rehabilitating capacity of nature. Therefore, it is essential to develop and strengthen proper techniques of logging, reforestation of exploited areas, and other forest management methods in line with the efforts made for the development of lesser-known wood. Although this area of cooperation had not been indicated in the original T/R, the Director of the Forest Products Research Institute emphasized strongly the need for this study.
2. As progress is made the utilization and development of lesser-known wood, a considerable amount of such timber will most probably exported to Japan. The responsibility for reforestation and rehabilitation of exploited areas would naturally have to be shared by Japan. It is concluded, therefore, that Japan should offer some sort of cooperation at this moment for tackling the problems in proper forest management.

**Annex 1: Interim Report**





**Annex I Interim Report**

**To : DR. SOEDJARWO  
Director General of Forestry**

**Interim Report  
on  
Utilization of Lesser-Known Wood Species  
by  
Japanese Preliminary Survey Team**

**Takashi ENDO  
(Team Leader)**

We the member of Preliminary Survey for Utilization of Lesser-known Wood Species have had field survey on distribution of standing stock and their utilizing conditions of lesser-known species in the area of South Sumatera, East Kalimantan and South Kalimantan, starting from 8th to 17th February.

We are much pleased with kind cooperation and assistance from KEMHUTANAN in each place.

With these kind cooperation, we were able to complete field survey successfully even in the limited time without any accidents.

Now, results of field survey are not yet discussed among the team, however, I'd like to give several comments and impressions on this occasion.

First, by the name of lesser-known species, we could find a large variety of them on wood species, wood size class and distribution of stock depending on each region. Therefore, it will be much better if we can differentiate those lesser-known wood species by each region.

Secondly, we found many sinkers among lesser-known woods which require high cost of transportation. And also their distribution of standing stock per hectare is small in volume. Therefore, it seems difficult to have constant supply with constant volume. Including above mentioned, there lies a lot of problems to utilize lesser-known wood as commercial woods.

With these recognitions, we think that we should have a new understanding of the importance of utilization of lesser-known wood species. It is also significant and beneficial to solve those problems with the cooperation between Indonesia and Japan.

Now, the results of survey are not yet fully summarized, however, we would like to present our views on Term of Reference in the following papers. Therefore, we are very much grateful if you give us views and opinions concerning with this Interim Report.

I hope we will be able to promote cooperation and deepen our mutual understanding between your country and ours.

Thank you very much.

## Views of Preliminary Survey Team on Terms of Reference

Now, We would like to present our views on "Terms of Reference, at the same time, views on "Requests" given by Directorate of Planning and Forest Product Research Institute.

We would like to refer by following the order of four items which are written in terms of reference as target and work-plan. These are our results of field survey and discussions among members.

Item No. 1. Research into the potential of wood into natural forest outside Java.

On this item, We understand the targets is to totally grasp the distribution of standing stock of lesser-known wood species depending on each region and to make use of those basic data for the effective utilization.

Therefore We, first of all, think this research should be under taken by statistical method on wood species, standing stock and distribution utilizing existing materials and data such as "Green Book", working plan of logger and so forth.

And as a supplemental approach, we also consider the remote sensing method such as existing aero photo data by satellite, at the same time, field survey and research on species logged and unlogged will be much effective.

However, request presented by Directorate of planning such as research by aero photo in the area of 30 million hectar might be beyond the development survey and as far as total financial limit concerns, statistically significant data will not be available within limited period of two years.

We feel much difficulty to reply on the requests of Directorate of Planning.

Item 2. Research into technological properties of wood.

We understand target of this item is to require practical experiment on processing which is deeply related with marketing research rather than too much going on the scientific data on fundamental wood quality.

Therefore, we think the selection of wood species and their experimental method should be as follows.

### 1. Selection of wood species for the experiment.

The T/R explains that in the first stage in 1981 properties of 50 species

should be researched and 50 species in second stage in 1982 excluding 120 species which had been already done in the Forest Research Institute.

However, we feel much necessity of practical experiment of processing on all species including 120 species which were already scientifically analysed.

Besides, 100 species which were requested in the T/R are mostly rare species, so that it will be mere significant as far as scientific analysis concerns however it will not be directly connected with market development.

Therefore we should select wood species with priority of high potencial with the consideration of its quality & distribution of standing stock by making use of the results of analysis by F.R. Institute or data from green book.

## 2. Experimental method

Main experiment will be manufacturing properties of Plywood and wood processing.

If necessary, basic experiment should be done. We think those experiment should be done in Japan as far as limit of development survey system considered.

## Item 3. Marketing Research

Implementation of Marketing Research is quite possible such as consumption patterns and its future prospective in Japan as well as developed countries by using Japanese consultants.

However we think it will be difficult to research in the middle East and other developing countries.

So, further we would like to discuss on this issue, as for the research on domestic market, Japan will be able to dispatch a few experts or consultants, so cooperation with counterpart is inevitable.

We would like to discuss detail contents later on, while, it will be much helpfull, if we receive your opinion on their research.

## Item 4. Transport research

It is emphasized in the T/R as transport research on inter-island (to Java) & overseas transport.

However, when it comes to the promotion of utilization of lesser-known wood species, it is also necessary to include the transport from logging site to each port of shipment.

It is also necessary to research appropriate wood processing site with the consideration of wood properties, and depending upon the market such as local, domestic or international.

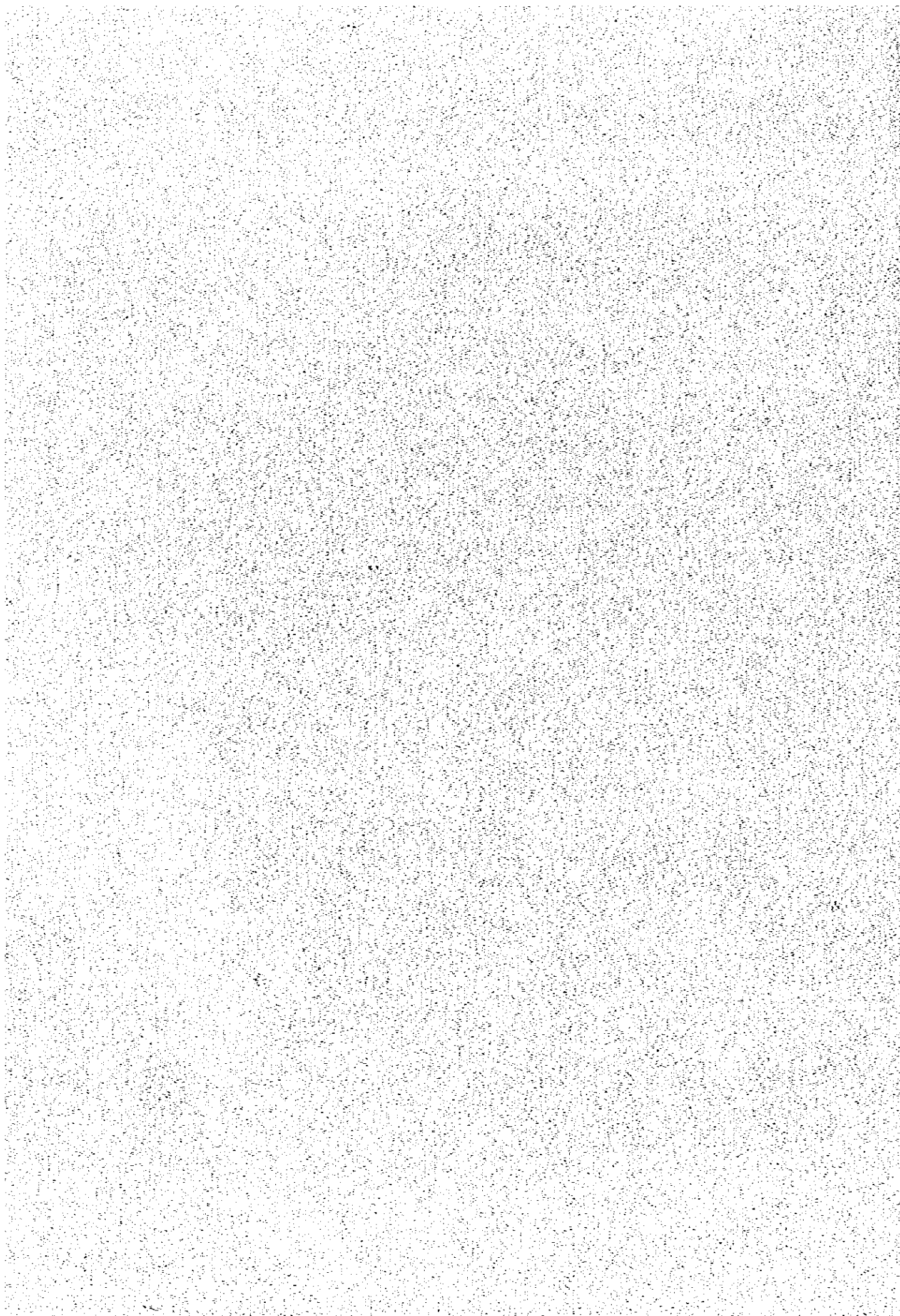
As for the research on transport system, it is quite difficult since it has different function depend on the region, transporting place, wood species, wood processing conditions.

Therefore, concrete planning on 12 provines will be difficult. It will be only general summary.

We think analysis by the case study on certain area will be also significant & helpfull for the tranport research.



**Annex 2. Terms of reference for Project "Utilization of  
Lesser-Known Wood Species" (ATA-269)**





Annex2 Terms of reference for Project Utilization  
of Lesser-Known Wood Species (ATA-269)

Code Number : ATA - 269

**PROJECT DIGEST : STUDY FOR UTILIZATION OF LESSER-KNOWN WOOD SPECIES**

1. Project Title : STUDY FOR UTILIZATION OF LESSER-KNOWN WOOD SPECIES,
2. Location :: Selected Provinces outside Java
3. Executing Agency : Directorate General of Forestry, Ministry of Agriculture
4. Objectives :
  - to assist and give advice to the Government in developing as standard reference on economic plants concerning the lesser-known species for possible utilization and marketing;
  - to investigate the most possibilities of developing an information centre that is capable in rendering information services on particular groups of plants having potential characters of economic use.
5. Project Description : The proposed study is aimed at providing list of genetic characteristics so as to encourage agriculturists, horticulturists, foresters, pharmacutists, and relevent scientist to develop the lesser-known species into more economic utilization and possible marketing.  
There are more than 4,000 species recorded in Indonesia. However, only 60 species or 1.5 % have been utilized and most of them are of lesser-known and remains untouched due to the following reasons :
  - lack of data and information concerning the technological progress and possible uses of such species,
  - insufficient coordination of managing surveys of possible economic species and the marketing aspects,
  - inadequate experience on developing such species.
6. Scope of Assistance Requested :

a. expert services	:	48 m.m.	=	US \$	325,000
b. fellowship	:	24 m.m.	=	US \$	60,000
c. equipment	:		=	US \$	115,000
					Total Cost = US \$ 500,000
7. Related to Project Aid : -----

TERMS OF REFERENCE  
UTILIZATION OF LESSER-KNOWN WOOD SPECIES

I. Background

Based on the findings of reserches made in the forests in Indonesia, more than 4,000 species have been recorded. However, only 60 species or ± 1.5 % have been utilized. The fact that the potential of the lesser-known species still remains intouched is due to the following matters :

- Incomplete information of the technological properties and the various uses of the species.
- Insufficient data on the volume, the species and the distribution of their standing stock.
- No information which may lead to prospective marketing areas and requirements, and consumer likings.

Promotion of utilization including marketing can be boosted in the appropriate way after these factors have thoroughly been mastered. In this relation participation of foreign investment / aid, financial as well as technical, can be induced in such a way as to benefit all parties concerned.

II. Objective of the Project

a. Long-term objective

The project serves the purpose of acquiring up-to-date and relevant information in the framework of the Government's efforts to stop up utilization and marketing of lesser-known timber species.

b. Short-term objective

The short-term objective is to gather information of :

1. The potential of the natural forest stands in the regions outside Java and its marketing possibilities.
2. The technological properties, the processing and the utilization of the species.
3. Marketing areas and requirements, and consumers' requirements and fancy.

4. ....

4. The most efficient and effective transport system

III. Targets

1. Research into the potential of wood in the natural forests outside Java: species, potential, production, forest structure (set-up), exploitation possibilities: .. 2 years (starting 1980)
2. Research into technological (physical, chemical) properties of wood, its processing and uses: ..... 2 years (starting 1981)
3. Research into international and domestic marketing (supply and demand, consumption patterns, influences of substitutes, trade channel prices): ..... 2 years (starting 1982)
4. Research into transportation systems: ..... 2 years (starting 1983)

IV. Work-plan

1. Research into the potential of wood in the natural forests outside Java:
  - 1.1. 6 Provinces (4 in Kalimantan + Riau + Aceh) .... 1980
  - 1.2. 6 Provinces (Jambi, West Sumatra, South Sumatra, Central Sulawesi, Maluku, Irian Jaya) ... 1981
2. Research into technological properties of wood:
  - 2.1. 50 species ..... 1981
  - 2.2. 50 species ..... 1982
3. Marketing research:
  - 3.1. In the country (Java, Outer Regions) ..... 1982
  - 3.2. Abroad (Europe, the USA, the Middle East, Japan) 1983
4. Transport research:
  - 4.1. Inter-island (to Java) ..... 1983
  - 4.2. Overseas transport (Europe, the USA, the Middle East, Japan) ..... 1984

V. Personnel

1. The Government of the Republic of Indonesia:
  - Co-Manager (the Directorate of Forest Product Marketing, the Directorate of Forestry Planning, the Forest Product Research Institute).

- Full-timer counterparts (15): 5 of the Directorate of Forest Product Marketing, 5 of the Directorate of Forestry Planning, 5 of the Forest Product Research Institute).

2. The Government of Japan:

- Manager (1)
- Senior experts (3) in economics/marketing, planning/statistics, and transportation.

VI. Location/office

1. Jakarta: The Directorate of Forest Product Marketing;
2. Bogor : The Forest Product Research Institute, the Directorate of Forestry Planning.

VII. Activities

1. On the Central level contacts are made with:

- 1.1. The Department of Agriculture, the Directorate General of Forestry (the Directorate of Forest Product Marketing, the Directorate of Forestry Planning, the Directorate of Forest Production, the Forest Product Research Institute);
- 1.2. The B.P.S.;
- 1.3. The Department of Communication;
- 1.4. The Department of Trade
- 1.5. The National Development Planning Agency.

2. On Provincial level contacts are made with:

- 2.1. Provincial Forest Services/The Provincial Administration;
- 2.2. Port Authorities.

VIII. Financial outlay

The cost of the research/study can be defrayed by:

- the Government .....

- the Government of Japan as a whole;
- the Government of the Republic of Indonesia and Japan on a joint basis.

The total funds required will amount to Rp. 400,000,000 covering:

- Wood potential research Rp. 150,000,000
- Wood property research Rp. 100,000,000
- Marketing research Rp. 100,000,000
- Transportation research Rp. 150,000,000.



