

資料-5 第1回ジョイントコミティに提出されたFR1研究5カ年計画

PAPUA NEW GUINEA FOREST RESEARCH INSTITUTE  
DEPARTMENT OF FORESTS

REVISED FIVE YEAR RESEARCH PROGRAMMES

FOREST BOTANY BRANCH

Section	Staff	Project	Status	TIME SCHEDULE			
				1990	1991	1992	
PNG FLORA							
K. Keranga		- Althoffia/Trichospermum	**	C, V, P			
		- Trumfetta	*	C, V, P			
		- Parasitic plants of PNG	*				
		- Study family group for volume 4 of PNG Flora	**				
O. Gideon		- Musaenda	**	C, V, P			
		- Spermaceae	**	U, P			
		- Pollen & Seed micro-morphology	**	C, V, P			
		- Sterculiaceae for Vol. 4 of PNG Flora	**				
R. Kiapranis		- Ethnobotanical studies	**				
		- Rometia	**				
		- Study Family group for Vol. 4 of PNG Flora	**				
		- Forest Dynamics	**				
K. Damas		- Gnecaceae	*	U, P			
		- Citrus	*	A			
		- Trimeniaceae	*	A			
-Field Collection/Exploration J. Wiakabu/S.Katik		- Seed germination and phenology of PNG Trees	**				
		- Western Province: Upper Strickland & Fly Rivers	**				
		- Pogeru/Mt. Kare	**				
		- Lihir	**				
		- Gulf Province: Whole Province if possible	*				
		- Milne Bay Province: Trobriand/Woodlarklands	**				
		- Bismarck Mountains: lower	**				

HARBARIUM  
E. Mare/E. Keas/L. Yakas

- slopes on the north Ramu/Bundi \* \* \*
- Fieldguide to the flora of PNG \*
- Computerisation of the Herbarium collection \* \* \*
- Herbarium maintenance, filing, updating loans, specimenpreparations, fumigation, identification & Correspondence \* \* \*

GARDENS

- Maintenance: Renovation of Shade House No.1, the Aroid House, Nursery houses, Office, Fencing and sealing of roads \* \* \*
- Revised Garden pamphlet \* \* \*
- Revise Garden Checklist \* \* \*
- Revise seed List \* \* \*
- Tree numbering & Labelling \* \* \*
- Curation of the Gardens \* \* \*
- Prepare checklist of PNG orchids in the Garden \* \*

S. Kulu/D. Sasap  
S. Kulu/S. Obedi  
S. Obedi

Determine the size and site of forest conservation areas with particular reference to water catchment areas \*

Investigate the extent of aquatic floral distribution and dynamics: Water chemistry and sedimentation processes in so far as soil erosion is concerned \*

Study the Nutrient cycling within a forest system including foliage nutrient analysis \*\*

Carry out studies into rehabilitation of degraded areas with the aim of drawing up appropriate land use plans \*\*

Study phenological behaviours of natural forest tree species \*\*

Carry out studies into autecology of major commercial tree species \*\*

FOREST MANAGEMENT BRANCH

Time Sch

Section	Staff	Project	Status	1990	1991	1
FOREST ECOLOGY & ENVIRONMENT	Saulei/Rau/Beibi	Study the nature of tropical rain forest ecology and dynamics: this will include seedling/sapling distribution & dynamics; forest regeneration strategies; pollination & dispersal mechanisms and agents.	*			
		Study the factors affecting forest environment: Macro & microclimate; predation by herbivores, moisture gradients, etc.	*			
		Determine soil chemistry of different forest types in relation to altitudes, geology and topographic variations	**			
		Drawing up of Environmental Plans	**			
		Study the effectiveness of buffer zones in reducing soil erosion, seed rain, phenological behaviour and pollinators, and attracting wildlife	**			

SILVICULTURE

- Natural Forest

Mir/Tiki/Forova

Continuous Forest Inventory (CFI)	**
Species Volume Tables	***
Natural Regeneration Studies on logged over forests	***
Timber Stand Improvement	**
Phenological studies of Commercial tree species	***
Permanent sample plots	**
Enrichment species trials	**
Database for field identification	*
Logging studies	***
Acacia Rhizobium Introduction	***
Mycorrhiza Inoculation	***
Hoop pine thinning trials	**
Klinki enrichment trials	**
Araucaria under plantings	**
Growth plot studies	**
Sectorial measures for Volume Tables	**

-Plantation

Howcroft/Afing

Mantang screening and provenance trials of <i>A. sulacocarpa</i> , <i>A. auriculiformis</i> and <i>A. carassiacarpa</i>	***
<i>Eucalyptus deglupta</i> provenance progeny trials	***
<i>Gmelina arborea</i> nursery work on rooting of cuttings of provenances, establish pilot plantations of provenance and establish second stage provenance trials	***
Establish a new provenance trial of <i>L. leucocephala</i> and establish provenance trials of <i>Terminalia brassii</i> , <i>Albizia falcataria</i> and <i>A. chinensis</i>	**
Study the effect of rhizobium modulation and phosphorus application in legumes on poor sites	***
Seed collection of <i>Acacia mangium</i> and natural forest species	***
Collect <i>Terminalia brassii</i> seeds	***
Collect <i>Casuarina equisetifolia</i> seeds for provenance trials	***

SEED TECHNOLOGY

SEED TECHNOLOGY

Hovcroft/Jarus/Afing/  
Kamit

National Seed Production & Accessories \*\*  
 National Tree Seed Centre, Bulolo \*\*\*  
 FAO Seed Collection \*\*  
 Establishment of seed source for MPTS \*\*\*

- Agroforestry & Community Forestry

Assessment of MPTS Performances \*\*\*  
 Leucaena Research \*\*\*  
 Coffee under Plantings \*\*

Mexican Leucaena Fuelwood Production \*\*\*  
 Australian Acacia Species Trials \*\*

TREE BREEDING/IMPROVEMENT

- Provenance Trials Hovcroft/Mahuze/  
Afing

Gaelina & Leucaena Fuelwood Production \*\*  
 Araucaria A. Cunninghamii \*\*\*  
 A. Munsteintii \*\*\*  
 Gaelina arborea \*  
 Eucalyptus deglupta \*\*\*

Pinus P. oocarpa \*  
 P. patula \*

- Publications:

P. verausii provenance trials 1 \*\*\*  
 & 2, P. oocarpa trials 1, 2a & 2b. \*\*\*  
 Gaelina arborea. \*\*\*  
 E. deglupta and Araucaria. \*\*\*

Collect seeds of  
Gmelina for second  
stage provenance  
trials

\*\*\*

Collect seeds of  
different  
provenance of  
Sida acuta

\*\*\*

Continue recordings  
and maintenance of  
the weather station

\*\*\*

Meteorological Studies



- Progeny Testing

Eucalyptus progeny  
& Seed Source  
Testing \*\*\*

A. cunninghamii  
progeny clones &  
seed orchards  
establishment \*\*\*

Hybrid trials

A. hunsteinii \*

Leuceana \*

P. merkusii F2  
Hybrid \*

P. caribaea \*

Publications:  
P. merkusii Hybrid  
Trial Nos. 2 & 4 and  
F2 Hybrid trial. \*\*\*

Seed Tree Selection \*\*\*

Seed Orchards & Seed  
Production areas. \*\*\*

- Genetics

MADANG FIELD STATION

-Natural Forest Silviculture  
Yelu/Davies/  
Kadam

- Phenological Studies \*\*

- Assessment of  
natural regeneration  
survey, establish  
and monitor \*\*

- Establishment  
planting trials on  
selectively logged  
over forest areas \*\*\*

Acacia mangium  
progeny trial,  
establishment  
stands and pilot  
plantation \*\*\*

-plantation Silviculture

FOREST PRODUCTS BRANCH

SECTION	Staff	Project	Status	1990	1991	1992	1993	1994
WOOD PRESERVATION	C. Konabe/B. Vali	Prophylactic treatment of logs & sawn timbers	** *					
	C. Konabe/B. Vali/J. Mukiu	Factors affecting dip diffusion treatment with BFCA	** *					
	C. Konabe/B. Vali/J. Mukiu	Isolation & identification of wood destroying fungi in PNG	*					
	C. Konabe/M. Rokova/B. Vali	Treatability studies of lesser used species	** *					
		Remedial treatment of timber in service	*					
		Treatment modification in vacuum pressure impregnation	** *					
	C. Konabe/M. Rokova	Natural durability trials of PNG timbers against termites.	** *					
	Konabe/B. Vali/M. Rokova	Alternative dip diffusion formulation	** *					
	J. Aruga/B. Pul	Assessment of plastic sheathing for marine piles	** *					
	J. Aruga/B. Pul	Performance of CCA pressure treated timbers in marine environment	** *					
		Marine borer ecology and distribution studies	** *					
		Inspection of waterfront structures	*					
		Evaluation of suitable timber for canoe and boat building	** *					

WOOD STRUCTURE & PROPERTIES

A. Amoako/A. Aglua	Preparation of a manual for timber identification	***	_____	_____	_____
	Wood quality studies of selected PNG plantation species	**	_____	_____	_____
A. Amoako	Physical properties of lesser used species	**	_____	_____	_____
A. Aglua	Preparation and promotion of PNG timbers	*	_____	_____	_____

MINOR FOREST PRODUCTS

M. Kabarua/M. Niangu	Assessment of Rattan resource and its utilization	**	_____	_____	_____
	Establishment of an information centre	*	_____	_____	_____
	Establish rattangene pool or seed wildings	**	_____	_____	_____
	Study the anatomical and physical properties of rattan	**	_____	_____	_____
	Prepare future work on tissue culture research programmes	*	_____	_____	_____

WOOD PROCESSING

J. Bori/J. Mamun	Literature review of sawmilling & seasoning practices	*	_____	_____	_____
J. Bori	Assessments of sawmilling practices and their efficiency	**	_____	_____	_____
J. Mamun	Assessment of seasoning practices and their efficiency	**	_____	_____	_____
J. Bori	Mechanical properties of lesser	**	_____	_____	_____

used species					
Machining properties of lesser used species	J. Mamun	***	_____	_____	_____
Qualitative and quantitative analysis of wood preservation	C. Pillotti/C. Mairi	**	_____	_____	_____
Distribution of CCA preservative in selected PNG hardwoods		***	_____	_____	_____
Chemical properties of lesser used species		***	_____	_____	_____
Wood preservation in PNG		***	_____	_____	_____
Properties of some PNG woods relating to manufacturing processes		**	_____	_____	_____
Handbook of Instructions for protection and maintenance of water/iron structures		***	_____	_____	_____

CHEMISTRY

PUBLICATIONS

Section	Staff	Project
ENTOMOLOGY Plantation Pests		
	1. Defoliators of Pinus in the Highlands	
H. Roberts/T. Kosi/H. Ivagai	Lymantria egg mass study	* * *
H. Roberts/T. Kosi	Establish a micro-organism laboratory to produce and store artificially diseased parasites of Lymantria for use in controlling its population	* * *
Roberts/Kosi	Study into the biology and damage caused by Alcis papuensis to Pinus patula plantation in the Highlands	* * *
Roberts/Kosi/Ivagai	Study into the diseases of all Pinus patula caterpillar defoliators	* * *
Roberts/New SOI	2. Under borers of Eucalyptus & Terminalia in PNG Lowlands	
Roberts/New SOI	Study into the occurrence of Agrilus borers on Kamarene in relation to site conditions, planting methods, stand age and tending intensity	* * *
Roberts/New SOI	Investigate the relationship between the visible surface tunnels and the numbers of live underbark Agrilus grubs	* * *

<p>Roberts/New SOL</p>	<p>Investigate the relationship between Agrilus numbers and the abundance of Kurakum and crazy ants</p>	<p>*</p>
	<p>Study the biology, abundance and site distribution of Agrilus on Terminalia in Cegol &amp; New Britain</p>	<p>**</p>
	<p>Investigate the relationship between Agrilus and fungus on Terminalia</p>	<p>x</p>
	<p>3. Termite attacks on Plantation Trees</p>	
	<p>Continue the monitoring of the spread of termite attacks on hoop and klinki pine plantation trees</p>	<p>x *</p>
	<p>Investigate termite attacks on Acacia, Gmelina and Kawarae plantations as well as on other lowland rain forest tree species</p>	<p>x *</p>
	<p>4. Insects affecting seed production</p>	
<p>" /Daur/"</p>	<p>Establish trials in Leucaena seed orchards using injection of insecticides to protect pods from insect infestation</p>	<p>*</p>

5. Psyllid attack on Leucaena

Roberts/New SOI

Investigate the relative susceptibility of different species and provenances of Leucaena and the variation with altitude and site conditions be studied \*

Culturing of a predator and its effectiveness to control the psyllid in the field be studied. \*

Roberts/New SOI

Assess Fergusonina attack on Kamarere flowers and investigate chemical trials. \*

6. Agroforestry

Robertst/New SOI

Investigate and assess insect problems associated with Agroforestry projects. \*

7. Environmental Surveys

Roberts/Kosi

Establish the used of insects as indication for environmental monitoring. \*

8. Impact on Insects on natural regeneration of rain forests

Roberts/Kosi

Assess insect attacks on Anisoptera at Omsis TSI plots. \*

Roberts/New SOI

Assess insect attack on Castanopsis at Manki trials. \*

9. Logs, Lumber and Timber Products

Roberts/Entomologist

Study the ambrosia attacks on Log ramps/log years.

\* \*

Assess the effective use of chemicals control to protect logs against ambrosia attacks.

\* \*

Conduct surveys to assess the status and losses caused by Lyctus and other powder - post beetle pests.

\*

10. National Forest Insect Collection

Dobunaba

Continue extensive of insect collection. Computerised insect collection.

\* \* \*



11. Publications

Forest and Timber Insect Pests. Insect Pest of Forest Plantations. Insect Pest of Logs and Lumber. Control of Forest Insect Pests.	* * * * *	
Study of Kamatere heart rot at Madang and Keravat	*	
Rhizobium inoculation trials on Acacia mangium & other spp.	* * *	
Study into Root & Heart rots of hoop pine at Bulolo pine plantations	**	
Investigate the incidence of root rot in Acacia mangium	* * *	
Study to be conducted on the occurrence of Valsa Canker on terminalia brassii	*	
Investigate the incidence of Nectriella Canker on Gmelina aborea	*	
Determination of the occurrence of Hectria canker on Anisoptera	*	

PATHOLOGY

Mukiu/New SOI

Please note that those projects which have \*\*\* have the highest priority and should be implemented immediately commencing in January 1990. The second most priority projects will only be done after those with \*\* are done, while those with \* will not be implemented in 1990. The letters A denotes abundantant, M - write up and P - publication.

資料-6 FRI 研究5 年計画の分野別課題数

PAPUA NEW GUINEA FOREST RESEARCH INSTITUTE  
SUMMARY OF THE FIVE YEAR RESEARCH PROGRAMMES

Branch	Section	Project Fields	Number of Projects
Botany	Taxonomy	Flora	16
		Field collections /expeditions	6
	Herbarium	Curation, renovation and publication	4
	Botanic Gardens	Extension, renovation and publication	6
Management	Natural Forest Silviculture	Natural regeneration and TSI	4
		Logging studies C. F. I and vol. tables	3
	Plantation	Nursery and Management	7
	Genetic Resources & Improvement	Provenance Trials	5
		Exploration/Seed Coll.	5
		Genetics	4
	Seed Technology	—————	6
	Agroforestry & Community Forestry	MPTS Research	3
		Fuelwood	2
	Forest Ecology & Environment	Forest Soils/nutrition	2
Environmental Plans		5	
Autoecology/Phenology		2	

Products	Wood Preservation		13
	Structure properties		4
	Minor Forest Products		5
	Processing		5
	Chemistry		3
Protection	Entomology	Plantation /Agro- forestry Pests	17
		Surveys	6
	Pathology	Rots	3
		2 Cankers	3
		Plant Inoculants	

THE PAPUA NEW GUINEA FOREST RESEARCH INSTITUTE

1989 ANNUAL REPORT SUMMARY

The Papua New Guinea Forest Research Institute, a Division within the National Department of Forests, was established on the 7th April last year (1989) through the Japanese Government Grant in Aid Programme to Papua New Guinea. The Institute comprises four Branches; namely Forest Management, Forest Products, Forest Botany and Forest Protection which came into being last year (formerly part of the Forest Management Branch).

There are three accillary support units to the Institute: the Bulolo Field Research station (formerly the Forest Research Station); the National Seed Centre (a New Zealand Aid Project established several years ago and managed by research staff); and the Madang Field Research Station.

The main objectives of the Branches are: (i) Natural and Plantation Forest Silviculture Research and Development which call for the development of techniques for the establishment and/or management of selectively logged natural forests and of forest plantation; (ii) Identification of suitable species, provenances and varieties for resource which are insect and disease resistant and better in quality and productivity; (iii) Agroforestry and community Forest Research; (iv) Development of Environment Protection Plans; (v) Genetic resources conservation and development; (vi) Seed Production, seed Improvement, self-sufficiency and seed marking; (vii) Study of P.N.G. flora and management of Herbarium and National Botanic Gardens; (viii) Research on wood preservation and treatment techniques, Processing and Seasoning, Wood properties and structure, particularly of lesser known species, survey and utilization of minor forest products; (ix) Research into insects pests, plant health and diseases as well as fire protection.

SUMMARY OF THE ACTIVITIES

FOREST MANAGEMENT RESEARCH BRANCH.

Natural Forest Silviculture

1. The Wawoi Guavi logging damage trial's final report was completed and circulated this year.
2. A species enrichment trial was established at Bukawa using several indigenous species onto sites abandoned by mobile sawmills. Fertilizer treatments have been superimposed to see if seedling establishment and early growth can be improved.

3. Investigations into the possibilities of incorporating silviculture diagnostic characters were carried out in the Wampit forest.
4. Monitoring of the Oomsis Anisoptera natural regeneration trial was continued for this year.
5. Field trips were undertaken to assess the reforestation requirement of several Southern Highlands Sawmilling companies. A short consultancy was completed for one such company. Other tours were also made of Logging companies at Madang and Momase with overseas experts.

#### Plantation Silviculture.

1. The monitoring of *Araucaria cunninghamii* thinning trials was continued this year and sectional measures were made during the clearfelling operations of some plots.
2. Fact finding field trips were made to the Highlands and Madang to obtain first hand information on the future silvicultural needs of reforestation projects in the province.

#### Species and Provenance Introduction.

1. The first *Eucalyptus deglupta* progeny trial was established this year in the Gogol plantation near Madang. This is the first programme of a series planned for this species for testing the seed orchards and seed production areas based at Bulolo.
2. General Maintenance and routine measurements of species and/or provenance trials were continued at Madang and Bulolo. These include *Acacia*, *Araucaria*, *Anthocephalus*, *Casuarina*, *Cordia*, *Eucalyptus*, *Gmelina*, *Leucaena*, *Octomeles*, *Terminalia*, *Pinus* and several other species.
3. Growth plots were established in Hoop pine planted under exotic pines on less than marginal sites for Hoop pine to monitor their performance using the exotics as a nurse and site amelioration crop.

#### Agroforestry and Community forestry

1. The Mexican giant *Leucaena* fuelwood plots were remeasured and thinned for a second time.
2. The growth and performance of other multipurpose tree species continued to be monitored at Bulolo. However, an Australian *Acacia* fuel wood species trial was destroyed by fire before it could be remeasured.

## Forest Ecology and Environment

1. Eight environment impact studies were carried out by staff in eight different timber concessions throughout the country. These investigations resulted in eight environment plans being drawn up, submitted and approved by the Government.

## Genetic Resources Conservation and Development

1. Collections of both live plant materials and seeds of *Casuarina* and *Paraserianthes* were continued this year and one small collection of a species from New Britain, possibly *Ceuthostoma terminale* was planted for trial and seed production at Bulolo.
2. Further *Acacia* seed collections were made with CSIRO teams in the Western province this year, resulting in substantial collections of *A. aulacocarp* and *A. crassicarpa* as well as *A. mangium*. Seeds from these collections will be sent by CSIRO in 1990 to P.N.G. for the establishment of provenance seed production areas.
3. Provenance seed production areas were established for a Yamuli provenance of *E. deglupta*, a Western Province *A. mangium*, and a West New Britain *Terminalia brassii* at Bulolo. One Madang *Acacia mangium* provenance seed production area was destroyed by fire.

## Seed Production and Improvement.

1. Seed collections this year involved the following species: *Acacia angustissima*, *auriculiformis*, *A. mangium*, *A. aulacocarpa*, *A. crassicarpa*, *Araucaria cunninghamii*, *A. hunsteinii*, *Cordia alliodora*, *E. deglupta*, *Gmelina arborea* and *Leucaena* species.
2. Candidate seed tree selections continued for *Acacia*, *Araucaria*, *Leucaena* and *Pinus*. An update on seed tree location information was started at the end of the year.
3. Work to improve the grounds of the National Tree Seed Centre was continued and the surrounds have been improved considerably. A new mower was purchased. Problems continue to be experienced at intervals with the Hoop pine storage cool room. Additions planned for the New Year will include the installation of a fax. A seed radiography course and a symposium on seed problems was attended by one staff member and arrangement have been made to have two staff attend a training course in Canberra during September 1990.

## BOTANY BRANCH

1. Field collection trips were made to the Hunstein Range (E.S.P.), the Nakanai (W.N.B.), Mt. Otto (E.N.B.), the Lae, Bulolo and Wau areas, the Eastern Highlands, Kutubu (S.H.P.) and parts of the Morobe and Madang Provinces. Botany staff also participated in Environmental surveys during the year.

2. Taxonomic work continued with the revisions of the general Trichospermum, Althoffia, Triumphatta, Musaenda. Preparations have been made to review Sterculiaceae, Pittosporaceae and Spermaceae. The revision on Gnetaceae has been completed.
3. As in the past years the Branch continued to provide the police Force with assistance in the identification of Cannabis material to aid prosecution of drug offenders.

#### Herbarium

1. Identification and curation activities were continued by staff with 1,307 specimens on loan being processed 566 duplicates sent out on exchange and 100 received in exchange with some 438 specimens identified. Current number of mounted specimens stands at 280,000 plus spirit and fruit materials.

#### Research Projects

1. Germination and seedling morphology studies continued with the aim to publish the information in a manual on seedling identification.
2. Phenological studies on rain forest trees was continued for this year. The project is confined to the Botanic Gardens. Further work is planned for other sites.

#### Publications

1. The third volume of the Flora Handbook is with the Publishers and a number of earlier Bulleting are being revised for reprinting. Several Technical papers have been submitted to journals for publications.

#### Botanic Gardens

1. The gardens continued to provide services to the general public in terms of recreational facilities, gardens plants, advice and training for community and vocational schools. Extension services are provided to government departments and companies for Landscaping.
2. Urgent repairs were made to the display shade house and further repairs and replacement are being made to other parts of the display gardens.
3. The gardens continued to maintain an overseas seed exchange programme and some 50 batches were dispatched to organizations around the world and recieved 30 packets in exchange.

#### Training, Conferences and Visitors.

1. Representatives attended four training courses, two symposiums and a 'Heads of Herbaria' meeting. Host countries were: India, Malaysia, Scotland and Australia.
2. Twenty three overseas visitors were received at the National Botanic Gardens and Herbarium during the year.

#### FOREST PRODUCTS RESEARCH BRANCH

##### Wood Presevation

1. Studies continued into Marine borers and protection against Marine bores and Termites. The Marine borer studies are being conducted in coastal regions of the Morobe, East and West New Britain provinces. The termite studies are conducted in the ~~National Capital District~~.

##### ~~Chemistry~~

1. Routine laboratory testing of treated timbers is being continued until an AAS unit is installed.

##### Processing

1. Studies are being conducted on sawmill efficiency, timber drying techniques and timber engineering.

##### Minor Forest Products

1. This section completed a full year on the collection and inventory of Rattan.
2. Surveys of local industries were conducted during the year. These included Gulf and Central Provinces Madang East and West Sepik Provinces.

##### Wood Structures and Properties.

1. The Manual for the Macroscopic Wood Identification manual for Papua New Guinea is now in press.

#### FOREST PROTECTION BRANCH

##### Entomology

1. No monitoring information was received from the Eastern Highlands Department of Forests on *Lymantria ninayi* for 1989. Attempts will be made to establish more reliable monitoring in 1990.



2. Termites attack surveys were established in the Bulolo Hoop pine plantation in November to assess losses due to *Coptotermes elisae*.
3. The Branch participated in environmental surveys during the year, in West New Britain and at Wawoi Guavi. The surveys assessed both variety and abundance of insects.
4. The National Insect Collections accessions continued to increase during 1989 for Butterflies, certain Beetles and Flies. This is partly due to the environmental surveys.

#### Pathology

1. Heart and root rot studies continued for *Acacia mangium*, *Araucaria cunninghamii* and *E. deglupta*. Sample plots are still required for the last species to assess the incidence of heart rot in relationship to site and age.
2. Canker studies continue with *Anisoptera Gmelina arborea* and *Terminalia brassii*. The canker on *Anisoptera* has been identified as *Nectria haematococca*.
3. *Acacia* rhizobia introduction and inoculation trials were established jointly with the Genetics resources section's staff. Initial results from pot trials demonstrated good responses to inoculation attempts and some rhizobia specificity was indicated by these inoculation trials.

#### Fire

No work has been started in this section of the Branch due to lack of additional staff.

資料- 8 アジア太平洋地域林業研究専門家会議 (1989. 8 バンコク) に提出された  
F R I の研究基本方針 (抜粋)

**STATUS, PROBLEMS AND PROSPECTS OF FORESTRY RESEARCH  
IN PAPUA NEW GUINEA**

by

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**FOR: EXPERT CONSULTATION OF ASIA-PACIFIC NETWORK ON  
FORESTRY RESEARCH, BANGKOK, THAILAND.**

**22 - 25 AUGUST, 1989**

## Introduction

Research in forestry is the key to wise management of the country's forest resources. Hence, it is being included in the proposed National Forest Policy. The mandate given to research under this policy is to provide essential support to the operational aspects of the management and utilization of the forest resources under sustained yield basis. This support will be in relation to the following:

- (i) The planned increased rate of forest exploitation and replenishment;
- (ii) the development of scientific techniques for proper management and utilization of the forest resources;
- (iii) better co-ordination of forest and forest product research in the country.

## Background information

Forest research in Papua New Guinea prior to world war II was non-existent. The Division of Forestry at that time was under the Department of Lands and was inadequately staffed and was aimed basically at collecting revenues and assessing the nature, extent and locations of forest resources throughout the country.

After the war however, a start in forest research activities was made in botany following the establishment of a National Botanic Garden in Lae, Morobe Province. Between the late 1940s and the early 1950s silvicultural research was initiated at both Bulolo and Kerevat (see Fig.1). During the late 1960s an entomological unit was also established at Bulolo which later developed into the research station with the inclusion of pathology and silviculture sections. A lowland forest research unit was initiated in the early 1970s at Madang.

About the same time when the research station at Bulolo was being established it was realised that wood properties of PNG timbers required defining and research, hence in 1966 a forest product research centre was built for that purpose at Hohola.

## I. STATUS OF FORESTRY RESEARCH IN PAPUA NEW GUINEA

### 1. Organization of Forestry Research

As of April this year (1989) the Papua New Guinea Forest Research Institute (PNGFRI) came into being, under the Department of Forests, through the Japanese Government Grant in Aid to Papua New Guinea.

Although this Institute is the only one in the country that has its major role to do forestry research there are however, three other institutions which also carry out forestry research activities one way or the other; namely the Department of Forestry (PNG University of Technology), Christensen Research Institute based at Madang, Madang Province and the Wau Ecology Institute based at Morobe Province (see Fig.1).

Within the PNGFRI there are four branches, each with a specific area of research and these are as follows: Forest Botany, Forest Management, Forest Protection and Forest products. For detailed structure see Fig.2.

The major function of the Forest Botany Branch is to increase the awareness and understanding of the country's very diverse flora through botanical explorations to different parts of the country, collection, identification and dissemination of botanical informations and the applications of botanical knowledge for the benefit of the country as well as the propagation of unique plants.

The aims of the Forest Management Branch are to identify suitable species, provenances and varieties of both introduced and native tree species for reforestation, produce improved quality seeds of such trees for use in the country as well as for export, develop timber stand improvement techniques (TSI) and other systems for managing selectively logged forests on sustained yield basis and research on forest ecology and various aspects of logging and agroforestry.

At present the Forest Protection Branch of the Institute has the main task of researching into the problems associated with forest insect pests and diseases. There is no research being conducted into fire protection, though it is expected that such activity will be conducted in the near future.

Finally, the Forest Product Branch has the following functions in so far as its research activities are concerned:

- (i) utilization of PNG timbers with special reference to the lesser known or lesser used species for both domestic and overseas export;
- (ii) develop suitable techniques for improving efficiency in sawmilling, timber preservation, seasoning and grading of sawn timber; and
- (iii) cultivation, management and utilization of minor forest products with the aim of increasing the income for the rural population.

## 2. Human Resources

Currently the Institute is well under staff with a total of 26 professionals comprising 12 scientific officers; all of whom are trained at the first degree level, and 14 foresters trained at both the certificate and diploma levels. In addition, these staff are supported by a total of 45 support staff including the labourers.

## 3. Financial Resources

The total funding for the forest research activities for the current year is K1.186 million (K1 = US\$1.14) an increase of well over 100% from the previous year's funding. Although the availability of funds for forest research has been increasing for the last five years from a mere K334,000.00 in 1985 to well over a K1.00 million in 1989 such increases in real terms are however, minimal in comparison with what the other two Divisions of the Department had. For instance, in this year's budget the research Division (PNGFRI) only received 22% of the total Departmental allocations as compared to the previous year's allocation when the Research Division was allocated about 66% of the total Departmental allocations. Nevertheless, the funds allocated for forestry research are still inadequate considering the number of projects to be carried out by PNGFRI as well as for research travels recruiting additional staff, training, and for purchasing necessary equipments and consumables.

## 4. Facilities and Equipments

The newly established PNGFRI is very well equipped with adequate research facilities, a library, a Scanning Electron Microscope (the only one in the country), a National Herbarium & a Botanic garden, a National Insect Collection, a National Seed centre and two field stations located at Bulolo and Madang. The library is however, still to be stocked. Although such facilities and equipments are available, much of these are not being utilized due to lack of qualified technicians who know how to use them.

## 5. Interaction with other Organizations

Since the inclusion of the Research Division as part of the Department of Forests, much have been achieved in so far as research results are concerned. However, linking the forest research with other research organizations within the country is very minimal, as both in the past and at present such organizations appeared to be isolated within their own Departments or institutions, although they may be addressing the same issues in their respective research activities. This is also true in regard to the Department's interactions with educational institutions, except with its own institution such as the Forestry College at Bulolo. Nevertheless, with the establishment of the PNGFRI remedial measures are now being taken to correct this situation. A number of discussions have been held between the Institute and the Departments of Agriculture & Livestock (DAL), and Environment & Conservation as well as with the Department of Forestry (PNG University of Technology) and both the Wau Ecology Institute and Christensen Research Institute for more dilogue and collaborations in carrying out some of the major researches in the country.

On the other hand, the Division's interactions with external research organizations were apparently well established, such as the various collaborative research programmes being conducted with CSIRO, FAO, UNDP/FAO and JICA. Further, the Institute is currently engaged in securing funds from a number of international organizations such as IDRC, AIDAB, Commonwealth Science Council and WINROCK International to enhance its research activities. Of these organizations IDRC and WINROCK International have already given some funds for specific projects (rattan and multipurpose tree species respectively), while AIDAB and the Commonwealth Science Council together with UNESCO have and/or agreed to fund a number of research projects and workshops which the Institute is contemplating to conduct soon or in the near future.

## 6. Interactions with users of Research Results

Although, research priorities should be established after consultation with users of research results no such consultations were held previously and that only the Government, through the Department of Forests, institutes such priorities. As a result very little research results have been used by the forest industries. However, with the recent establishments of the Forest Industry Association (FIA) and the Forest Industry Council of PNG (FIC), these have greatly increased the awareness of the need to use research results for optimizing the industry's economic benefits. Nevethless, this realisation is still at its infancy and that the industry has yet to comprehend a number of very recent interesting results being attained by the Research Division, such as in the area of logging techniques and planning.

## 7. Current Research Programmes

The Research Division, since 1986, had drawn up a five year research programmes for implementation (see Annex.2). However, due to both financial and manpower problems a number of the planned programmes were not being carried out. Nevertheless with the establishment of PNGFRI and its facilities some of those planned programmes will now be implemented and will be included with those currently being conducted. Those projects which are presently being carried out include the followings:

- (i) Study of the country's flora;
- (ii) Plantation silviculture with emphasis on growth performances of different exotic and native valued tree species, development of nursery techniques, field trials of improved provenances;
- (iii) Agroforestry trials;
- (iv) Tree improvement and seed technology;
- (v) Natural forest silviculture with emphasis on phenology, floristic composition of logged over areas, survival, growth and yield;
- (vi) research into wood preservation, especially for the lesser known timber species and natural resistance of wood from termite attack;
- (vii) Studies of wood structure and properties;
- (viii) Intensive research into the utilization of rattan and chemical use of the lesser known species;
- (ix) Examination of the efficiency of sawmilling and the improvements of seasoning practices for sawn timbers;
- (x) Studies into insect pests and fungal diseases of both plantation and natural forest tree species.

Following the recent changes in the Government Forestry Policy as well as the finalisation of some of the long established research programmes and the limited resources, the five year research programmes are currently being under review.

## 8. Research Priorities

With the establishment of the PNGFRI the role of co-ordinating various forest research activities will now be one of the Institute's main tasks.

In view of the current Government's policies as stipulated in the draft Forest Policy and regulations, the Institute's future research priorities will be directed towards the following areas:

(i). The productivity and silviculture of the residual stands in logged over forest areas

Because there already exists over 2.0 million ha of logged over forests throughout the country research studies have to be conducted to determine the residual stands' conditions and requirements for maintenance, and where possible increase their productivity. Further, there is an urgent need to improve current logging practices in order to minimize damage to residual trees and protect the environment.

Since much of the country's forest resources are traditionally owned, it is essential that the land owners are informed about their forest value and the income that they can generate from it, through proper planning and management. The essence of concentrating research activities on the residual stands is that they will comprise the next harvest.

(ii) The promotion and development of natural and artificial regeneration

This is a vital area for research as the yields of exploitable timber are derived from seedling and sapling regeneration, and at best will not be available for harvesting for at least 25-30 years (for fast growing species) and in the case for the more valuable and slow growing species, a period of between 50-70 years is forseen. Artificial regeneration by enrichment planting with either the fast growing general purpose species of value that may be required in areas subject to repetitive logging or utilized for shifting cultivation.

Promotion of secondary species and minor forest products are seen a opportunities not only to increase the income from the forest, but also to offer a means of carrying out some silvicultural treatments as cheaply as possible.



Improvements in all aspects of logging are needed to provide not only the financial, but importantly the silvicultural and ecological benefits. Hence, development of applied research is seen here as a means of assisting the logging companies to increase their efficiency and reduce their operational damage to the forest environment.

(iii) Basic research studies of silviculture, stand development and management of natural forests

Ecological studies of natural succession and their application to forest management systems, studies of site characteristics and quality changes will allow further improvements to yield control and estimates. Detailed examination and studies of forest injuries will provide information to predict more precisely and reduce natural losses in growing desirable commercial tree species.

Studies of other available forest products will further increase the potential value of the forest providing additional employment, income and incentives to maintain and protect the forests.

(iv) Environmental impact assessments

Although this area of research impinges into the responsibilities of the Department of Environment & Conservation, it is important that the research Institute be responsible in carrying out such an activity. This is especially apparent when one considers the fact that the Department of Forests is responsible in conducting forestry surveys prior to such areas being declared a Timber Right Purchased area or otherwise for development and that it is only proper that an environment study be done at the same time of surveying. Hence this would provide the Department of Forests the necessary information and data for which it can monitor and evaluate the impact of logging operations on the environment as well as to plan for the management of the forest under sustained yield basis.

Further, this would also save the Department more time in getting its forest development projects off the ground. However, this area of research will require co-ordinated efforts between the various divisions of the Department, especially research, resource planning & management as well as inputs from the related Government Departments and agencies or the research institutions. It is from this sort of collaborations that some meaningful and viable followup landuse plans can be drawn up and implemented.

(v) Sociology

Applied research into social aspects of forestry may seem to be out of forestry's main operational activities however, social issues such as the unique land tenure system in the country (where almost 90% of the land is traditionally owned), population growth, forest use and employment are so important that they cannot be ignored. This is so when considering the management of the forests under sustained yield basis is the focal of the new Government Forest Policy.

The most rewarding approach for research in this subject area is to monitor social impacts of ongoing timber projects throughout the country and develop feedbacks and adjustments to guide future development programmes.

(vi) Social Forestry & Biotechnology

These two areas of research have been considered, but have been deferred until such time the institute is able to recruit more staff who are better qualified to do research in such areas.

## 9. Forest Genetic Research

During the last 30 years or so, major research efforts were put into different aspects of plantation forestry. In order to improve product quality of seeds and increase genetic base, seed collection expeditions were carried out for Eucalyptus deglupta, Acacia spp., clonal and seedling seed orchard of Pinus patula, Araucaria spp., P. caribaea, P. merkusii, Tectona grandis, E. deglupta and seed production stands of P. chiapensis and Acacia spp., were established. Seeds of a number of species have been supplied for research and commercial planting both within the country and abroad. A National Seed Centre has already been established with the aid from the New Zealand Government. Species and provenance trials involving E. deglupta, T. grandis, Araucaria spp., Gmelina arborea, Acacia spp., Pinus spp., leucaena spp., and varieties were also conducted. Nursery techniques have been developed for most of the species mentioned above.

Tree Improvement and Seed Technology: Important projects in this Section include seed collection, establishment and management of seed production of stands of various Acacia spp. with financial support from UNDP/FAO; provenance trials of E. deglupta, P. patula, P. chiapensis, Terminalia brassii, T. impediens, C. alliadora, Peraserianthes falcataria, Anthocephalus chinensis, progeny trials of P. caribaea, P. merkusii, Araucaria spp., E. deglupta, seed germination and storage tests of important timber species - both native and exotics - management of seed orchards and seed production stands, and sales and exchanges of seeds of commercial species for research and commercial planting.

## 10. Important Results Achieved so far

Since the establishment of the numerous forest research stations and centres at different locations with different activities and aims, a number of achievements have been made. For example, in forest management research a number of species suitable for reforestation of logged over areas and afforestation of degraded areas with different site conditions have been determined. Nursery and plantation establishment techniques have been developed, provenance trials established and completed for a number of species, the establishment of clonal and seedling seed orchards with seed production stands, and the improvement of seed quality were accomplished. Further, studies into logging methods and planning have been completed and are to be incorporated in the forest policy.

For forest protection attainments were made in the following areas: collection and preservation of well over 40,000 forest insect specimens and identification of both past and present insect pests as well as fungal pathogens. A shiitake mushroom project was initiated at Bulolo forestry research station and was proved so successful that it was transferred to the Southern highlands province to be continued on a commercial basis.

In regard to the forest products researches achievements were made in the successful introduction and application of dip-diffusion treatment techniques, promotion of simple but effective methods of wood preservation and utilization in rural areas. The Branch has been actively participated in promoting PNG timbers as well as promoting the use of minor forest products both internally and overseas. Further, the Branch has successfully completed a book on micro-identification of all commercial timbers and also offers identification services to the industry and the public. The publication of "Commercial Timbers of PNG" was the result of a successful study into the pulping of selected PNG hardwoods and the characteristics and end use of many other timber species in collaboration with CSIRO. The Branch has also published more than 10 manuals for the public and industry in areas of timber preservation, utilization seasoning and on minor forest products.

For the Botany Branch well over 280,000 plant specimens from all over the country have been collected, identified and preserved in the National Herbarium at Lae. The establishment of the two National Botanic Gardens based at Lae and Port Moresby containing various living plant specimens from all parts of PNG and some from overseas countries is another attainment of the Branch. A number of publications resulting from various collaborative researches have been achieved which include the following:

- (i) Botany Bulletins (13 Vols.)
- (ii) Handbooks of the PNG flora (3 Vols.)
- (iii) Tropical forest research notes.

The Branch has also provided a lot of field assistance in tree identifications during numerous field expeditions and field surveys and has continued its assistance to the police in positively identifying plants which are used as drugs.

## II. PROBLEMS OF FORESTRY RESEARCH

Like any other Research Institute within the Asia-Pacific region the PNGFRI has so many problems and obstacles which hinder much of the research activities that are or will be implemented. However, the most pertaining ones are the lack of trained manpower, finance and the availability of land for conducting research.

As mentioned earlier, most of the professional research staff of the Institute have either only gained their first degrees, diplomas or certificates and in most instances lack the experience to conduct research of their own. Quite a significant number of these officers, and especially those with forestry diplomas or certificates are old, and are finding it difficult to go and further their studies. While those who are young lack the experience and some even lack the drive to do research independently from their immediate supervisors or to further their education. Nevertheless, there are others who are young and are motivated to further their studies and learn, but are hampered through lack of scholarships and also by various bureaucratic red tapes. Currently there are limited scholarships and fellowships available and thus very difficult to obtain.

Finance is another problem area which is currently hampering our attempts not only to recruit new members of staff, but also for their training and increase research activities either in terms of travelling to study sites or purchasing essential supplies and consumables. As mentioned earlier, the Institute's financial allocations are very minimal in real terms when considering the current inflation rate (12%) the country is facing.

Since almost 90% of the land is traditionally owned, long term research is rather limited. This is because if the land is not alienated by the state, but rather on lease or other sorts of arrangements from the landowner for research purposes, it may be taken away by the landowner for other uses. However, unless the landowner is fully compensated for the use of his land or if such research can produce some short term benefits to the landowner and/or involved the landowner, some success may be made in ensuring that the land to be used for research is secured. Another alternative would be for the state to purchase land and be given to the Institute for the purpose of forestry research.

### III. PROSPECTS OF FORESTRY RESEARCH

The future for the PNGFRI and its research programmes are looking bright and encouraging. For a start, the institute's proposed staff structure together with the requested increases in staffing have been approved by the Department of Personnel Management. Hence next year the Institute will commence its recruitment of new staff, upgrading of the present staff positions and implement the approved structure as shown in fig.2. Further, a review of the current research programmes is underway with the objective of removing those current projects which are no longer required or are not being prioritised. In addition, new projects will be considered for inclusion in the revised programmes, especially those in community forestry and biotechnology.

Because of the country's unique land tenure system, the Institute will recruit a social scientist early next year to assist in the agroforestry project being conducted. This social scientist will also be involved in research extension and liason with the industry as well as in assessing social issues presently being experienced in most of the forestry development projects throughout the country as well as in land purchases. Further, he/she will be engaged in the evaluation of the environmental impacts of such projects.

The Institute's involvement in a major agroforestry research programme with DAL is already in progress and that its collaboration with WINROCK International will further enhance this project.

The PNGFRI will, in the future, play a major leading role in the Pacific subregion in coordinating and implementing the draft Forest Action Plan (FAP) which were drawn up in June, 1988 at Lae, Papua New Guinea.

These FAP are as follows:

A. EDUCATION, TRAINING AND CO-OPERATION AMONG THE COUNTRIES IN THE PACIFIC REGION

This was emphasised as an important priority area for enhancing manpower capacity for each member country and the region as a whole for better management of their respective forest resources. This could be achieved through:

- i) development of appropriate training courses for all levels of forestry and forest resource management.
- ii) identification and promotion of collaborative researches.
- iii) organised Seminars/Workshops for decision makers, planners, resource managers, owners and users.

B. ESTABLISHMENT OF AN INFORMATION AND AN EDUCATION CENTRE AT THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY FOR THE PACIFIC COUNTRIES

Discussions on this recommendation brought out the following:

- i) Collaboration with other institutions in the region, especially the University of the South Pacific (Fiji), University Papua New Guinea, Bulolo Forestry College (PNG), PNGFRI and various National Forestry Departments within member countries.
- ii) Develop library resources.
- iii) Initiate a quarterly circulation of contents of journals and provide a copying service for requests of articles for research and development.
- iv) Establish a school for tropical rain forest studies.

C. ESTABLISHMENT OF A TROPICAL RAIN FOREST  
STUDIES CENTRE AT THE PNGFRI LAE FOR THE  
PACIFIC SUB-REGION

This Centre would:

- i) identify and direct resources
- ii) promote the view of rain forest studies as a total resource and thus promote the development of research studies leading to a broad concept for ecosystem management.
- iii) affiliate with research individuals or Institutions both within and outside the region.

Apart from the above recommendations it was agreed that a framework for a Forest Action Plan for the Pacific Countries be drawn up with linkages between countries both within and outside the region and co-operations with International organisations for financial and technical support.

This action plan will provide an overall policy framework for the region, but specific projects will be relevant to subsets of the countries in the region. The projects were drawn up in such a way that they are flexible enough to cater for the varying needs and resources of the member countries. These Forest Action Plans are given in Annex. 3.

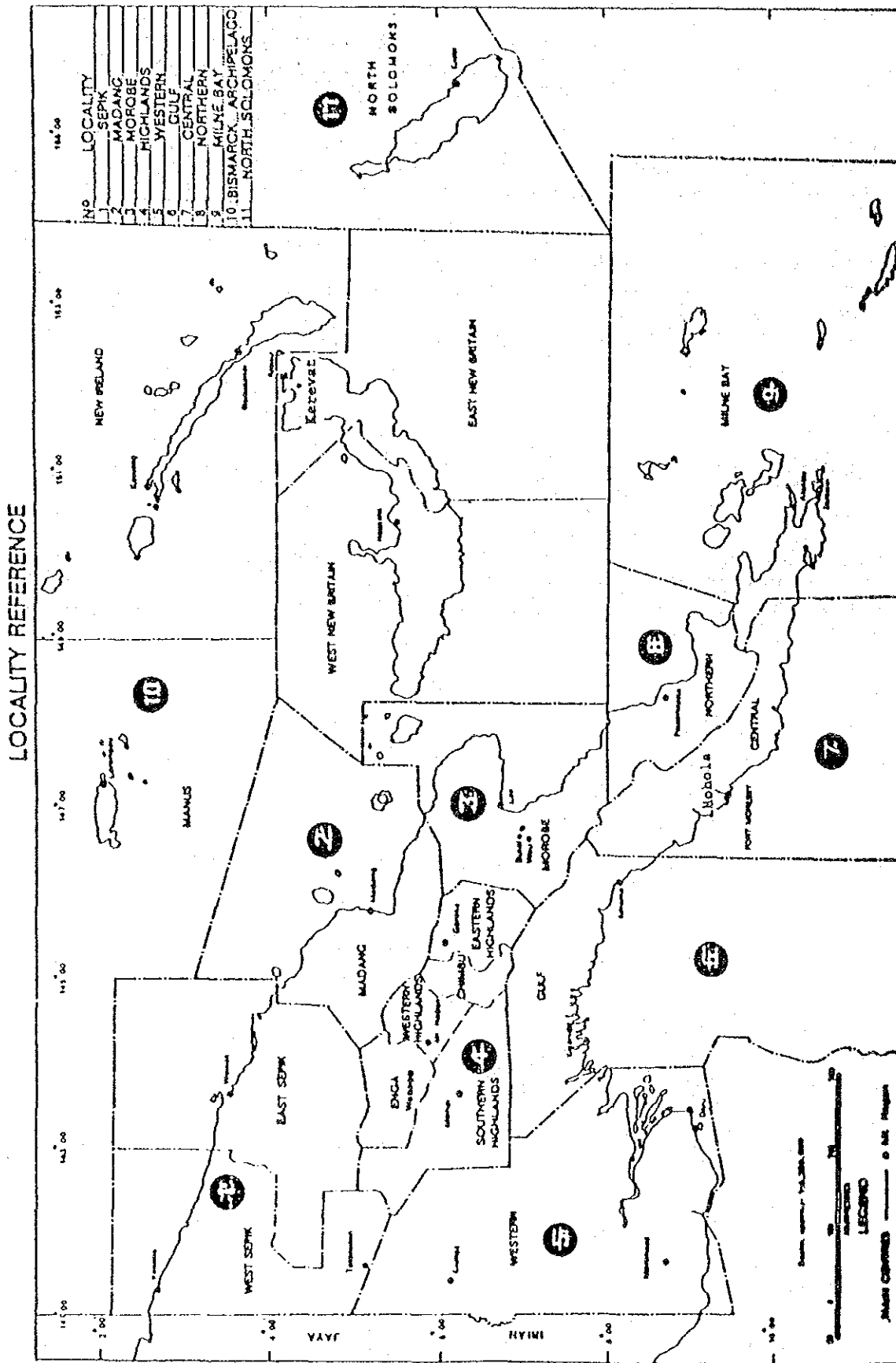
#### IV. IMPROVING THE EFFECTIVENESS OF FORESTRY RESEARCH THROUGH INTERNATIONAL ASSISTANCE

Due to lack of adequate finance and skilled manpower a number of research activities are currently not being implemented. Nevertheless, they could be executed and pursued if international assistance is provided either in the form of direct funding or through technical consultations. However, from previous experiences it would be more preferable if such assistances are given without much dictatorial directives as to how programmes are to be conducted, but left to the implementing institute to implement according to its capabilities.

On a regional basis, if such international assistance are provided, a co-ordinating unit is required which should be based in one of the forestry research institutions in the region. This co-ordinating unit should then be able to form a regional research committee comprising representatives from the various forestry research institutions in the region. Such committee would be in a position to screen numerous research applications from member institutions and discuss problem areas common to all which could then be submitted to the international agencies providing such assistance as well as raising the issues to their respective Governments for action.



Figure: 1



THE MINUTES OF DISCUSSIONS ON  
THE FOREST RESEARCH PROJECT IN PAPUA NEW GUINEA

The Japanese Consultation Team ( hereinafter referred to as "the Team" ) organized by the Japan International Cooperation Agency and headed by Mr. Jun-ichi KONUMA, visited Papua New Guinea from April 9 to April 21 for the purpose of reviewing past activities and working out the details of implementation plan of the above-mentioned Project.

During its stay in Papua New Guinea, the Team has carried out a field survey and held a series of discussions with the authorities concerned of the Government of Papua New Guinea.

As the result of the survey and discussions, the Team and the Papua New Guinea authorities concerned agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

Port Moresby, Papua New Guinea

April 20, 1990



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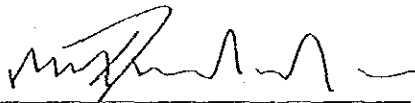
Mr. Jun-ichi Konuma  
Leader,  
Consultation Team,  
Japan International Cooperation  
Agency, JAPAN



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Mr. Christopher Mero  
Assistant Director,  
Office of International Development  
Assistance,  
Department of Finance & Planning,  
Papua New Guinea

Witnessed by



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Mr. Michael Komtagarea  
Secretary,  
Department of Forests,  
Papua New Guinea

THE ATTACHED DOCUMENT

1. Research activities

Item	Japan Fiscal Year	1st 1989	2nd 1990	3rd 1991	4th 1992	5th 1993
I Forest Research						
1 Nursery practice, planting and tending						
1) Improvement and enrichment of forest stands						
2) Tree breeding and progeny testing						
3) Mycorrhiza inoculation and Acacia Rhizobium introduction						
2 Seed technology of major species						
Seed technology of main plantation and natural forest species						
3 Soil classification and soil fertility						
Genesis and characteristics of forest soil in PNG						
4 Forest entomology and insect control method						
Impact of insects on main tree species						
5 Forest pathology						
Root and heart rot of commercial tree species						

Item	Japan Fiscal Year	1st	2nd	3rd	4th	5th
		1989	1990	1991	1992	1993
II Forest Products Research						
1 Wood preservation						
1) Treatability studies of lesser used species						
2) Performance of CCA pressure treated timbers in marine environment and inspection of waterfront structures						
2 Chemical properties of major and lesser-known species						
1) Fundamental procedure for wood chemistry						
2) Wood extractives						
3 Physical and mechanical properties of tree species						
1) Physical properties of lesser used species						
2) Mechanical properties of lesser used species						
4 Wood seasoning and sawmilling techniques						
1) Assessments of sawmilling practices and their efficiency						
2) Assessments of seasoning practices and their efficiency						
3) Wood machining properties						

2. The Papua New Guinea side strongly requested the research on natural forest dynamics.

In response, the Team resolved to consider the request as a topic of examination and to convey the fact of the request to the Japanese Government.

3. The Papua New Guinea side will secure land for nursery on the premises of Forest Research Institute, Lae, and for experimental forests at Bulolo Forest Research Station by June 30, 1990.



資料-10 部屋別機器設置図及びリスト

INDEX NO.	ROOM NO.	DESCRIPTION
1.	24	CHEMICAL BALANCE ROOM (天秤室)
2.	30	CHEMICAL STORE (実験器具洗浄室)
3.	33	ELECTRIC MICROSCOPE ROOM (電子顕微鏡室)
4.	49-1	METEOROLOGICAL ROOM (気象観測室)
5.	50	MAPPING & SURVEY LABORATORY (地図・測謬実験室)
6.	51.52	MICRO-PROPAGATION (組織培養実験室)
7.	53	SEED LABORATORY (種子実験室)
8.	54.55	SOIL & PHYSICAL LABORATORY (土壌物理実験室)
9.	57.58	AUTOCCLAVE ROOM & MUSHROOM LABORATORY (滅菌室/きのこ実験室)
10.	62	NON-DECAY LABORATORY (樹病実験室)
11.	63	DECAY LABORATORY (腐朽菌実験室)
12.	64	PLANTATION/NATURAL FOREST ENTOMOLOGY LABORATORY (人工林天然林昆虫実験室)

INDEX NO.	ROOM NO.	DESCRIPTION
13.	65	FOREST PRODUCTS ENTOMOLOGY LABOLATORY (林産物昆虫実験室)
14.	67	INCECTICIDAL LABOLATORY (殺虫剤実験室)
15.	68	NATIONAL INSECT COLLECTION (国産昆虫標本室)
16.	72. 73	WOOD ENGINEERING LABOLATORY (建材性能実験室)
17.	78	WOOD STRUCTURE & SAMPLE PLEP ROOM (木材組織実験室)
18.	79	CHEMISTRY LABOLATORY (化学実験室)
19.	80	MINOR FOREST PRODUCTS ROOM (特殊林実験室)
20.	OUTSIDE	NURSERY HOUSE & STORE (育苗室/倉庫)
21.	OUTSIDE	EXPERIMENTAL TREATMENT PLANT

**ACTIVITY 1: FOREST RESEARCH SERVICES - (3) 101**

.. Expenditure (in thousands of Kina)

Expenditure Items	Appropriation	
	1989	1990
<b>100 CURRENT EXPENDITURE</b>	<b>1,186.2</b>	<b>1,128.1</b>
110 Personal Emoluments:	746.9	822.0
111 Salaries and Allowances	593.5	601.4 ✓
112 Wages	114.6	182.9 ✓
113 Overtime	5.2	-
114 Leave Fares	33.6	37.7 ✓
120 Goods and Other Services:	191.7	285.0
121 Travel Expenses	29.0	48.6 ✓
122 Utilities	30.0	61.1 ✓
123 Office Materials and Supplies	14.0	13.0
124 Operational Materials and Supplies	14.5	29.4
125 Transport and Fuel	90.7	69.3 ✓
126 Administrative Consultancy Fees	-	10.0
128 Maintenance Expenses	-	5.0
135 Other Operational Expenses	13.5	48.6
140 Current Transfers:	247.6	21.1
141 Retirement Benefits, Pensions & Gratuities	47.6	21.1
143 Grants to Public Authorities	200.0	-
<b>200 CAPITAL EXPENDITURE</b>	<b>-</b>	<b>54.7</b>
220 Capital Formation	-	54.7
224 Plant, Equipment & Machinery	-	54.7
<b>Grand Total:</b>	<b>1,186.2</b>	<b>1,182.8</b>

B. Other data ... 1990

1. Average Staffing: 58 -- Managerial: 6 - Scientific: 17 - Forester: 21 - Administrative: 9 - Technical: 5
2. Labourers: 45
3. Additional Inputs from External Grants: T.A. - Government of Japan: 120 man-months, vehicles: 3 - Government of Canada: 12 man-months
4. Main Performance Indicators/Targets: 151 research & analysis projects and 40 field visits.



TABLE 1: RESEARCH PRIORITIES FOR 1989/90.

Section	Research Priorities	
Preservation	Performance of BFCA treated timber	
Mr.C.Konabe & B.Vali		
Mr.C.Konabe & B.Vali	Treatability of lesser known species	
Mr.C.Konabe & M.Rokova	Natural durability of PNG timbers against termites.	
Mr. J.Aruga & B.Pul	Assessment of plastic sheathing for marine piles.	
Mr. J.Aruga	Performance of treated timber in marine environments.	
Mr. C.Konabe	Prophylactic treatment of logs and sawntimber.	
Mr. J.Aruga	Taxonomy, systematics and ecology of marine borers.	
Chemistry	Qualitative and quantitative analysis of wood preservatives	
C.Pillotti & C.Mairi		
		Distribution of CCA preservatives in selected PNG hardwoods
		Chemical properties of Lesser Known Species
	Natural biocides	
Wood Processing	Sawmilling and seasoning practices and their efficiency	
J.Bori & J.Mamun		
	Mechanical properties of natural and plantation species	

Wood Structure & Properties	Physical properties of Lesser Known Species
Dr. Amoako & A.Aglua	Wood quality studies of selected PNG plantation species
	Preparation and promotion of PNG Timbers
	Preparation of Timber Identification Manual for PNG
Minor Forest Products	Assessment of Rattan resource and its Utilisation
Mr.M.Kabaru & M.Niangu	Anatomical and physical properties of rattan
	Establishment of rattan gene pool and seed wildings

### 3.2 Constraints on Research Activities.

Some of the major drawbacks to the implementation of research activities are financial and manpower constraints as well as equipment backup. These constraints are in some respect inevitable and in most cases research activities have to be carried out with whatever is available. Forest Products has been engaged in collaborative research with some overseas organizations, institutes and individuals in the past. Such organizations as CSIRO, IRG/WP, and AIMS, have contributed considerable efforts in the establishment of collaborative research with the Branch. National organisations which helped to enhance research efforts include PNG Harbours Board, PNG Electricity Commission, National Housing Commission, PNG Forest Industries Council and Department of Works.

### 3.3 Man power Constraints.

The branch currently is staffed by eight (8) Scientific Officers. Of these officers, one is an expatriate officer who holds a PhD. in Wood Engineering. By March, 1990, the branch will have two national officers who will have obtained post-graduate qualifications to MSc. degree level, both of whom will be specialised as Timber Technologist and Wood Chemist respectively. The rest of the officers have a first degree in either Forestry, Timber Technology, Science or Agriculture.





JICA