

Report of the workshop to identify uses and values of cutover natural forest in Papua New Guinea

Papua New Guinea Forest Research Institute Meeting Room 2

13-14 March 2008, Lae, Papua New Guinea

ACIAR project FST/2004/061

Prepared by

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Introduction and objectives

Forest resources are a major contributor to different sectors of the Papua New Guinea (PNG) economy. They also play a vital role in sustaining the traditional subsistence livelihoods of most of the population and contribute significant environmental values. Forests also contribute revenues to government and communities. For example, the log export industry contributed some 200 million kina to the national economy in 2003. Unfortunately, the current level of harvesting by the log export industry is unsustainable and accessible primary forest is likely to be logged out in the next 15 years. An economic challenge thus looms for PNG as revenues from log export based on primary forest dwindle. Other forest values may also be compromised.

Properly managed, however, PNG's forest resources have the capacity to continue to make a major and sustainable contribution to the PNG economy, while maintaining many of the other values that PNG society values from their forests. The Australian Centre for International Agricultural Research (ACIAR) supports research in agriculture and natural resources between institutions in Australia and in developing countries. ACIAR has a major commitment to PNG and its forestry strategy, developed in collaboration with PNG colleagues, is designed to promote the attainment of a positive vision for PNG forestry.

Most logging in PNG forests has been selective, with not all trees removed during the harvesting operation. Cutover forest varies in condition and production potential, depending on the nature and timing of previous harvesting and the recovery rate of the forest. Because they are generally the most accessible and some of the most productive forest in PNG they will form a major part of the future estate for timber production. Some areas have been subject to further harvesting in larger scale or small scale operations. This project, a key element of the ACIAR strategy for PNG, is aimed at improving the contribution that these 'modified' natural forests make to national and local economies through development of appropriate strategies for their management and marketing.

The workshop described in this report had the objective of reviewing the status and prioritising attributes and values of secondary cutover forests. The 23 participants comprised stakeholders in the management of cutover forests. A précis of each workshop presentation is provided, and concluding comments on workshop outcomes provided.

Participants

Rod Keenan	University of Melbourne (UM)
Julian Fox	University of Melbourne
Cris Brack	Australian National University (ANU)
Peter Mussett	The Woodage
Joe Pokana	PNG Forest Research Institute (FRI)
Martin Golman	PNG Forest Research Institute
Kuncey Lavong	PNG Forest Research Institute
Terry Warra	PNG Forest Research Institute
Francis Inude	Village Development Trust (VDT)
Steven Yandima	Village Development Trust
Kentis Igai	Village Development Trust
Rabbie Lalo	PNG University of Technology (PNGUT)
Mex Peki	PNG University of Technology
Emaus Togu	Madang Timbers
Cosmas Makamet	ForCert
Peter Damm	ForCert
Ripa Karo	PNG Forest Authority (PNGFA)
Goodwill Amos	PNG Forest Authority
Gabriel Samol	PNG Forest Industries Association (PNGFIA)
Yati Bun	Foundation for People, Community Development (FPCD)
Guy Maxau	PNG Department of Conservation
Bob Johns	Cambridge University



Figure 1. Workshop participants

Status of cutover forests

Ripa Karo PNGFA

Using statistics from 2002, PNGFA estimate that undisturbed forested areas in PNG cover an area of 29,679,736 hectares whilst cutover forest comprises 3,385,264 hectares. It is clearly a large (10% of forested areas) and important part of the resource, but is considered to have no current potential for timber production, from an industry point of view, and is assumed to be degraded. In the Momase Region (Morobe, Madang & Sepik Provinces) cutover areas comprise 548,982 ha. Assessment of this largely unknown resource is required to explore future options for management and production. PNGFA's capacity to assess this resource and other forest resources is limited by out-of-date spatial data, and limitations imposed by the use of hardcopy maps and plans in the current planning process. Remote sensing coupled with ground based GPS of cutover areas is an obvious way forward. These limitations will be ameliorated by capacity building work undertaken as part of FST/2004/061.

Methods for assessment of the condition of cutover forests

Julian Fox and Rod Keenan UM

Methods for assessing cutover forest will use remotely sensed images that can be used in the first instance to classify the forest according to intact canopy density, and in the second instance for predicting forest attributes such as timber volume, biomass and possibly carbon. Preliminary work will involve a classification of cutover forests in the Momase region using LANDSAT and ASTER images and Forest Canopy Density Mapper software developed by International Tropical Timber Organisation (ITTO). Proposed case study areas are the Yalu, Gabensis, and Sogi community operations overseen by Village Development Trust. Francis Inude will collect baseline information on these community operations.

Future work will involve the prediction of forest attributes from remote sensing; a preliminary study indicated that volume on permanent sample plots (PSPs) was related to Radar Backscatter from the JERS-1 satellite and BIOCLIM climatic variables. Utilising such relationships will facilitate the prediction of attributes such as volume across cutover forests. Ground truthing for case-study areas will be required to ensure predictions are defensible. This information will be valuable for community forestry operations, particularly in the form of maps that can be used to improve on-the-ground management.

A limitation to this work is the absence of spatial information for 75% of PSP plots. Without spatial information, the PSP data cannot be related to remotely sensed images and other spatial datasets.

PSP sampling program

Joe Pokana FRI

A large PSP program in cutover forests has been undertaken by PNG Forest Research Institute (FRI) with the objective of monitoring growth & yield, forest dynamics, and the recovery of the forests following commercial harvesting. The program was initially funded by ITTO commencing in 1992, and now

consists of 135 plots that covers major forest types & provides good spatial coverage of PNG. Data for PSPs is stored in the PERSYST database, and has been used in developing the PINFORM growth model. The ACIAR project FST/2004/061 is providing funding for ongoing measurement of PSP plots.

Market prospects for PNG timbers from cutover forests

Peter Mussett The Woodage
Emaus Tobu Madang Timbers
Gabriel Samol PNGFIA

For cutover forests, minor and secondary timber species will become important, and there are market prospects for these timbers particularly when marketed as a certified or community based fair trade product. It is also likely that primary timber species such as Kwila will have been removed in selective logging operations. The Woodage has had success with species such as Taun, Blackbean, and Kamerare, and these species should be available in cutover forests. FSC certified timbers attract double the price of uncertified product, e.g., The Woodage pays \$900/m³ at the wharf for FSC certified Kwila compared to Madang Timbers who sell uncertified Kwila for \$440/m³. The Woodage also pays \$600/m³ for community based fair trade Malas. See Table 1.

Madang Timbers process local timbers into sawn products for export to Australia and Europe attracting \$440/m³ for Kwila and \$290/m³ for mixed species. Madang Timbers is currently operating in Sogerum TRP (50,000 ha) that consists of 40% Kwila with remaining volume consisting of lesser species such as Taun, Malas, Gero Gero, and Walnut. The Sogerum TRP was allocated to Madang Timbers on the basis of 42 m³/ha, but only 10-12 m³/ha is being utilised. Assessment methods used by PNGFA need to be improved to ameliorate these disparities. Currently Madang Timbers only cuts stems above 60cm DBHOB; analysis in an earlier ACIAR project indicated that there is a lot of volume in the 50-60cm diameter class. This may explain the disparity between predicted and realised volume on the Sogerum TRP.

Madang Timbers have discussed certification with SGS, who indicated that it would prohibitively expensive for a medium sized operation.

Table 1. The outcomes of discussion of market prospects for timber from secondary forest.

Common name	Scientific name	Certified price*	Uncertified price*	Properties	Uses
Well known timber species					
Kwila	Intsia bijuga	\$900/m3	\$440/m3	Durable Colour Stability Workable	Furniture (indoor/ outdoor) Flooring Doors Cladding
Rosewood	Pterocarpus indicus				
Walnut	Dracontomelon dao				
Black bean	Castanospermum australe				
Red Cedar	Toona sureni				
Lesser known timber species					
Malas	Homalium foetidum	\$600/m3	\$290/m3	Unknown until tested	Joinery Unknown until tested
Taun	Pometia pinnata				
Vitex	Vitex				
Dillenia	Dillenia papuana				
Kamerere	Eucalyptus deglupta				
Terminalia	Terminalia				
Callophyllum	Calophyllum				

* Certified price paid by the Woodage at the wharf, Uncertified price sold at the wharf by Madang Timbers

PNG Forest Industries Association is advising companies that they need to change current patterns of unsustainable utilisation, and is exploring certification as a possible approach on behalf of companies, although certification will be difficult and expensive for medium to large scale operations. Cutover forest is assumed to have no timber products from an industry point of view.

Uses of cutover forests (Group exercise)

The following uses of cutover forest were identified in the group brainstorming exercise: Agriculture – Large scale, community gardens; Timber – Poles, sawn timber, export, local use/construction (canoes); Building materials, fuelwood; Rattan, Bamboo, Eaglewood; Medicinal plants; Fruits, Nuts; Wildlife conservation, wildlife for food, hunting, fishing; Carbon storage; Water; Conservation/passive management; Cultural history, educational values,

scientific study; Artefacts /carving /billums/ baskets; Soil protection; Reforestation; Ecotourism, recreation (bushwalking/driving); Butterfly, insect collection; Spiritual values; Settlement; Mining

This group exercise was designed to identify the major potential uses of cutover forests for communities in different forest situations. The group was divided into 3 smaller groups who were asked to assume the outlook of a community group in 3 different remoteness categories;

1. A remote community (more than 1 days walk from a main road, more likely 2-3 days walk)
2. A moderately accessible community (access to a road, but some distance from a town)
3. An accessible community (on a main road & near a town)

Each group was asked to consider the uses of cutover forest (identified in the previous exercise) in the context of 3 condition classes;

1. Forests with intact structure and sufficient growing stock for a harvest in 10-20 years
2. Forests with some disturbance to the canopy and adequate regeneration, but will not provide a harvest for more than 20 years
3. Forests with inadequate regeneration, high disturbance and needing rehabilitation

This information was compiled on butcher's papers, and individuals were then asked to vote (using coloured dots) on what they think is actually happening, and what they think should happen. Full results are detailed in appendix XXX,

Several general rules were identified in the exercise;

- Accessibility determines if the community can be involved in cash economies; accessible communities will have access to this economy and a ready market for their agricultural and other produce from the forest.

- Accessible and moderately accessible communities may convert their cutover forest to large-scale agriculture such as oil palm (West New Britain).
- Remote communities have no access to the cash economy, and will be largely using their cutover forest for subsistence purposes, or selling their timber resource to logging companies.
- As we moved from forest type 1 (intact) to forest type 3 (degraded), possible uses became more restricted.
- Generally forest type 1 & 2 had similar uses and could be grouped – perhaps a single distinction should be made between intact cutover forest and degraded cutover forest. What is the threshold that switches forest from intact to degraded? Could this threshold be estimated from the percentage of intact canopy density.

Inventory of cutover forests

Cris Brack
Peter Dam

ANU
FORCERT

Strip-line inventory methods current used in PNG forest planning and in certification inventories are biased in that they sample only a restricted area of the resource. The current 1% strip-line inventory prescribed in PNG's forestry legislation is also unnecessarily labour intensive. This is in contrast to more random inventory methods such as cluster sampling that provide an unbiased and more efficient assessment of the resources available in an area. There is considerable scope to improve current inventory methods as part of the ACIAR project FST/2004/061.

FORCERT follow prescriptions detailed in PNG's forestry legislation; 1% strip-line survey to initially estimate the forest resource, followed by 10% strip-line survey of 5 year working area. There is scope to adjust this for improved efficiency and to achieve an unbiased estimate.

In FORCERT operations, community groups create a map of their forest on the ground, and discuss possible management options based on this. This is

then transcribed to a paper map by FORCERT staff. If a map (perhaps an A0 laminated map) of the forest resource and information on attributes such as timber volume were available it could enhance community forest planning.

Models for different scales of utilisation

Julian Fox and Rod Keenan *UM*

Forest growth models are the cornerstone of sustainable forest management, and the network of PSPs provide considerable scope for the development of growth models for PNG. The existing growth model (PINFORM) was developed using only the first 5 years of measurement, and is relatively inflexible in application. It is proposed that new growth models that match the scale of forest utilisation in PNG are developed as part of ACIAR project FST/2004/061. Forest utilisation in PNG is increasingly occurring at the community level with small-scale operations using 'wok-about' sawmills to extract individual trees. To examine whether these operations are sustainable, growth models are required for predicting growth and simulate utilisation options at the scale of the individual tree. Thus individual-tree growth models will be developed for this purpose as part of ACIAR project FST/2004/061.

For examining the sustainability of larger-scale utilisation, growth models are required for stand-level forecasting of growth and yield. Stand level growth models will also be based on the PSP dataset, and predict growth of the current resource as estimated from remote sensing analysis. There is scope to align remotely sensed data with PSP measurements, and base growth projections on observed relationships. It is intended that stand-level models will be used to explore cutting cycles and perhaps vary the current blanket application of a 35 year cutting cycle. There may also be an opportunity to relate volume accumulation to carbon sequestration.

Analysis of forest management scenarios (Group exercise)

The goal of the second group exercise was to gain an understanding on the evaluation of management scenarios as undertaken by communities. This

would include identification of the sorts of information that communities require for decision making. The group was divided into three accessibility groups as in the first exercise, and each group was to identify the information required to make a decision on 4 different forest management scenarios.

Information requirements were quite similar among the three accessibility groups, and were also similar for the 4 management scenarios. Communities wanted background information on the company putting forth the proposal, and wanted to see a development proposal for each option before making a decision. Monetary returns to the community were a priority, and how these would be paid and distributed was seen as important. An important element of the development proposal was ongoing support for roading and infrastructure, particularly once the company had finished operations in an area. They also requested a second opinion on each proposal before making a decision. For some options such as that for carbon storage, the community requested information on what exactly carbon storage was. Communities also wanted to know how each option impacted on their continued access to the forest for other uses.

The ideal decision making process would consist of discussions and agreement within clan groups, and then wider discussion within the community (inclusive of women's views) which would take advice off an informed third party (often the village elites). In reality decision making was usually driven by a senior community member who had received benefits from a company to promote their proposal.

Conclusions and priorities for future work

Secondary or cutover forest is a large but poorly understood resource. Its neglect and ongoing degradation is largely due to poor knowledge of the goods and services that may be available. Therefore assessment of this resource is a priority, and will be based on remote sensing and growth modelling to classify secondary forest according to the products it may provide now and into the future. Communication to communities of the goods

and services that are available and the flow of these resources in the future is paramount to ensure they benefit from their resource and to avoid further degradation. The PSP sampling program maintained by PNGFRI provides a sound basis for assessment activities; it is based solely in secondary forest, provides excellent geographic coverage, and includes up to 15 years of continuous measurement. Current assessment methods (strip-line inventory) used by PNGFA and forest certification bodies are labour intensive, inefficient, and possibly biased. There is scope to modify this practice using random cluster sampling, and this is a priority in future project activities.

Cutover forest will be characterised by a predominance of minor timber species, and there are definite market prospects for these timbers, particularly when sold as certified or community based fair trade product. Secondary timber species offer community revenue in certified operations, and this unrealised potential in other tree species in PNG will be explored in future project activities. Group exercises demonstrated the vast array of goods and services that communities draw from secondary forest. This utilisation is influenced by accessibility to towns which determines if the community has ready access to markets. Accessible secondary forest is likely to be used for forestry or agriculture with products flowing to nearby towns, while remote communities will use secondary forest for subsistence purposes. A second group exercise examined community level decision making, the sorts of information required to make decisions, and how project outputs can effectively inform this process.

Appendix 1. Workshop photographs



Figure 2. Terry Warra (Managing director FRI) opens the workshop and provides an opening address.



Figure 3. Group exercises



Figure 4. Participants voting on their preferred scenario for cutover forest management

Appendix 2. Workshop program

ACIAR project workshop – Prioritising attributes and values of cutover forests – 13 to 14 March, 2008

Day 1 (13 March)

9:00 Introduction

- Welcome from Director FRI (Terry Warra)
- Ice breaker (Participants)
- Project overview (Rod Keenan)

10:30 Morning tea

11:00 Morning presentations (10 min each)

- Status of cutover forests – Momase region (Ripa Karo)
- PSP sampling program and results (Joe Pokana)
- Preliminary remote sensing of cutover forest status (Julian Fox)
- Market prospects for PNG timber (Peter Mussett)
- Current demand for PNG timber (Emaus Tobu)

12:30 – 2:00 Lunch

2:00 – 4:00

- Exercise to establish attributes of cutover forest

Day 2 (14 March)

8:30am Morning presentations

- Sampling approaches for multiple values (Cris Brack)
- Assessment and modeling of cutover forest status (Julian Fox)
- Current inventory requirements for FORCERT (Peter Dam)
- Inventory advances (Cris Brack)
- Management scenarios for community forestry (Martin Golman)

10:30 Morning tea

- Exercise on management scenario evaluation

12:30 Summing up

- Field site selection
- General discussion (other issues)
- Next steps

1:00 Lunch

Participants depart for Nadzab at 3pm

Appendix 3: Results from group exercise 1

Only the top 5 uses are shown for each forest type for each community.

Remote community

Example remote communities included

- Makapa, Morobe South Coast for forest class 1
- Manus West Coast, Vanimo Forest Block 1-6 for forest class 2
- Anualambit, Passismanua for forest class 3

Uses of forest type 1	What is happening	What should happen
• Poles – local use	**	
• Fruits, Nuts	**	
• Wildlife Conservation	**	*****
• Fuelwood – local use	***	
• Building Materials – local	*****	**
• Carbon		****

Uses of forest type 2	What is happening	What should happen
• Medicinal plants	**	
• Fruits, Nuts	***	
• Wildlife Conservation	**	*****
• Fuelwood – local use	***	
• Water	**	
• Building Materials – local	*****	

Uses of forest type 3	What is happening	What should happen
• Garden	****	
• Fuelwood	***	
• Reforestation	*****	*****
• Agriculture		****

Moderately accessible community

Uses of forest type 1	What is happening	What should happen
• Agriculture	*****	*****
• Timber (all uses)	*****	
• Carbon storage	**	**
• Non wood products	*****	**

Uses of forest type 2	What is happening	What should happen
• Agriculture	*****	*****
• Timber (all uses)	***	
• Carbon storage	****	*
• Non wood products	****	*****

Uses of forest type 3	What is happening	What should happen
• Agriculture	*****	*
• Settlement	****	
• Reforestation	*****	*****
• Bamboo	**	

Accessible community

Uses of forest type 1	What is happening	What should happen
• Agriculture – subsistence	*****	*
• Timber – local use	*****	****
• Fuelwood	*****	*
• Water	**	
• Eco-tourism		****

Uses of forest type 2	What is happening	What should happen
• Settlement	*****	*
• Agriculture cash/local	*****	*****
• Timber local	*****	*
• Fuelwood	***	*
• Wildlife cons		***

Uses of forest type 3	What is happening	What should happen
• Settlement	*****	
• Agriculture cash/local	*****	***
• Reforestation	****	*****
• Fuelwood	**	

Appendix 4. Results from group exercise 2

Goal: To understand approaches to evaluation of management scenarios for community forests.

Remote Community

Option 1:Q1 a). Want to know company background
b). Value of Timber (Forest)
c). Need to know where the road goes.
d). Road Maintenance – who?
e). Development proposal

Option 2:Q1 a) Want to know Company's background.
b). Value of Timber (Market and stumpage).
c). Development Proposal

Option 3 Q1: a). Background of NGO group
b). Know what is CO2 storage and Biodiversity Benefits.
c). Mechanism of payments.

Option 4: Q1 a). Know background information on company
b). Development proposal
c). Accessibility of Use

Q2: a) Compare the development proposals.
- investements
- participation
- sustainability
- ownership –entry/exit strategy
-Value of our Forest – broad vlaues
- Biodiversity values
- Forest products

Q3: a). Family discussions – to clan – community
b). seek advice from village elites.
c). Seek external advice
- Government
- NGO's
-Others
d). Sign Consent for clan leaders.

Moderately Accessible Community

Option 1: Q1:

a) Know how much money for Road Construction
b). Know how much price per species per log and and how many logs required.
c). Kow background information on other available timber markets to compare prices per log per species.
d). Know the background information on overseas timber company

Option 2: Q1:

- a). Know the price for different timber species
- b) Seek advice from other sources (Forestry, Timber Yards, Hardwares) on actual timber market prices.
- c). Know the Timeframe of operations
- d). Know the background information on local company.
- e). Harvesting plans
- f). Know if company has plans for infrastructure development.(Road access and maintenance).

Option 3: Q1:

- a).Know the monetary benefits and infrastructure development for the community.
- b).Know background information
- c). Timeframe for payment
- d). Want to know about biodiversity benefits.
- e). Restrictions and Conditions of Carbon storage.

Option 4:

- a).Background information * yeild payment per year/ha.
- b).Land uses (all land)?
- c).Joint venture
- d).Environmental Impacts.

Q2: How to compare ideal options:

What kind and level of benefits from each option:

- Cash income
- Infrastructure Development (Road, Schools etc.)
- Employment

And Quality and Duration of these Benefits

Q3: Process used to reach decision:

(In Practice):

- Bought off advocate who convinces everyone to go for his option.
- Ideally: -Each clan involved; discuss and agrees
- women's views considered.

Accessible Group:

Q1: Company Profile:

- Shareholders
- Registration
- Finance

Benefits:

-Socio/ Economic/ Environmental

Sustainability:

-Self Reliance

-Capacity Building

Q2: How to Compare:

- Get third party to assist us.
- -companies will give us in writing all their proposals.

Q3: What process in Decision Making?

Get expertise to help get communities to make decisions.
Leave it to them.