

The Political Economy of Forest Management in Papua New Guinea

edited by Colin Filer



The National
Research Institute

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International
Institute for
Environment and
Development

NRI MONOGRAPH 32

**THE POLITICAL ECONOMY OF
FOREST MANAGEMENT IN
PAPUA NEW GUINEA**

**Colin Filer
Editor**



**NRI
The National Research Institute**

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The International Institute for Environment and Development**

**Produced with additional support from:
The PNG Biodiversity Conservation
and Resource Management Programme
and
The Australian National University,
Resource Management in Asia-Pacific Project**

First published July 1997

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NRI Monograph 32

Published by NRI – The National Research Institute
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ISBN 9980 75 089 8

National Library Service of Papua New Guinea

ABCDE 9987

Printed by Colorcraft Ltd, Hong Kong

Cover design by Julian Lewis; photographs by Alex Smailes

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CURRENCY CONVERSIONS

The Bank of PNG's *Quarterly Economic Bulletin 1/96* shows the following equivalence of Australian and US dollars to the PNG kina at the end of each year from 1988 to 1995.

Year	AUD	USD
1988	1.4181	1.2100
1989	1.4659	1.1633
1990	1.3616	1.0511
1991	1.3818	1.0498
1992	1.4708	1.0127
1993	1.5077	1.0190
1994	1.0927	0.8485
1995	1.0176	0.7545

INTRODUCTION

COLIN FILER

For Policy that Works

This book, unlike many others of its kind, does not contain the proceedings of an academic conference, but represents one part of the outcome of a long and rather tortuous series of conversations and negotiations between the editor, the contributors, the sponsors, and a considerable number of other people who may be counted as 'intellectual stakeholders' in PNG's forest policy process. This introduction will therefore trace the history of these conversations and negotiations in order to reveal the logic which lies behind the form and content of this particular collection of essays, and also the 'missing links' in this chain of reasoning which (we hope) will soon be filled by other publications.

In September 1994, the International Institute for Environment and Development (IIED) proposed a comparative study of forest policy to be funded by the Netherlands Ministry of Foreign Affairs and the UK Overseas Development Administration. The project was entitled 'Policy That Works for Forests and People', and its overall goal, as formulated in consultation with the funding agencies, was 'to improve understanding and practice of policy processes, so that they improve the sustainability of forest management and optimise stakeholder benefits' (IIED 1995b:2). It was understood from the outset that this project would involve a number of 'collaborative country case studies', but a further process of consultation was required in order to identify the countries to be chosen for this purpose. In early November, the IIED made its first approaches to research institutions in Papua New Guinea (PNG), including the National Research Institute (NRI), in order to assess their willingness and ability to be involved in such a study, and received a generally favourable response.

When I joined the NRI in January 1995, it was still not clear whether PNG would be one of the countries selected for a case study, even though we knew that the IIED was keen to make this choice because of its previous involvement in the country's National Forestry and Conservation Action Programme (NAFCAP).¹ Since this programme had absorbed a great deal of intellectual effort over the previous five years, as well as a substantial amount of financial support from the donor community, the time was ripe for the NRI to make its own input to the assessment of that programme in its capacity as the government's 'think tank' on matters of social and economic policy. One of my

¹ The IIED had provided one of the consultants who participated in PNG's Tropical Forestry Action Plan Review in 1989 (see Sargent 1989; World Bank 1989), and subsequently provided counterpart support to the NGO Specialist in the four-person Technical Support Team which assisted in the implementation of the Action Programme (see Mayers and Pentalo 1995).

2 *The Political Economy of Forest Management in Papua New Guinea*

new colleagues, Tahereh Nadarajah, had been making her own contribution to this assessment in a series of NRI discussion papers (Nadarajah 1993a, 1993b, 1994), and other NRI staff had also been engaged in the study of specific projects or issues in the forestry sector (see Fernando and Nen 1991; Temu, Gumoi and Kanari 1994), but the Institute had not produced a monograph on the subject of forestry or forest conservation since 1982, when it had been the moving force behind a conference on the contemporary relevance of traditional conservation practices (Morauta, Pernetta and Heaney 1982). We therefore decided to seek expressions of interest from potential contributors to a monograph whose provisional title was *The Sociology and Politics of Forestry in Papua New Guinea*.

We discussed this proposal with James Mayers of the IIED when he visited PNG in April 1995, and in light of these discussions, we decided to amend the title to *The Political Economy of Forest Management in Papua New Guinea*. At this stage, it seemed almost certain that PNG would indeed be one of the countries selected for a case study of 'Policy that Works for Forests and People', and we therefore tried to address the contents of the monograph to the IIED's own draft guidelines for the production of such case studies. We therefore planned to divide our monograph into three parts:

1. The National Forest Management Policy Process.
2. The Negotiation and Impact of Large-Scale Logging Projects.
3. Local Conservation and Sustainable Development Initiatives.

The first part was intended to deal with the recent history of forest industry and forest conservation policy at the national level, and thus represent a further reflection on the lessons learnt from the NAFCAP.² The second part was meant to supplement the very small volume of existing literature dealing with relationships between rural communities and logging contractors,³ while the third was meant to reflect on the experiences of staff and consultants engaged in the design and implementation of several 'integrated conservation and development' (ICAD) projects in PNG.⁴

² The NAFCAP had been reviewed by a team of four consultants at the end of 1994 (Taylor et al. 1994), but their work had been completed in some haste, and had not been officially published by the United Nations Development Programme.

³ At this time the only substantial published accounts of such relationships by social scientists were Colin De'Ath's study of the Gogol timber project (De'Ath 1979, 1980) and Daniela Renner's study of the Kumil timber project (Renner 1990), both of which are located in Madang Province. Some additional material was available in shorter publications by Waiko (1977), Mitio (1984), Deklin (1992), and Sagir (1994), and these have since been supplemented by those of Kaspu (1996), Lotu (1996), and Wood (1996a, 1996b).

⁴ A meeting of ICAD project personnel took place at the Christensen Research Institute in Madang towards the end of April 1995 (see James 1996).

By June 1995, staff of the IIED's Forestry and Land Use Programme had completed the literature review which constituted the first phase of their project on 'Policy that Works for Forests and People' (IIED 1995a), and were ready to host a workshop to plan the case studies of forest policy in six countries – Costa Rica, Ghana, Zimbabwe, India, Pakistan and PNG. The PNG 'delegation' to this workshop comprised myself, Nikhil Sekhran and Brian Brunton. Nikhil was the Resource Economist attached to the Biodiversity Conservation and Resource Management Programme in the Department of Environment and Conservation, while Brian had a long record of involvement in the national forest policy process, both as a lawyer and an activist in some of PNG's more radical non-government organisations (NGOs).⁵ In our own contributions to the workshop, we painted a rather gloomy picture of past and present attempts to reconcile the aspirations of PNG's people with the conservation of PNG's forests. Despite the money, time, and effort which had been poured into the NAFCAP since its inception in 1990, the capacity of the national government and the international community to achieve the goal of 'sustainable forest management' was limited, both by the dynamics of PNG's political system and by the crucial fact that 99 percent of all forested land is owned and controlled by communities of customary landowners, whose attitudes and behaviour are not normally amenable to any form of centralised control. Nor could we reasonably claim that any further addition to the small mountain of documents which the NAFCAP had already deposited in the middle of this forest would have any significant impact on its real guardians in a country where very few people read anything except the Bible and the daily newspaper.

These considerations weighed heavily on our minds when we came to reconsider the organisation of the PNG country study after our return from Britain, especially because our sponsors in the IIED were clearly concerned that we should try to secure a high level of 'participation' on the part of local policy makers. We therefore made a number of changes in the form and content of our proposed monograph to take account of the relationship between customary land tenure, the distribution of academic expertise, and the nature of the national policy process. The tripartite division of the study was rearranged as follows:

1. The Negotiation and Impact of Large-Scale Logging Projects.
2. Conservation and Sustainable Development Initiatives.
3. The National Forest Management Policy Process.

This revision was intended to reflect the fact that local project negotiations in PNG are generally not the outcome or reflection of decisions taken at the national

⁵ Brian had produced a 'Critique of the World Bank's Tropical Forestry Action Plan Review for Papua New Guinea' (Brunton 1990) when he was still Chairman of the PNG Law Reform Commission, but had since spent some time in Australia before returning to help found an NGO called the Individual Community Rights and Advocacy Forum (ICRAF), which combined legal aid with public awareness campaigns.

level, but rather that the national policy process represents a contradictory (and often a seemingly hypocritical) balancing act between the politics of the Melanesian village, on the one hand, and the politics of the global economy and international community of aid donors, on the other. The study would therefore proceed by considering:

- first, the way that different stakeholders have contributed to the negotiation, operation, and impact of specific local logging projects in the period since the final report of the Barnett Inquiry⁶ and the Tropical Forestry Action Plan (TFAP) review process of 1989;
- second, the design and implementation of specific (local and national) 'alternatives' to the destructive logging practices which seem to be sustained by the balance of interests previously described; and
- third, the actual and potential relevance and coherence of a distinctively 'national' policy process which seeks to encompass and transform the general relationship between PNG's people and their forests.

At the same time, we were still wondering how to deal with the aftermath of the whole TFAP/NAFCAP process, in which substantial funding from PNG's traditional aid donors had so palpably enhanced the weight of expert expatriate opinion in the formation of national forest policy, even if, at the end of the day, the impact of their fleeting presence was diminishing quite rapidly. We therefore aimed to amend the study format in ways which would expand the number and variety of participants beyond the range of those who had the time and inclination to write a chapter for an academic monograph. We could see two ways to achieve this goal:

- If the first two sections of the monograph were still to contain a number of substantial written contributions by individuals with detailed inside knowledge of specific local or national projects, these writings might be supplemented by shorter criticisms or commentaries by other individuals who had an equally detailed knowledge of these projects, but viewed them from a different perspective, and some whole 'chapters' might even consist of a series of short sections written by different authors.
- The appearance of 'dialogue' (and unfinished argument) might then be amplified in the third section, dealing with the national policy process, where

⁶ In April 1987, the PNG government appointed an Australian member of the local judiciary, Justice Thomas ('Tos') Barnett, to conduct a Commission of Inquiry into allegations of impropriety against the executives of the Forest Industries Council, and to assess the respective roles of the Council, the Minister, and the Department of Forests in the marketing of timber. Over the course of the next two years, the Commission produced seven interim reports and one final report, whose revelations of malpractice were instrumental in forcing the government to initiate a major process of policy reform. Barnett (1992) has provided an excellent summary of his own findings and recommendations.

the bulk of the material would consist of transcribed interview sessions with those 'key players' in the policy process who were unlikely to produce written contributions of their own.

This meant, in effect, that four different roles would be made available for individuals to participate in the study process: 'contributors' (or primary authors) would write substantial pieces for the monograph; 'commentators' (or secondary authors) would write shorter pieces, including responses to those written by the primary authors; 'interviewers' would be engaged to design and put questions to key players in the national policy process; and 'respondents' would be those key players who agreed to participate in such interviews.

By this time, we had also come to realise that the proposed monograph and the country study required by the IIED would probably not be the same document, that the former would be considerably longer than the latter, and that these two products would be designed for different audiences. Nevertheless, we were still working on the assumption that the country study would most probably consist of edited extracts from the monograph or summaries of some of its findings.

At this point, the organisation of the study became the collective responsibility of a 'Core Group' which comprised myself, Nikhil Sekhran, Brian Brunton, and a fourth member, Basil Pentalo, who had previously worked as the NGO Specialist in the UNDP-funded NAFCAP Technical Support Team, but who was now employed by the World Wildlife Fund. The main task of the Core Group was to establish a timetable of activities and a division of labour which would lead to the completion of both monograph and country study in the latter part of 1996. Specific provision had to be made for:

- the design of a 'framework of analysis' for circulation to the main contributors to the first two parts of the monograph;
- the organisation of a local planning workshop, whose participants would frame the questions, and identify the potential respondents to be interviewed, on matters of forest policy;
- the approval of a budget which the IIED would make available for various aspects of this work.

In practice, I was the only member of the group whose own terms of employment created the time required to make a substantial input into the organisation of the study, and this state of affairs was recognised in the NRI's assumption of responsibility for the overall administration of the project. Nevertheless, a process of consultation with other group members was put in place, and this was periodically reinforced when James Mayers made one of his occasional visits from London.

The Framework of Analysis

Nikhil Sekhran and I met to discuss a draft framework of analysis for the first two parts of the monograph towards the end of August 1995, on the understanding that I would take the main burden of responsibility for soliciting and coordinating contributions to Part One ('The Negotiation and Impact of Large-Scale Logging Projects'), while he would assume an equivalent responsibility for Part Two ('Conservation and Sustainable Development Initiatives'). This framework of analysis was incorporated into different versions of a project document which were circulated to potential contributors and other interested parties between October 1995 and February 1996.

The framework of analysis for Part One began with a discussion of the gap in the existing body of literature which this monograph was partly intended to fill.

Despite the physical extent of logging, the political influence of the timber industry, and its contribution to national exports and revenues, much less is known about the political history and social impact of individual logging projects than is known about the political history and social impact of mining and petroleum projects in PNG. This discrepancy is partly due to the difference in the levels of investigation required by statute and government regulation, partly to differences in the 'public relations' strategies of the major companies involved in these industries, and partly to differences in the amount of interest which these two types of development have aroused in academic circles. As a result, it is difficult to make an assessment of the relative significance of the national policy process and a multitude of local 'policy processes' in the forestry sector on anything but an anecdotal basis, or by making generalisations from the few case studies which have been undertaken, some of which are now seriously outdated.

The aim was to remedy this deficiency by assembling a number of case studies from different parts of the country, each of which would be designed to produce data which would be both contemporaneous and mutually comparable.

In order to achieve this kind of comparability, contributors to this part of the monograph were asked to consider the following questions:

1. What have been the main *turning points* or *crucial decisions* which have affected the 'development' of this project (or set of projects) and thus constitute its *policy process*?
2. Who are the main *stakeholders* (both groups and individuals) who have either contributed to, or been affected by, these decisions, and what can be said about their respective *interests, policies, plans, strategies, or motives*?

3. What have the various 'local' stakeholders gained or lost from this process in (a) *wealth*, (b) *power*, and (c) *knowledge* (including their perception of 'development' itself and of other people's interests and motives)?
4. To what extent, and in what ways, has the *local* policy process surrounding this project (or set of projects) influenced the *national* policy process, and vice versa?

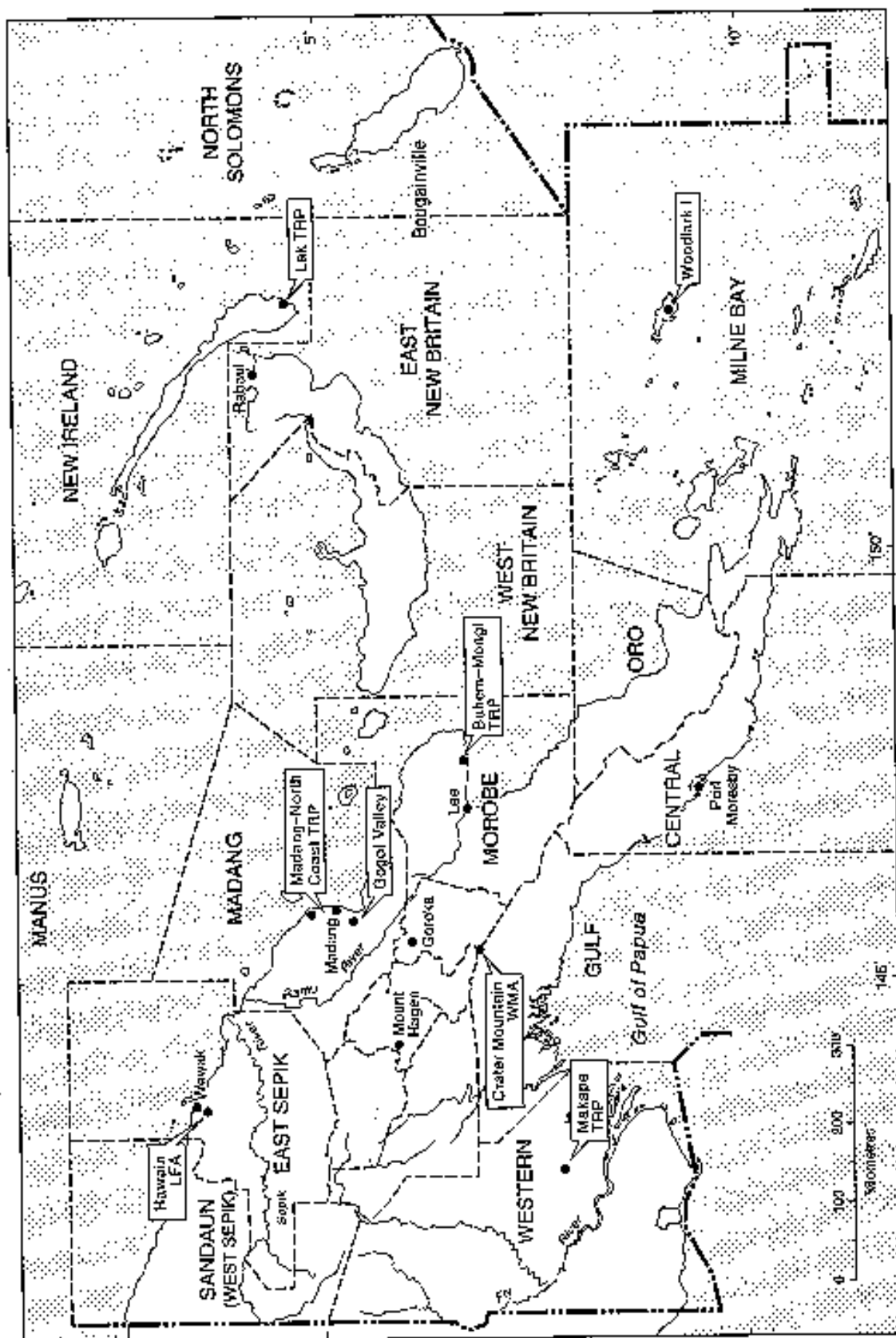
Our aim was to secure at least six chapters altogether, with at least two projects from each of the three coastal regions of PNG. An examination of the eight chapters which are now included in Part One of the present volume shows that we have accomplished this goal (see Map 1.1), though we cannot claim that these case studies represent the full range of local stakeholder relationships throughout the forestry sector.⁷

Our framework of analysis for what was then to be Part Two of the monograph originated in some of the 'unfinished business' which remained after completion of the *Papua New Guinea Country Study on Biological Diversity* (Sekhran and Miller 1994), which had been prepared by the Department of Environment and Conservation for the first Conference of the Parties to the Convention on Biological Diversity. Despite the wealth of PNG's biodiversity heritage, and the importance of its contribution to the subsistence base of the rural population, this endowment is currently under threat from various unsustainable forms of land use, for which a number of separate causes can be identified:

- the dislocation of forest-edge communities from traditional culture, and their purposeful or forced absorption into a cash economy in which they are not well equipped to participate, which then serves as an incentive to sell their forest resource to the highest bidder;
- the 'dependency syndrome' that afflicts many rural communities, which partly originates in the 'development determinism' of both colonial and post-colonial administrations, and which reduces the capacity for self-reliance;
- economic factors, such as high interest rates and the lack of resource pricing, which serve as disincentives for sound resource stewardship;
- corruption in political circles, both at local and national levels, and the existence of patron-client relationships that have to be serviced through largesse;
- the opportunistic behaviour of many developers, fuelled by rent-seeking opportunities and the limited effectiveness of state regulation;

⁷ Given the fact that West New Britain Province currently accounts for approximately half of all the logs exported from PNG, we were very keen to secure an additional case study from this province in order to supplement Gary Simpson's more general account, but this did not eventuate.

Map 1.1: Location map for local case studies presented in this volume.



- population growth, beyond the 'carrying capacity' of some local environments, and a consequent increase in the intensity of resource utilisation; and
- the introduction of new technologies, such as firearms, which adversely affect natural systems.

Although the earlier country study investigated some of these pressures, we thought that further attention should now be given to some of the practical questions which arise in the pursuit of conservation values in PNG. Such questions are addressed in five of the chapters now contained in Part Three of the present volume.

It may be noted here that the design of this discussion had already departed from our original intention to focus attention on a number of *local* 'conservation and sustainable development initiatives' within PNG; for only one of the chapters in Part Three of the present volume (by Arlyne Johnson) has a local focus (see Map 1.1), while four others are concerned with PNG as a whole, and one (by John Leedom) illustrates the difference between the practical pursuit of conservation values in PNG and its next-door neighbour, Irian Jaya.⁸ Although we still believe in the desirability of a comparative evaluation of the efforts being made by government and non-governmental organisations to establish and manage ICAD projects in different parts of PNG, it is still too early to assess the success and the sustainability of some of these initiatives, so we hope to revisit this subject in a separate monograph to be published at a later date.

The second part of the present volume does *not* contain the dialogue on national forest policy which we had hoped, in our earlier scheme, to construct out of transcribed interview sessions with 'key players' in the policy process. Instead, it consists of a number of chapters, written from widely different perspectives, on the political economy of the forest industry, which fill some of the gaps left by our initial distinction between a series of local case studies of 'forest exploitation' and a series of chapters on various aspects of the national 'conservation industry'. Even in the original framework of analysis for Part One, it was recognised that additional chapters on the logging industry as a whole might be included, where these would throw useful light on the analysis of specific projects. For example, my own collection of statistical information on the log export industry (Chapter 10) was originally canvassed as a method of supplying relevant facts and figures to the authors of the local case studies. Discussion with Yoichi Kuroda of the Japan Tropical Forest Action Network in September 1995 led us to recognise that some attention should ideally be paid to the political economy of tropical timber consumption in the major markets for

⁸ The Core Group felt that this chapter would provide an important counterpoint to the rest of the study, precisely because the physical and traditional cultural similarities between the two parts of New Guinea are offset by such stark differences in property rights and the power of the state to determine the use of natural resources.

PNG's timber exports, and hence to our eventual request for Anja Light's contribution to the present volume. And another 'chance' meeting with Rod Taylor in November 1995 afforded us the opportunity to solicit a discussion of the legal framework of the forest industry from one of the key players in the recent process of legal and institutional reform in the forestry sector (see Chapter 11). At the same time, it should be noted that this part of the monograph omits any detailed discussion of at least three issues on which we had originally hoped to include separate chapters – the production of national and provincial forest plans, the costs and benefits of 'downstream processing', and the barely visible question of gender equity in the forestry sector.

The final shape of Part Two has thus developed in an incremental, and sometimes accidental, fashion, even as we were sometimes tempted to revert to our original distinction between studies of 'exploitation' and 'conservation' – whether at local, national, or regional levels – or even to use the distinction between these three levels of analysis as the basis for an alternative tripartite division.⁹ The division we have chosen must remain, to some extent, an arbitrary one. This is especially true of the line which we have drawn between the second and third parts of the monograph, where chapters such as those by Anja Light, Ron Martin, John Millett, Hartmut Holzknecht and Bas Louman can obviously be construed as discussions of *both* the 'forest industry' *and* the practical achievement of 'conservation values' or 'sustainable development'. The final division between these two parts has thus been motivated primarily by our conception of the mutual relationship between the chapters which each one contains.

Unfinished Business

Although the monograph in its present form presents a broad spectrum of evidence and opinion on the political economy of forest management in PNG, written from a combination of academic and non-academic perspectives, it clearly fails to embody that appearance of participation and dialogue which we had sought to achieve by conducting interviews with 'key players' in the national policy process and appending written commentaries on some or all of the chapters which it contains. I should therefore briefly explain how we have tried,

⁹ The distinction between forest exploitation and forest conservation would have reflected the bureaucratic division between the PNG Forest Authority (formerly Department of Forests) and the Department of Environment and Conservation, and between their respective interests and projects within the NAFCAP, but would have distorted the conceptions of forest management held by other major stakeholders – most notably the customary owners of the forest. A tripartite division between local, national, and regional studies would have left us with an unbalanced collection of papers, in which the regional context of forest management in PNG would not seem to have received the attention which it deserved. Some might argue that this is indeed one of the deficiencies in the volume as it stands, but it needs to be remembered that our sponsors in the IED were primarily concerned that we should produce the basis for a 'country study' which focussed on the linkages between local and national dimensions of the policy process.

and are still trying, to achieve this goal, and the manner in which we now propose to complete this task outside the framework of this monograph.

In January 1996, a two-day Planning Workshop was held to finalise the design of the interview programme which was expected to produce the material for what was then to be the third and final part of the monograph. Participants were drawn from a range of occupations and institutions, on the understanding that this was not an exercise in the formulation of forest policy, but an attempt to determine the most cost-effective way of canvassing the full range of local knowledge and opinion about the workings of the PNG forest policy process – both the nature of the decision-making process which affects the use of forest resources, and the factors, motives, and values that influence the decisions which are made.¹⁰ Workshop participants defined six major groups of ‘stakeholders’ in the policy process – politicians, public servants, industry, NGOs, donors, and local landowners (or resource owners), and then designed a number of key questions to be put to representative members of each category. It was recognised that interview techniques would only be appropriate for members of the first five stakeholder groups, and that a different approach would have to be adopted in order to canvass the diverse range of ‘grassroots’ community or landowner opinion in PNG. The participants therefore decided that this latter task would need to be undertaken indirectly, by designing a survey instrument which would be distributed to a stratified sample of social scientists and university students who should be able to describe the views held in those rural communities with which they are especially familiar.¹¹

For each of the first five stakeholder groups, workshop participants made a provisional listing of approximately one dozen ‘key players’ whose perceptions and opinions would represent the diversity of experience and influence within that group. Some attention was also paid to the problem of recruiting interviewers who would have the interest and ability to capture these perceptions and opinions on tape. Since then, several attempts have been made to organise and implement an effective interview strategy, but progress has been very slow, primarily because we decided that the politicians would have to be the first group

¹⁰ Apart from James Mayers and members of the Core group, the workshop was attended by some of the other contributors to the present volume (Arlene Johnson, Bas Louman, Fadzilah Majid Cooke, John Millett, Michael Wood), and also by: Joe Gabut (private lawyer), John Geno and Bruce Jefferies (Department of Environment and Conservation), Ngen Isana (Institute of Public Administration), Joe Ka’au (Greenpeace), Dike Kari (National Forest Service), Norlie Miskaram and Vincent Warakai (University of PNG), Carol Poyep (Conservation Melanesia), and Hans-Martin Schoell (Melanesian Institute).

¹¹ This approach was previously used in Marilyn Strathern’s study of local variation in the classification and punishment of sexual offences. In 1973, she circulated a questionnaire on this subject to 197 social scientists, mostly social anthropologists, who had conducted or were still conducting field research in Papua New Guinea. Her (1975) report on the results of this survey includes a discussion of the drawbacks and advantages of this method of study, as well as the text of the survey instrument itself.

to be interviewed. This decision was based on our recognition of the likelihood that politicians would become increasingly inaccessible with the approach of the next national election (scheduled for June 1997), and also on the assumption that their 'real' perceptions and opinions might be difficult to disentangle from those which are normally offered for public consumption on the floor of Parliament or through the local media.

More progress has been made in our efforts to canvass the range of 'landowner' perceptions and opinions through the design and distribution of a 'Rural Community Survey Form' which contains a number of open-ended questions on various 'forest management issues'. This survey instrument was designed in April 1996, and then despatched to a sample of one hundred social scientists (mostly anthropologists) who had spent a substantial period of time in a specific rural community, and whose research interests were known to have some bearing on questions of forest management.¹² Multiple copies were also distributed to university teachers offering courses which dealt with questions of 'environment and development' in general, or with questions of forest management in particular, and whose students might therefore be encouraged to provide information relating to their own communities.¹³ Some additional copies have been circulated to field staff of the Summer Institute of Linguistics.¹⁴ Although we have had an encouraging response from all three sources, it has long since been apparent that we should not have the time or space to include an analysis of this material within the pages of the present monograph, and so we now hope to produce a separate publication on this subject at a later date.

It took slightly longer for us to reach the same conclusion in respect of the interviews with 'key players' in our other five stakeholder groups. Although we were soon obliged to abandon the prospect of completing the full set of interviews envisaged in the January planning workshop by the end of 1996, we thought at one stage that the present volume might still incorporate a certain amount of the material obtained in this way, within a general historical account of the evolution of forest policy under the last three national governments – the Namaliu government (1988-92), the Wingti government (1992-94), and the Chan government (from 1994). Such an account would certainly have taken up several chapters within the framework of the present volume, but it would make more sense to complete it after the national election of June 1997, which will constitute

¹² We stratified this sample by attempting to select equal numbers of respondents from each of the thirty 'biogeographic districts' distinguished in the *Papua New Guinea Conservation Needs Assessment* (Alcorn and Bechler 1993).

¹³ David Mowbray was kind enough to incorporate the survey exercise into the teaching of the Environmental Science programme at the University of PNG.

¹⁴ This was done at the suggestion of one of our anthropological 'informants', Pat Townsend, who had previously worked for both the Summer Institute of Linguistics and for the NRI. Thanks are due to David Troolin for facilitating the distribution of these survey forms.

an obvious hiatus in the national policy process. And by that time, the conduct of additional stakeholder interviews will hopefully provide the basis for a more rounded account of decisions which have been made, and values which have been pursued, under all three regimes.

Meanwhile, most of the contributors to the present volume have clearly made use of information which they have gleaned from interviews with 'key players' in specific project areas or policy domains, and have likewise adapted their findings in light of the comments made by these other stakeholders. The absence of the shorter commentaries which we would have liked to append to some or all of the chapters,¹⁵ or to each of the three main parts of this monograph, should not be taken to indicate our reluctance to represent the diversity of viewpoints within the forest policy process, but rather to reflect the time which it has taken to assemble all the material which is presented here, and the belief that this material should be offered as a contribution to further public debate before it loses its contemporary relevance.

Acknowledgments

Special thanks are due to Brian Brunton, Wari Iamo, James Mayers, Basil Peutalo, and Nikhil Sekhran for their various inputs to the planning process which has already produced this volume, and which will hopefully produce several more publications on questions of forest policy in PNG. Nikhil Sekhran deserves additional acknowledgment for his role in organising and commenting on the six chapters which make up the third part of this volume. Bryant Allen, Colin Barlow, Michael Bourke, Peter Dauvergne, James Fox, Maryanne Grieg-Gran, and Gerald Ward made detailed comments on individual chapters from different parts of the book, and in the case of my own chapter, I must thank Ben Everts, John McAlpine, Peter McCrea, Bob Tate, and Kathy Whimp for their valuable contributions to the quantity and quality of the data which it contains. Hartmut Holzknecht and Robin Hide have provided useful assistance in my compilation of the list of references, while James Robins and Lulu Turner have shared the onerous task of copy-editing the entire text, and Neville Minch produced most of the maps.

The production of this volume would not have been possible without the institutional and financial support of the International Institute for Environment and Development in London, the Conservation Resource Centre in PNG, and the Research School of Asian and Pacific Studies at the Australian National University in Canberra. Editorial work on this volume was completed during my attachment as a Visiting Fellow to the Resource Management in Asia-Pacific Project at the Australian National University.

¹⁵ The only example of such a written commentary is John McAlpine's postscript to Chapter 15.

PART ONE

**THE LOCAL POLITICS
OF LARGE-SCALE
LOGGING PROJECTS**

CHAPTER 2

'GET WHAT YOU CAN WHILE YOU CAN': THE LANDOWNER-GOVERNMENT RELATIONSHIP IN WEST NEW BRITAIN

GARY SIMPSON

Introduction

This paper presents a case study of the interaction which took place between landowner companies, the government of Papua New Guinea (PNG), and foreign logging contractors in West New Britain Province, over the implementation of the *Forestry Act* and the government's Revenue Guidelines in 1993 and 1994. The role of international aid donors and their technical advisers in supporting the implementation of the Act is also examined. The conclusion is that the national government and landowner companies lost over A\$100 million in export revenue to foreign logging contractors because they were unable to resolve equity issues associated with the distribution of forest revenues. This situation arose because the participation and equity imperatives of the *Forestry Act* were unachievable and unenforceable in the West New Britain context, and prevented the landowners and the government from reaching agreement on the distribution of logging revenues.

The Project Area

In 1982, West New Britain was estimated to contain about 25 percent of PNG's commercial timber reserves, with most of this being located in the Kandrian and Gloucester districts. There were only two logging companies operating in the province at that time – the Japanese-owned Stettin Bay Lumber Company (SBLC) and a Korean company, Nam Yang. Both companies held timber permits over areas in which the government had acquired the timber rights from local landowners through a Timber Rights Purchase (TRP), and then, by way of international tender, had sold these rights to a logging contractor in return for a resource rent and a package of social, economic, and infrastructural benefits.

The agreement with SBLC had a profound influence on the landowners and provincial politicians of West New Britain. Under the terms of its timber permit, SBLC cleared land and established roads, bridges, schools, markets, and housing facilities in the Bialla and Hoskins districts. This infrastructure attracted another foreign investor (Harrison and Crossfield) to establish an oil palm industry in a joint venture with the national government. This project increased income and employment opportunities for local landowners and settlers, contributed to provincial revenues through royalty payments, and

provided the national government with a major source of foreign exchange from the export of palm oil.

The early success of the Bialla and Hoskins oil palm schemes stimulated interest throughout the province in utilising the local forest resource as the basis for agricultural and infrastructural development.¹ Nowhere was there more enthusiasm for this approach than among the rural population of the Kandrian and Gloucester districts. These districts had few all-weather roads, limited shipping services, poorly maintained airstrips, dilapidated schools and aidposts, poor water supplies, and few opportunities to market their produce. Rural people suffered from poor health, and had lower educational qualifications than people in other parts of the province.

In response to community and political pressure, the West New Britain Provincial Government put forward a proposal to the national government in 1988 to replicate the Bialla and Hoskins experience in the Kandrian and Gloucester districts. The proposal was for a A\$44 million investment programme to develop agricultural (mainly cocoa) estates and associated infrastructure throughout both districts. Investment funds were to be raised through the acquisition and allocation of new TRP areas, thus ensuring that the government would have a significant measure of control over the collection and distribution of the revenues.

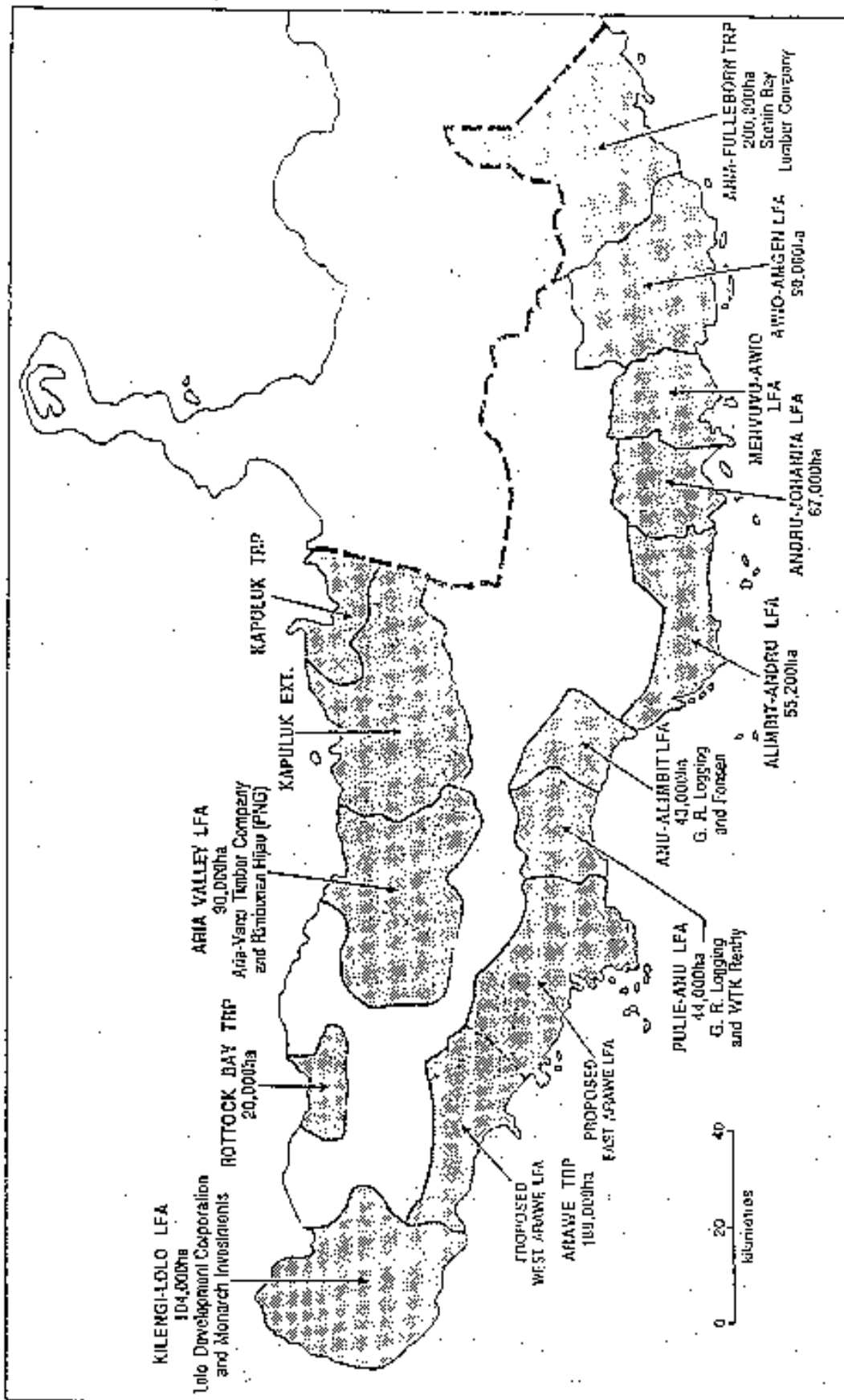
Landowner Companies and Local Forest Agreements

At the same time as the province was finalising its development strategy for the Kandrian and Gloucester districts, the national Minister for Forests (Karl Stack) began to allow groups of landowners to make logging agreements independently of the state under the *Forestry (Private Dealings) Act*. These dealings between landowners and logging contractors were framed within Local Forest Area (LFA) agreements. The LFA mechanism allowed landowners to form a landowner company and negotiate a Logging and Marketing Agreement (LMA) directly with a logging contractor. The LFA simply required the approval of the Minister.²

¹ Since the late 1980s, the Bialla and Hoskins schemes have become the focus of increasing social unrest between local landowners and resettlement block-holders from other provinces.

² Under Section 4 of the *Forestry (Private Dealings) Act*, the Minister's declaration of a Local Forest Area allowed the customary owners to sell or dispose of timber and related rights to any person, including non-citizens, but an agreement for the sale of timber was of no force or effect until it too had received the Minister's assent. Once it had received this assent, a landowner company or its contractor could carry out forestry operations in that area without having to obtain a Timber Permit under the *Forestry Act*.

Map 2.1: Existing and proposed LFA areas, Kandrian and Gloucester districts, 1990 (after McNeil 1990).



The decision by the Minister to allow logging under LFA agreements proved to be exceptionally popular with landowners and logging contractors. It allowed them to expedite logging operations and avoid government scrutiny of their LMAs. Landowner groups in the Kandrian and Gloucester districts, with the active support of logging contractors, were quick to seize the initiative and pressure the Minister into declaring LFAs (see Map 2.1).

The decision by the Minister to declare LFAs effectively derailed the provincial government's strategy of financing a development programme through the use of TRP revenues. At the political level within the province, there was little concern over the Minister's actions. Most provincial politicians were also landowners, and were actively involved in setting up their own landowner companies and negotiating with the Minister for LFAs.

Provincial public servants, on the other hand, were extremely dissatisfied. Whereas the TRP mechanism empowered government officers in the decision-making and resource allocation process, the LFA mechanism marginalised them. Under an LFA, the landowner companies were given control over forest revenues, and hence the power to direct investment strategies. The enthusiasm for landowner company and LFA arrangements on the part of landowners was also fuelled by their mistrust of, and continual frustration with, the government. Dependency on, and control by, successive colonial, national, and provincial governments had stripped rural populations of their identity and traditional power base. Landowner companies were seen by many rural people as a mechanism for establishing control over local social and economic issues and promoting a truly self-reliant community.

In sum, the willingness of the national Minister for Forests to facilitate LFAs led to a fundamental shift in the balance of power between government and community groups in the Kandrian and Gloucester districts of West New Britain. The LFAs empowered landowner companies to negotiate directly with logging contractors and to develop LMAs which had the potential to deliver significant benefits to the landowner company and its members.

Landowner Company Structures and Contracts

By 1989, four landowner companies had been established in the Kandrian and Gloucester districts. Although landowner companies were emerging as the dominant expression of community activity, it soon became apparent that there was considerable variation in their structure and representation. The basic model used in forming landowner companies was an adaptation of the practice used by the Department of Forests in framing TRPs. For the proposed timber area, customary landowner groups were defined, members recorded, and landowner representatives selected. Following these procedures, landowning groups would incorporate within a company structure.

In practice, landowner companies were formed without adequate attention to the recording of landowner groups or to the election of landowner

representatives. Landowner company directors were for the most part self-appointed, and most had no previous experience in company management or procedures.

The lack of a representative structure, community consultation, and basic skills in business management severely limited the capacity of landowner companies to negotiate favourable LMAs with logging contractors. The LMA specified the responsibilities of the landowner company and the logging contractor. It also determined the nature and extent of logging operations, allocated responsibility for compliance, and established the formulae for the distribution of proceeds from the sale of the logs.

In 1989, a review was undertaken of the LMAs of the four landowner companies which were operating in the Kandrian and Gloucester districts (personal communication, Gordon McNeil, 1990).³ This review revealed that the LMAs, for the most part, significantly disadvantaged landowner companies in their share of logging revenues as against forest management and service provision responsibilities.

The figures shown in Table 2.1 reflect the typical logging margins negotiated by landowner companies under the LMAs during this period. Based on an average annual cut of 70,000 cubic metres per LFA, the net return to the logging contractor was estimated at A\$1.064 million, with the landowner company receiving A\$336 000.

Table 2.1: Typical logging margins negotiated by West New Britain landowner companies in 1989 (in Australian dollars).

Item	Landowner Company	Logging Contractor
Gross Revenue at \$100/m ³ f.o.b.	28.0	72.0
Export tax	15.0	
Royalties to landowners	6.6	
Provincial government levy	0.6	
LOC agricultural fund		2.6
LOC commercial dev't fund		1.2
Operating costs	1.0	53.0
Total expenses	23.2	56.8
Net income	4.8	15.2

Source: Personal communication, Gordon McNeil, 1993.

The review also revealed that landowner companies were substantially in debt to logging contractors for start-up costs involving unspecified payments to

³ The review was part of a prefeasibility study conducted by the Australian International Development Assistance Bureau (AIDAB) which formed the basis for the Kandrian-Gloucester Integrated Rural Development Project (KGIDP).

individuals and landowner groups. The deduction of these costs considerably reduced the overall viability of the landowner company and its development funds. Each of the four landowner companies had signed agreements in which the landowner company, and not the logging contractor, was responsible for meeting the forest management guidelines of the Department of Forests. Hence, any breach of regulations by the logging contractor was legally the responsibility of the landowner company.

Similarly, in the case of infrastructure and service provision, two of the four landowner companies had signed agreements in which basic infrastructure development such as roads, bridges, wharves, and education and health services were the responsibility of the landowner company. Subsequent investigation revealed that few landowner company directors had ever sighted the contents of the agreements they had signed.

From the review findings, it was clear that landowner companies were unable to negotiate meaningful and equitable LMAs with logging contractors, and were unable to supervise their operations. While landowners were benefiting from royalty payments from the sale of their timber, and some landowner companies were accumulating funds in their business and agricultural trust accounts, their relative share of logging revenues was minimal.

The original intention of landowner company directors had been to engage the logging contractor under the management structure of the landowner company. However, the reality was that landowner companies were being directed by the logging contractor, particularly in the performance of the LMA, and especially on financial matters.

National Government Intervention

The largesse of the Minister for Forests in declaring LFAs was not restricted to West New Britain. LFAs had become the hallmark of the forest industry throughout PNG in the mid to late 1980s. However, the inequity in the agreements, and the loss of substantial revenue to landowners and the state, prompted the national government to initiate an inquiry into the forest industry. The report of the Barnett Inquiry (Barnett 1989c) detailed a litany of corruption, malpractice, environmental degradation, and inefficiency. Barnett noted that, if these problems were allowed to remain unchecked, they would lead to the irreversible depletion of PNG's forest resources, with consequent environmental and social problems and lost economic opportunity.

The Barnett Inquiry, and the high profile which rainforest management issues were accorded among PNG's principal aid donors, prompted the national government to seek assistance with review and development of its forest policy. Several donors, notably the World Bank and Australia, pledged support to PNG under the National Forestry and Conservation Action Programme.⁴ This

⁴ The name was changed from the original National Forestry Action Plan in 1991.

programme sought to provide a framework for the national government and donors to formulate an economically viable and ecologically sustainable forest management programme.

One of the first outcomes of this programme was the passage of a new *Forestry Act* in 1991, which sought to re-establish national government control over the forest industry and landowner company operations in the form of revised forest agreements.⁵ The Act provided for the establishment of a PNG Forest Authority managed by a National Forest Board with a range of industry, landowner, and government representatives (see Taylor, this volume). Technical committees were to be established to advise the board. The Act effectively recentralised control of the forest industry under a unified National Forest Service.

In addition to restructuring the forestry administration, the Act sought to revise the approach to the issuing of timber permits. A series of procedures were developed which required a study of forest development options, the establishment of operational guidelines as the basis for future evaluation of forestry activities, the establishment of a formal tendering process, the appraisal of proposals, and the negotiation and approval of a Forest Management Agreement.

The new Act made the recording of customary land tenure a key prerequisite for the issue of a logging permit. As already noted, a major weakness in the designation of LFAs was that landowner companies frequently failed to document their constituent members and hence their entitlements. The legitimacy of the landowner company and its directors was, therefore, constantly being contested by disaffected individuals and clan groups. Under the new Act, before a Forest Management Agreement could be entered into, the title of the customary owners to the land had to be vested in one or more registered land groups.

The new Act was hailed by the government and its donor supporters as a significant improvement. It provided for more rational management of PNG's forest resource, scope for increased community participation and representation through incorporated land groups, and greater control over foreign investors. Political support for the new Act was further enhanced by a change of government in 1992 and the appointment of a new Forests Minister (Tim Neville) who was a strong supporter of forestry reform.

Donor Support through Technical Assistance

The introduction of the new Act, supported by a sympathetic Forests Minister, had the effect of encouraging donors to support the National Forestry and Conservation Action Programme and other forest management initiatives.

⁵ The new Act was introduced by Jack Genia, who had replaced Karl Stack as Minister for Forests.

Among the projects being considered was a proposal by the PNG and Australian governments to assist the West New Britain Provincial Government to revise and implement its proposal for a programme of social and economic development based around logging operations in the Kandrian and Gloucester districts. Both governments gave approval for the Kandrian-Gloucester Integrated Development Project (KGIDP), and Australian and Papua New Guinean technical advisers were appointed in April 1993.

The KGIDP found that the situation in the Kandrian and Gloucester districts in 1993 had changed markedly since 1989. In 1989, there were only four landowner companies operating in the two districts; by 1993, there were thirteen, and logging was proceeding along the entire north and south coasts. In 1993, log exports from West New Britain accounted for 35 percent of PNG's total log exports, with an estimated value of A\$244 million. At the time, the bulk of this revenue (72 percent) was being appropriated by logging contractors to cover their operating costs and return on investments. The national government received 15 percent from log export taxes. The remaining 13 percent was distributed between landowner companies and customary resource owners (Carter 1995).

The KGIDP noted that commercial forestry operations in the Kandrian and Gloucester districts were the driving force of social and economic change. Logging had brought increased income and employment opportunities, and had upgraded rural infrastructure in many dispersed areas through the provision of roads, shipping services, and airstrips. This infrastructure had been built by the logging contractors, either as part of their LMAs or to support their own operations. While there were obvious social, economic, and environmental costs associated with logging operations, most landowners were prepared to put up with, or else ignore, these costs in anticipation of improved living standards. However, the KGIDP advisers noted that, if the rate and nature of forest exploitation was to continue, most of West New Britain's commercial timber resources would be logged out by the year 2000.

The KGIDP also observed that virtually no progress had been made in implementing the new *Forestry Act*. The problems associated with landowner company representation, their inequitable relationship with logging contractors, and the issues of sustainable forest management remained unresolved.

There was a mixed response to the KGIDP findings by West New Britain Provincial Government members. As already noted, most provincial politicians had interests in landowner companies, and many held executive positions within these companies. Generally speaking, politicians did not want any interference in the established structure of landowner companies, but were prepared to consider proposals which would increase landowner company and landowner revenues. Forest management issues were largely viewed with indifference unless they provided scope for improving the bargaining position of landowner companies when seeking to increase their revenue share.

To further complicate matters, the KGIDP found that the Department of West New Britain, which in 1989 had sought to play a central role in the management of forest revenues for rural development purposes, had become marginalised and ineffective. Politicians and landowner companies had bypassed the provincial public service for advice and technical support. This situation, coupled with the lack of budgetary support from the provincial government and internal bureaucratic management inefficiencies, had demoralised many senior public servants and their field officers.

Development Strategies and the Policy Imperative

In formulating a strategy for the KGIDP, technical advisers had to address a range of conflicting interests. At the national level, there was strong resolve from the Minister for Forests to pursue the provisions of the *Forestry Act*. While the Act had not been fully implemented, progress was being made in securing the necessary staff and resources for the National Forest Service. There appeared to be sufficient political support from within the Wingti government for its eventual implementation. The Minister's resolve was heavily backed by bilateral and multilateral donors and some international non-governmental organisations (NGOs). The NGOs were running a strong agenda directed towards supporting rational reform of the forest industry within the framework of popular participation, equity, and ecologically sustainable development. The KGIDP was viewed by all concerned as an important project for piloting the provisions of the *Forestry Act* and the agendas of aid donors and NGOs.

At the provincial level, however, it was business as usual. Logging contractors and landowner companies continued to flaunt the *Forestry Act*, and were antagonistic towards any strategy which required restructuring landowner companies.

In considering the interests of the various stakeholders, the KGIDP was faced with the dilemma of finding sufficient common ground between the stakeholders while, at the same time, promoting the *Forestry Act* and revenue guidelines which were unpopular with landowner companies, logging contractors, and most provincial politicians.

From the consultations with community groups, landowner companies, and government officials, it appeared that the common ground between all parties lay in their collective view that forest resources should be used to generate revenue to improve rural social and economic welfare. The sticking point, however, was disagreement over whether the state or landowner companies should determine how forest resources should be managed and the revenues distributed.

On this issue, the government was standing firm – the forest industry would be reorganised around the provisions of the *Forestry Act*. The government had too much to lose. Unless sustainable forest management practices were initiated, and forest revenue agreements revised, PNG's forest resources would be rapidly

depleted, the government and landowners would lose hundreds of millions of kina in revenue to logging contractors, and the practices of unscrupulous landowner company directors would continue to divide rural communities and deprive them of an equitable share of forest revenue.

The Political Stalemate

Landowner company directors and their logging contractors also felt they had much to lose. They mounted a major political campaign against the provisions of the Act and, in particular, the proposed revenue guidelines. Under the Act and the revenue guidelines, the logging and marketing practices of contractors would be more tightly controlled and their revenue share reduced. Landowner companies were to have their revenue entitlements put in trust if they failed to demonstrate that they were representative of the constituencies they claimed to serve. Self-interest fostered a strong alliance between landowner company directors and logging contractors.

In September 1993, in an effort to break this alliance, the national government offered to increase the landowner share of logging revenues from 13 to 44 percent. Based on projected log exports from West New Britain, this would have meant that some AS310 million would have been paid out to landowner companies and landowners in the five years from 1993 to 1998 (Carter 1995). However, the West New Britain Forest Resource Owners Association (WNBFR OA), acting on behalf of landowner companies in the province, rejected the offer on the basis that it was still conditional on restructuring landowner companies. Other Forest Resource Owner Associations throughout PNG followed suit.

In March 1994, in response to the rejection of the forest revenue guidelines, the national government increased excise duties on log exports from 17 to 30 percent in order to prevent further loss of logging revenue to the economy. The end result was that the revenue base of logging contractors was significantly reduced, while landowner companies lost a major opportunity to secure additional revenue.

In August 1994, the Wingti government was toppled by the Chan coalition. The new ministry included a Forests Minister (Andrew Posai) from the Kandrian District in West New Britain who had direct linkages with the WNBFR OA, extensive interests in logging activities, and strong connections with overseas logging contractors. The WNBFR OA lobbied the Minister to reverse the national government's decision on forest revenue arrangements. However, the national economy was in deep financial crisis, and needed all the available revenue it could get, so the Minister was unable to assist.

On the issue of landowner company reform, the Minister shared the WNBFR OA view that the government had no right to intervene in the affairs of landowner companies. The Minister's view, coupled with the fact that the Forest

Authority had virtually no resources to implement the Act, meant that the operations of landowner companies continued as before.

The Role of the KGIDP

The economic and political events of 1993 and 1994 severely limited the effectiveness of the KGIDP operations. In the absence of National Forest Service personnel and resources,⁶ it was always understood that the KGIDP would play an initial role in generating awareness of the provisions of the *Forestry Act* and monitoring and reporting on compliance. However, the intention was that, as the National Forest Service became more organised and better resourced, it would progressively take over KGIDP functions.

In 1993, KGIDP officers vigorously promoted the provisions of the *Forestry Act* and the revenue guidelines. Landowner companies were alerted to their obligations, and a widespread programme of community awareness was initiated. The awareness programme fostered widespread community discussion and debate over forestry issues. A number of landowner splinter groups were formed to challenge the authority and practices of some landowner companies. However, while the KGIDP's actions resulted in heightened awareness of the forestry issues, it had no authority to resolve them. The promised back-up from the National Forest Service did not eventuate because of the financial and political constraints at the national level. This left the technical advisers of the KGIDP exposed to the criticism, from both the splinter groups and established landowner company directors, that they had encouraged division within the community without providing any meaningful solution to the issues at hand.

The KGIDP's foray into landowner company affairs on behalf of the national government effectively alienated the project from the very people with whom it was trying to negotiate. The mistrust closed off access to most landowner company directors and company accounts. By the end of 1994, it became apparent that the KGIDP, without substantial support from the National Forest Service, would have no influence over the management or distribution of forest revenues by landowner companies. Technical support for direct intervention in forest revenue and landowner company affairs was withdrawn following a joint review of the KGIDP by the governments of Australia and PNG in June 1995.⁷

⁶ In 1993, there was only one forestry officer serving the Kandrian and Gloucester districts.

⁷ The decision to reduce support for landowner company interventions did not herald the end of donor support to the people of the Kandrian and Gloucester districts. The joint government review resulted in a restructuring of the project which sought to encourage a more productive partnership between technical advisers, landowner companies, and the provincial government in the development of extension services and the provision of infrastructure support. On the other hand, the KGIDP was no longer seeking to play a proactive role in landowner company management and investment decisions.

The Case of the Kapuluk TRP

The KGIDP's relationship with landowner companies contrasted sharply with its dealings with landowners involved in TRP arrangements. While the affairs of landowner companies under LFA arrangements dominated the efforts of the KGIDP, a group of landowners from the Kapuluk TRP area, which was under the management of the Korean company, Nam Yang, sought assistance in renegotiating the terms and conditions of the agreement between the state and the logging contractor. The Kapuluk landowners were especially concerned to secure an increased share of timber revenues through this process of renegotiation.

Because of the preoccupation of the national government with mobilising the National Forest Service, the representations of the Kapuluk landowners went unheeded. Frustrated by government inaction, the landowners sought assistance from the KGIDP to develop a strategy to bring the state and Nam Yang to the negotiating table. The KGIDP responded by initiating a series of landowner meetings in order to determine if there was general support for the negotiations. The KGIDP brokered a role as technical adviser to the landowners, who then entered into a series of lengthy negotiations with the state and Nam Yang. The end result was a substantially revised agreement, in which landowners increased their royalties and levies from A\$4.67 per cubic metre to A\$13.67 (personal communication, Tom Vigus, 1995). This increase translated into an additional A\$1 million per annum for Kapuluk landowners.

Under the TRP arrangement, the KGIDP was able to play the role of technical adviser to both the Kapuluk landowners and the national government in its negotiations with Nam Yang. In the case of Kapuluk, this was made easier by the fact that the original TRP arrangements had largely excluded landowners from any participation in the agreement, and there were no significant vested interest groups, such as those associated with landowner companies, who would oppose access by the wider community.

While not performing the role of negotiator or mediator in a strictly legal sense, the KGIDP was able to facilitate these processes by keeping the lines of communication open between Kapuluk landowners and the Forest Authority, and supplying both parties with critical technical information. The end result was that the state negotiated a substantial increase in royalties for landowners which, in part, satisfied its new forest policy requirements. In the Kapuluk negotiations, the KGIDP avoided being tagged as the agent of the national government. Instead, the KGIDP was seen as the source of independent advice which allowed landowner representatives access to up-to-date information on government forest policy, the activities of the logging contractor, and a range of negotiating options.

The Question of Compromise

If the KGIDP had more flexibility to play the role of negotiator, would it have been able to assist in brokering a more acceptable outcome between the government and the landowner companies? Despite their public stance through the WNBFOA, many landowner company officials made private representation to the KGIDP on the scope for restructuring their companies, renegotiating their agreements, and securing technical advice for their investment strategies. They acknowledged the inequities in their LMAs, the internal feuding over the distribution of forest revenue, the mismanagement of trust accounts, and the rapid depletion of their forest resources. However, their private expressions of concern and pleas for assistance were not for public consumption.

Many landowner company officials wanted a way out of the situation in which they found themselves, but were not prepared to lose face and power by publicly acknowledging their position. Some were totally compromised through their own corrupt actions or those of the logging contractor. Although they had sought personal gain, their power base rested on being able to deliver the goods and services which they had promised their constituents through their LMAs. Any public admission of weakness or uncertainty by landowner company directors would have automatically opened the door to other aspiring big men, and their fame and fortune would have been short-lived.

On many occasions, the KGIDP had the opportunity to negotiate with landowner company directors, but in a private capacity. While most directors were wary of advice to introduce participatory management practices which would empower other landowners to challenge their authority, they were keen to develop strategies for increasing landowner company revenue, and to collaborate with government on the use of landowner company investment funds for improving social and economic welfare. In development terms, the objectives of the landowner company directors were similar to those espoused under the *Forestry Act*, the exception being that the directors thought they should have the right to determine landowner company structure, leadership, and mechanisms for distributing forest revenue without government intervention.

Had the government accepted this position, the coalition between the landowner companies and the logging contractors would almost certainly have been broken. Under its revised (March 1994) revenue arrangements, the government was offering much more than the logging contractors could concede. However, entering into negotiations with landowner companies on this basis would have required an about-face by the government and its donor supporters. It would have meant collaborating with the very people whom the *Forestry Act* was seeking to weed out. The government position was based on two assumptions:

- that many landowner company directors had secured their positions without recourse to proper elections, and had been corrupted by logging contractors and their own greed; and

- that, given the right opportunity and support, the community could be mobilised to replace these directors with democratically elected representatives of the people.

In the Kandrian and Gloucester districts, there was sufficient evidence to support the first assumption, but not the second. Most challenges to established landowner company authority came from splinter groups, usually opposing clans, the leaders of which simply wanted to replace the existing directors with their own people, preferably themselves. In the KGIDP experience, there is little evidence to suggest that splinter groups which succeeded in deposing the established landowner company hierarchy were any more democratic than those which they had replaced.

Thus, while the Forest Authority could claim the high moral ground on the actions of some landowner companies, it had absolutely no control over social organisation and dispute resolution at the landowner level. Rural communities in the Kandrian and Gloucester districts, as elsewhere in PNG, were governed by a set of social relations which do not fit into conventional Western notions of popular participation and democracy. In commenting on social organisation in the two districts, Hide (1990) noted that:

Kandrian-Gloucester communities are still largely small-scale, kin based and demonstrate strong continuities with the past. Decision making occurs at levels associated with small-scale settlements such as hamlets and groups centred on men's houses. Social organisation at this level implies constant political manoeuvring by leaders, aspiring leaders and their followers. Factionalism, dispute and division are common features.

Landowner companies represent a new order or scale of organisation that has not previously been seen in the region. The areas of forest involved, and the numbers of people claiming rights in the resource areas, are both large. There is no traditional precedent for lasting, decision-making structures with authoritative power over such large primary resource areas. Significant problems of organisation and communication are already apparent.

In sum, while the Forest Authority's first assumption was correct and based on empirical evidence, the second was out of character with the political realities of rural PNG.

While the vagaries of popular participation at the community level in PNG have been well documented (see Filer 1991b), the lessons were largely ignored by the national government, aid donors, and the KGIDP in seeking to implement the *Forestry Act*. The primary reason for this was that, at the time of formulating the National Forest Policy and the KGIDP strategy, all of these parties judged their common position to be righteous and enforceable. Righteous it may have been, but enforceable it was not.

Finally, in economic terms, both the national government and landowner companies paid a heavy price for their ongoing debate over participation and equity. Failure to agree on mechanisms for implementing the government's revised forest revenue guidelines on log shipments from West New Britain resulted in a loss of some A\$106 million in export taxes in 1993.⁸

The First Lesson for Government

Policy should be negotiated and incremental if government lacks the resources and political will to enforce its provisions.

At no stage in the formulation of the National Forest Policy did the government seek to enter into any significant negotiations with the forest industry or landowner groups. While briefings were held with these groups, in the period during the formulation of the Act, there was no systematic attempt on the part of government to assess the position of landowner companies and what oppositional strategy they might invoke. Equally important, there was no assessment by the government as to its own capability to enforce the Act, and the likely outcome if it could not. In short, the government was singularly focussed on enforcing the content of the Act within an unrealistic time-frame, and without due consideration of the processes which could have been used to delineate common ground between the parties.

The common ground for both parties was the desire to maximise their respective share of logging revenues. Once the revenue base had been secured, the government could have then reintroduced the issues of landowner company management and equity, and pushed for incremental changes to the way landowner companies operated. Indeed, given the scale of the returns which would have accrued to landowner companies, it would have been relatively easy for the government to focus public attention on management and equity issues. As it was, the only beneficiaries from the deadlock were the logging contractors, who increased the volume of log exports throughout the dispute, and at a time when international log prices were at record levels.

The Second Lesson for Government

Greater recognition must be given to the problems of achieving popular participation and equity in rural PNG.

As a result of colonial and post-independence policy, rural society in PNG has become increasingly divided by the uneven distribution of education, access to social services, and economic opportunity. This inequality places significant pressure on those communities with access to natural resources to develop them

⁸ This figure has been derived by subtracting the actual rent paid by logging contractors operating in West New Britain from the available rent which the government could have collected if it had been able to reach agreement with landowner companies on the implementation of the 1993 forest revenue guidelines (personal communication, Rod Taylor, 1995).

as quickly as possible and, in the words of one landowner company director, to 'get what you can while you can'.

Government policy rhetoric continually seeks to reaffirm the nation's commitment to social democratic process, and plays down the real problems which rural communities have in dealing with participation and equity issues. Had the government made public acknowledgement, when formulating the National Forest Policy, that it was unlikely to be successful in achieving its objectives of fostering equity and participation in the short term, the Act and forest revenue guidelines could have been modified to reflect an incremental position on these issues. However, such a statement would have been unlikely to endear the national government to the aid donors, who were looking for bold political statements to justify their expenditure and to placate vocal interest groups in their own countries.

In sum, the issues of equity and participation in PNG are unlikely to be resolved any more quickly than they are in other developing countries. In the case of forestry agreements, the problems are made more complex when offshore investors seek to take advantage of a transitional society in which government and rural communities have limited experience in negotiating their differences.

The ferocity with which overseas logging contractors set about exporting logs between 1993 and 1994 meant that landowner companies and government had to reach a rapid agreement if they were to stem the flow of revenue offshore. Unfortunately, the questions of participation and equity on which they sought to commence their negotiations proved to be thoroughly intractable in the short term. With hindsight, the government would have achieved more by adopting a strategy which sought to work from the common ground – maximising landowner company and government revenue shares – and then progressively addressed the issues of participation and equity.

The Lessons for Donors and Their Technical Advisers

In the case of the KGIDP, donors and their technical advisers would have been better advised to play the role of 'honest broker' and facilitate the process of negotiation between landowner companies and the government.

In supporting the negotiation and mediation process in the Kapuluk TRP, the KGIDP was able to play a more useful and acceptable role than it did as the implementing and monitoring agent for unpopular and unenforceable provisions under the *Forestry Act*.

Donors gave themselves little opportunity to consider the negotiation option. The World Bank, and the Australian, New Zealand, and German governments, were all enthusiastic proponents of forestry reform in PNG, and committed extensive resources to its development from the outset. The KGIDP was a direct outcome of this enthusiasm. Had donors and their technical advisers given more consideration to the difficulties of implementing the Act,

and to the oppositional stance of landowner companies, the prospect of providing support for facilitating the negotiation process may have been more attractive.

It is, of course, questionable whether donors would have opted to support the negotiation process, particularly if it meant some short-term acceptance of the status quo in landowner company and community power relationships. As already noted, donor responses were influenced by the attitudes of international and local NGOs, whose philosophical foundations were deeply rooted in promoting community participation and social equity. Any turnaround on these issues would have been strongly and publicly contested by these groups – a situation which all donors were keen to avoid.

Finally, donor flexibility is ultimately constrained by bilateral and multilateral aid agreements which dictate that donors give priority to the government agenda. In the case of the *Forestry Act* and revenue guidelines, the government agenda ran counter to the adoption of a more flexible approach to negotiating with landowner companies. From the perspective of both protocol and approach, aid donors were both locked into, and strongly supportive of, the government's position.

The Lessons for Landowners

Landowners who enter into development agreements with unresolved land and resource disputes have little chance of maintaining group solidarity in the face of conflict with resource developers.

Most landowner companies were formed without due consideration for the membership of the land groups which they claimed to represent, or for the actual ownership of resources. Had land groups been able to reach agreement between themselves over ownership of the forest resource, and establish common development objectives, their power to negotiate with logging contractors would have been vastly increased. Instead, the relationship between many landowner groups was typified by mistrust and conflict, some of which had its origins in traditional clan allegiances and rivalries. Logging contractors, aided willingly or unknowingly by landowner company directors, were able to exploit divisions within and between these groups to secure maximum advantage.

It could be argued that, far from being the flagships of the new social order which many rural people had hoped for, landowner companies effectively disempowered their members by making them too dependent on the logging contractor. By the time this was realised, it was too late for landowners to play their trump card – namely the fact that, as traditional landowners, they had the undisputed right to determine who should have access to their forest resources, and at what price.

Finally, while it may have been better for the government and landowner companies to have focussed on securing a greater share of forest revenue in the first instance, the increased revenue generated would have inevitably heightened

landowner tensions over resource ownership and revenue distribution. Such tensions, as demonstrated in Bougainville (Dorney 1990), could have a severe impact on provincial and national political stability. Hence, the government could not have afforded to adopt a strategy which simply sought to maximise revenue and ignored the more fundamental questions of participation and equity.

CHAPTER 3

'PRIVATE DEALINGS':

A SOCIAL HISTORY OF THE HAWAIN LOCAL FOREST AREA, EAST SEPIK PROVINCE

JOHN M. LEBDOM

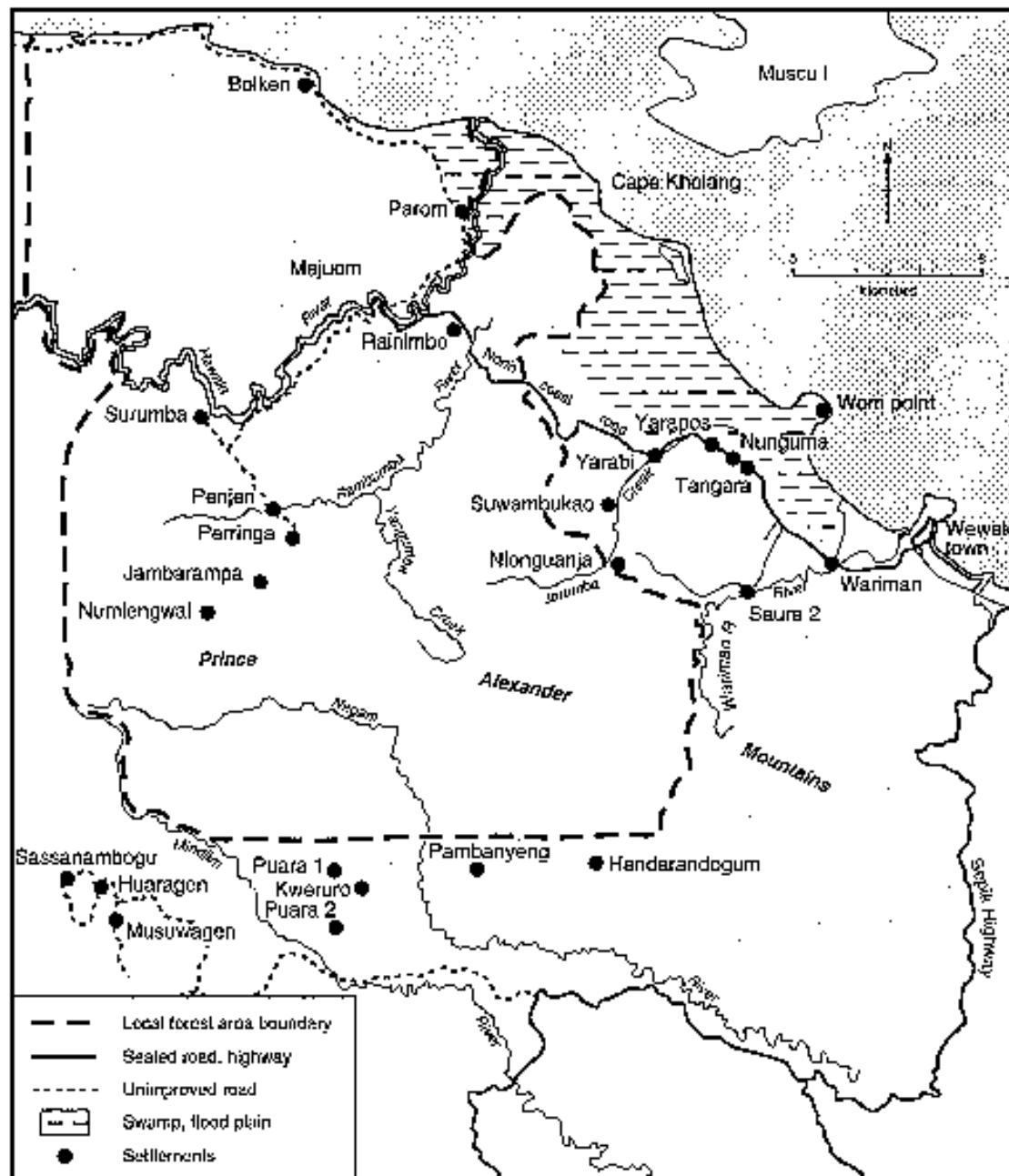
Introduction

In January 1993, a ship under contract to a Malaysian logging company appeared off the coast of Wewak, a small town on the northwest coast of Papua New Guinea (PNG). The ship was transporting about K4 million worth of new bulldozers, tractors, trucks, and chainsaws to a new logging project that was supposed to begin operations that year in the Prince Alexander Mountains. The project location was known as the Hawain Local Forest Area (LFA), named after the largest river within its boundaries.

The arrival of the ship seemingly marked the successful culmination of several years of effort, on the part of a group of local politicians and clan leaders, to initiate a large-scale logging project as a means of bringing 'development' to their home villages. They had formed a local landowner company, 'WongWong' Logging, and successfully lobbied the Minister for Forests, Jack Genia, for a logging permit at a time when there was an official moratorium on the issue of new permits. They had also negotiated a contract with a company named Sovereign Hill, a wholly owned subsidiary of the giant Malaysian timber firm, Rimbunan Hijau. But as soon as the ship unloaded its cargo on Wom Beach, conflicts began between customary landowners, WongWong Logging, and Sovereign Hill.

In this chapter, I provide a case study of the troubled history of the Hawain logging project. I examine the shifting nature of relationships between customary landowners, politicians, forestry officials, and the management of Sovereign Hill during the development of the project. My aim, in particular, is to examine how Sovereign Hill gained and lost access to forest resources, both at the national and local level. In brief, I will show that, while politicians and government officials used their authority to officially push the project ahead, this did not provide Sovereign Hill with unfettered access to the forests of the Hawain LFA. Instead, the advance of bulldozers and chainsaws was repeatedly blocked by various forms of conflict within the local community of customary landowners. As we shall see, the outcome of these processes has been unsatisfactory both for the majority of local people and for Sovereign Hill.

Map 3.1: The Hawaitn Local Forest Area and its environs.



The Project Area and Its Customary Owners

When the Minister for Forests declared the Hawain LFA in April 1992, it encompassed some 400 square kilometres of lowland rainforest on the slopes of the Prince Alexander Mountains west of Wewak (see Map 3.1). This mountain range, despite its limited extent and relatively low elevations, is surprisingly rugged. The range is composed of a deeply dissected complex of razor-back ridges, steep escarpments, and upland benches. The range begins near the mouth of the Sepik River, follows a west-northwest trend that culminates in the summit of Mount Turu (1,178 metres), and then abuts the Torricelli Mountains in the west (Reiner and Mabbutt 1968:22). The northern escarpment is drained by a series of steep and narrow canyons which empty into a swampy coastal plain east of the Hawain River. The southern escarpment, meanwhile, drains into a series of rivers (the Mindjim and Nagam being the most important) which flow in a southeasterly, then southerly, direction to meander through grassy foothills and plains before joining up with the mighty Sepik River.

The forests of the Prince Alexander Mountains are composed of a wide variety of trees, shrubs, ferns, herbs, fan palms, climbers, and epiphytes. At the lower elevations, the forest is especially complex, due to variable soil conditions, human disturbance, and relatively dry conditions. There are, for example, over sixty species of trees that have been recorded for the upper canopy layer alone (Saunders 1968:131). At the higher elevations, where rainfall is generally greater and human activities more restricted, the forests are not as floristically complex, but are composed of denser concentrations of large trees. Finally, in the coastal plain, forests are restricted to areas that have relatively well-drained soils, which means that they form isolated stands of timber in the midst of larger sago and nipa palm swamps. In all three of these types of forest, the most commonly occurring species of economic value are Taun (*Pometia pinnata*), Celtis (*Celtis philippensis*), Erima (*Octomeles sumatrana*), Kwila (*Instia bijuga*), Talis (*Terminalia* spp.), and Walnut (*Dracontomelum* spp.), among others (Robbins 1968; Saunders 1968; ESP 1987).

By national law, the forests of the Hawain LFA are the property of an undocumented number of Boiken-speaking descent groups called *klan* in Tok Pisin. While I will translate this word as 'clan', it should nonetheless be noted that local usage departs somewhat from standard anthropological definitions. The word *klan* is indeed used in a normative sense to refer to corporate descent groups whose members are believed to be descended from a single ancestor through patrilineal links. But in practice, a *klan* is more importantly a proper name which connects specific corporate groups to particular 'spaces' or 'slots' on the landscape. When I asked Boiken men, for example, how to translate *klan* into Boiken, they often responded with perplexity and confusion. Most men denied that *klan* could be translated into their vernacular, and asserted instead that they always used the proper name of a clan to refer to a specific spatial and temporal group. These proper names, they told me, were functionally equivalent

to an *address* in English, such as one would use to locate a person.¹ This shows that there is a close relationship between land and social identity in contemporary Boiken culture. The local landscape is compartmentalised into named subterritories, each of which has its own resident trickster spirits (Tok Pisin, *masalai*; Boiken, *wari*) and history. Knowledge of the histories of these subterritories – in terms of knowing the names of spirits and the ancestors who inhabited, used, or fought for the land – forms the fundamental basis for staking claims of landownership.

The stated rules regarding the inheritance of land rights are relatively straightforward. All Boiken will claim that rights over land, particularly decisions regarding its use and distribution to others, are transferred from father to eldest son. Thus, while he is still alive, the father shows his eldest son the boundaries of their land and teaches him its history. The eldest son then acquires the authority to decide how land is to be shared among his family members, and how it is to be used when his father dies or is incapacitated. In practice, however, the land tenure system is often accommodated to the demographic fortunes of specific clans. As is common throughout the Sepik culture area, the relationship between mother's brother (*wawo*) and sister's son (*rawa*) is very important, both in customary exchange and in property relations. It is not uncommon, for example, for mother's brothers to grant sisters' sons rights over land with the intention of eventually incorporating them into their clan.

In 1990, the Boiken-speaking population living in close proximity to the Hawain LFA numbered about 5,600 (PNGNSO 1993). This population was residing in thirty-one hinterland villages and three peri-urban settlements on the outskirts of Wewak. These villages and settlements are concentrated in three locations:

- along the North Coast Road that travels from Wewak to Dagua;
- along the southern ridges of the Prince Alexander Mountains near the Sepik Highway; and
- along the ridges adjacent to the Hawain and Rambumba valleys (see Map 3.1).

Contemporary Boiken settlements are agglomerations of semi-autonomous hamlets separated by gardens and secondary regrowth. Hamlets are mainly occupied by the members of a single patrilineage or joint fraternal group, but they sometimes also include married sisters, their husbands, and their children. Prior to missionisation, men usually slept apart from their wives and children; today, however, households are often composed of nuclear families. The houses

¹ Some men, however, did suggest that *klan* could be translated by the Boiken word *wango*, which they said literally meant 'family'. Interestingly, *wango* has two other associations. First, it is used to refer to holes in the ground or in Ficus trees from which apical ancestors emerged. Secondly, it also used to refer to the 'space' or 'room' that a particular clan occupies.

belonging to the nuclear families of a larger descent group are arranged around a central courtyard that is cleared of all vegetation.

The component clans of a larger settlement generally unite to defend their common territory from the people of neighbouring settlements, but they also have complex relationships of alliance and enmity with clans living elsewhere. A regional moiety system or dual organisation, for example, once encompassed the local-level organisation of clans, and regulated marriage and male initiation on a regional basis. Although it has faded from most aspects of contemporary social practice, the moiety system created some fluidity and instability in socio-political relationships within and between settlements. Furthermore, customary exchange practices, such as brideprice, child payments, and mortuary payments, establish a network of ongoing obligations between avuncular and affinal relatives in different settlements.

The customary landowners of the Hawain LFA speak at least three dialects of Boiken, a non-Austronesian language of the Ndu family of the Sepik-Ramu phylum (Laycock 1965; Freudenberg 1976).² While the people who speak these dialects are collectively known as the 'Boiken', after a coastal village where Catholic missionaries first established a mission station near the turn of the century, no one I know refers to themselves as such (see Roscoe 1991). Boiken-speakers do not, in other words, have an overarching conception themselves as an ethnic group. Nor, in the pre-colonial epoch, were they ever united into a single polity. Instead, social identities are based on people's village of origin and its geographical provenance ('mountains', 'coast', 'Hawain River', and so forth). Dialect differences also figure prominently in the construction of regional social identities. Village and regional affiliations have played a central role in landowner politics during the development of the logging project.

The present logging operation is neither the first to have been planned nor the first to be carried out in the area. Between 1962 and 1982, a significant area of the alluvium forest immediately west of Wewak was commercially logged by a company called Sepik Timbers. The company had expatriate (Australian) managers but employed local men. The logs were processed in a small sawmill in Wewak and sold on the domestic market. In 1982, Sepik Timbers closed down their Wewak sawmill because the production of timber from a sister sawmill in Madang was already outstripping local demand (Fleetwood 1983:73; see also Sagir, this volume).

In the mid-1980s, the East Sepik Provincial Government and the provincial Division of Forests revived interest in exploiting the timber resources of the Prince Alexander Mountains. The Division of Forests carried out a survey of the

² These dialects formerly corresponded to geographical and ecological subregions in the Boiken-speaking area. The 'Coastal' dialect was spoken by residents of the coastal plains and the islands of Muscu, Walis, and Tarawai, to the west of Wewak; the 'Nagam' dialect was spoken by residents of villages along the southern escarpment of the Prince Alexander Mountains, near the Nagam River valley; and the 'Central' dialect was spoken by residents of villages in the eastern shadow of Mount Turu.

timber resource and queried local landowners about their interest in a future logging project. The Division concluded that, while not extensive, the forest resources could nonetheless support a viable timber industry. Divisional staff also noted that 'the landowners of the area have differing views about developing the timber resources there ... [but] to break up the resource in that area to suit each individual group's wishes would not be economically viable' (ESP 1987:4). Nonetheless, they concluded by proposing a 50,000 hectare area (called the 'West Coast Timber Area') for further consideration. It was bounded by the coastline to the north and the peaks of the Prince Alexander Mountains to the south.

Whatever plans the provincial government was making to develop a timber industry in the Prince Alexander Mountains were interrupted in 1990, when it was suspended by the national government for misappropriation of funds and political corruption.³ Instead, the impetus for exploiting the timber resources of the West Coast Timber Area was taken over by a coalition of Boiken-speaking migrants who lived in peri-urban settlements along the North Coast Road. To understand what motivated them to take this initiative, it is necessary to describe briefly the way in which colonial policy and practice fostered an uneven process of social and economic change in this region.

The 'Uneven Development' of the Boiken Landscape, 1884-1990

The last one hundred years have been a period of dramatic events and rapid change in the Wewak area, which have greatly altered its social and natural landscape. On the eve of Germany's annexation of the northern half of New Guinea in 1884, Wewak was simply a small, Austronesian-speaking village surrounded by generally hostile Boiken groups (Fleetwood 1984:7). Since 1884, through successive periods of German, Australian, Japanese, and then again Australian rule, Wewak has emerged as the administrative and commercial centre of the whole Sepik region, and has become the fourth largest town in PNG (PNGNSO 1994).

The Germans first established a trading station and government post at Selco (near Aitape) in 1894. Over the next thirty years, they built up a small network of coconut plantations, Catholic missions, and patrol posts, first along the coast and on the islands, and later at Marienberg and Angoram on the Sepik River. While thus expanding the trade networks that reached into hinterland villages, the Germans also started to recruit men, sometimes forcibly, to work as labourers on plantations in what are now Madang, New Britain, and New Ireland provinces. The influence of the Catholic church also began to spread gradually along the coast (see May 1990:176). Then, with the outbreak of the First World War, the Australian army took over the framework of German administration. Thereafter, the pace of labour recruitment continued to increase, additional patrol posts were established, and the Society of the Divine Word extended its missionary activities into the hinterlands of the Prince Alexander Mountains.

³ The deposed Premier responded by burning down the provincial government offices.

In the first half of the twentieth century, then, many Boiken converted to Catholicism, abandoned practices associated with the *haus tambaran* (cult houses) and male initiation, and worked on copra plantations in other parts of the Territory of New Guinea. They also learned, and helped to create, a new language – ‘pidgin English’ (henceforth referred to as Tok Pisin). In 1933, the Australian colonial administration moved the headquarters of the Sepik District from Aitape to Wewak, thus cementing the substantial shift which was already under way in the regional political economy.

In 1942, 2,000 Japanese soldiers invaded Wewak, driving out the Australian colonial administration. In early 1944, about 30,000 additional soldiers, representing the remnants of the Japanese army on the New Guinea mainland, retreated overland from Madang to Wewak. Cut off from their supply lines, they fanned out into the mountains as far west as Maprik, where they hunted and foraged for food, raided native gardens and sago stands, and began to clear forest for gardens of their own (Long 1963). They also armed local men with rifles, and gave them cartridges to hunt game on their behalf.

The Japanese were eventually driven out by Australian armed forces in 1945, but not before the war had made a major impact on the indigenous people. Perhaps 15 percent of the population died during the three-year occupation.⁴ In addition, large game animals in the forest were depleted (Gerstner 1952), gardens, coconut groves, and sago stands in coastal areas were destroyed, and many villages were abandoned.⁵

Prior to the Japanese occupation of Wewak, little economic development had taken place in the Sepik region. The district generated a small amount of income from gold mining around Maprik, from trade in crocodile skins along the Sepik River, and from a limited volume of copra production in the coastal areas and offshore islands (Curtain and May 1979; May 1990). With the re-establishment of the Australian administration after the war, however, things began to change. The colonial administration made systematic attempts to introduce cash crops such as coffee, rice, and peanuts into village agriculture. Meanwhile, returning ex-servicemen, such as Pita Simogun and Yauwiga Wangonalo, challenged traditional forms of leadership and mobilised a large proportion of the coastal population into what Ron May has called ‘a loosely coordinated, development oriented, generally pro-administration movement which promoted cash-cropping (especially rice and cacao) and other forms of business (notably, around Wewak, transport), road building and education’ (ibid:177). Their achievements, in organising Rural Progress Societies, mobilising labour for the construction of an all-weather road between Wewak and Dagua, and promoting the planting of cash crops, were considerable.

⁴ See ‘Wewak Patrol Report No. 4, 1946/47’ (R.G. MacIntyre).

⁵ See ‘Wewak Patrol Report No. 3, 1947/48’ (A.J. Zweck) and ‘Wewak Patrol Report No. 5, 1948/49’ (L.R. Foster).

In the post-war period, the population of Wewak was steadily increasing. The expansion of government in the 1950s increased the size of the expatriate community, which created an impetus for the growth of service industries, such as small-scale construction, transport, and retail stores, most of which were owned by ethnic Chinese residents. The growth in the service industry helped to provide increasing opportunities for local 'native' employment. Two large-scale projects undertaken in the early 1960s, the construction of Wewak General Hospital on Boram peninsula and the army barracks on Moem Peninsula, also stimulated employment and population growth in Wewak (Curtain and May 1979:56). In 1966, the total population of Wewak town was about 9,000; by 1971, it had increased to 15,000 (Lea 1976:356). The construction of the Sepik Highway during this period also made the town more accessible to the hinterland populations of the Prince Alexander Mountains and the Sepik River.

Before the war, the swamplands and forests of the coastal plain west of Wewak had been sparsely inhabited. Once the war was over, however, families from hinterland villages in the Prince Alexander mountains began to migrate to the outskirts of Wewak. In 1958, Patrol Officer Mater explained that isolation from the burgeoning cash economy of Wewak was one of the main motives for migration:

Lack of communication (i.e. transport) in the more remote inland villages has been the major factor in these people's migration to the coast to plant cash crops and the local landowners have realised the advantages of allowing them to settle to supplement the sparse population for cash cropping, road construction and similar efforts. The opportunity of acquiring an income from casual labour around Wewak has also contributed to the desire to migrate.⁶

In the 1950s and early 1960s, the migrants opened up the swampy and forested lands which had formerly served the relatively small population of customary owners (from Wom, Mingar, Saure, and Yarapos) as reserves for sago, hunting, gathering, and fishing. They converted them to subsistence and market gardens, coconut and cocoa groves, and even cattle pastures. By 1963, patrol officers reported that there were about eighteen new settlements, with a combined population of about 1,350, along the recently completed Wewak-Dagua road.⁷ By 1990, the population had increased to about 3,000.

For our purposes, the most important settlements that were founded in this period (in about 1952) are Tangara, Nunguma, and Yarabi. These settlements were composed mainly of families from villages in the southern foothills of the Prince Alexander Mountains, including Handara, Nungori, Kweruro, Puara, Huarigen, Musuwagen, and Sassanumbogu. They are also the home of a significant number of people from the Rambumba Valley villages of Penjen,

⁶ 'Wewak Patrol Report No. 4, 1957/58' (J.H. Mater).

⁷ 'Wewak Patrol Report No. 19, 1962/63' (D.L. Emery and B.A. Hull).

Numicnguai, and Jambarampa (see Map 3.1). Individuals from these settlements have played significant roles in the development of the logging project.

As the settlements on the outskirts of Wewak have grown in size, due to natural increase and continued internal migration, so too has socio-economic differentiation increased between peri-urban 'settlers' and the rural 'locals' still living in their traditional homelands. The permanent residents of the peri-urban settlements tend to have completed more years of education, are more likely to be employed in town or to be self-made entrepreneurs, and are more active in provincial and national politics, than their counterparts in the hinterland.⁸ Along the North Coast Road, contemporary Boiken-speakers distinguish between 'outsiders' (*yanduo*, or in Tok Pisin, *kamman*), and 'locals' (*wianduo*, or *man bilong ples*). The latter group's perception of the increasing economic inequality between *wianduo* and *yanduo* has also led to increasing tensions between the two.

By the late 1980s, however, many (if not most) of the Boiken-speaking settlers in Tangara, Nunguma, and Yarabi were wanting to return to their home territories to live. There are a number of social and material factors that explain why, for many of them at least, 'going home' has become both increasingly desirable and necessary. First of all, many still have insecure tenure over the land they occupy and use, since it remains under the customary ownership of patrilineages in the neighbouring villages of Mingar, Wom, Saure, and Yarapos. As early as 1958, the colonial administration endeavoured 'to stabilise this vexed question of migrants and their land problems', primarily by negotiating long-term leases with the customary owners.⁹ However, these efforts were largely unsuccessful, as the customary owners preferred to maintain an informal host-guest relationship in which the settlers, to whom they were connected by kinship and marriage, would remain perpetually in their debt. Yet when relationships between settlers and locals break down, there is nothing legally preventing the latter from demanding that the former 'get off their land', as happened to the Kweruro settlers resident at Yarabi in 1990.

Secondly, the economic opportunities open to settlers are increasingly limited in scope and number. Since they do not occupy their own land, expanding their holdings of perennial cash crops such as coconut, cocoa, and betelnut carries the risk that they may be repossessed by customary landowners who become envious of their tenants' economic achievements. Nor has the

⁸ This is not surprising, since most settlers state that the main reason why they migrated closer to town was so that their children would have easier access to schools, while they themselves hoped to find employment in town or start businesses, such as running trade stores or public motor vehicles (PMVs).

⁹ 'Wewak Patrol Report No. 1, 1958/59' (J.H. Mater).

urban job market in Wewak grown fast enough to absorb the growing migrant population of working age.¹⁰

Finally, the amount of arable land available for gardens and the number of productive sago stands have both in proportion to the demographic growth of the squatter settlements. A comparison of aerial photographs taken in 1973 and 1994 shows an increase in the proportion of the coastal plain which has succeeded to climax grassland. Anecdotal evidence from interviews also suggests that the settlers have shortened their fallow cycles, while yields from their gardens are decreasing.

All of these factors have inclined the settlers to believe that they face an increasingly uncertain future in the settlements. They believe that, if they could return to their homelands, they would have a wider range of economic options. But they have been reluctant to return to their villages because of the lack of roads connecting them to the urban market and the absence of basic health and educational services. The logging project, then, was conceived as a means of resolving their problematic status. As a WongWong executive once explained to me:

Basically the whole idea behind our starting this project was to cut down on the migration problem. Our people have been migrating down to Tangara for some sixty to seventy years. They started to move right after World War Two. We believed that, if we remained here, we would not have a very bright future. The only reason why we are living here is so that we can be near to town, to enjoy the benefits that come from living in a town. Otherwise, if we had a good infrastructural base back in our homeland, we would go back and come to town just when we needed to. We would move... We sold our forests for a road. We felt that we would wait a long time if we waited for the government to do it for us. Other provinces have already progressed, but we, in the East Sepik Province, are way behind the others. We produced the first Prime Minister of the country. But in terms of development, we haven't experienced any.

Such ideas were commonplace amongst the people of the LFA area. Indeed, when I asked local people why they supported the logging project, the most common response I received was: '*Rot tasol!*' ('Just for a road'). They did not believe that the government would ever be able to construct the roads which they desired. They hoped, instead, to cultivate a relationship with an overseas company with sufficient capital and machinery to build the roads for them. It was for roads, above all other reasons, that many customary landowners, in the migrant settlements and hinterland villages alike, were prepared to 'sacrifice' their forests.

¹⁰ East Sepik remains a province of net outmigration to other urban areas in PNG (PNG National Statistical Office 1990).

Negotiating the Local Forest Area Permit, 1990-1993

In the accounts of local people, the idea of selling their timber resources to an overseas logging company originated in the Seventh Day Adventist enclave at Tangara settlement. A group of elders in the church, among whom Robert Passu was the most important, took the initiative in organising a landowner company, petitioning the Minister for Forests to issue a logging permit, and negotiating a contract with an overseas company.

Robert Passu was a second-generation resident of the settlement, but was also a senior member of one of the six landholding clans in Numienguai, a hinterland village located near the headwaters of the Rambumba River, some two to three hours' walk from the nearest road. Passu held the position of local government councillor in Numienguai, had been employed as a 'second secretary' in the national Department of Justice, and was also an active member of the Melanesian Alliance Party. In 1992, he was acting as election campaign manager for the national Member of Parliament, Bernard Narokobi, having put aside his own dreams of becoming an MP in order to serve as chairman of the new landowner company.

Between 1990 and 1992, Passu and his group of close associates held numerous meetings with customary landowners in the Wewak Local, Numbo, and But-Boiken provincial electorates. They urged the landowners to commit their forests to a logging project in order to open up the hinterlands, and thus resolve the problematic status of the settlers along the North Coast Road. Men who were interested in the idea provided the names of their clans and of the lands which they controlled, signed 'Clan Land Usage Agreement' forms, and paid K30 to become (as they thought) shareholders in a landowner company. At some point in 1991, men representing about sixty clans from sixteen villages met at Tangara to organise the company itself. They formally appointed Passu to the position of executive chairman, seconded the nomination of a secretary, a treasurer, and a project manager, and then elected twelve men to sit on the company's board of directors. Passu named the company 'WongWong' Logging, after the word in the Central Boiken dialect for the King Bird-of-Paradise, *Cicinnurus regius*.

According to documents on file with the Investment Promotion Authority in Port Moresby, Passu first registered WongWong Logging as a proprietary company in September 1991. Passu and a lawyer based in Port Moresby, Luke Nalo, were listed as the company's two sole directors and shareholders. The company's Memorandum of Understanding stated that its main objective was 'to harvest timber for the purpose of exporting or to be used within Papua New Guinea.' Its Articles of Association declared that 'the rights of the members to transfer shares in the company is restricted in that the Board of Directors may at any time in its absolute discretion decline to register any transfer of shares.' WongWong, in other words, was registered as a private company with whom customary landowners were registering their lands, rather than a corporate organisation with broad landowner participation.

While the landowner company was being formed, its executives were also busy searching for an overseas company to invest in the project. The first company with whom they began serious negotiations was Groomes Pacific, a company based in New Zealand. Groomes, they said, performed a careful inventory of the forest resources of the Prince Alexander Mountains, and ultimately expressed an interest in signing a Logging and Marketing Agreement with WongWong. Negotiations broke down, however, when the executives of WongWong discovered that Groomes would only pay landowners a flat royalty of K4 per cubic metre, and that Groomes also intended to finance the project through bank loans. It was possible, although it is not documented, that the landowner company would have shared the liability for these loans.

When negotiations with Groomes were terminated, the WongWong executives then turned to the national Department of Forests for assistance in locating a suitable contractor. Their contact in the Department referred them to a 'reputable' Malaysian company, Niugini Lumber Merchants. The WongWong executives were suitably impressed by the financial and technical capabilities of this company, and were especially reassured by a map displaying more than a dozen logging projects in PNG in which it was already actively involved. Niugini Lumber Merchants proposed to establish a subsidiary company, Sovereign Hill, which would actually log the concession, while the parent company would retain the right to market the timber overseas.

During the last six months of 1991, Niugini Lumber Merchants paid for WongWong's executives, directors, and other landowners to make a series of trips to Port Moresby. During their visits, these men lobbied the Minister for Forests and other national parliamentarians to grant WongWong a timber permit under the terms of the *Forestry (Private Dealings) Act*.

This Act, which was originally enacted in 1971 and amended in 1979, granted the Minister for Forests the sole authority to declare a 'Local Forest Area' upon 'application by any interested person and on payment of the prescribed fee', as long as he was satisfied that such a declaration was 'in the interests of the owners by custom of the timber', 'the national interests', and 'the prospects for the economic exploitation of the timber'. In the 1980s, this Act proved extremely popular with overseas logging companies and local landowner companies alike. In effect, as the name of the Act implied, it empowered the customary owners of timber resources to enter into private, contractual relationships with overseas companies outside of government scrutiny and planning. In theory, landowner companies were to be formed following the model which the Department of Forests used in the case of Timber Rights Purchase agreements. The customary owners were to be identified through genealogical investigation, their land boundaries delimited, representatives selected, and the mechanism for distributing royalty payments for timber extracted from the land defined in advance. In other parts of PNG, however, landowner companies frequently failed to adequately delimit customary groups and land boundaries. The executives and directors were often not representative of the range of customary groups or their interests, and they often lacked the

business skills and knowledge necessary to negotiate favourable Logging and Marketing Agreements with logging contractors (see Simpson, this volume).¹¹

In 1989, the Barnett Inquiry had recommended that the *Forestry (Private Dealings) Act* should be repealed because it opened the door to all sorts of unscrupulous dealings, and because landowner companies were often 'mere puppets created to enable the foreign timber companies to gain access to the resource' (Barnett 1989c, Vol.1:120). In 1990, the Minister for Forests, Karl Stack, announced a two-year moratorium on the issue of new timber permits, with the aim of creating an interim period in which new forestry legislation could be drafted and institutions capable of implementing and enforcing the regulations established. However, over the course of the following year, Stack continued to issue permits under both the old *Forestry Act* and the *Private Dealings Act* (see Filer 1991b).

When Jack Genia took over the Ministry of Forests in April 1991, he too continued to lobby Cabinet for exemptions to the moratorium while the provisions of the new *Forestry Act* were being finalised.¹² On 12 December, while Prime Minister Namaliu (who was publicly opposed to any breach of the moratorium) was making an 'official visit' to New Zealand, Cabinet granted exemptions for five new projects. The Hawain LFA was one of them. In justifying his submission to Cabinet, Genia wrote: 'I am reluctant to recommend these to the NEC [Cabinet] but pressure from landowners, provincial governments and members of Parliament are such that I am compelled to make this submission' (*Times of PNG*, 21 November 1991).¹³

Four months later, on 8 April 1992, Genia proceeded to declare the Hawain Local Forest Area. He appointed the Acting Assistant Secretary for the East Sepik Division of Forests, Alimel Bellet, to certify WongWong as the corporate vehicle for all of the customary landowners of the Hawain LFA. According to a copy of the Dealings Agreement between WongWong and the LFA landowners that was circulating in Wewak in 1995, Bellet certified that sixty-eight men acting as the representatives of sixty-seven clans from fourteen villages had the right, by custom, to dispose of the timber resources of the 40,000 hectare

¹¹ According to the provisions of the *Forestry (Private Dealings) Act*, the responsibility for authenticating the claims of ownership over timber resources lay with a 'prescribed authority' to be nominated by the Minister for Forests. At the same time, the Act exempted both the state and the prescribed authority from being liable in civil proceedings for the facticity of the certification. Thus, if the parties to a timber sale under this act avoided government scrutiny of their contractual relations, the government also washed its hands clean of any responsibility for policing this relationship.

¹² See the reports in the *Post-Courier*, 8 May 1991, and the *Times of PNG*, 21 November 1991.

¹³ It may be noted that the NEC simultaneously voted to extend the moratorium on new timber permits until July 1993.

concession.¹⁴ The boundaries of the Hawain LFA, as declared in the government gazette, were essentially the same as those which had been delimited for the 'Wewak-West Coast Timber Area' by the Division of Forests in 1987 (ESP 1987:2). In its report, the Division of Forests had estimated that the population of customary landowning clans could number some 5,000 individuals resident in seventy villages. WongWong itself, in its Environmental Plan, stated that Block 1 of the Hawain LFA covered thirty-one villages with a population of some 4,876 (WongWong Logging 1992:34-36). Clearly, then, the sixty-eight men who signed the Dealings Agreement with WongWong represented but a small fraction of those men who would, by either customary right or capitalist self-interest, claim ownership over forests in the Hawain LFA.¹⁵

On 1 May 1992, WongWong signed a Logging and Marketing Agreement with Sovereign Hill, which was now a wholly owned subsidiary of Rimbunan Hijau.¹⁶ The margins which WongWong negotiated with Sovereign Hill for the payment of timber from the LFA are shown in Table 3.1.

Table 3.1: Local revenues under the 1992 Logging and Marketing Agreement for the Hawain LFA.

Description	Kina/m ³
Non-premium hardwoods	4.50
Premium hardwoods	5.50
Super premium hardwoods	7.00
Timber for poles and piles	2.00
Landowner company premium	5.00
Reforestation levy	1.00
Agricultural development levy	1.00
Infrastructure levy	1.00
Provincial government levy	0.50

Source: WongWong Logging 1992.

¹⁴ The villages which were represented were: Suwambukao (4), Mandigen (1), Jambarampa (5), Penjen (4), Perringa (9), Rainimbo (1), Harigen (2), Murabura (1), Sassanumbogu (4), Muscuwagen (13), Puara (11), Kweruro (9), Numianguai (3), and Wom (1).

¹⁵ In 1995, many of the men whose names appeared on the Dealings Agreement were publicly denying that they had ever seen or signed the document.

¹⁶ Documents filed with the Investment Promotion Authority show that Sovereign Hill was originally registered as a stockbroking company, Rokwana Pty Ltd, by two Port Moresby lawyers in 1986. In 1989, the name was changed to Sovereign Hill, new directors were appointed, and the nominal share capital was increased to K1 million. In August 1992, 999,998 shares were allotted to Rimbunan Hijau, while the remaining 2 shares were allotted to Tiong Ik King of Singapore. Sovereign Hill is also the vehicle through which Rimbunan Hijau holds its 50 percent stake in Niugini Lumber Merchants (see Filer, this volume).

The day before the Minister for Forests gazetted the declaration of the Hawait LFA, the Acting Minister for Forests, Michael Singan, signed documents necessary for the gazettal of the new *Forestry Act* during a campaign rally which the Prime Minister, Rabbie Namaliu, was staging in the Duke of York Islands (*Post-Courier*, 7 April 1992). The Act was to be formally made into law on 15 April. While Genia had publicly supported the passage of the new *Forestry Act*, he now combined with the Secretary of the Department of Forests to block its gazettal until 25 June, at the end of the national elections. They claimed that neither an appropriate institutional structure nor an operating budget was in place that would permit the implementation of the Act. Later, Genia added that delaying the gazettal of the act was necessary to ensure that '19 timber permits and licences due to expire this year are renewed and extended prior to the enforcing of the new act' (*Post-Courier*, 22 April 1992).

Because of his breaches of the moratorium and his delay of the implementation of the new act, Genia came under increasing fire from officials in the Department of Forests, the opposition, and non-governmental organisations. The Forestry Transitional Management Council, which was overseeing the amalgamation of the Forest Industries Council and the Department of Forests into the PNG Forest Authority, under the provisions of the new Act, was especially outraged. In late April, its chairman released a press briefing which claimed that the majority of logging permits which Genia had issued during his tenure as Minister for Forests had been awarded to Rimbunan Hijau or its subsidiaries, giving them control over about 66 percent of the total area of logging concessions in PNG (*Post-Courier*, 28 April and 21 May 1992). There were also allegations that Rimbunan Hijau was lavishly funding the campaigns of Pangu Party candidates for the upcoming elections, a charge that Genia vigorously denied (*Post-Courier* 19 June 1992). Meanwhile, the opposition, led by Paias Wingti and Sir Julius Chan, were calling for a new inquiry into the forestry sector. All this meant that the government's handling of forestry legislation and the issuance of new timber permits between 1990 and 1992 was turned into an issue for the June elections.

In the aftermath of the elections, Namaliu lost the position of Prime Minister to Paias Wingti by one vote in the national parliament. Wingti then appointed Tim Neville to replace Genia as the Minister for Forests. Once ensconced in office, Neville announced his intention to review all of the timber permits which had been issued after the writs of election had been filed, and proceeded to step up the speed of reform in the forestry sector. As a result, by the beginning of 1993, the legal status and future development of the Hawait LFA appeared to be in question.

However, the landowner company executives who had been the beneficiaries of permits awarded or extended during Stack's and Genia's terms of office wasted no time in organising themselves to protect their positions. Before the elections were over, they organised the PNG Forest Resource Owners Association (PNGFROA) and began to campaign against the implementation of the 1991 *Forestry Act*. Robert Passu, the chairman of

WongWong Logging, was nominated as the 'representative' of the Momase region.

The PNGFROA attacked the Act as constituting illegitimate government interference with the rights of resource owners to determine how their forests were to be used. They vigorously opposed Neville's proposals to scrutinise the composition of landowner companies and to channel the 'premiums' which they received from log exports directly into government-controlled accounts to fund infrastructural projects. Instead, they put their weight behind a Private Member's Bill, introduced by Daniel Tulapi in 1993, which would have severely weakened the capacity of the government to regulate logging projects by re-establishing some of the provisions of the now repealed *Private Dealings Act*.¹⁷

Tulapi's bill was eventually defeated in Parliament, but the backlash from the PNGFROA had enough political clout to delay implementation of the 1991 *Forestry Act* while it went under yet another review (see *Post-Courier*, 4 March 1994). The review was not complete in late August 1994, when the Wingti government was toppled and a new government, headed by Sir Julius Chan, appointed Andrew Posai as the new Minister for Forests. Posai hailed from the Kandrian-Gloucester District in West New Britain and had links with the PNGFROA (see Simpson, this volume). The Minister shared the PNGFROA's view that the government had no right to intervene in landowner company affairs. The government decided to postpone further scrutiny of the composition and financial affairs of local landowner companies until the timber permits that were issued during the moratorium came up for review and renewal.

While the PNGFROA partially succeeded in winning the political battle against the implementation of the new *Forestry Act* in Port Moresby, WongWong and Sovereign Hill were losing support among the customary landowners in Wewak. Somewhat incongruously, while the chairman of WongWong was making frequent trips to Port Moresby to campaign against the Act in the name of the sacrosanct property rights of customary landowners, in Wewak he was confronted with a series of profound crises among the landowners whom he claimed to represent. First, landowners outside of his own immediate constituency prevented the logging company from gaining access to their land. Then land disputes tied up significant areas of forest, and thus prevented them from being logged. Finally, the coalition of settlers who had initially placed him in the position of broker broke up into mutually hostile groups. The next section describes how this infighting among landowners led to a halt in logging activities in April 1994, which Sovereign Hill temporarily overcame by directly intervening in landowner company affairs.

¹⁷ See, for example, a letter from the PNGFROA that was published in the *Post-Courier*, 1 March 1994.

Landowner-Contractor Negotiations, 1993-1995

Because the permit was granted in a hurry, many communities in the LFA were poorly informed about, and ill-prepared for, the start-up of the logging project in 1993. While some clans in some villages had committed their forests to the project, many others had not yet done so. As a result, Sovereign Hill resorted to negotiating access to specific stands of timber as its men and machinery advanced into the forests.

At first, WongWong acted as a middle-man between Sovereign Hill and the local landowners. On the one hand, the executives were able to draw on local kinship connections and exchange obligations to smooth the advance of the project. On the other hand, they tried, at times, to exert some real control over Sovereign Hill for the benefit of their constituency. Yet ultimately, WongWong was unable to resolve land disputes, meet compensation demands, or account to local landowners for the funds which it was (purportedly) accumulating. As a result, WongWong lost credibility, not only with the landowners, but also with Sovereign Hill. Sovereign Hill therefore began, from late 1994, to intervene directly in landowner company affairs, and to negotiate agreements directly with individual landowners. In this way, WongWong became irrelevant as a socio-political organisation representing the interests of landowners in the LFA.

The Plan for Logging and Development

In August 1992, WongWong submitted an environmental plan to the PNG Department of Environment and Conservation (DEC) for approval.¹⁸ Since this is the most complete and 'official' five-year plan to which I have had access, it is worth summarising its contents briefly here. This is because the way in which logging activities actually unfolded between 1993 and 1995 turned out to deviate considerably from the plan.

The Environmental Plan (EP) estimated that, out of the 40,000 hectares which fell within the official boundaries of the LFA, only some 28,263 hectares contained forests of sufficient timber density, on gentle enough terrain, to be commercially viable and practically operable. The operable forest area was then divided into five roughly equivalent areas (or 'coupes') which were to be logged successively over the following five years (see Table 3.2). The first coupe encompassed the remaining alluvial forests of the coastal plain and the hill forests blanketing the western portion of the northern escarpment between the Hawain and Wariman Rivers. The remaining four coupes then revolved clockwise from the forests of the southern escarpment to the ranges south and north of the Hawain River (see Map 3.1). In delimiting the boundaries of these areas, the EP took into account neither village nor clan land boundaries. In addition, the forests belonging to the men who were most enthusiastic about the project lay for the most part in Coupe 3, which was not scheduled to be logged until the third year of the project – 1995.

¹⁸ The plan was approved by the Minister on 20 September 1992.

Table 3.2: Five-year harvest plan for the Hawaii LFA.

Coupe	Hectares	Timber volumes in cubic metres		
		Est. harvest	Max. export	Sawmill
1	5,863	152,438	150,000	nil
2	6,080	158,080	147,000	3,000
3	6,070	157,820	145,000	5,000
4	5,850	152,100	152,100	10,000
5	4,400	114,400	114,800	10,000
TOTAL	28,263	734,838	708,900	28,000

Source: WongWong Logging 1992.

The enthusiasm of the coalition of settlers was dependent on their obtaining what they had long desired – roads that would enable them to go home. Indeed, the EP proposed that the first logging camp and transshipment point for timber extracted from the LFA should be located at a site on Wom Peninsula.¹⁹ From here, it was proposed that Sovereign Hill would reclaim a section of the swamp to construct an access road through Tangara into Coupe 1. The logging company would then build all-weather roads, surfaced with gravel, linking Penjen to Perringa, Perringa to both Numienguai and Jambarampa, Numienguai to the base log camp along the banks of the Nagam River, and then on to Musuwagen. There was also a plan to construct a road from Surumba to Majuom, which brought the total length of the proposed road network up to 132 kilometres. ‘The logging road and network,’ the plan stated, ‘would eventually improve the accessibility and enhance the development of agricultural areas in interior lands and western villages in the LFA.’ For this reason, and perhaps only for this reason, the plan could then go on to confidently assert that ‘the timber project is perceived by the people to be a major breakthrough in promoting balanced social development and community prosperity’. Everyone wanted a road.

The EP also listed a wide range of socio-economic benefits which the villagers would obtain from participating in the project. WongWong and/or Sovereign Hill would:

- upgrade the existing roads and bridges that linked certain villages to the coastal highway;
- establish a portable sawmill to supply timber for local use;
- upgrade the classrooms and teachers’ residences in the LFA schools, and provide them with furniture and water supply systems;
- construct a health centre to cater for the needs of LFA communities;

¹⁹ Wom was the site of the Japanese surrender to Allied forces in 1945, home to a small community of Austronesian-speakers (with whom the settlers had some ties of intermarriage), and also the site of one PNG’s few National Parks.

- help to maintain and repair local churches by providing them with building materials;
- help villagers to install water tanks or other water supply systems;
- establish a base camp near the Nagam River, complete with workers' housing, a workshop, an aid post, a police station, a store, and a market place for local produce;
- implement a training and localisation programme to help local workers enhance their skills and expertise;
- take measures to protect special cultural, historical, and archaeological sites in the LFA; and
- encourage environmental awareness and participatory planning among the local people.

It was, in brief, a comprehensive plan which contained a long list of promises.

Conflicts and Confrontations over Logging

There were problems, however, as soon as Sovereign Hill unloaded its fleet of new bulldozers and other heavy machinery on Wom Beach in January 1993. Three crises developed and intensified over the course of the following year, which ultimately led to Robert Passu's downfall as chairman of WongWong Logging, and the temporary suspension of the project.

The first crisis that confronted the project involved the location of the wharf and base camp at Wom Point. While one landowner from Wom had signed an agreement with WongWong, many others opposed the construction of a wharf, base camp, and road on Wom Peninsula. The *Times of PNG* reported that Wom landowners had threatened to block the company's access because they feared 'disruption to their community activities, damage to their fishing grounds and pollution of their environment'.²⁰ They wrote to the DEC, requesting an immediate inquiry into the possible environmental consequences of the proposed development so that they could make an informed decision. On 4 March, another report in the *Times* featured the testimony and photograph of Cathy Tuhak and her grandchildren. She was quoted as follows:

These companies are going to destroy my forests, my land and my seas. I am old and I am going to die soon. I do not want to see my children and my grandchildren suffer as a result of the destruction to my forests, my land, and my seas.

In response to the landowners' complaints, the DEC suspended the development of a base camp and wharf at Wom pending the completion of a comprehensive environmental impact assessment by WongWong and Sovereign

²⁰ *Times of PNG*, 18 February 1993; see also *Wantok*, 18 February 1993.

Hill (personal communication, John Douglas, 1993). However, the assessment was never carried out because Sovereign Hill decided to abandon the original development proposal.²¹

The EP also proposed that Cape Kholang could be developed as an alternative location for the wharf. Thus, when Wom was ruled out, the executives of WongWong turned their attention to the landowners of Kholang. At this stage, however, the latter had not been informed of the impending project. One of these landowners, who later came to sit on WongWong's board of directors, told me that:

when the company arrived in Wewak, I had no idea that they were going to come here... [One day] they came in a boat, picked me up, and we went over to Muscu Island. There we all sat down together and discussed how we could reach an agreement for the company to come and use Kholang.

Whereas he and his family had been living at Kholang for several years, subsisting off their gardens, the adjacent mangroves, and the sea, he was now offered the possibility of an increased cash income and permanent house, complete with a water supply system. He therefore agreed to allow Sovereign Hill to establish a log pond and wharf at Kholang. In exchange, he was to receive K400 a month in rent, K3,000 as compensation for damage to a garden which would be uprooted during construction of the log pond, and a permanent house for himself and his family. Once the agreement was signed, in March 1993, Sovereign Hill quickly established a small base camp and wharf.²²

Having secured a foothold on Cape Kholang, WongWong then turned its attention to resolving two additional problems. The first involved the choice of a location for the temporary, but large, base camp which was required for Sovereign Hill's equipment and employees until such time as they reached the Nagam River. This problem was solved when customary landowners from Suwambukao readily agreed to allow the company to construct a temporary base camp on their land. The second problem was that Wongwong had yet to negotiate access to the forests that lay beyond Cape Kholang, and this proved more intractable.

Although, on paper, Coupe 1 extended down to the alluvium forests east of the Hawain River, most of the customary landowners from the villages of Parom and Rainimbo were initially inclined to deny access to their land, because they regarded the largely intact alluvium forest as their 'store' – a place where they

²¹ The project manager apparently believed that it would be too impractical and expensive to construct a road through the mangrove swamps. Villagers recall him saying (in Tok Pisin) '*Dispela tais bai kilim indai olgeta masin bilong mi!*' ('This swamp will swallow up all of my machinery!').

²² Unfortunately, after the agreement was made, his relatives from Muscu Island disputed his claim to exclusive ownership of Kholang. As a result, the rental payments have been paid into a trust account pending the result of a court decision on the issue.

could freely hunt game, gather forest produce, and catch fish. They feared that logging and road-building through the heart of this forest would foreclose this option. In addition, they distrusted WongWong's motives because it had been formed by people from the hinterland villages: '*I no kampani bilong mipela!*' ('It's not our company!'), they said.

In late February and early March, executives from WongWong held four successive meetings with the leaders of Parom and Rainimbo clans in an attempt to negotiate a right of way for the road. They pleaded that the hinterland people were desperate for a link between their villages and the North Coast Road. The leaders of the Parom and Rainimbo clans ultimately found it difficult, if not impossible, to oppose the desires of their inland kin.²³ They demanded, however, that they be duly compensated for any damage caused by the construction of the road, and they continued to withhold approval for their forests to be logged. WongWong was thus compelled to sign a Memorandum of Understanding which specified that about K80,000 would be paid to them, in a series of instalments, once log exports began.

By June 1993, Sovereign Hill had cleared a track from Cape Kholang up into the foothills, to the place where they were also completing construction of the provisional base camp, a few kilometres directly west of Suwambukao. However, although the work on the road was largely complete, the customary landowners of Parom and Rainimbo had received only a small proportion of the promised compensation payment.²⁴ By the end of July, they grew increasingly impatient at the delay, and during the first week of August, a landowner from Rainimbo made a public demand for immediate compensation on Radio East Sepik's weekly current affairs programme 'What's Happening' (*Wanem Samting i Kamap*). Meanwhile, other landowners from Rainimbo and Parom were plotting to erect a roadblock on the main logging road until their demands for full and immediate payment of the promised compensation were met.

WongWong reacted swiftly to these threats. On the morning of 9 August, they borrowed large dump trucks from Sovereign Hill and used them to transport a gang of youths from the settlements to fight with the dissident landowners. One man suffered minor injuries as a result of the attack. During the next week, the Premier of East Sepik Province arranged a meeting between the executives of WongWong and the dissident landowners from Rainimbo and Parom, and it seems that he sided with WongWong, because the logging project went ahead without any further compensation being paid to the Rainimbo and Parom clans.

²³ One of the leaders present at the meeting recalled: 'I watched how [the chairman of WongWong] was crying and I felt sorry for him. So I said: "Okay! We must arrive at an agreement with you. If you build this road through our forest to continue with your work inland, then you must pay us for all the damage that you cause to our land."'

²⁴ Informants vary in their claims about the amount which had been paid - from K5,000 to K24,000.

About a month later, on 7 September, the East Sepik Division of Forests gave Sovereign Hill written approval to begin felling logs in three small areas of Coupe 1. But no sooner had logging begun in these areas when clans from Rainimbo and Suwambukao disputed the ownership of some trees included in the three set-ups, thus causing further delay.

Land disputes constituted the second crisis which threatened the progress of the project. By law, unless the parties to a dispute agree otherwise, logging cannot proceed in forests whose ownership is under dispute. If the parties to a dispute do agree that logging should go ahead, the royalties payable on timber taken from the disputed area are paid into a trust account until the dispute is resolved. From the perspective of the disputants who choose this path, the role of the court is to hear the genealogical and historical claims of both sides, and then to declare a 'winner'.

As mentioned previously, the composition of land groups and their boundaries had not been formalised before the logging project started. Instead, the men who were interested in the project signed Clan Land Usage Agreement forms, while WongWong urged those others who were in the immediate path of Sovereign Hill's bulldozers to do the same. This ad hoc procedure led to enormous competition over forested land in Coupes 1 and 2 during the first year of the project. Clans from Suwambukao and Rainimbo disputed the ownership of forests adjacent to the main logging road. Clans from Yarapos and Suwambukao debated the ownership of an area to the west of Suwambukao. Kweruro and Suwambukao disputed the ownership of forests in the vicinity of the Siling Creek. Pambanyeng clans challenged Mandigen's claims to ownership of the forests around Mount Pambang. In addition, long-standing land disputes between clans *within* some villages, including Rainimbo, Suwambukao, and Nionguanja, flared up into bitter conflicts. In many, though not all, cases, the disputants were also divided into supporters and opponents of the logging project.

Provincial lands officers were reluctant to get involved in resolving land disputes once the project had started. They felt alienated by WongWong because the company had not sought out their assistance in the first place. Nonetheless, in July 1993, the head of the provincial Division of District Affairs wrote a letter to WongWong, stating that he would assign five officers to the project if WongWong would give them the use of a four-wheel drive vehicle and pay their overtime and camping allowances. When WongWong failed to respond, the Division assigned volunteer land mediators to hear the disputes. None of the twelve disputes which were brought to the attention of government officials between 1993 and 1995, as a result of the logging project, have been resolved.

The third crisis that confronted WongWong and Sovereign Hill was the breakdown of the coalition of landowners which had initially supported the project and their fragmentation into mutually hostile factions. This crisis was provoked, in large part, by the leadership style of WongWong's executive

chairman, which was authoritarian, conspiratorial, and highly secretive. Just three days before the logging operation was opened by three national MPs,²⁵ a core group of landowners who had been instrumental in supporting the project convened an impromptu meeting in Tangara, where they confronted the WongWong executives with a long series of grievances. They wanted to be informed about the company's working plan, the contents of the contract between Sovereign Hill and WongWong, the financial status of WongWong, the powers of its directors, and its employment procedures. The executives responded by largely ignoring the requests for clarification and information about the project. Instead, they insisted that the real motive for the meeting was jealousy between landowners over project employment, and their impatience to receive royalty payments, roads, and 'services'. They defended their selection process and threatened to resign from their positions.

Needless to say, the meeting failed to resolve the brewing conflicts between WongWong and the local landowners, who now felt too intimidated to speak up for themselves in public. Instead, they began 'talking behind the backs' (*tok beksait*) of the executives and spreading rumours of embezzlement and special treatment by Sovereign Hill. The seriousness of these rumours, and the general atmosphere of distrust, only increased as the felling of trees proceeded, the first log shipments went out, and royalty payments were made. By January 1994, Sovereign Hill had logged out a number of areas adjacent to Perringa, Suwambukao, Nionguanja, Mandigen, and Saure. They had shipped 16,454 cubic metres of logs, while WongWong had paid out K65,907.79 in royalties to the resource owners.

After the June meeting, then, a faction of landowners began to withdraw their support from WongWong and to organise opposition to its chairman and executives in the North Coast settlements. On 16 January 1994, more than one hundred men from nine villages in the Coupe 1 and 2 areas attended a meeting initiated by this opposition group. The participants compiled a twenty-one point petition demanding that the chairman should respond to questions about the working plans, shareholding structure, and financial status of the company, and should state whether Sovereign Hill intended to pay them compensation for damage to crops and other resources (see *Times of PNG*, 24 March 1994).

A week later, a second meeting was attended by a lawyer from Port Moresby, whom the impromptu opposition committee had hired to investigate the shareholding structure and financial dealings of WongWong. When he announced that, 'up until Friday at 5 o'clock p.m.', WongWong was not included on the official list of registered companies in Port Moresby, the crowd grew tense and anxious. Feelings of betrayal and indignation were widely expressed.

²⁵ The entourage included Jack Genia, Bernard Narokobi, and Sir Pita Lus – all members of the opposition during Wingti's coalition government.

Even at this meeting, however, the customary landowners took two sides. One side wanted to take immediate action to stop Sovereign Hill's operations. They proposed setting up roadblocks, burning down access bridges, and obtaining a court injunction. The other side asked the lawyer to help them work out a separate and exclusive agreement with Sovereign Hill, removing WongWong from its intermediary role.

During the month which followed, meetings of the opposition continued. Two documents from the Registrar of Companies were circulated at these meetings, and then widely dispersed among the settlements along the North Coast Road. The first document, which bore a stamp dated 19 September 1991, showed that WongWong had been registered as a proprietary company with two sole directors and shareholders: Robert Passu and Luke Nalo. Most landowners took this as legal confirmation that WongWong was not a landowner company at all, but the private business venture of two men. They had been tricked. The second document, which was dated 19 September 1991 but stamped by the Registrar of Companies on 8 February 1994, showed that Nalo had resigned as a director and transferred his share to Paul Porei. Other documents, dated 31 January and 2 February 1994, listed an additional fourteen directors and eleven shareholders in WongWong Logging Company, but some of the men whose names appeared on this list denied that they were either shareholders or directors when I asked them.

On 27 February, Robert Passu convened a meeting at Tangara which was attended by the general manager of Niugini Lumber Merchants, George Yong, and a crowd of several hundred local landowners. The goal of the meeting was to overcome the rumours which had been circulating about WongWong, and reign in the ranks of the opposition so that the project could go ahead. Passu reviewed the history of the project, insisting that everything was legal and in order. Luke Nalo announced that he had resigned from WongWong two years previously, and was neither a director nor a shareholder. He threatened to sue any men who continued to spread rumours about him for defamation of character. George Yong pleaded with the crowd to support WongWong and the logging project, and to cease their incessant demands for compensation in the interests of promoting development in East Sepik Province. He also suggested that, if they were unhappy with Passu's leadership as chairman of WongWong, they could always elect a new man to take his place. Passu, for his part, attempted to reassert his control over the landowner company, and to shore up support among the landowners of Coupes 2 and 3. By the end of the meeting, it appeared that landowners from several hinterland villages, such as Kweruro and Puara, were behind him. Most, however, were not.

The meeting did not succeed in giving new life to the logging project. Instead, the *Times* reported that 'the landowners' were now 'against the developers of the Hawait LFA' and *Wantok* reported that 'WongWong no longer has the support of landowners.'²⁶ Sovereign Hill seems to have agreed

²⁶ See *Times of PNG* and *Wantok*, 3 March 1994 and 24 March 1994.

with these statements. By the beginning of May, the company transferred most of its heavy machinery and expatriate employees to other project areas in PNG, and laid off all of its local workforce. The logging project had come to a standstill.

A Turning Point

The events of the first half of 1994 marked a turning point in the relationship between the management of WongWong and Sovereign Hill. At first, Sovereign Hill had largely been content to remain in the background as the disputes between WongWong and local landowners evolved. Sovereign Hill responded to conflicts amongst the landowners, when they got out of hand, by simply threatening to pull out of the LFA altogether.

In the initial stages, this strategy seemed to work. It mobilised support for the WongWong executives in such a way that it became difficult for dissident landowners to publicly maintain their opposition. In the first months of 1994, however, rumours about the financial improprieties of WongWong, and disappointment over the size of royalty payments and delays in compensation payments and provision of services, were so severe that the threat of a 'pull-out' no longer had the intended effect. There were now too many landowners who would be happy to see the downfall of the landowner company and the withdrawal of the contractor.

From Sovereign Hill's point of view, WongWong had failed in its primary purpose: to act as a broker between themselves and the local people, and thus to ensure that Sovereign Hill would continue to have untroubled access to the forest resources of the LFA. Thus, in the latter half of 1994 and the first few months of 1995, Sovereign Hill modified its approach to the local landowners. While the operation was temporarily suspended, Sovereign Hill withdrew its support from WongWong's current chairman and executives, planning to replace them with a new team. At the same time, the logging company planned to negotiate access with small groups of landowners on its own account.

On 24 August, Robert Passu convened a general meeting of LFA landowners, where he presented a verbal report on WongWong's financial status, announced his resignation, and set a date for the election of new directors and executives. On 28 August, at a meeting which was mainly attended by the old directors and executives, the mantle of chairmanship was passed to Martin Simbuk, a landowner from Parom. Shortly thereafter, two young men, one from Kweruro and one from Penjen, succeeded to the positions of deputy chairman and secretary. This core group was then charged with the responsibility for restarting the project.

The Revival of the Project in 1995

Although it took several months to develop, this move breathed new life into the stalled logging project. On 4 March 1995, George Yong flew out to Wewak to meet with WongWong's new team of directors and executives, and expressed

Sovereign Hill's desire to re-enter the areas of Coupe 1 which had not yet been logged – the alluvial forests belonging to Parom, and the forests in the foothills behind Suwambukao and Nionguanja – and resolve the problems which had developed in the Coupe 1 area over the previous year. Unfortunately, however, WongWong continued to draw its greatest support from villages in the hinterland, such as Puara, Kweruro, and Penjen, whose forests were in Coupes 2 and 3. Thus, to achieve its aim of 'finishing up' in Coupe 1, Sovereign Hill still had a long road of negotiations ahead.

Sovereign Hill first focussed on negotiating with the customary landowners at Parom. In early March, its management tried to persuade them to sign some new agreements in the Wewak courthouse, but the landowners unanimously refused to do this. An anonymous source, who was present at this meeting, told me that:

there was a general fear among the people that, if they went up to the courthouse and signed a new agreement, and the courthouse then put its stamp on it, then later it wouldn't matter how much the forest was damaged, they wouldn't be able to demand compensation or anything else.

Indeed, a long-standing grievance of the Parom landowners was that they had never received full payment of the compensation which had been promised to them by WongWong back in 1993. But in February and March, WongWong and Sovereign Hill tried to persuade them that Sovereign Hill would only be able to pay off their compensation demand if they were able to log their forests.

As a result of this argument, Parom clan leaders began to change their mind about the merits of collaborating with Sovereign Hill. They were envious of the royalties which the clans in Coupe 1 had already received. Their attitude towards their forest was also changing. Whereas, before, they held to the conception of their forest as a storehouse of game, they were now starting to view it as an area in which to expand their settlements, gardens, and cash crops. As one Parom man explained it to me:

Its not good when we just clear forest for starting a garden. The trees just fall down and rot. We want the company to come and take a few of our trees [in areas where we will establish gardens] and then, instead of their rotting, we will have a little bit of pocket money too.

Thus, the anticipation of receiving compensation payments and royalties, combined with a revised conception of land use in this alluvial area, began to sway the minds of many Parom clan leaders.

On 11 April, George Yong once again flew out to Wewak from Port Moresby to meet with the Parom landowners. At a meeting in Parom village, Yong offered a K500 bonus to each of the landowners who would come forward and sign an agreement granting Sovereign Hill access to their forests. Most of the Parom landowners stepped forward, signed the agreement, and received their

K500 gift. In this way, Sovereign Hill gained access to the last significant area of operable forest in the coastal plain.

While Sovereign Hill set about logging this area, it was also engaged in serious negotiations with landowners from other parts of Coupe 1. The company was intent on returning to the forested areas, in the foothills of this coupe, which had not been logged in 1993 and 1994, and also had a practical need to retain control of the land on which their logging camp was situated. In early 1995, however, the owners of these areas – from Saure, Nionguanja, Suwambukao, Mandigen, and Perringa – were, for the most part, thoroughly disillusioned with both WongWong and Sovereign Hill. They were angry that they had not been paid compensation for economically valuable crops which had been uprooted and destroyed during the logging activities of 1993 and 1994. They were also concerned that they had not received any benefit from the agricultural and infrastructural levies which had been deducted from the export price of their timber. In this respect, they were certain that WongWong and/or Sovereign Hill had abrogated the terms of both the Dealings Agreement and the Logging and Marketing Agreement.²⁷ Thus, in early 1995, they started organising themselves into a coherent group in order to take both companies to court for breaches of contract.

Sovereign Hill and the Coupe 1 landowners initially adopted a hard line in their mutual negotiations in a number of meetings that took place between April and July 1995. The landowners from the five villages demanded that they be paid K5 million kina in compensation before they would grant Sovereign Hill access to the logging camp and their forests. They asserted that they had many justifications for making this demand. Sovereign Hill had cut down many trees in their forest which it then left to rot; many roads had been built without the permission of the landowners, fouling their waterways and killing off their sources of fish, eels, and crustaceans; logging activities had likewise scared away much of the wildlife in their forests; and the company had uprooted many of their cash and food crops, including their cacao, coffee, betel nut, sago, and tulip.

Sovereign Hill's project manager regarded the landowners' demand for K5 million as completely unreasonable, and suggested that he would not entertain an amount of more than K30,000. Similarly, he responded to their complaints about the agricultural levy by saying that it amounted to a mere K24,000, 'just like chicken feed' which 'cannot do anything yet'. As in the case of the Parom landowners, Sovereign Hill thus attempted to persuade the landowners from these five villages that their hopes for higher incomes and more infrastructural and agricultural development could only be realised by providing Sovereign Hill with further access to their forests.

²⁷ They were still unable to secure copies of these agreements, despite the fact that some of them had actually signed the Dealings Agreement.

Nevertheless, from May to July, the landowners largely stuck to their demands. They strongly believed that there had been many 'improper dealings' in the award of the logging permit, and they hoped that their threats of publicly revealing these illegalities, in the media and in court, would pressure Sovereign Hill into reaching an out-of-court settlement with them. But Sovereign Hill's general manager was ultimately able to undermine the solidarity of the group by making opportune financial gifts to a few important individuals who were leading the effort, and by privately negotiating small compensation payments with individual landowners. In September, he also finally paid the landowners the K24,000 in cash which represented their share of the agricultural levy. While some landowners were satisfied with these amounts, and seemed poised to grant Sovereign Hill access to the remaining forests on their land, others were not. Instead, the latter began to file lawsuits (a total of five by November 1995) against WongWong and Sovereign Hill, seeking compensation for illegal trespass and environmental damage.

Finally, in the latter half of 1995, WongWong was faced with a serious challenge to its legitimacy as an organisation which represented the LFA landowners. A faction within the group of settlers who had participated in the formation of the 'opposition' in 1994 were taking steps to register a new landowner company under the terms of the 1991 *Forestry Act*. They named the competing landowner company 'Numbosawa', joining the Boiken words for 'mountains' and 'beach'. This was symbolic of what they hoped would be a practical and political alliance between coastal and mountain Boiken, both to wrest the logging permit from the hands of WongWong and to nullify the Logging and Marketing Agreement with Sovereign Hill. They familiarised themselves with the procedures to be followed under the terms of the new Act to register customary land groups, they began some genealogical investigations, and they lobbied the Forests Minister for the transfer of the permit.

While many landowners appeared ready to join this new group, and thus participate in the campaign against WongWong, I found it very difficult to gauge the true level of support which existed for either faction. The comment of a man from Kweruro, who lives on the North Coast Road, was typical:

There are two companies operating amongst us now – WongWong and Numbosawa. Those of us who are living in this settlement are just going to sit back and wait and see what happens. We go back and forth from one to the other as we consider: Who is respectable enough to perform truly honest work and help us?

By the end of October 1995, Sovereign Hill had succeeded in logging out Parom's alluvial forest. The company had not succeeded, however, in winning back the support of the Coupe 1 landowners, nor in preventing large-scale defections to the side of Numbosawa. It appeared that many landowners in the LFA would continue to refuse to grant Sovereign Hill access to their forests. Thus, after a month of attempting to move into new parts of Coupe 1, Sovereign Hill once again suspended its operations.

Outcomes for Local Stakeholders

As a result of the ongoing crises in the Hawain LFA, the total area of forest that was logged between March 1993 and December 1995 was not very large. According to provisional estimates, based on data from existing topographic maps and maps of logging roads compiled with a global positioning system (GPS) device, the logged-over area in Coupe 1 stood at about 2,200 hectares, some 3,600 hectares short of the total area in which the company had intended to operate (see Table 3.2).

In the forests on the slopes of the Prince Alexander Mountains, the combination of land disputes, local opposition to the logging project, and the steep and difficult terrain caused Sovereign Hill to practise 'corridor logging', in which most of the logs were extracted from within 50-100 metres of the 70 kilometres of logging roads. The forests of the alluvial plain were more extensively logged because of the flat terrain, accounting for only 19 percent of the logged-over area but 27 percent of total log exports.

The log harvest in this period was also much lower than the projections made in the Environmental Plan. Sovereign Hill exported only about 38,403 cubic metres of logs from Coupe 1, which had been estimated to contain 152,438 cubic metres of merchantable timber.

Table 3.3 summarises the volume and distribution of income from the export of logs from the Hawain LFA between March 1993 and October 1995. This shows that the landowners received royalties worth just over 4 percent of the export price of these logs. In Suwambukao and Nioguanja, this royalty income was very unevenly distributed: out of fifteen patriline, three received about 75 percent of the total.

Table 3.3: Export volumes and income from the Hawain LFA, 1993-1995.

Period:	1993-1994	1995 (11 months)	Total
Estimated logged area	1,777 ha.	n.a.	n.a.
Volume (cubic metres)	23,534.9	8,867.00	32,402.9
F.O.B. sale price	K3,830,688.65	K1,049,124.00	K4,879,812.65
Landowner royalties	K128,520.19	est. K66,502.50	K195,022.69
Landowner company premiums	K164,744.34	est. K62,100.00	K226,844.34
Levies	K82,372.18	K26,601.00	K108,973.18
Government export duty	K663,954.50	n.a.	n.a.

Sources: PNG Forest Authority; interview with chairman of landowner company, October 1995.

Despite the reduced area in which the company operated, there was a great deal of ecological disturbance in Coupe 1. The network of logging roads mainly followed the mountain ridges which form the watershed of three major rivers – the Yangumba, the Rambumba, and the Jarumba. The clearance of forest along the length of these ridges promoted rapid soil erosion, and hence the siltation of the creeks and streams below them. As a result, there has been a significant decline in the quantities of fish and crustaceans which were formerly consumed

by the residents of Nionguanja, Suwambukao, Rainimbo, and Parom. The forest fauna was also severely impacted, as villagers report that the noise of bulldozers and chainsaws caused large game animals, such as wild pigs and cassowaries, to flee the area. Bulldozers destroyed the ground nests of brush turkeys, while clearance of the ridge-top forests made it more difficult to trap flying foxes, since local hunting methods require small clearings in an otherwise intact forest. Finally, expatriate and local employees of the logging company also hunted the fauna displaced by the felling of trees.

For the customary landowners whose forests were logged, the financial benefits of royalty payments proved to be disappointing and short-lived. While they invested some of their income in used motor vehicles, trade store inventories, or savings accounts, most of it was used to meet customary exchange obligations, dealt out to close kin in small quantities ranging from K50 to K250, spent on sponsoring beer parties, or otherwise spent on consumer goods, such as mattresses or stereo cassette radios. The following comment from a landowner in Suwambukao typifies the disenchantment of many others:

Before, when we still had some royalty money left, we were happy. If there was something one of us wanted to buy, we just bought it. When we made trips into town, we could buy lots of things. But now that the money is gone, it is just like it was before... We are finding life hard once again.

Nor did the logging project provide much employment for local men and women. According to my census materials, during the peak of its operations, Sovereign Hill employed between fifty and sixty of them, mostly as assistants to expatriate surveyors, as bulldozer drivers, or as chainsaw operators, and they earned between K45 and K60 a fortnight. Women's weekly returns from marketing garden produce and betel nut in town often exceed such amounts.

The landowner company had also promised that they would provide services to landowners who participated in the project. Such services included roads to home territories, assistance in establishing cash crops such as cacao and coffee, building materials, and assistance in the provision of village water supplies. While Sovereign Hill did establish roads into the home territories of some clans, only the clans in Parom were able to take advantage of them. The majority of roads (especially those in the foothills) quickly deteriorated under the combined effect of erosion and regrowth. Few individuals in the LFA possessed sufficiently sturdy four-wheel drive vehicles to navigate these roads.

In the short term, however, the logging roads did open up new areas for garden cultivation. Villagers took advantage of the clearings on the roadsides to plant bumper crops of sweet potatoes, squash, and bananas. They were also able to travel more easily by foot to make gardens further from their villages, in areas that were formerly densely forested.

Most of the other services which were promised to participating landowners never eventuated. While Sovereign Hill donated funds to the Catholic women's

group in the Hawain parish, and supplied the church with some building materials, landowners did not receive any agricultural assistance nor any water supply systems. Instead, the logging company uprooted large numbers of their cash crops, while the quality of water in local streams and rivers declined. As previously explained, it was only after bitter struggles with Sovereign Hill that landowners in Coupe 1 received some compensation for their lost cash crops and the funds which had been paid to WongWong as agricultural levies.

Lessons Learned by Local Stakeholders

What, then, did the local landowners learn as a result of their experience? First of all, they learned that landowners who collaborated with Sovereign Hill were temporarily empowered in their relationships with other villagers. Since the logging contractor was obliged to recognise their land claims when they were granting access to their forests, they acquired a greater capacity to decide how land was to be used. They found that it was easier to put land into the logging project than it was to withhold it, yet they eventually lost status and wealth as their kinsmen contested the legitimacy of their land claims, demanded a share of their logging incomes, and spread rumours about them cutting 'private deals' with Sovereign Hill. Similarly, while collaboration with Sovereign Hill initially empowered the executives and directors of WongWong, they ultimately lost authority, and became increasingly alienated from their constituents and kinsmen, amidst the accusations and rumours that they had been 'bought off' by Sovereign Hill.

At the same time, the material interest which many landowners had in the outcome of the logging operation involved many of them in a quest for increased literacy and knowledge of the law. On the other hand, other powerful actors, from WongWong executives to forestry officials, put up many obstacles to their quest for an understanding of their legal rights and the various contracts which they had purportedly signed. Despite these handicaps, I believe that knowledge about forestry and corporate law, the conduct of business, and the behaviour of overseas companies has increased as a result of their experience. One can only hope that this gain in knowledge will put them in a better position, in the future, to negotiate more favourable outcomes for themselves and for the health of the forest.

Conclusion: National Policy, Local Practice

In this chapter, I have tried to document two aspects of the national and local policy process in the case of the Hawain LFA. First, I argued that national forestry policy was itself in a state of crisis during this period. Second, in the absence of national policy and state regulation, the actual advance of Sovereign Hill into the forests of the LFA was shaped by a multitude of local-level conflicts between landowners, the landowner company, and the logging contractor. Forestry policies debated and formulated in Port Moresby were ultimately of little relevance to resolving the specifically local problems of the LFA. Instead, logging proceeded as a function of the temporary balance of

allegiances between the jumbled 'class' of customary landowners and Sovereign Hill. The former, as we have seen, easily divided themselves into factions which took up temporary positions in either facilitating or blocking Sovereign Hill's access to local forests, depending on their contingent political alliances.

Where then, does this leave us, the outside observers who are called upon to make policy recommendations? In my view, the most important arena for future action in the practice of forestry management in PNG is not to be found in the formulation of additional policies, laws, and institutions at the national level. Instead, the challenge ahead is to foster forms of social organisation and political culture, at the local level, which can more effectively safeguard the interests of local communities, rather than just advancing the agendas of aspiring politicians or big men. The point here is that the forces of *regionalism* and *nationalism* are both weak in PNG. One of the most important consequences of this weakness is that foreigners with capital can (whether intentionally or not) easily manipulate struggles between local factions for their own benefit. These local-level power struggles then result in a multitude of negative social, economic, and environmental consequences. Meanwhile, the lion's share of the benefits derived from log exports accrues to the national government and foreign capital, while local actors merely fight over the patronage offered by overseas logging companies in return for their political loyalty.

The Assistant Secretary of the East Sepik Division of Forests, Alimel Bellet, once provided me with the following thoughtful reflection, which might be taken as the theme of this chapter: 'We Sepiks are our own worst enemies.' A starting point for further action is to raise public awareness of this predicament, and pose the question of how all Sepiks (and all Papua New Guineans) ultimately lose as a result.

CHAPTER 4

THE INVISIBLE DEVELOPER: THE DISSIDENTS' DILEMMA IN THE BUHEM-MONGI TRP AREA

THOMAS NEN

Introduction

In the Fourth Interim Report of his Commission of Inquiry into Papua New Guinea's (PNG's) forest industry, Judge Barnett (1989a) described the logging of New Ireland Province in the following terms:

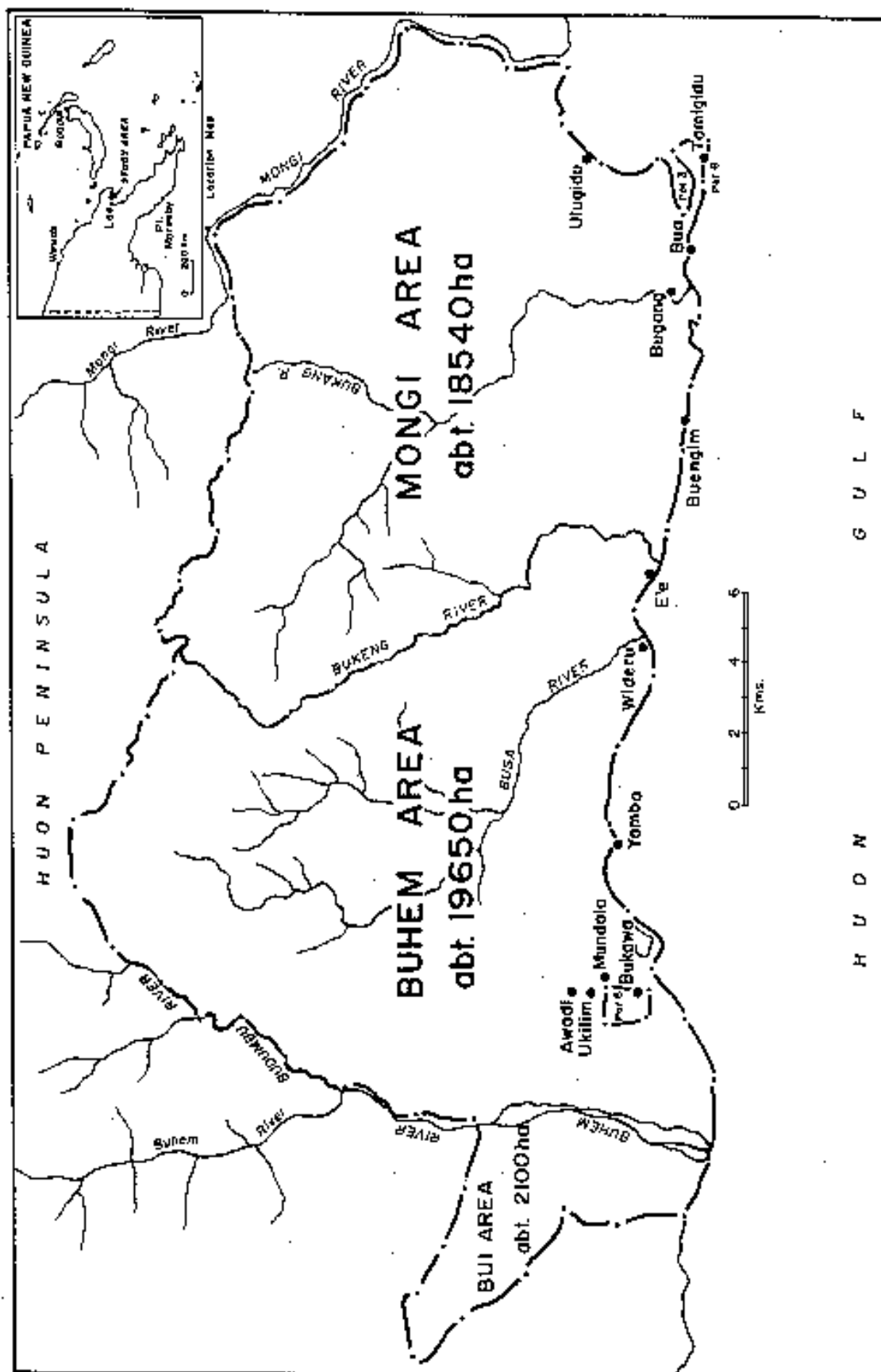
It would be fair to say, of some of the companies, that they are roaming the countryside with the self-assurance of robber barons; bribing politicians and leaders, creating social disharmony and ignoring laws to gain access to, rip out, and export the last remnants of the province's *valuable timber*.

These companies are fooling the landowners and making use of corrupt gullible, and *unthinking* politicians. It downgrades Papua New Guinea's sovereign status that such rapacious foreign exploitation has been allowed to continue with such devastating effects to the social and physical environment, and with so few positive benefits.

In this chapter, I shall question the extent to which this situation has changed as a result of reforms to forest policy and forestry legislation, by examining the recent history of the Buhem-Mongi Timber Rights Purchase (TRP) in Morobe Province.

For this purpose, I shall describe the interactions between different stakeholders involved in the establishment of PNG's first helicopter logging project, and the legal entanglements which have developed around these relationships since the 'heli-logging' venture came to grief in 1992. The stakeholders have included the landowners and 'their' landowner company, provincial and national forestry officers, local, provincial, and national politicians, two sets of 'developers', and several sets of lawyers. In telling the story of their mutual relationship, I shall lay particular emphasis on the dilemmas faced by those landowners who wanted to achieve and to participate in the kind of sustainable development which was originally promised by the proponents of heli-logging, but which seems to have been abandoned by their successors, with the apparent connivance of government agencies responsible for encouraging this kind of achievement and participation.

Map 4.1: The Buhem-Mongi Timber Rights Purchase.



The Buhem-Mongi TRP

The Buhem-Mongi TRP area is located some 50 kilometres northeast of the city of Lac in Morobe Province. The TRP covers 38,190 hectares of land between the Buhem and Mongi rivers, and is in fact an amalgam of two separate concessions – the Buhem-Bugeng and Bugeng-Mongi areas (see Map 4.1).¹ The area is bounded, on the south, by a thirty-kilometre stretch of the Huon Gulf coastline, and on the north, by ridges which lie some fourteen kilometres from the coast.

Environmental Conditions

The area has abundant rainfall. The wet season normally runs from April to October, and the dry season from November to March.

There are four distinct types of vegetation in the Buhem-Mongi TRP: the highland mountain Podocarp forest, the medium lowland hill forest, the lowland riverine forest, and the combination of grassland and gardens (Low Impact Logging 1995).

The highland mountain zone consists of hills and mountains up to 750 metres in height, with a mixture of Podocarp species and some medium lowland species. The medium lowland hill forest has the richest forest flora, with a dense shrub layer and sparse herb growth. Major species of commercial value in this zone are *Pometia*, *Calophyllum*, and *Terminalia* (ibid.). In the lowland riverine zone, the major species of commercial importance are *Endospermum* and *Pometia*. The last zone contains land currently used by villagers for gardens and plantations, and these two forms of land use have been responsible for the creation of grasslands in the coastal zone of the TRP.

Human Settlement

There are twelve census units located within the TRP area, with a total population of 3,687 in 1990 (see Table 4.1).² Three of these – Awadi, Mundala, and Ukilim – are offshoots of the older settlement of Bukaua, and are commonly subsumed under the latter's name.³ This means that the area contains a total of nine village communities, of which Bukaua (including its satellite settlements) is by far the largest. Four of these communities – Bukaua, Buengim, Ulugidu, and Yambo – are currently in favour of logging, while the other five – the 'dissidents' – are opposed to it.

¹ The Bugeng is one of three main rivers between the Buhem and the Mongi, the others being the Busa and the Bukang.

² The official spelling of village names is retained throughout this chapter, even though it is sometimes at variance with local pronunciation.

³ A fourth offshoot of Bukaua has recently appeared as a result of the impact of the logging project.

Table 4.1: Population of villages in the Buhem-Mongi TRP area, 1990.

Census Units	Households	Females	Males	Total
Awadi	17	56	71	127
Bua	50	155	149	304
Buengim	76	193	236	429
Bugang	48	140	137	277
Bukaua	48	137	141	278
E'e (Busong)	59	164	178	342
Mundala	57	180	204	384
Tamigidu	73	261	210	471
Ukilim	25	78	76	154
Ulugidu	34	100	112	212
Wideru	65	180	180	360
Yambo	61	163	186	349
TOTAL	613	1807	1880	3687

Source: PNG National Population Census 1990.

All the people of this area, except those of Tamigidu village, speak the Bukaua language, which is an Austronesian language of the Siassi family. Following the arrival of German Lutheran missionaries, the people also learnt to use the Yabem language as a *lingua franca*. Intermarriage is quite common between village communities, and has served to strengthen traditional social relationships throughout the concession area.

Local Infrastructure

The TRP area has a relatively low level of infrastructural development. There is a road from Lae up to Bukaua, which was built by South Pacific Timbers when the company was logging in the Buhem area during the 1970s. There is no airstrip, and no harbours or jetties in the TRP area. The village people use small dinghies with outboard motors to travel to Lae for shopping, and to conduct government and private business. The journey takes an hour or two.

There are four community schools in the TRP area: one at Tamigidu which serves Tamigidu and Ulugidu villages; one at Bua which serves Bua and Bugang villages; one at Busong which serves Busong, Buengim, and Wideru villages; and one at Hopoi which serves Yambo and Bukaua villages.

The Awateng Health Centre, located at Bua village, provides health services to all the villages in the TRP, and there is also a small aid post at Bukaua village. The health centre treats about 450 patients a month and has a staff of five national health workers. Financial support for the running of the health centre is provided by the Morobe Provincial Government (Low Impact Logging 1991). The most commonly treated diseases are malaria, upper respiratory tract infections, and some cases of tuberculosis. Serious cases are referred to the main hospital in Lae.

Most of the people in the are Lutherans. There are two major churches at Tamigidu and Bukaua, but nearly all the other villages have their own small churches.

The Formation of the Landowner Company

The rights over the two concession areas – Buhem-Bugeng and Bugeng-Mongi – were respectively acquired by the Australian colonial administration on 7 and 23 November 1973, for a period of twenty years. The administration subsequently issued a permit to a logging company called South Pacific Timbers Pty Ltd, but this company only operated in the area around the Buhem River, and apparently ceased all operations in the late 1970s.

The local landowner company, Deinzehil Investments, was incorporated in Lae on 23 August 1988, with seven original subscribers to the company's Memorandum of Association: Bingmalo Iga (from Wideru village), Ania Kaiwa (from Busong), Kiong Masang (from Buengim), Paul Itama (from Bugang), Kaisom Goy (from Bua), John Aladu (from Tamigidu), and Labo Aladu (from Ulugidu). The stated objectives of the company were:

- to bring together the various people, clans or landowners of each village community for the economic and social development of the area;
- to be involved in agricultural development activities in the area;
- to carry on business in logging, harvesting, treating, and exporting of timber and timber products, and to carry on business in sawmilling for production of sawn timber and other timber products for use in PNG;
- to establish, conduct, and carry on the business of transportation, including carriage of passengers and freight by motor and other road vehicles of all kinds, ships, and canoes, and to function as wharf owners, stevedores, and warehouse operators.

According to one of the original directors, Paul Itama, who is now the interim chairman of the dissident landowner group, representatives of the Bukaua community were able to gain control of the company within a year of its establishment. This happened on 8 August 1989, when a man from Bukaua village, Jonah Tisam, filed a Form 44 with the Registrar of Companies, listing a new set of seven shareholders. Five of the new shareholders, including Tisam, were members of the Bukaua community, one was from Yambo village, and Paul Itama was the only one who had also been a member of the original board.⁴

This sudden change in the ownership and control of the landowner company led many local people to question its integrity. Claims have since been made that the landowner company has served the interest of the logging companies

⁴ It is interesting to note here that Bukaua and Yambo were the two communities which had apparently *not* been represented on the original board.

operating in the area rather than that of the landowners. Most landowners are unclear about the identities and shareholdings of the individuals who control the company's affairs, and their suspicions have made them reluctant to participate in the 'development' of their resources. As in other parts of PNG, where landowner companies play a vital role in the negotiation of resource development, suspicions have been aroused when the directors have not been available to answer local people's requests for information, or when they have stayed away from the site of the development project for a considerable period of time.

The Visible Developer

The directors of Dienzehil Investments exerted some pressure on the national government to secure the development of a new logging project in the Buhem-Mongi TRP area. In March 1990, the Department of Forests placed advertisements in the local newspapers asking for expressions of interest in the development of the TRP. Although Cabinet imposed a moratorium on the issue of new log export permits in July 1991, the Buhem-Mongi project was one of several which the Forests Minister, Karl Stack, later said would not even need to be exempted from this moratorium because they were 'either ready for allocation or had been allocated for some time, are extensions to existing operations or defunct projects being revived' (*Post-Courier*, 2 January 1991; see Filer 1991b). The Buhem-Mongi project was evidently considered as one which fitted one or both of these criteria, because the national Department of Forests subsequently granted a five-year Timber Permit (TP 13-31), commencing on 3 October 1991 and expiring on 2 October 1996, to a company called Low Impact Logging Pty Ltd.

Records held at the Investment Promotion Authority's office in Port Moresby reveal that the ownership of Low Impact Logging Pty Ltd was originally divided between Tuckman Holdings Pty Ltd of New Zealand (25 percent) and a company called Malan Investment Pty Ltd (75 percent). Malan Investment represented the interests of two expatriates, Mal Smith and Alan Shannon, the first of whom was already managing one of the main helicopter companies operating in PNG. The timber permit was granted specifically for the purpose of selective logging using helicopters to transfer logs from the logging sites to the log ponds for export. This was in accordance with the expressed wishes of the landowners for a sustainable form of development.

The Development Proposal

Low Impact Logging engaged a team of forestry experts who carried out both an aerial and a ground survey of the area. They divided the gross area of 38,300 hectares into three parts: 9,800 hectares of 'non-productive forest', 2,900 hectares of 'inoperable forest', and a 'net productive area' of 25,500 hectares, from which it was thought that an average annual cut of approximately 320,000 cubic metres of timber could be harvested over a period of fifteen years. Up-front capital costs were estimated at K14 million, comprising K12 million for

machinery (which would need to be replaced after eight years), K1.5 million for mobilisation and establishment, and the rest as working capital. The logging operation was expected to generate about K97 million in total revenue to the country over its projected fifteen-year life span, most of which would be divided (in order of relative importance) between export duties paid to the national government, wages paid to local workers, and royalties and levies paid to the provincial government and local landowners.

The economic benefits to members of the local community were supposed to include:

- the development of local infrastructure through the construction of new access road and wharves (see Map 4.2);
- the employment of up to eighty local people in camp construction and other start-up operations;
- the continuing employment of a smaller workforce during the course of routine logging operations;
- the monthly distribution of royalty payments immediately after the start of the operations; and
- various 'spin-off benefits', such as the development of a sawmilling business, the establishment of tree nurseries, and contracts for coastal shipping and the transportation of workers to and from work.

Meanwhile, the national government and the country as a whole would not only secure direct financial benefits from the payment of taxes and royalties, but would also learn about the benefits of a new method of harvesting logs.

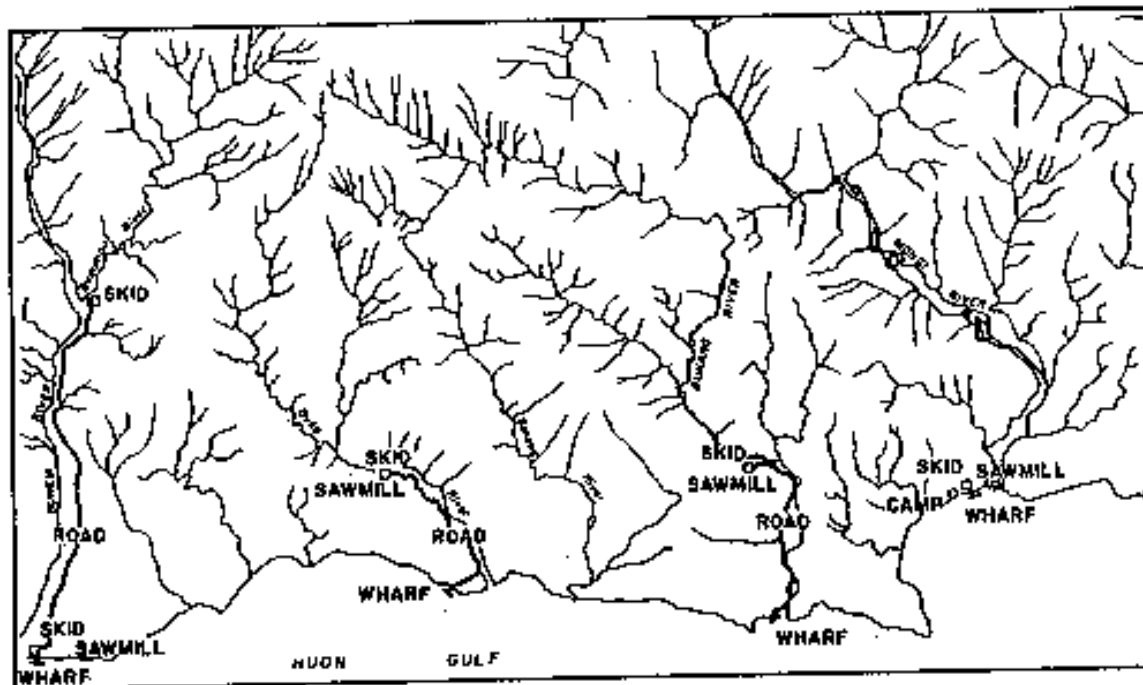
Helicopter Operations

The company's K14 million development proposal emphasised the reduction in damage and destruction of residual trees entailed in PNG's first 'heli-logging' venture. The proposal claimed that the operation would be of a truly selective nature, since only those trees of definite commercial value would be felled and removed. This was because the usual bulldozers and skidders would be replaced by helicopters capable of lifting a five-tonne payload, thus eliminating the need for roads and skid tracks into the forest area. By this method, there would be no benefit in removing lower-value species, which are normally cut by conventional logging practices just because they have been rendered accessible by a road or track.

Given the combination of technical, economic, and environmental factors involved in heli-logging, the TRP area was divided into five zones, each of which was to contain a wharf and a sawmill (see Map 4.2). Flight distances would range from 200 metres to 1,500 metres, and the average flying time from the coast to the interior of the TRP would be about 2.05 minutes. An estimated average payload of 2.5 cubic metres yielded daily production rates between 700

and 900 cubic metres for ten hours of flying time, depending on flight paths and climatic conditions (Low Impact Logging 1991).

Map 4.2: Proposed infrastructure development for the Buhem-Mongi TRP area (after Low Impact Logging 1991).



The development proposal laid considerable emphasis on the reduction of those kinds of environmental damage (such as soil compaction or damage to residual trees) which result from standard logging practices. In approving the company's environmental plan, the former Minister for Environment and Conservation, Michael Singan, stated that his department recognised that the type of logging to be carried out in the Buhem-Mongi TRP would have less of a negative impact on the environment than conventional logging practices. The approval was effectively conditional on the logging company's capacity to demonstrate a combination of economic viability with a reduced level of physical impact (*Post Courier*, 2 January 1992).⁵

Operations Curtailed

Low Impact Logging began logging activities in the area towards the end of 1991, following the approval of its environmental plan. Although there was still some disagreement amongst them, most landowners cooperated with the company because it was accepted that this form of logging would cause less environmental damage than conventional methods.

⁵ In a paper presented to the 20th Waigani Seminar, Tony Power (1996) applauded the heli-logging techniques as the best way to avoid the damage caused by conventional 'selective' logging methods, which, by his estimate, damage between 50 percent and 80 percent of non-harvested species.

The total volume cut by Low Impact Logging during its first and only year of heli-logging operations was 40,129 cubic metres, of which the total volume actually exported was 35,599 cubic metres. Export earnings amounted to K2,937,700, from which landowners received a total of K143,597 in royalty payments. Under the original proposal, direct landowner benefits had been set at K5.03 per cubic metre, comprising K3.31 in royalties and K1.72 in development levies. The levies were actually used to install new water supplies in Yambo village and to construct an aid post in Ulugidu village.

The operation continued until 10 September 1992, when one of the giant Russian helicopters on hire to the logging company crashed (*Post-Courier*, 11 September 1992). Seven people died in the accident, including four landowners from villages in the TRP area. Officials from the Department of Civil Aviation conducted an investigation immediately following the crash, found that there had been gross negligence on the part of the operator, and imposed an indefinite suspension on the flying licence for all rotor-wing aircraft operating in the area. This action naturally resulted in the cessation of all heli-logging operations in the TRP area.

Soon after the crash had occurred, a group of local landowners lobbied the newly established PNG Forest Authority not to renew the TRP agreement, which was due to expire in November 1993, but instead to allow the landowners to negotiate a Forest Management Agreement under the terms of the new *Forestry Act*. The landowners also wanted to put an end to logging operations at this stage, and were demanding that the company pay compensation for the death of their relatives in the accident.⁶ Paul Itama, one of the original directors of the landowner company, Dienzehil Investments, was elected as the interim chairman of a committee representing this group. He and his fellow committee members were hoping to secure the timber permit themselves, and thus exercise direct control over any future logging operations in the area in order to achieve the twin goals of sustainable development and downstream processing.

Enter the Invisible Developer

Following the closure of the heli-logging operation, Malaysian loggers have made two separate attempts to resume the export of logs from the Buhem-Mongi TRP using standard logging techniques. It seems that Messrs Smith and Shannon sold their interest in Low Impact Logging to one of the companies in the 'Monarch group', which is effectively managed by Mr Hii Yii Ann, but which is also closely associated with Rimbunan Hijau, the largest of the Sino-Malaysian logging companies operating in PNG (see Filer, this volume). This sale was apparently accomplished before the expiry of the original TRP agreement in November 1993. However, the dissidents claim that this transfer of ownership and control took place without their knowledge and consent, and

⁶ Local informants claim that no compensation has ever been paid to the relatives of the landowners who were killed in the crash.

have subsequently been engaged in a series of frustrating battles to remove the 'invisible developer' from their land.

The First Appearance

On 1 October 1993, the *Post-Courier* newspaper carried a story by one of its staff reporters, Wesley Bunpalau, under the title: 'Province uncovers secret logging plot: Morobe authorities impound shipload of logging equipment'. This story was apparently based on an interview with the Forest Authority's Acting Provincial Manager, Mrs Agatha Pokatou. According to Mrs Pokatou, Low Impact Logging had been officially asked on 24 July to show cause, within a period of fourteen days, why its timber permit should not be cancelled, and since the company had failed to respond within the stated period, her office was operating on the assumption that no new permit would be granted until the Buhem-Mongj area had been placed under a Forest Management Agreement in accordance with the provisions of the 1991 *Forestry Act*. However, on Monday 27 September:

a Malaysian believed to be an agent of the logging company and sent by a Mr Hii An based in Port Moresby, called at the provincial forestry headquarters to meet with Mrs Pokatou and one of her officers. By a slip of the tongue, the expatriate mentioned that a vessel loaded with logging equipment destined for Oligudu [sic] was due to arrive in Lae on Tuesday. But as they were meeting, the vessel was being cleared by Muruks Customs Agency to sail to Oligudu the same afternoon.

When Mrs Pokatou sought to delay the process of clearance, she was told that it had already been granted, and the ship had set sail for Ulugidu. She therefore went out in person, with two other forestry officials, two policemen, and a customs officer, and ordered the vessel to take its cargo back to Lae while she sought to clarify the status of the timber permit with Forest Authority headquarters in Port Moresby.

She was also upset that the landowner company of the Buhem/Mongj, Deinzahill [sic] Investment Pty Ltd had not informed her office of any dealings it had or had engaged in, let alone complaints of environmental damages and benefits that were later channelled to her office.

Four days later, on 5 October, the *Post-Courier* carried another story by the same journalist, which reported that

while she and her officers were carrying out their duty to safeguard the people's resources and environment, an instruction was faxed to a Mr Hii Eean [sic] of Magnum Resources Pty Ltd based in Port Moresby, to inform his agent in Lae to land the logging equipment outside the TRP area.

The instructions were from Mr Kanawi Poru [sic], who is the divisional manager of operations with the Forest Authority.

Mrs Pokatou maintained yesterday that there was no approval granted to any new company to move into the TRP, although she said it seemed a company had been given approval by 'someone in authority'.

She said she would battle on to establish who gave approval and to which company. The equipment had been landed at Oligudu. But she would not allow the company to begin logging operations until the uncertainties had been removed, adding that she wanted the equipment removed.

On the same day, the *Post-Courier* published a full-page advertisement, authorised by the chairman of Deinzehil Investments, which refuted some of the points made in the earlier article by making the following claims:

- that Low Impact Logging had received its show cause notice on 14 July and had given a written response to the Forest Authority on 22 July, so the timber permit was still valid;
- that Mrs Pokatou had herself been a witness to an agreement between Low Impact Logging and Deinzehil Investments, executed on 30 July 1991, which had facilitated the subsequent issue of the timber permit;
- that representatives of the logging company, the landowner company, and the Department of Forests had met again in August 1991, and agreed that the period of the TRP agreement should be extended to 1996, so that a five-year timber permit could be issued;
- that the logging company had submitted a revised Forest Working Plan to the Forest Authority in June 1993, though it had not received any response;
- that a meeting of landowners and landowner company directors, in July 1993, had agreed that the logging company should now use conventional logging methods, and that the Minister for Environment and Conservation had also approved the use of such methods on condition that the logging company prepare a new submission on its environmental plan by February 1994; and
- that the landowner company was 'totally satisfied with the way and manner in which Low Impact Logging is carrying out its functions and duties and obligations in accordance with the Agreement reached with it and in accordance with the guidelines and requirements of the Forestry Department'.

Three days later, on 8 October, Wesley Bunpalau produced another story in which it was claimed that landowners in the Buhem area, especially members of the Musam Buatu clan under the leadership of one Dobin Dally, had 'dissociated themselves from any dealings by the landowner company' and 'reaffirmed their decision not to allow logging operations to restart until outstanding payments are made for logs now rotting away and compensation to relatives killed in accidents during the heli-logging operation'. This decision had apparently been

communicated in writing to Nawae MP Amos Yamandi in July 1993, and to Deinzehil's chairman the following month.

The Second Appearance

The press did not carry any further stories about the Buhem-Mongi TRP until 23 June 1995, when the *Post-Courier* reported that local landowners were once again complaining about the importation of logging equipment, this time bearing the name of Low Impact Logging, but still under the control of Mr Hii and his employees. It appears that local forestry officials were still in the dark, since a 'forestry registration officer', Maria Kelva, reportedly denied that Mr Hii or his company had been authorised to harvest logs in the area.

Spokesman for the people of Bukawa area Paul Itana [sic] explained that the expiry date of the old Timber Rights Purchase (TRP) had lapsed, and the landowners wanted a new investor to be brought in under the new forestry guidelines as legislated for in 1991 under former Forest Minister Tim Neville.

Mr Itana said the villagers of Bukawa, Buingim, Yambo, Widiry, Eec, Bugahang, Boac, Tamigudu and Uligudu will only allow logging in their are[a] if the concession comes under the new Forestry Act.....

He added: 'We will burn Mr Hii's equipment if he intends to use the divide-and-rule tactic on our people.'

Despite these reported threats, the Malaysians had begun to construct new buildings at the Dumadum campsite, near Oligudu village, by the end of September 1995, and had already moved various pieces of equipment onto the site in preparation for a further round of logging operations.

By this time, the dissident landowners had been able to establish that Mr Hii had previously been responsible for the operations of Putput Logging, a company contracted to exploit the timber resources of Umboi Island, off the north coast of Morobe Province, that the Umboi timber permit had been cancelled because of the contractor's failure to comply with certain conditions set by the government, and Putput Logging had been sold to Rimbunan Hijau shortly after the permit had been re-negotiated and reissued. From this knowledge they inferred that a similar sequence of dealings must have taken place over the Buhem-Mongi timber permit.

Extension of the TRP Agreement

During the course of 1994, leaders of the dissident landowner group began to suspect that the new Malaysian owners of Low Impact Logging were attempting to negotiate a new agreement with representatives of the 'landowner company', Deinzehil Investments, but they were unable to obtain access to the latter's records of income and expenditure, or the current distribution of its shareholdings. These concerns were raised in a number of letters sent to senior officers of the Forest Authority in Port Moresby, in which the dissidents sought

some assurance that such negotiations would not proceed without their participation. As a result, they claim to have received an assurance from the Managing Director, Jean Kekedo, that their own desire to negotiate a new agreement with a new developer was perfectly consistent with national government policy.

A landowner liaison officer from the National Forest Service, Muyang Basenke, was assigned to consult with local landowners over the question of extending the duration of the TRP agreement. He reported that the landowners were divided on the issue, and recommended against any continuation of logging activities until these divisions had been overcome, at which time any new timber permit would need to be put out to tender under the terms of the 1991 *Forestry Act*.

At some point in 1994, however, the State Solicitor drafted a form of agreement for extension of the Buhem-Mongi TRP for a period of five years from November 1993 to November 1998. The schedule attached to this form of agreement listed the names of twelve clan agents from six villages in the TRP area – E'e, Buengim, Bugang, Bua, Tamigidu, and Ulugidu. It appears that this agreement was signed, on behalf of the state, by the Deputy Prime Minister and Minister for Finance and Planning, Chris Haiveta, on 29 July 1995.

The dissident landowners say that the majority of local people had not been consulted over the terms of the agreement, and did not become aware of its existence until some time after it had been signed. Nor can they understand how the agreement came to be drawn up by the Department of the Attorney-General, and signed by the Minister for Finance and Planning, without the involvement of the Forest Authority.⁷

On 23 September 1995, the dissident leaders convened a general meeting of landowners at Busong (E'e) village to discuss the extension of the TRP agreement and the timber permit previously issued to Low Impact Logging. This meeting unanimously resolved:

- to seek the deregistration of the landowner company, Deinzchil Investments Pty Ltd, on the grounds that it had been used by a minority of landowners for making agreements with the state after unwarranted changes to the membership of its board of directors;
- to support the formation of an interim committee to represent the landowner interest in preventing any company from conducting logging operations in the TRP area, unless it was under the ownership or control of a representative landowner body;

⁷ According to a former member of the National Forest Board, the matter did come before the Board, and the Board accepted the validity of the extension on the grounds that the state had acquired the right to extract a certain volume of timber under the terms of the original TRP agreement, and this volume would not have been extracted by the end of 1993 (personal communication, Jim Belford, 1996).

- to ask the courts to declare the purported extension of the TRP agreement null and void; and
- to negotiate an entirely new agreement with the Forest Authority, whereby landowners would themselves become the permit holders and seek to establish a sustainable forestry project with a downstream processing component, rather than simply harvesting logs for export.

The interim chairman of the dissident landowner committee, Paul Itama, consequently wrote to the managing director of the Forest Authority, arguing that the extension of the TRP and the continuation of logging activities under Timber Permit 13-31 were both illegal, and pointing out that four of the nine landowning villages in the TRP area had flatly refused to give their consent to any extension of the TRP agreement. In his view, this meant that there had been no process of consultation of the kind required under Sections 115 and 116 of the newly-gazetted *Organic Law on Provincial Government and Local-Level Governments*.⁸ He also argued that conventional logging practices violated the conditions of the original permit, because the original Forest Working Plan and Environmental Plan had both been based on the assumption that helicopters would be used to extract the logs. He therefore appealed to the managing director and the Minister for Forests to revoke the extension of the TRP agreement and proceed instead with arrangements for a new Forest Management Agreement.

The landowners were informed by Forest Authority officers based in Lae and Port Moresby that no new permit had been issued. This meant that the only permit which currently existed, despite the expiry of the TRP agreement, was the one which had been granted to Low Impact Logging in 1991, and which was due to expire in October 1996. On the other hand, it was conceded that the developers had now voluntarily submitted a new Environmental Plan for consideration by the Minister for Environment and Conservation, which implied some recognition on the part of the developers and the government that the TRP was no longer being 'developed' in the way that had been foreseen in 1991.⁹

⁸ Section 115 requires all three levels of government to 'liaise fully with the landowners in relation to the development of [their] natural resources', while Section 116 requires the national government to make provision for the establishment of 'natural resource development forums' or other institutions through which this consultation can take place.

⁹ According to the new Environmental Plan (Low Impact Logging 1995), the development of the Buhem-Mongi TRP was to be managed on a sustained yield basis through a combination of selective logging and plantation forestry. An official of the Department of Environment and Conservation advised the author that his department had not responded to the submission of this document because of the conflict that was known to exist between the Forest Authority, the developer and the landowners (personal communication, James Sabi, 1996).

Going to Court

Since the relevant government authorities were apparently unwilling or unable to assist the dissidents in their efforts to renegotiate the conditions of resource development, advice was sought from a national law firm. The lawyers noted that Section 137 of the new *Forestry Act* had allowed for the continued validity of all TRP agreements signed, and timber permits issued, before the passage of the Act, but while the Act had made some allowance for the subsequent extension of timber permits, no such allowance had been made for the extension of TRP agreements. The lawyers therefore took the view that the state had no right to grant a timber permit for a period which outlasted the expiry of the original TRP agreement, especially considering that the purported extension of that agreement had not been authorised until after the original expiry date, and well after the gazettal of the new legislation. The dissident landowners sought a local land court injunction in Lae to prevent Low Impact Logging from conducting any further logging operations in the TRP area until the validity of the extension made to the TRP agreement could be determined.

In their originating summons (No. 561 of 1995), the dissidents asked the court to declare:

- that the two TRP agreements between the landowners of the Buhem-Mongi area and the State were only valid for a period of twenty years, from November 1973 to November 1993;
- that, as of November 1993, these agreements between the landowners and the State had ended;
- that the award of a timber permit by the State (the second respondent) to Low Impact Logging Pty Ltd (the first respondent) in 1991, for a period of five years, was illegal;
- that the purported extension of the TRP Agreement between the landowners and the State in July 1995 was illegal;
- that the activities of Low Impact Logging Pty Ltd in recommencing logging operations were illegal; and
- that Low Impact Logging Pty Ltd and any associates should be restrained from pursuing any further logging operations within the TRP area in question.

On 11 January 1996, the court duly ordered that Low Impact Logging should cease all logging operations within the concession area, that any merchantable timber which had already been logged was to be seized and sold by the Forest Authority, and that monies received from the sale were to be held in a trust account pending completion of the proceedings.

However, lawyers representing the logging company proceeded to challenge these restraining orders in the National Court, and on 8 February 1996,

the landowners' case was dismissed, apparently on the technicality that it had been based on an 'originating summons' rather than a 'writ of summons'. The dissident landowners then engaged the services of another law firm – the third from which they have so far sought assistance in their costly legal battle with the logging company – in order to pursue their case.¹⁰

Whilst the whole matter is still before the court, the company continues its logging operations in the area. As a result, the level of tension and frustration is constantly mounting amongst the dissident landowners, especially the younger men who are now threatening to take the law into their own hands. Dissident leaders like Paul Itama believe that the court system still provides an avenue through which the company's activities can be stopped in a peaceful manner, but the failure of previous attempts to achieve this goal, for 'technical' reasons beyond the understanding of local people, is making it harder for them to keep their followers under control.

Conclusion: Whose Sustainability?

On 2 October 1996, the Minister for Forests granted a further extension of Timber Permit 13-31 to Low Impact Logging for another period of three years, so that it would now expire on 2 October 1999 – almost one year after the expiry of the extended TRP agreement. This extension of the timber permit was apparently warranted by the Minister's powers under Section 78 of the *Forestry Act*. But, if this is the case, his action would seem to imply that old TRP agreements *and* the timber permits issued over TRP areas can both be extended indefinitely, at ministerial discretion, without being overtaken by the new resource allocation procedures specified in the 1991 *Forestry Act*.¹¹

The recent history of the Buhem-Mongi TRP presents a clear example of some of the problems which the Barnett Inquiry identified in the mutual relationships of landowners, developers, and government in the forestry sector. Despite the recent reforms in policy and legislation, these problems continue to exist. The internal divisions and outward hostility of landowning communities both stem from an ongoing failure of communication, which leaves the majority of rural villagers in the role of passive bystanders who can exercise no control over the exploitation of their resources.

Current development policies in the PNG forestry sector still fall well short of achieving the full participation of resource owners in the process of resource development (see Holzknicht, this volume). The result is an escalation of social unrest which exacerbates the 'law and order' issue, and which may create more

¹⁰ Legal action had already cost the dissident landowners almost K20,000 before the end of 1996.

¹¹ Jim Belford (personal communication, 1996) maintains that the National Forest Board advised the Minister that this further extension would *not* be consistent with the provisions of the *Forestry Act*, and the Minister accepted this advice. However, at the time of writing, the dissident landowners had not yet heard anything about the Minister's change of heart.

employment for lawyers, but also requires the government to spend more of its own funds on the business of dispute settlement (Nadarajah 1993a).

In this particular case, it is reasonable to ask whose interests are actually being represented by the national government. This is certainly the question which the dissident landowners of the Buhem-Mongi TRP have been asking since 1993. Since that year, the members of several landowning villages have been trying in vain to persuade the authorities to prevent any conventional logging operations from taking place on their land – not because they are opposed to logging as such, but because they agree with the government's own stated policies in favour of sustainable development and sound environmental management. Having been persuaded to accept a developer who also seemed to espouse these policies, they now find themselves being forced to accept another developer whose understanding of 'sustainable development' does not accord with their own.

CHAPTER 5

THE MAKAPA TIMBER RIGHTS PURCHASE:

A STUDY IN PROJECT FAILURE IN THE POST-BARNETT ERA

MICHAEL WOOD

Introduction

The Makapa Timber Rights Purchase (TRP) area, located in the Western province of Papua New Guinea (PNG), has been the subject of a lengthy process of negotiation in which no party or interest group has been able to exercise sufficient power over the other players to successfully impose their own definition of the TRP on those other actors. This is a case in which the various stakeholders have failed to achieve a level of cooperation which would impose a workable order on their divergent understandings of the Makapa TRP itself. What has happened instead is that conflicts over the definition of the Makapa TRP have so transformed and diluted this 'project' that it has yet to be scaled up from the micro-world of proposals, maps, ideas, letters of intent and project agreements to the macro-world of actual project development.

This paper outlines some of these transformations in the definition of the Makapa TRP, and also analyses the reasons for this failure to quickly implement a logging project. A crucial factor was the questionable validity of the project's 'pre-reform' legal basis, which meant that the project's definition was open to challenge by rival logging companies and by what I will call 'pro-reformist' sections of the state forestry bureaucracy.¹ On the other hand, the PNG Forest Authority itself has been unable to control the definition of the project – alternative proposals with different boundaries have proliferated, and they have sometimes been linked to quite different procedures for project evaluation (for example, whether a project should be processed by the Forest Authority or by Cabinet). These disputes are crucially about policy making, in the sense that they are about the legitimate (and illegitimate) powers and capacities of the

¹ The 'reformers' are those people who broadly shared the goal of bringing the PNG logging sector under new forms of state regulation which aimed to ensure that PNG's exploitation of its forest was placed on a sustainable basis. The reforms were a direct response to the revelations of the Barnett Inquiry and a follow-up report by the World Bank (1989), and are detailed in Holzknicht (1994a), Nadarajah (1993b, 1994), Power (1994), and Holzknicht (ed. 1995). The reforms have been subject to continual attack, as exemplified in 1993 by the introduction into Parliament of the Forestry Act Amendment Bill that sought to weaken the new Forest Authority and transfer control of resource decisions to the Minister and the forest industry (Holzknicht 1994:28). This bill lapsed in 1994, but in early 1996 attempts were again being made to amend the *Forestry Act* to grant the Minister much greater power to make resource allocation decisions.

agents involved to define events – to issue a ‘permit’, for example, or sign a letter of ‘intent’ to allow logging – in such a way that other actors are obliged to accept those definitions.² In the case of Makapa, the Forest Authority’s capacities to impose reformist policies were weakened by the national political elite’s general concern to limit the reform process so that it did not radically alter their own capacity to enter into relationships with loggers. Moreover, the Authority, ‘fragmented’ (see Jones 1994)³ and overloaded by its difficulties with the national political elite, failed to significantly transform the nature of landowner dependence on the competing logging companies involved in Makapa. Under pressure from the political elite, from various logging companies, and from landowners – all with their own views on the project’s definition – the Authority was unable to quickly formulate a single robust definition of the project. Consequently, the Authority was unable to effectively link its own vision of project development to those entertained by the landowners. The result was that sections of the political elite, competing logging companies, and the Forest Authority negotiated various definitions of the Makapa TRP with virtually no input from landowners.

This is not to say that landowners lacked effective influence on the overall process. I shall show that landowners have competed quite intensively to support specific logging companies which they favoured. This competition, largely induced by the logging companies themselves, played a role in destabilising the Forest Authority’s ability to effectively implement the project, since it was no longer sure whether the various competing landowners could be thought of as ‘representative’ of the wider community. From the perspective of those landowners able to access the resources of the competing logging companies, the result was commonly one of temporary empowerment. But from the perspective of most landowners, the Makapa TRP represents the failure of the post-Barnett reform process to deliver equitable and prompt access to the benefits of ‘developing’ their forest resources.

Innovation and the State: Trying to Fix a Definition of the Makapa TRP

In 1987, the Department of Forests surveyed the forest resources in the Makapa timber area, and found that its 301,949 hectares contained 7.9 million cubic metres gross volume of timber. The TRP area contains no permanent villages. The 1990 National Census showed that the non-Gogodala population with an interest in this area numbered only around 2,500, but there were roughly 17,000 Gogodala living along the Aramia River system, a large number of whom would be profoundly affected by any large-scale logging in the TRP area. The Gogodala are heavily reliant on the Aramia for drinking water, fishing, and

² This formulation, and my general sense of the Makapa TRP as a site of conflicting understandings, owes quite a lot to Fujimura (1992), Law (1992, 1994), and Star and Griesemer (1989).

³ I am indebted to Chris Ballard for providing a copy of this excellent thesis.

processing sago, and development of the TRP would involve logging much of the land around its tributaries and headwaters. A number of Gogodala clans also have interests in land in the TRP area.⁴ Map 5.1 provides a simplified summary of the location of the major language groups in and around the TRP area.

Around the time of the survey, the state purchased the rights to the timber in the Makapa TRP area. Landowners signed or marked a document that was equivalent to a contract to sell their timber to the state. On signing, landowners were paid two kina each. A very large number of Gogodala signed the document, and it is not clear whether all the signatories had legitimate rights to the land at issue. Equally, there have been allegations of incomplete coverage of all right holders, and of highly literate people apparently signing the document by making a mark.⁵ In 1994, Forest Authority staff attempted to bring this process under the ambit of the 1991 *Forestry Act* by incorporating land groups who would then have the power to sign a Forest Management Agreement with the state. I have not yet seen the results of this more recent process.

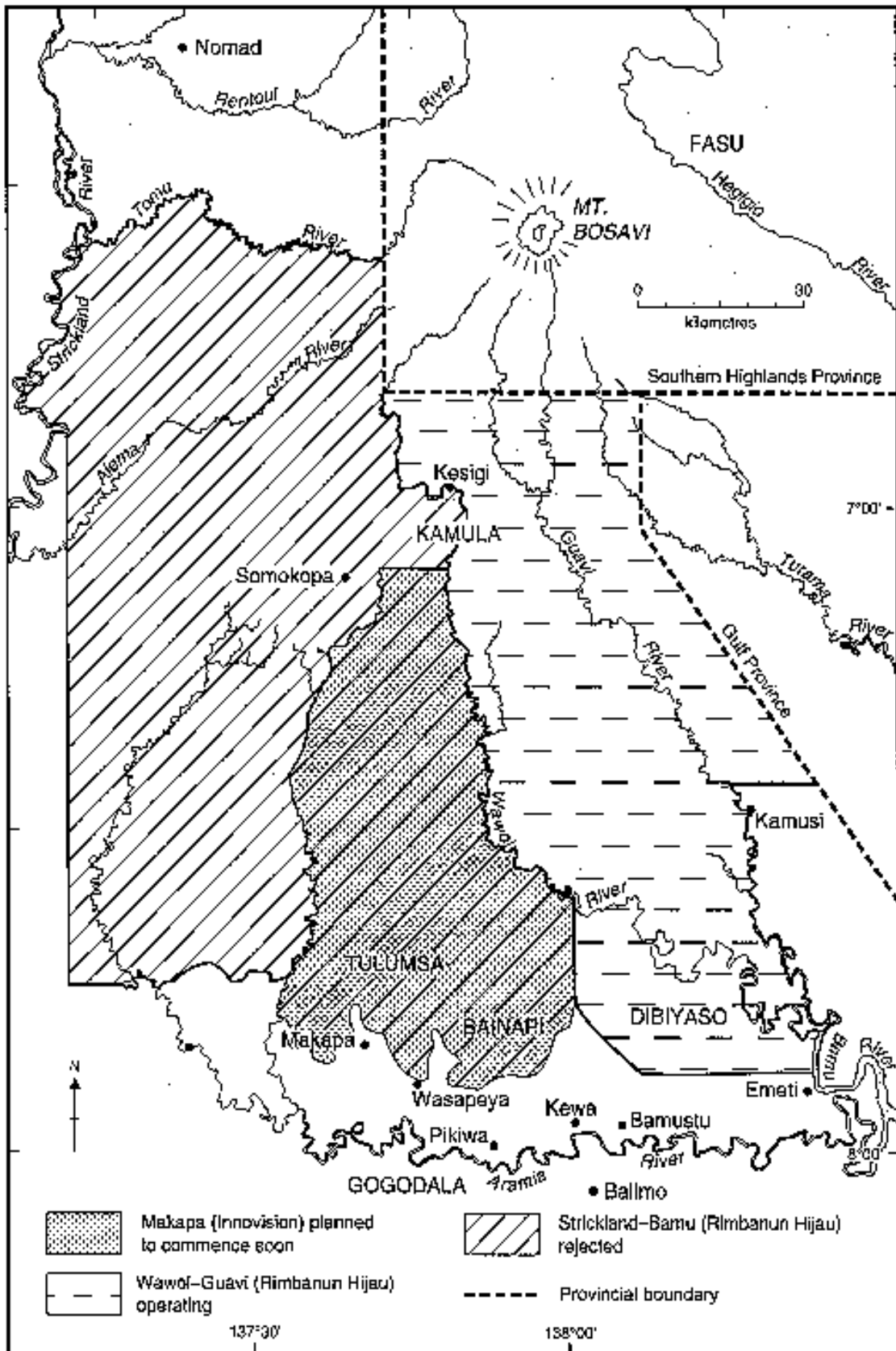
In 1989, Wawoi-Guavi Timber Company, developers of the adjacent 473,000 hectare Wawoi-Guavi timber area, registered an interest in the Makapa forest resource. In mid-1989, Rimbunan Hijau, through its subsidiary Niugini Lumber, bought the Wawoi-Guavi Timber Company. Niugini Lumber staff then set about very actively seeking control of the Makapa TRP.

In the early 1990s, they came to face serious competition from Innoprise Corporation Sedirian Berhad (ICSB) of Sabah, Malaysia. On 10 April 1991, ICSB incorporated a wholly owned subsidiary company, Innovision (PNG), through which they pursued their interest in acquiring the Makapa timber area. In early 1991, Innovision submitted Forest Development Proposals for Makapa to both the Fly River Provincial Government and to the national Department of Forests. This was despite the fact that the Department's own negotiations with landowners were not formally concluded until December 1991, when the TRP Agreement was signed between the landowners and the state. Innovision also secured endorsement from the provincial government that it be given first right of refusal for the Makapa TRP.

⁴ A group known as Wawoi-Ridge has tried to represent Gogodala interests in the Makapa TRP. It was strongly supported by some educated Gogodala people based in Port Moresby, and represented as a potential umbrella organisation for all development in the Gogodala region. It was also supported by some important figures in the vicinity of Balimo. Since my own research has focussed on non-Gogodala groups, my understanding of Wawoi-Ridge is rather limited and I shall not discuss it any further in this chapter.

⁵ My own perusal of the document revealed a certain homogeneity in the marks made by many landowners. It is also clear that some people were multiple signatories due to misunderstanding, so the clan called Kuyala, for example, gets represented in a number of ways, and therefore tends to proliferate throughout the document.

Map 5.1: The Makapa Timber Rights Purchase and related concession areas.



A significant barrier to gaining control of the Makapa resource was the fact that the Makapa timber area was subject to a moratorium on the allocation of new timber areas imposed by the government in July 1990. So both would-be developers had to ensure that government policy was transformed with reference to Makapa. This change in policy was seemingly relatively easily achieved since, once the TRP agreement was signed by the landowners in December 1991, the government exempted the Makapa timber area (together with five other areas) from the moratorium. At the same time, the government initiated a tender process for the Makapa TRP which culminated in May 1992, when three companies – Innovision, Niugini Lumber, and a Korean company called Kuk Dong Construction – submitted Forest Development Proposals. On 3 June 1992, the National Executive Committee (NEC) selected Innovision.

On 15 June, Innovision pointed out to the government that the new forest legislation was coming into force on 25 June 1992. In their view, it would take some time to negotiate a project agreement. In a brilliant move, they proposed 'that a Timber Permit be first issued with negotiation and execution of a project agreement as a condition precedent'. They sent a draft permit, containing this condition, to the Department of Forests.

On 22 June, the State Solicitor's office commented that 'the draft permit is legally in order', and on 24 June, Timber Permit 1-9 was issued over the Makapa timber area. On the same day that the Makapa permit was issued, the then Minister for Forests, Jack Genia, issued sixteen other timber permits. The mass issue of permits took place one day before the new *Forestry Act* was due to come into effect and supposedly prevent such ministerial abuses (Henderson 1996a). This perhaps represented one of the high points of Innovision's influence, in that it was able to get the project defined in the way it wanted, even where that definition was in direct conflict with the overt policy intentions of the government. But the questionable manner by which the permit was issued, and the specific terms of the permit, meant that the project was vulnerable to disabling challenges from its very inception.

The issue of the permit immediately triggered a violent response from landowners who supported Niugini Lumber. On the day when they learnt that the agreement was being formalised, some men went to the Department of Forests headquarters and, according to the victims, assaulted some landowners who were supporters of Innovision. In the process, they also attacked the Provincial Minister for Forests, Mr Biaguna, who from that day on was widely understood to be highly opposed to any bid by Niugini Lumber to gain control of the Makapa TRP or any other concessions in the Western Province.

This attack also had important implications for project implementation, in that it led the State Solicitor's office to qualify its support for the issue of the permit to Innovision. Officials from this office argued that, even though the permit was legal, it should not be granted to Innovision until the dispute among the landowners was resolved. In this sense, the use of violence to influence policy does seem to have been successful.

On 7 July 1992, in a further move aimed at destabilising Innovision's access to the resource, Niugini Lumber took out an injunction restraining the state from issuing the permit, preventing any logging or marketing agreement from being approved, and preventing any actual logging. The injunction was granted, but lapsed in late August, and Niugini Lumber's case was dismissed. Nonetheless, it had the effect of creating the impression that something was 'wrong' with the project generally, and with the way the permit had been issued.

A related problem for Innovision was that the permit required that negotiation of a project agreement be concluded within six months of the permit being issued. This was a condition 'precedent' to the operation of the permit. But, on 3 July 1992, the then Secretary of the Department of Forests advised Innovision that 50 percent local processing would be required. This was quite different to Innovision's initial proposal to only process about 15 percent of annual log production into sawn timber – that is, 50,000 cubic metres out of a total cut of 320,000 cubic metres (see Innovision 1992:5). Given these divergent positions, the government and Innovision had to engage in quite complex negotiations before a project agreement could be signed.

The injunction, and the obvious disagreement with the Department of Forests, gave Innovision grounds to seek an extension of six months for negotiations. In late August 1992, it sought an extension under clauses which allowed the permit holder an extension of time to perform obligations for reason of *force majeure* (delays by the state). Simultaneously, Innovision mobilised political support for the project. This was exemplified by the then Premier of the Fly River Provincial Government, Isidore Kaseng, who wrote on 11 August to Tim Neville, the recently appointed national Minister for Forests, strongly backing Innovision.

Despite such expressions of local support, the negotiations took time. On 17 December 1992, the government extended the time available for negotiation to 24 June 1993. But as this date approached, Innovision noted that negotiations still had not taken place, because of the preparations being made for the Department of Forests to become the PNG Forest Authority with the gazettal of the new *Forestry Act*. In June 1993, Innovision's lawyers asked for an urgent extension and threatened a writ of mandamus against the state. An extension was granted on 30 June 1993, and Innovision then refrained from taking the state to court. Innovision submitted a revised proposal, but, in late November, it asked for yet another extension until 24 June 1994. It appears that the government did not respond to this request, and Innovision then took the state to court for breach of contract.

What this sequence of events reveals is that Innovision could not force the state to negotiate with it in a way that it saw as appropriate. Indeed, from Innovision's point of view, the Department seemed at best indifferent, and at times actively hostile. Part of the conflict between the Department and Innovision derived from the ideas about 'sustainable development' that were beginning to circulate within the restructured forestry bureaucracy. By August

1993, reforms were beginning to focus on the issue of sustainability, and the new Forest Authority began to redefine the Makapa TRP as a 'sustainable project'. The most crucial part of this redefinition involved reducing Innovision's preferred annual rate of cut of 320,000 cubic metres down to 150,000 cubic metres (with eventual agreement on 170,000 cubic metres). This was thought to ensure 'sustainability' if a forty-year cutting cycle was assumed. However, the Makapa permit was to operate only for twenty years. Hence, some Authority staff thought Innovision should be offered long-term access to the resource. At that time, it was thought that domestic processing should involve 85 percent of the allowable cut, and that approval to export logs should be based on the company's processing performance. Staff also argued that new conditions had to be imposed on Innovision. They argued that treating the Makapa TRP as legitimately based on commitments made prior to the new *Forestry Act* would send the wrong signal to other loggers who were opposed to any review or renegotiation of project agreements made under the old legislation.

Responding to these pressures, Innovision submitted revised conceptual proposals in October 1993, and again in November 1994. It is clear that, during 1994, the negotiations between the Forest Authority and Innovision were difficult. Indeed, there are indications that some staff in the Authority started to represent Innovision's permit as already being terminated. In records of the Batanapi Landowner Company – which at that time was representing many landowners associated with the Makapa TRP – there is an account of a meeting in Port Moresby (on 5 May 1994), where forestry officers informed members of Batanapi that the permit given to Innovision PNG had been cancelled. Late in the next month, Batanapi was told that, due to a fire which burnt down a key building at the Forest Authority's headquarters, copies of the letter cancelling the permit were not available. Whatever the status of this apparent, potentially quite destabilising, 'cancellation' of the permit, it is clear that, during 1994, staff of the Authority were thinking that they would be able re-tender the Makapa concession.

Aware of these possibilities in its November 1994 revisions, Innovision agreed to several new conditions:

- to reduce the annual cut to only 200,000 cubic metres, if the project's 'life' was extended to thirty-two years;
- to engage in domestic processing, over the total life of the project, of nearly 56 percent of total log production volume;
- to offer the landowners shares in the project, up to a maximum of 20 percent (where no such equity had been mentioned in the initial proposal); and
- to use 'reduced impact logging' techniques that had been pioneered by its parent company in Sabah.

However, even this movement towards the Forest Authority's position did not meet with automatic approval. By this time, Andrew Posai had replaced Tim Neville as national Forests Minister, and Posai was widely understood to be a strong supporter of Niugini Lumber. The following letter, written in early 1995, indicates that he was strongly opposed to Innovision:

Having had Forestry Authority staff evaluate the revised proposal, I consider that the proposal is still unsatisfactory for the needs of the Papua New Guinea forestry industry..... I consider it an insult to Papua New Guinea, that the proposal states that your company is committed to the objective of sustained yield forest management and that it operates on a 60 year rotation in Malaysia, yet the company first proposed logging in PNG on a 15 year rotation and later, when pushed, revised this to a thirty year rotation. Consequently, I intend to re-advertise the Makapa TRP area for the submission of development proposals.

In addition to these political attempts to radically redefine the Makapa TRP as belonging to no-one, by 1994 there were legal opinions circulating in the Authority which argued that the Makapa permit had lapsed, and that the permit was, in any case, never a binding or effective contract. These legal opinions threatened Innovision's access to the entire resource, and, if accepted, would have led to the Makapa TRP being re-tendered under the reformist *Forestry Act* of 1991. It would have converted the Makapa TRP to a Forest Management Agreement which would have been authorised by the National Forest Board. Re-tendering would have led to a Forest Development Options Study, more stringent environmental and social impact analysis, and detailed evaluation of the tendered proposals. Not only would this have delayed the project, but there was no guarantee that Innovision would be successful if it were to re-tender.

In August 1994, staff members of the Authority argued, with forceful clarity, that there was actually no power to extend the time limit for negotiations, because the clauses that addressed such an issue were only relevant after the 'condition precedent' (namely that negotiations were completed within six months) had been satisfied. An extension could be granted only if there was an agreement actually made between the parties. The permit could not come into operation until that condition was satisfied, and, until that happened, it was not a valid contract.

This kind of argument acknowledged that the old *Forestry Act* did give the Minister discretionary power to issue permits subject to terms and conditions agreed by the Minister. But it was pointed out that the initial Makapa permit did not specify details of things essential to the definition of a 'permit', such as details concerning processing and export volumes. Moreover, it was a matter of fact that Innovision and the Forest Authority had failed to make any agreement on major issues, such as the annual cut and the amount of local processing. Since more than six months had passed without these matters being settled, it was argued that the permit itself had lapsed. If accepted, this advice would have

radically transformed the Makapa TRP, and Innovision would have lost control of assets worth around K850 million.⁶

The advice was endorsed by some senior officials of the Forest Authority. In September 1994, the Managing Director, Jean Kekedo, wrote to the Batanapi Corporation and confirmed that 'as a result of their failure to satisfy the condition precedent to the permit namely, finalise a project agreement, the Innovision permit has lapsed'. A letter written to Batanapi on 10 April 1995 shows that she was then still of the view that the Makapa TRP would be re-tendered.

Innovision responded by repeating and pursuing its earlier threat to sue the state for breach of contract, and apparently sought damages of K250 million – at a time when the state was suffering an acute fiscal crisis. The State Solicitor, while aware of the argument about the potential invalidity of the Makapa permit, advised, in April 1995, that the matter should be settled out of court, without any admission of liability, and that no costs be awarded against the state. At the same time, it was argued that any project agreement with Innovision should be undertaken in terms of the new Forestry Guidelines (see PNGMOF 1993b).

During this period, a further problem for Innovision emerged when Mrs Suliyato Henderson took out an injunction against the project proceeding on the grounds that the permit was invalid. Mrs Henderson had close ties with a landowner company, the Makapa Timber Development Company, which was supportive of Sir Danny Leahy's increasing interest in the Makapa area (to which I shall return). However, Mrs Henderson lost the initial round, in that she failed to gain any order from the court restraining the state from executing an agreement with Innovision.⁷

Despite this action by some landowners, finalisation of the project was under way by mid-1995, even though Innovision had not formally withdrawn its own action against the state for breach of contract. On 27 July, presumably under some pressure from this threat, the National Forest Board gave its approval to the project going ahead, pending approval by Cabinet. It took the step of seeking the additional endorsement of Cabinet because the permit required that any agreement made was to be executed by the Head of State, rather than the Board, since the latter had not been in existence at the time when the permit was issued. By this rather complex route, ultimate control of the project was returned to the political elite. However, the decision to involve Cabinet resulted in a very considerable delay to the project, since it did not receive NEC approval for almost a year.

On 11 May 1996, a project agreement between the state and the developers was signed. The main benefits to the landowners, under the terms of this

⁶ This figure is derived from multiplying the net volume (5.95 million cubic metres) by the commonly cited current price of a cubic metre of logged timber (K150).

⁷ In November 1996, it was understood that this action was still proceeding.

agreement, would be a standard royalty of K10 per cubic metre, plus a 'premium' (based on 7 percent of the f.o.b. price) which, at current export prices, might be worth an additional K10. There would also be an annual payment of K420,000 to fund local development projects. Villages located along the Aramia might also receive a further K150,000 per year if they agreed for logs to be barged on the Aramia – a process which would pose some acute risks to the region's environment. There would be a small infrastructure programme involving the construction of one medical clinic worth K100,000 and a number of school classrooms worth up to K100,000. Innovision would also be obliged to spend K20,000 a year on 'marketing studies'. Operations were expected to start in the first half of 1997.

Sino-PNG: the Makapa TRP as the Western Province Agro-Forestry Project

From 1993 to 1995, while Innovision was trying, seemingly unsuccessfully, to enforce its definition of the Makapa project as a valid contract binding the state, other companies started to see that there was still an opportunity for them to acquire rights to the Makapa TRP. In the expectation that the state would break off negotiations with Innovision and re-tender the Makapa concession, these companies tried to mobilise landowner and political support for their specific proposals. These new plans often involved redefining the Makapa TRP so that it became something quite different from what most people understood by the term.

The most audacious attempt to transform the Makapa TRP involved a company called Sino-PNG Resources. Basically, what Sino-PNG tried to do was to convert the Makapa TRP into one among many other 'development' projects for the whole of the Western Province. In what seems to reflect an increasing trend in logging proposals in PNG, Sino-PNG claimed that the Makapa TRP was no longer to be construed as a logging project, but part of an 'integrated development package'.

Sino-PNG was a newcomer to the PNG forestry sector. It was incorporated in PNG on 21 May 1993, and comprised a consortium of two Singaporean companies, Sino-PNG Resources Pte Ltd and Lum Chang Holding Ltd, the Hei Long Jiang Provincial Government of the People's Republic of China, and Innoprise International Incorporated Ltd from Sabah. It appears that Innoprise had become less interested in Innovision. Certainly, it is clear that, in August 1994, Innovision (PNG) sold its interest in the Makapa TRP to Construction and Supplies House (CASH), a company with considerable links to Sabah.⁸ In exchange for securing the approval of the PNG government for the Makapa TRP to go ahead, and giving CASH the exclusive right to the concession, Innovision was to receive 5 percent of the net sales of timber from the concession.

⁸ See *New Straits Times*, 25 August 1994.

It is uncertain whether Innoprise had links with CASH, but it does appear that, for a time, Innoprise was trying to secure access to the Makapa TRP through the Sino-PNG consortium. Since Innoprise is a statutory body of the State of Sabah, some people have argued that Sabah did not want to be directly involved in taking the State of PNG to court to seek damages for breach of contract. Other people have told me that Innoprise's apparent involvement in Sino-PNG had not been authorised by Innoprise, and that it was either a 'mistake' or part of a deliberate misinformation campaign by supporters of Sino-PNG who were seeking to undermine the credibility of Innovision. In early 1996, I was informed by staff from Innovision that Innoprise was still backing Innovision, and a search of documents at the Investment Promotion Authority revealed no change in the ownership of Innovision. This 'return' to Innovision may be related to the stronger expectation that the Makapa project would go ahead through the permit issued to Innovision.

It may also be the case that Innoprise thought it should seek alternative political backing against Minister Posai, who was, as I have already indicated, a strong backer of Niugini Lumber. Sino-PNG was strongly supported by the MP for Middle Fly, Bitan Kuok, who was also Deputy Minister for Forests. In May 1995, Kuok was actively promoting the project by visiting landowners associated with the Makapa TRP. This meant that the government was now split over the question of which logging company would gain its support, and it now had to confront the difficult task of adjudicating between the competing claims of Niugini Lumber, Sino-PNG, and Innovision.

Sino-PNG staff argued that, because their plans constituted a total development package, their interest in Makapa did not amount to a logging project, and so the project could be dealt with directly by the NEC instead of the Forest Authority. What this represented was an attempt to bypass those decision-making structures of the reform process which threatened the developer's ability to deal only with the political elite. It was an attempt to create new procedures, whereby tight elite control of resource development could be maintained. It reproduced elements of the pre-reform forestry sector, where the Minister had wide discretionary powers over resource allocation. Other logging companies objected to this attempted short-circuiting of reform procedures, rather ironically arguing that such tactics would distort the 'level playing field' established by the new *Forestry Act* and associated administrative regulations (personal communication, Brian Brunton, 1996).

Supporting the impression that it was not just a logging company, Sino-PNG claimed it would invest US\$1.2 billion in infrastructure and resource development in the Western Province. Table 5.1 provides a rough guide to the company's expenditure plans.

Table 5.1: The Sino-PNG Resources 'development budget' for Western Province, 1995.

Item	US\$m
Roads and transport	210
Power distribution	100
Water supply, treatment, and distribution	100
Drainage and prevention of soil erosion	50
Telecommunications	10
Port and harbour development	150
Agroforestry development	300
Industry development	180
Social development	50
Land development	50
TOTAL	1,200

Source: Sino-PNG 1995:35

These expenditures had a visionary sweep to them – for example, the US\$210 million investment on roads and transport would involve a highway linking Kiunga to Nomad, which would then extend south to Wawoi Falls and on to Emeti in the lower Bamu area (see Map 5.1). However, a close reading of the various proposals indicates that specific details of these investments would only be clarified after appropriate feasibility studies.

In exchange for a potential – perhaps fanciful – investment of US\$1.2 billion, Sino-PNG focussed its attention directly on the Makapa TRP, arguing that it required:

full approval for the development of the Makapa TRP including but not limited to the execution of all necessary agreements, including project agreement and Timber Permits, between the relevant authorities and Sino-PNG by the NEC. Full approval of the development of the Makapa TRP is required as the Makapa development is the initial step undertaken by Sino-PNG for the concerted development of the Western Province of PNG as outlined in this proposal. The revenue generated from the Makapa development will also go towards funding the part of the wider and macro-development of the Western Province PNG (Sino-PNG 1995, not paginated).

In this account, the Makapa TRP appears as the source of a surplus capable of financing the development of the entire Western Province – something even a real gold mine has been unable to do. Balancing this visionary rendering of what the Makapa TRP might contain, Sino-PNG, in a far more pragmatic mode, demanded that it be exempt from any restrictions on the export of logs (until 2005), and from payment of all taxes, including income tax on expatriate salaries, for an equivalent period. It also sought:

- Alienation of land required by Sino-PNG Resources for development purposes in the Western Province to Sino-PNG including the grant of leases and the award of all mineral rights, for up to a period of 99 years.
- All necessary legislative changes required for the implementation and completion of the Development (ibid.).

Proposals like these show why the 'Makapa TRP' cannot necessarily be understood as a coherent object. Rather, at the time of the Sino-PNG proposal, it was a highly unstable ensemble of potential forms of resource exploitation. In the situation that obtained in the PNG forestry sector in 1995, the 'Makapa TRP' could be transformed into virtually any kind of poorly documented set of 'developments' covering a rather ill-defined area of terrain. Moreover, the Sino-PNG proposal appeared to be unconstrained by any serious consideration of the policies of the PNG state. Sino-PNG's assumption appears to have been that the PNG state could easily accommodate Sino-PNG by amending its existing legislation and policies.

This assumption received some support from the actions of the Acting Minister for Forests, Titus Philemon. In July 1995, he gave written approval, in principle, for Sino-PNG to develop forest resources in the Western Province in what he referred to as the 'Makapa extension area'. The letter also expressed his intent to enter into a project agreement with Sino-PNG. The Minister defined the project area in utterly vague terms – it stretched 'from Fly River, Strickland, Aramia, Tunu, Nomad and Wawoi Falls' (Minister's letter to Sino-PNG, 17 July 1995). Moreover, 'upon establishment of a full inventory of timber supply, boundaries may then be altered to correspond to the appropriate supply of timber to your commercial industrial complex proposed' (ibid.). Given this highly ambiguous definition, the 'extension area' could actually have included all of the Makapa TRP, but presumably the 'extension' was understood to exclude the area of the Makapa concession held by Innovision. The allowable cut was 'to be specified after establishing the boundaries of the project area', but, at the same time, the Minister gave permission for Sino-PNG to enter 'the project areas to undertake and conduct forest surveys ... within the areas defined' (ibid.). A Sino-PNG staff member told me that the area of the project was likely to be about 1.2 million hectares.

What this represented was an attempt by a politician to totally ignore the procedures of the *Forestry Act* and, at the margins of his legal power, lock the state into possibly binding obligations to give Sino-PNG access to unclearly specified forest resources. At the very least, his letter gave Sino-PNG a greater degree of control over forest resources than it would have had if it had merely submitted its proposal to the Forest Authority through the normal tender procedures. His actions indicate that some aspects of decision making in PNG's forestry sector had either returned to the pre-Barnett era or had never left it.

Niugini Lumber's 600,000 Hectare Redefinition of the Makapa TRP

As a further example of instability in the definition of the Makapa TRP, I now want to quickly consider various proposals submitted by Niugini Lumber Merchants. This company is the other main opponent of Innovision. Niugini Lumber, like its parent Rimbunan Hijau, has always been quite effective in pursuing its interests in PNG. During the moratorium on additional logging projects that was in place from July 1990 to July 1992, Niugini Lumber was able to gain an extension for its Wawoi-Guavi Timber Permit. In December 1990, Niugini Lumber submitted a proposal to the Department of Forests to consolidate the three separate TRP blocks of Wawoi-Guavi into one timber permit. On 10 April 1992, despite the 'moratorium' on the issue of new permits, and without imposing any new conditions on the developer, the Minister for Forests, Jack Genia, gave the company what it wanted by issuing the new Timber Permit 1-7 (Wawoi-Guavi Timber 1993:v).

As indicated above, this company has competed very intensively with Innovision for access to the Makapa resource. A good example of its competitive approach is found in a decision of the Executive Council of the Fly River Provincial Government. On 18 October 1991, this body had rescinded its previous decision for Innovision to be given first right of refusal for the Makapa TRP, and agreed that priority be given to Niugini Lumber. It had also requested Minister Genia to exempt the Makapa project from the moratorium on forestry projects, and had made a further recommendation – without any additional conditions or qualifications – that an additional 602,000 hectares be given to Niugini Lumber to be added to the Makapa TRP. Had this resolution been implemented, the Makapa TRP would have grown to an area of around 904,000 hectares, which, when added to the adjacent Wawoi-Guavi concession, would have given Niugini Lumber control of 1,376,000 hectares. This would have been one of the largest and most valuable unified sets of concessions anywhere in PNG.

In 1993, Niugini Lumber had submitted a detailed conceptual proposal for Makapa. In this document, Niugini Lumber almost emotionally argued:

With the vision of long term development and forever-lasting forest resource to be harvested and regenerated to benefit the landowners and the country as a whole, we propose a bigger area to be set aside for this Makapa TRP.... We propose that the area be divided into four (4) blocks with total of 904,130 hectares. (Niugini Lumber 1993:1)

It also sought to make the twenty-five year project 'renewable for another 25 years' (ibid:4), arguing that this would allow government and landowner revenue to double to an enticing total of K774 million. The company also gave considerable emphasis to a series of minimal village 'infrastructure' developments. Typical of what it proposed were its plans for Bamusti, a village where a number of its strongest supporters resided. Niugini Lumber promised, during the life of a fifty-year project, to do no more than 'upgrade or rebuild' the church, to build a water tank, to 'study the possibility' of building a community

school, and to provide a dinghy for transport (with no mention of providing an engine).

Capturing and Fragmenting Landowners: Landowner Companies

Along with these kinds of potential 'infrastructure developments', the Makapa TRP has opened up the exciting possibility that landowners may be able to capture some capital, and bind it permanently on to their land, while receiving large royalty payments. Before reaching this stage of 'development', landowners exchange their 'support' for resources supplied by the investors. These resources involve access to prestigious, often paid, positions in investor-funded landowner companies. Being a 'director on the board' also entails frequent trips to Port Moresby and occasional trips overseas. Smart operators try to maximise their links to investors, with the result that no investors can ever be sure that they have recruited a permanent support base.

From the perspective of the logging companies, it is essential to have access to a group that can be portrayed as the 'representatives of the landowners', to be mobilised in the process of lobbying government officials to endorse company proposals or when signing agreements. Groups of landowner supporters can also be mobilised to influence policy decisions, or to create the impression of disunity amongst 'the landowners' as a whole, thereby disabling the claims of another investor's landowner company to representative status. They can also be mobilised to express 'landowner' opposition to any government decision which threatens the position of the logging company backing the 'landowners'. At this level, the aims of landowners and logging companies are often compatible, and can be mutually empowering. Such compatibility of interests is also found in cases where logging companies transform specific 'representative landowners' into politicians by funding their political campaigns.

Niugini Lumber's landowner company, Eksowa, was established in March 1990. By July 1996, supporters of Niugini Lumber claimed that it had spent around K6.5 million trying to get control of the Makapa TRP, and much of this money had been spent on Eksowa and its supporters. The main core supporters of Niugini Lumber were Dibiyaso and Bainapi men from the villages of Bamustu and Pikiwa (see Map 5.1), but, through gifts to villages, offers of trips to Moresby, and associated flows of funds, Niugini Lumber was always able to temporarily mobilise supporters from most other villages associated with the Makapa TRP. It also sought to bind its key supporters by getting them to swear their total allegiance to the company on the Bible. In an area of strong mission influence, this was an especially potent attempt to permanently enrol landowner support.

Eksowa members spent a great deal of time of lobbying against Innovision. In opposition to Eksowa, Innovision established its own landowner company – the Makapa TRP Development Corporation (MDC). The main supporters of MDC came from Makapa village, whose inhabitants were mostly Tulumsa and

Kamula people (see Map 5.1). Support for Innovision in other villages was not particularly strong, since Innovision did not spend as much money as Niugini Lumber on landowner support, and tended to fly only landowner company executives and directors into Port Moresby, ignoring 'ordinary' landowners. Innovision staff told me that it was explicit company policy, and was designed to avoid the development of a 'handout mentality' amongst landowners. But prudent financial management also played a part in Innovision's relationship with landowners. For example, when the Makapa permit was signed, Innovision gave the MDC K20,000 on the condition that, if Innovision did get the project, the money would be repaid from royalties during the first year of the project's operation.⁹ It may have also been the case that, after Innoprise downgraded its interest in Innovision, Innovision was strapped for cash, and was consequently unable to finance 'its' landowners to the same extent as Niugini Lumber.

Innovision support was also weakened by the active participation of a New Zealand expatriate, Mr Henderson, who had married Suliyato Madie from Makapa village. In the early days of Innovision, Mr Henderson strongly supported the landowner company, and MDC supporters reciprocated by transforming him into a 'landowner'. He was listed as such in one report on a meeting between the landowners and Innovision, and was allocated to his wife's purported clan, 'Dopto Kamula'.¹⁰ But many people were critical of his past business practices and expressed reservations about his involvement in MDC. Many of these doubts focussed on his wife's Dopto Kamula Business Group, which was, for a time, receiving K1,000 a month in 'consultancy fees' from Innovision.¹¹ Niugini Lumber supporters used these associations to denigrate the Innovision bid as nothing more than a device to make the expatriate rich.

By early 1994, in the context where Innovision was seemingly unable to conclude its negotiations with the state, and where the TRP appeared likely to be put to tender, the division between the landowners was widely seen as an obstacle to the development of the project. A 'unified' landowner company was established, known as Batanapi, and it immediately set about gaining recognition as the legitimate representative landowner company. It seems that this move was partly a response to national forestry officials who wanted to deal with a unified group of landowners which was somewhat more independent of the logging companies than were the previous landowner companies, Eksowa and MDC.

Nevertheless, many of the meetings designed to generate a unified company were organised by a provincial government representative who was a strong supporter of Niugini Lumber. Despite selecting a man who had previously been the MDC chairman as the Batanapi chairman, and despite a

⁹ From 'Affidavit of Suliyato Madie Henderson, sworn 2/6/95', p.4.

¹⁰ My own Kamula informants argue that the Dopto clan is now extinct, and its land has been taken over by other clans.

¹¹ From 'Affidavit of Suliyato Madie Henderson, sworn 2/6/95', p.4.

preponderance of previous Innovision supporters on the board, Batanapi endorsed Niugini Lumber as the preferred developer of the Makapa TRP. On 1 May 1994, the new board wrote of Niugini Lumber that 'we have seen you to be a true brother', and agreed that Batanapi, and not MDC or Eksowa, would be the official spokesperson for matters related to the TRP. Innovision had temporarily lost its landowners to its main opponent. As a token of these shifting alliances, the new Batanapi chairman was flown to Malaysia and the Philippines by Niugini Lumber. But this new alliance was more apparent than real, since many of the landowners on the new Batanapi board still maintained close relationships with Innovision.

This tendency to back more than one contender at the same time was due to a growing perception that the national government would not award the project to Niugini Lumber, even if it was re-tendered. Such complexities were reflected in Batanapi's own account of its options at that time:

RESOLUTIONS:

Leave N/Lumber or find others so that they can apply for the project because the project will be on Tender. All companies are line [sic] up but they want to deal with the landowners and they do not know who are the landowners (Batanapi records of meeting, 27 June 1994).

Around this time, the Batanapi chairman was being actively solicited by other interested parties. In July 1994, he signed a letter of intent, on behalf of Batanapi, with Fillet Capital Corporation of San Diego, endorsing this organisation as the potential developer of Makapa. Around the same time, he also started to form links with Golden Springs International, who, on 14 September 1994, formed their own landowner company, known as Kamula-Doso Timber. They were interested in the area around the Makapa TRP, and were in direct conflict with Niugini Lumber's plans to extend the Makapa TRP into the same area. Despite these new alliances, the chairman still maintained his links with Innovision, at one point indicating to me that Innovision officials had expressed some interest in linking the Makapa development to the plans of Golden Springs.

This strategy could not be maintained for long, and in January 1995, the chairman attempted to subvert Niugini Lumber's claims by recruiting all Batanapi supporters who had interests in land associated with the expansion of the Makapa TRP. He argued that members of the Kamula and Doso groups had no land within the Makapa TRP, and that consequently they should withdraw from any involvement with Batanapi. This was quite an extraordinary move, in that many board members of MDC (Innovision's landowner company), including the chairman, were in fact members of these groups, and for a long time had been claiming an interest in the Makapa TRP. They had maintained this interest in the face of very strong criticism by Niugini Lumber supporters, who had argued that the Kamula and Doso members of MDC really had nothing to do with land in the Makapa TRP. The chairman explained to me that he only

found out that this was 'true' after talking to elders during a Christmas trip to Makapa.

He also argued that the Makapa TRP would take a long time to be developed because the various parties were likely to continue their legal contests, so it would be better for Kamula and Doso people to align themselves with Golden Springs, which was unencumbered by such disputes. In trying to align specific language groups with specific logging projects, the chairman was not just acting on Golden Springs' behalf. What happened can also be understood as an innovative attempt by some landowners, including the chairman, to establish a stronger, less 'ethnically' divided basis for links between landowners, projects, and potential developers. So, in early 1995, he engineered a seemingly complete withdrawal of all Kamula and Doso from Batanapi. He was apparently abandoning Batanapi to Niugini Lumber's core supporters, who, as mentioned earlier, were primarily members of the Dibiyaso and Bainapi language groups.

Golden Springs International initiated a legalistic procedure to fix and specify Kamula and Doso support through a Memorandum of Understanding between itself and the Kamula-Doso landowner company. This agreement required the landowners to prevent any disputes from disrupting Golden Springs' operations, and in the event of such disruptions, the landowner company was to indemnify Golden Springs for any losses it might suffer. In exchange for securing such obligations from the landowners, the developer took on responsibility for organising 'all developments and logging operations' in the permit area, and undertook to pay compensation for damage to gardens and sacred places. The developer also agreed to give the landowner company cash advances of K20,000 to help build an airstrip at Somokopa (a village in the proposed concession area), and a further K100,000 for construction of an office in the timber permit area and the purchase of a dinghy, engine, and radios. These advances were to be repaid by deductions from royalty payments.

In practice, the memorandum had little effect. By September 1995, the signatories had started to drift away and join other companies, such as Sino-PNG and Niugini Lumber. Apparently, Golden Springs was thinking of taking action against some of them, but could not do so, simply because the landowners had no resources to compensate Golden Springs for its putative losses. In any case, by the end of 1995, Golden Springs was no longer interested in the Makapa extension area, and the chairman of Kamula-Doso then started to have preliminary discussions with a Korean company, Halla, and simultaneously intensified his links with Innovision.

The 'Greening' of the Makapa TRP?

While these complex shifts in the allegiance of landowners to specific logging companies were occurring, further divisions amongst the landowners were being amplified by the activities of the New Zealand expatriate, his affines, and other supporters. Having split off from the Makapa Development Corporation in

1994, and then being excluded from the Batanapi corporation, they reformed themselves into another 'Makapa Development Corporation' and sought their own developer. They effectively used the MDC name to make high-profile assertions of their exclusive and privileged relationship to the Makapa TRP. They did this by placing an advertisement in *The National* (10 October 1994) which claimed that they were the only true representatives of the landowners. The advertisement read as follows:

MAKAPA TIMBER AREA

Makapa TRP Development Co. P/L hereby advises the public and the National Forest Authority that it is the true landowner company representing all groups from the Makapa area.

We further advise that any person, group or company pretending to represent the people or attempting to influence the granting of a timber operation or licence in the area will be resisted with the full process of Law etc.

We currently have an operating company which involves large PNG interests which is submitting a marketing and logging agreement for the area.

This new MDC eventually secured the backing of Collins and Leahy, a company closely associated with Sir Danny Leahy. A new company, known as Pisa, was established to develop the Makapa TRP. Collins and Leahy held 50 percent equity, the landowners held 40 percent through the Makapa Timber Development Company, and a group known as Piskulik held 10 percent. Pisa has gained some support from people at Makapa, Wasapeya, and Pikiwa villages, but landowners often refer to it as 'the expatriate's company' – and this association is sufficient reason for some people to express their opposition to it.

Of all the players in the Makapa TRP, Sir Danny Leahy was perhaps the most serious in seeking to ensure sustainable development, landowner equity, and possibly even meaningful landowner participation in the project's design and implementation. Indicative of this ideology was the attempt to involve the Pacific Heritage Foundation in the preparation of its plans. This is a group with an excellent reputation for trying to implement sustainable use of rainforest resources in parts of New Britain (see Henderson 1994b:20).¹²

As mentioned earlier, Mrs Henderson took out an injunction against the state finalising an agreement with Innovision. This legal challenge was seen by many landowners, especially those backing Innovision, as interference that would only further delay the start of the project. As a part of the court battle, Pisa was subject to a campaign which sought to undercut its legitimacy as a representative body. In this process, its support has probably diminished further. In late June 1995, the chairman and vice-chairman of the Makapa

¹² Max Henderson, founder of the Pacific Heritage Foundation, is not related to the Hendersons of Makapa.

Development Corporation (which had supported Pisa) wrote to the Forest Authority, stating that 'our landowner company namely Makapa Development Corporation (MDC) has agreed to join forces with Batanapi Holding Pty Limited because we feel this is the only way to eliminate conflicts and unnecessary delays on the project'. On 11 July 1995, Batanapi took out a full-page advertisement in *The National* (a newspaper controlled by Rimbunan Hijau), announcing this unification and calling for early approval of Makapa by the National Forest Board and the acting Forests Minister. The advertisement also dealt with 'green issues' in its final paragraph:

We are also aware that some foreign experts are concerned about environment and protection of rare insects. We welcome their expertise and invite them to write to us with their proposals and expert plans and programs so that our landowners can incorporate these into our forest development plan. The forest are [sic] with us in Makapa area so please send your ideas to us and don't keep them in Waigani alone.

Despite this somewhat self-confident tone, Niugini Lumber's own power in respect of Makapa declined quite dramatically in the second half of 1995. According to landowners, around the time that the Forest Authority endorsed the permit originally issued to Innovision, Niugini Lumber was told not to interfere further in the Makapa project. Certainly, towards the end of 1995, Niugini Lumber had started to wind down its overt support of Batanapi, and very few supporters were being flown to Port Moresby. In the same year, Niugini Lumber temporarily lost control of its supporters when Lan Huwat, a Malaysian company interested in the Makapa concession, was able to fly the Batanapi board and other landowners to Malaysia, and almost managed to gain their endorsement as the preferred developer. Soon after these events, two key senior staff, who were coordinating Niugini Lumber's bid for Makapa, resigned from their positions. Moreover, once the project agreement was signed in May 1996, Niugini Lumber immediately ceased to fund Batanapi. Given these events, a number of previously strong supporters of Niugini Lumber moved over to Innovision, though some of Batanapi's board members were still lobbying against Innovision in October 1996 (see *Post-Courier*, 7 October 1996).¹³

Transformations in Local Powers and Understandings

From the landowners' perspective, the Makapa TRP and its long delayed start-up represent the failure of government to provide the highly marginalised and impoverished groups of the Makapa TRP with access to opportunities for immediate 'development'. Landowners, particularly in the southern villages,

¹³ Despite such setbacks, Niugini Lumber has continued to try secure access to logging areas to the north of the Makapa TRP. It now hopes to achieve this by 'extending' its Wawoi-Guavi concession. To achieve this extension it is using another landowner company (Wawoi-Tomu), which is primarily supported by Kamula, Doso, and Kalamo people living at Somokopa and Kesigi.

have watched their region undergo a process of stagnation over the last fifteen to twenty years. Health and educational services remain much as they were, no innovations have been made in the local system of production, and there has been no fundamental change in the way of life in the villages. At the same time, there is an enormous interest in the possibilities of epochal change. There is a widespread concern with the meaning of the year 2000, which is thought to be associated with apocalyptic events, including the end of all current property relationships and the return of Christ. The logging project is seen as one vehicle that will quickly shift people into modernity and its associated wealth before the year 2000 has its effect.¹⁴

An equally significant basis of local support for logging was the proliferation of 'landowner' companies which provided large numbers of men with access to unprecedented wealth, prestige, and influence, by bringing these men into regular contact with developers and the often unstable networks of elite and bureaucratic power. They have also become familiar with forestry consultants, lawyers, and, to a more limited extent, the ideas of non-governmental organisations and the power of international agencies such as the World Bank.

Yet, despite this expansion of practical knowledge of modernity, Port Moresby, and PNG's forestry sector, the landowners have so far been unable to create any organisation that represents their unified interests. Given the pre-existing divisions amongst the landowners, and the intense competition among men for senior positions in landowner companies, such an organisation was perhaps unlikely to have been successful, but the landowners have been further divided and destabilised by competing logging companies who do not necessarily require strongly unified and independent landowners. Rather, each potential investor is interested in maintaining patron-client ties with a small group of 'representative' landowners who are fundamentally dependent on the investor for further funds and resources.

Landowner company board members and directors who find themselves in this position are unlikely to always represent the views and interests of the wider community. This point is not lost on other landowners, who often bitterly criticise directors for tricking the 'ground people' by doing deals in Port Moresby without telling them. At the same time, board members and directors are accused of 'eating' or 'stealing' future royalty monies, since it is thought that the investor will recoup all expenses in running the landowner company

¹⁴ There is also a strong view that the younger generation, who tend to occupy most positions on landowner companies, owe their seniors at least some access to the benefits of development, and that these benefits should materialise before the elders die. Here a notion of inter-generational equity is reworked into the more culturally specific theme that the younger generation are indebted to the senior generation for the 'suffering' and 'pain' which the latter suffered when rearing the former. This emphasis on the previous generation tends to undercut a concern with 'sustainable development', either in the sense of long-term sustainability or in the sense of this generation's responsibility to the next generation.

from royalties, should the investor be successful. Some directors are said to be 'like prostitutes' who just 'look for money' and 'jump' from one company to another. The result is that the 'ground people', even when overtly supporting a particular logging company, are highly suspicious of the directors of its associated landowner company. Partly because of such criticisms, some men holding senior positions in a landowner company rarely leave Port Moresby, and consequently have little direct contact with people at the village level. Such divisions within factions further contribute to the sense that, in the village, no-one really knows what is going on, apart from the often hidden pursuit of self-interest. The government did not intervene or in any way regulate this process. It simply refused to recognise the legitimacy of any of the feuding landowner companies, but by failing to intervene, it facilitated, by default, the landowners' transformation into competing and highly unstable factions which were organised and funded by potential investors.

Moreover, neither the state nor the investors were really interested in landowner participation in the negotiations over the Makapa project. Most negotiations have taken place in Port Moresby, with little input from landowners, and indeed most landowners have little knowledge of the details of these negotiations. Many landowners still have no real understanding of the transaction which they were entering into when they signed the initial TRP agreement. Many people find it difficult to understand that the state now owns their timber and has given it to Innovision. They believe that, since they own the land, all their possessory rights in the trees are still active. People also think that they will be able to 'try out' any logging company that comes on to their land, and that, if they are not happy with its operation, they will be able to send it away. Embedded in this view is the belief that they still control access to the resource, and that they have the capacity to negotiate terms and conditions as the project develops.

Such ideas are evident in assertions, by some landowners, that adequate recognition of their sovereign powers over 'land and resources', by the state and other parties, will result in a more successful development. Such ideas are also indicated in a 'Petition to get the Makapa Timber Project Operational', which was sent to the then Deputy Forests Minister, Bitan Kuok, by supporters of the Makapa Development Corporation:

The living style of the people are just like in colonial day times where people are living like primitives who just came from the bush, while others are much well off than our people, where no proper health care, education, no proper social development, no good water during long drought, no proper economic and infrastructure development..... we are again so concerned that we are living like during colonial days. We are independent, PNG is an independent country and we as native of this country have every right to have any say over our property like land issues and the resources. Why is it that our area is still the least developed area in the county? (Makapa Development Corporation, 27 January 1994)

The problems identified in the petition do not just refer to poverty, but to the failure of the landowners' 'independent' or sovereign status to be recognised. The state, in both its bureaucratic and political arms, is able to make arbitrary decisions about landowners' resources without sufficiently acknowledging the landowners' rights over their property. The petition provides an important insight into the level of frustration amongst landowners about the way in which the state operates:

We now believe that no body is telling us, the landowners, the truth with our Makapa Timber Project when exactly the project is commencing. We believe that officers are cheating ... the landowners..... We always stood for ourselves not for any contractor, we were always been with the state's decision but yet we seem (landowners) to be kept in the dark (ibid.)

What this reflects is the very significant failure of the government to formulate an alliance with the landowners, and the landowners' resulting sense of isolation (rather proudly expressed in the phrase 'we always stood for ourselves'), balanced by indications of their potential support for state decision making (if only they knew what those decisions were). What these quotes also reflect is landowner awareness that the state, represented by its 'officers', is possibly engaged in a 'dark' process of political and economic domination over the previously 'independent' landowners, pushing them back into 'colonial times'.

Insofar as many of the negotiations concerning Makapa have involved only members of the political elite, staff of the Forest Authority, and the various logging companies, then this landowner perception of disengagement accurately reflects their situation. Landowners did not participate in the negotiations that led to the Makapa project agreement in May 1996. They were not parties to the agreement and did not sign it. By July 1996, they still had not been given a copy of the full agreement, which was being treated as confidential to the signatories. As one man put it (in July 1996), they were now being treated like a pig that has been bound:

We have chains around our neck and legs. We are like a pig that's tied up. That pig can't move where it wants. It goes where you make it go. It can't move, when it does it hurts. It cries. No-one listens. It cries and cries and then it falls asleep in pain. It can't move. We landowners are like that now.

Conclusions

The material presented here has outlined some of the complexity in the definition of the Makapa TRP, as understood by various actors attempting to influence policy concerning the project. These various, often changing, definitions of the Makapa TRP have emerged in a national context where reformist policies were being defined and strongly contested by the loggers and sections of the political elite. Due to this policy conflict, the state was unable to quickly implement the Makapa TRP, despite having identified it as a key project

in PNG's forestry sector. The Makapa TRP was not only potentially a major source of revenue for the government – it was, for a time, seen by the reformers as being likely to exemplify many of the benefits of the reform process. But the failure to implement the Makapa TRP became an icon, to their opponents, of the reformers' more general inability to effectively implement their policies.

Yet the material on the Makapa TRP suggests that the reforms did not go far enough in dealing with obstacles to effective implementation. While the reforms weakened the discretionary powers of the Minister for Forests, there was no real attempt to destroy or transform the alliances between the wider political elite and the loggers. If anything, the reformers succeeded in temporarily transforming a 'governing alliance' between the loggers and the elite which had previously run the forestry sector (see Barnett 1989) into a 'defensive alliance' which aimed at constraining, and winding back, the reform process. What this case study reveals is that the reformers have been unable to effect a full structural transformation of forest resource allocation decisions. The reform process has not been robust enough to completely transform the permit given to Innovision under the old *Forestry Act* into an arrangement that fully conforms to the procedures of the new Act. Moreover, the reformers have been unable to prevent alliances between politicians and loggers from generating other definitions of Makapa which also seem to challenge procedures established by the Forest Authority. As this case study has shown, logging companies are still able to strongly influence elements of the state decision-making process by recruiting influential politicians. The competing loggers in the Makapa TRP have been reasonably successful in continuing to operate with a model that allocates power to the political elite in the form of the Minister for Forests, other ministers, and the National Executive Council.¹⁵ Understood in these terms, the Makapa TRP represents the failure of the Forest Authority to effectively impose its reformist policies on the political elite.

On the other hand, the national reform process and the associated policy shifts have delayed the Makapa TRP, and in this way slowed the rate of exploitation of PNG's forests to something less than what it might have been, had the project started in 1992 or 1993. The uncertainty associated with the negotiations over Makapa has created a space, albeit one which is increasingly implausible, where a national logging company, possibly with a real concern for socially appropriate and sustainable logging, may still emerge to be considered as an appropriate developer of the Makapa TRP. Secondly, sections of the bureaucracy were, for a time, able to take control of the negotiations with Innovision and, up to a point, effectively use their control of Innovision's uncertain access to resources as a point of leverage in their negotiations.

¹⁵ The restriction of funding for the Forest Authority, the recent (1995) sacking of Jean Kekedo as its Managing Director, and the more recent (1996) attempts to amend the *Forestry Act* in ways that would have given the Forests Minister the power to appoint members of the National Forest Board, also exemplify this trend to weaken or subvert the independence and capacity of the Authority.

Threatening to revoke the permit meant that the state was able to use some real power in negotiations, at least up until the point when Innovision threatened to claim damages. What this suggests is that the reformists have had an important role in shifting the possible definition of the Makapa TRP away from that outlined in the initial proposals lodged by Innovision and Niugini Lumber in 1992. While the newer definitions have yet to be actualised, the options now being considered for Makapa represent a considerable, albeit still contingent, achievement of the reform process.

Despite these positive outcomes and possibilities, the material above shows that, fundamentally, many of the specific decisions associated with the Makapa TRP involved a weakening of national policy as formulated by the Forest Authority. The new forestry bureaucracy was unable to assure landowners of Makapa TRP that it was acting effectively in their interests, and it was unable to radically transform alliances between the elite and the loggers. What the Makapa case suggests is that any further attempt to reformulate the state's relationship with landowners (see Taylor, this volume) must be augmented by more effective state regulation of the elite's relationship with the loggers.

CHAPTER 6

WHERE DO THE RAW LOGS GO?

CONTRACTORS, TRADERS, AND LANDOWNERS IN LAK

FADZILAH MAJID COOKE

Introduction

The bulk of timber harvesting in Papua New Guinea (PNG) is carried out by Malaysian-based multinational companies. These logging companies generate extreme emotions in PNG. The Chan government has seen them as development pioneers whose presence needs to be promoted by political elites in power.¹ Non-government organisations (NGOs) regard them as environmental vandals at best, or 'robber barons' at worst, whose activities are normally illegal and ought to be instantly stopped.² At one time or another, different groups of local landowners have also seen Malaysian logging contractors as the perpetrators of large-scale environmental destruction, but have still thought they ought to be milked at every available opportunity. Yet the occasion for milking rarely presents itself, because the companies are too cunning to allow them such opportunities. More often than not the reverse is true. Willingly or unwillingly, landowners have often been used as mouthpieces for timber companies, most notably when they resist any change to what they perceive to be the 'cosy' deals which they have maintained with 'their' developers (*National*, 16 July 1996). The Malaysian companies themselves regard their role in PNG as that of an 'investor' whose primary aim is to accumulate profit, even if the profit motive receives little emphasis in their own rhetoric when compared to the provision of 'development' goods (health, education, infrastructure) to remote rural regions (*Post-Courier*, 23 June 1993; *National*, 13 March, 7 July, 16 July 1996). According to the Malaysian Prime Minister, Dr Mahathir, the emotion associated with the activities of Malaysian logging contractors has something to

¹ In March 1996, during the visit of a Malaysian trade delegation headed by the country's Minister for Primary Industries, Lim Kheng Yaik, Prime Minister Chan issued an open invitation to Malaysian business interests to explore PNG's potential in various sectors, including agro-forestry, finance and tourism. Wisely or otherwise, the Association of Southeast Asian (ASEAN) countries in general, and Malaysia in particular, are often held up as models of 'development' by political elites in power in PNG (see *Post-Courier*, 10 April 1996; *Independent*, 19 July 1996; 2 August 1996).

² See, for example, Henderson (1996a). The *Independent* newspaper (4 October 1996) recently published a summary of the findings of a report by the Environmental Investigation Agency, entitled 'Corporate Power, Corruption and the Destruction of the World's Forests', which compared timber companies to 'robber barons' that create social disharmony, threaten rare animals, and seriously damage the environment.

do with 'resentment among some regional powers' (read Australia) at the success of Malaysian investments in the South Pacific region (*New Straits Times*, Malaysia, 26 August 1994). In this conception, Malaysian logging contractors have become a political football within the changing (if not deteriorating) context of regional power relationships in the area, as evident in PNG's increasing unease with the nature of its links to Australia.³

It is not the intention of this chapter to establish the 'true' role of Malaysian loggers in PNG. The aim is to examine the part played by one Malaysian logging company, Niugini Lumber (NGL), itself a subsidiary of the Rimbunan Hijau conglomerate of Kuching (East Malaysia), in influencing the nature of social change in the Lak electorate of New Ireland Province. The objective is to frame NGL's commercial intervention in Lak within the larger context of the world tropical timber trade into which PNG has been drawn. The first argument is that forest degradation in PNG constitutes one aspect of a larger production and consumption system which depends for its survival on the maintenance of low prices and large turnovers in the consuming countries – especially Japan. The second argument is that logging is voracious in PNG because of the uncertainties and risks attendant on timber harvesting generally – but especially in PNG.

The Tropical Timber Trade, Logging Companies and Timber Production in PNG

The image of Malaysian logging companies in PNG is one of a politically influential, and even all-powerful, machine (*Post-Courier*, 9 April 1996). Most of the Malaysian timber companies which operate in PNG are from Sarawak in East Malaysia. In Sarawak, the timber industry is dominated by one segment of the ethnic Chinese population, the Fouchow (Majid Cooke 1997). They may have partners who are not Fouchow, including Sarawak native groups and Malays from Sarawak itself and from Peninsular Malaysia, but in such partnerships they remain the controlling party.

However, in the context of global trade, these contractors are nothing more than intermediaries in a raw log production chain which is dominated by

³ Australia dominates the flow of both budgetary and programme aid to PNG, and the current shift from budgetary to programme aid is evidence of a struggle for control over the aid component of the PNG economy. The point at issue is the extent to which efficient and equitable spending of the aid budget is an internal matter, and how far donor concerns can be accommodated without infringing on the sovereignty of the recipient country. Australia's shared position with the World Bank in pushing for reform of PNG's forestry sector as a fundamental condition of the current structural adjustment programme, and its public discomfort over the use of Australian helicopters in the Bougainville crisis, both exasperate PNG politicians. In public, PNG political elites have occasionally 'rapped Australia on the knuckles', but economic reality (and dependency) often dictate the need for compromise (*Independent*, 2 August, 23 August, 6 September, 1996; *Post-Courier*, 4 October 1996), even while PNG seeks to broaden its vision by 'looking north' to ASEAN, especially Malaysia (*Independent*, 2 August 1996), and by strengthening its relationship with other countries of the Pacific.

companies in consumer countries such as Japan and Korea. In the tropical timber industry, the Japanese *sogo shosha* ('general trading companies') dominate the raw log trade, while their control of the tropical plywood trade has been weakened somewhat, in recent years, by the planned entry of Indonesian products into the Japanese market (see Dauvergne 1996). The *sogo shosha* link firms involved in the raw log trade, control distribution chains, and finance producers, wholesalers, and distributors, as well as final consumers – all for a small fee. According to Dauvergne (1996), wasteful consumption is a necessary outcome of their function and corporate structure. Moreover, they are able to control the market by the sheer volume of their purchases. When raw logs are perceived to be in short supply, the *sogo shosha* commence a buying spree, sending prices up, creating instability and, ultimately, price collapse as excess logs are sold back into the market (Krause and Sekiguchi, cited in Nectoux and Kuroda 1989). Operating on a two-to-three month reserve stock, *sogo shosha* are able to use these reserves to flood the Japanese market and lower log prices (Dauvergne 1996).

In sum, producer companies in PNG, even the seemingly all-powerful Rimbunan Hijau, enjoy nothing more than a subordinate position in a world raw log trade that is dominated by the appetites of consumers. Malaysian loggers in PNG function to cater to consumer appetites for timber which are largely Japanese. Having exhausted sources in the Philippines and Sabah in the 1960s and 1970s, these consumers found new supplies in Sarawak and PNG (World Bank 1995:76). Malaysian logging companies, as longstanding suppliers to the Japanese market, are now also logging in Africa, South America, and other South Pacific island countries apart from PNG – especially the Solomon Islands, Vanuatu and Samoa (*ibid.*). However, for these logging contractors, remaining in a subordinate position does not imply complete subjugation, and often produces some real advantages – a point which will be dealt with in more detail later.

Operational Risks

In general, timber harvesting can be a very lucrative business. According to Vincent and Binkley (1992:101), it is lucrative because of low royalties and premiums. Since concessions are awarded, withdrawn, or reissued under criteria which are often unclear, and certainly not based on economic efficiency, low premiums and royalties actually provide valuable perquisites for those in power (Barnett 1992; Taylor 1992). On the other hand, markets are uncertain, demand is controlled by consumer countries, sunk costs are high, and in the case of PNG, production itself may be risky because of uncertain operational conditions.

Timber harvesting calls for heavy front-end expenses which usually include outlays on infrastructure, purchase or rent of heavy machinery, and fees payable to landowners who may or may not turn out to be representative of communities in the project areas. The more remote the logging site, the higher these operational costs are likely to be. Because of uncertainties about the richness of forest, about obtaining full landowner support and, even if such support is

forthcoming, of being able to proceed smoothly, large-scale logging is not for the faint-hearted nor the small, under-capitalised companies.

Provincial and national governments see logging companies as potential providers of infrastructure and services to remote rural areas. In most licensing agreements, there have been clauses stipulating the responsibility of landowner companies for the construction of transport facilities, especially roads and bridges. This responsibility has commonly been transferred to the logging contractors by the Logging and Marketing Agreements which they have negotiated with the landowner companies, although the burden has occasionally been shared. Road and bridge construction may cost anything up to K100,000 per kilometre, depending on the nature of the terrain and local soil conditions.⁴ For convenience, road construction is normally sub-contracted, often to other Malaysian companies.

Despite the relatively high labour costs in PNG, wages do not account for more than 15 percent of total operational costs. Apart from roads, the sunk costs on machinery constitute the other major component of front-end expenses. The requirements of each logging site are different, and the number of machines obviously depends on the size of the operation. In 1991, when logging in the Lak TRP began, a cluster of four different types of machinery cost over K2 million. A single cluster includes machinery for the sawmill, a forklift, two types of bulldozer for logging, and additional machinery for road maintenance, including a shovel, a grader, an excavator, and a dump truck. More than one cluster of machines is sometimes required at a particular site at any one time. Some machines may be shared, that is flown or shipped from other existing logging sites, but this does not solve the problem of spare parts. Because parts are not readily available in PNG, they are often brought in directly from Singapore or Japan. In view of the distance, together with the high cost of transport within PNG itself, importing machinery and parts is a costly exercise. Calculations made by Kumar (1986:99), based on logging operations in Malaysia, where availability and distance may be less problematic, show that machinery and equipment account for anything up to 90 percent of fixed costs. There is no reason why such costs should be any lower in PNG. Moreover, there are other uncertainties specific to PNG operations.

Six years after the adoption of the new National Forest Policy, no national forest inventory has yet been undertaken, and national forestry planning is based on maps which are described as 'inaccurate, confusing and misleading' (Brian Brunton, cited in the *Independent Business Weekly*, New Zealand, 2 August 1996). Consequently, official calculations of annual allowable cut may or may not be reliable (Taylor 1992:138). Admittedly, this in itself is not a problem peculiar to PNG. Because of uncertainties inherent in the biological qualities of the forest, and the difficulty of measuring the mean annual increment of particular species over a long enough period of time and a large enough

⁴ Much of the information presented here on operational costs is based on a personal interview with NGL's Lak Operations Manager, conducted on 13 July 1996.

geographical area, most calculations of annual allowable cut tend to be fairly fluid (Majid Cooke 1995). A national forest inventory may help, but only up to a point. At ground level, miscalculation of the potential timber volume from a given patch of forest can affect the attitude that loggers present to landowners as these are translated into the sums of money which the former are prepared to part with in their negotiations with the latter. More importantly, miscalculation of timber volumes affects operational decisions over the question of how many clusters of machinery need to be used, or whether the outlays on infrastructure can be recuperated from the logging operations.

The fees paid to landowners (some of whom are politicians) form part of the front-end expenses that logging companies have to bear (Nectoux and Kuroda 1989).⁵ However, the purchase of landowners' good will is a protracted and unstable process which does not always yield predictable results, as will be explained in more detail in the next section.

Counting the cost of machinery and equipment, the construction and maintenance of infrastructure, and upholding landowners' good will, logging is, in fact, a high-risk business. Moreover, regardless of alliances made with landowners, politicians and others, good networking alone does not convert trees into profits. Knowledge of the forest is important. Unless logging companies are prepared to undertake vigilant surveys themselves, they may have very little idea of what 'their' patch of forest may yield. It is frontier territory, where one may strike gold or oil, but luck has a lot to do with it as well. In Malaysia, losses from logging operations are represented in the expression *untung tidak tahan rugi* – 'profit that cannot withstand losses' (Majid Cooke 1994:428). The survival of logging companies is therefore driven by the urgent need to recover front-end expenses or sunk costs. It is this imperative that drives the logging frenzy in large-scale commercial operations, regardless of where it is done or by whom, Malaysians or others.⁶

In 1996, in an attempt to restructure the PNG timber industry, the World Bank has persuaded the PNG government to effect a greater redistribution of forestry profits. This redistribution has been based on the perception that the landowners were receiving inadequate returns from their forest resources. In response, the Forest Industries Association (FIA) has told an incredulous public that the timber industry could not afford any further reduction to an already

⁵ In Malaysia, the fees are usually paid by Chinese logging contractors to their *Bumiputra* partners in a system referred to colloquially as *Ali Baba* – the *Bumiputra* Ali and the Chinese Baba (Majid Cooke 1994; 1997). The *Bumiputras* are the licence-holders, but may or may not engage in actual harvesting for various reasons. The right to harvest any licensed area is sold for a fee to a contractor, usually Chinese. The fee paid to the licence-holder can be substantial, and is not taxed because the exchange is unofficial, and is actually illegal in the Peninsula under Section 23 of the *National Forest Act*. In Sarawak, on the other hand, with the very significant ethnic Chinese presence in the economic and political life of the state, Fouchow logging contractors may sometimes be awarded timber licences on their own account.

⁶ See Footnote 2 above.

small profit margin (*Post-Courier*, 9 April 1996; *National*, 16 July 1996; *Independent*, 2 August 1996). What the industry might have been referring to is overall margins. Because of uncertainties over market conditions, inadequate resource surveys, and differences in the richness of each individual patch of forest, there are bound to be some operations that are much more (or less) profitable than others. It is one reason why many logging companies have such large and dispersed logging concessions. Such holdings enable them to balance the less viable timber licences against the ones that are more profitable. After all, maintaining supply to meet market demand is the priority; which forest patch the raw logs are produced from is of little or no consequence. Nevertheless, what the FIA understated was the fact that when markets (especially prices), timber yields, and machinery have been well synchronised, logging has been a highly profitable business indeed, as it was in 1993.⁷ Estimates of profit margins are undoubtedly contested territory because of arguments about what may be considered as acceptable risks (especially production costs) and reasonable profit levels. Moreover, since 1993, the log price has fallen, though it has not yet fallen below the levels of 1989. And regardless of the price levels, the reality of day-to-day existence for the logging companies remains with the problem of controlling production costs, especially sunk costs.

While the cost structure of machinery, parts, and maintenance may be relatively inflexible because it represents the cost of 'dead labour', infrastructure costs and landowner fees may be more amenable to manipulation. The flexibility can be seen in the frequently sub-standard quality of logging roads and the various means and degrees by which landowner companies are manipulated or exploited in order to save costs. But another condition that drives the logging frenzy is found beyond the shores of PNG shores: this is the need to keep prices low in the international (especially northeast Asian) market and to keep sales volume (or turnover) correspondingly high. These two points are explored later, using examples from the Lak TRP in New Ireland.

How to Maximise Profits or Recover Losses

To ensure maximum profits, logging companies use many different strategies. These include cultivating smart business alliances internationally and within PNG.

Internationally, smart business alliances can be made by cultivating favoured trading and marketing arrangements with consumers. Since 64 percent of PNG log exports are destined for Japan (*Independent*, 19 August 1995; see also Filer, this volume), and the market for raw logs in Japan is controlled by a few conglomerates or *sogo shosha* (Dauvergne 1996), it makes sense for logging companies to have good working relationships with these conglomerates. NGL at Lak, in conjunction with its parent company Rimbunan Hijau, maintains a long-term business relationship with a few *sogo shosha*, including Sumitomo

⁷ In 1993, the price for PNG raw logs soared to US\$167 per cubic metre. One reason for the rise in price was the decline of supplies from Sabah (Dauvergne 1996).

and Nissho Iwai, as well as with Stettin Bay Lumber Company in Rabaul, which is the subsidiary of a *sogo sasha* (personal communication, NGL Lak Operations Manager, 13 July 1996). These long-term relationships have several advantages. Some of these include guaranteed and stable access to the Japanese market, as well as access to the range of services that *sogo shosha* provide to timber suppliers, such as loans at relatively cheap rates of interest. Another key service is the links which *sogo shosha* provide with other firms involved in the log trade, such as shipping companies and agents (Dauvergne 1996).

More importantly, such relationships cushion raw log producers against price fluctuation. When the price is low, for example, Rimbunan Hijau's (and NGL's) logs are given priority; more logs are purchased from them in order to keep their volume and turnover at a steady level. On the other hand, when prices are high, their logs are not phased out of the market (personal communication, NGL Lak Operations Manager, 13 July 1996). Undoubtedly, this business arrangement helps to explain much of the momentum behind the company's production levels.

While *sogo shosha* may provide essential services for logging companies such as Rimbunan Hijau, their business style is detrimental to the sustainability of PNG forests. They are not discriminating in their sources; they do not distinguish between legal and illegal suppliers or between those logging concessions which are sustainably managed and those which are not. In fact, although some major *sogo shosha*, including Marubeni, have agreed in principle to confine their log purchases to suppliers who follow sound environmental practices, most Japanese tropical log imports have originated from concessions that are not managed in a sustainable way (Dauvergne 1996; see also Light, this volume).

Most logging contractors are driven by a form of competition which requires them to keep the price of raw logs low in order to maintain the large turnovers on which their profits are based. Several strategies are used in the process, including transfer pricing and the misdeclaration (or underdeclaration) of species. For lack of space, only the former is dealt with here.

Transfer pricing, which may be effected by undervaluing purchases or overvaluing services, means lower (official) profit margins, leading to payment of lower corporate taxes, which in turn means lower costs and lower export prices. This reduction in export prices may not mean a corresponding reduction in import or consumer prices, but the undervaluation of exports does mean a loss of revenue to producer countries such as PNG. Surveillance, of the kind undertaken by the Swiss company Société Générale de Surveillance, for example, may be able to control transactions involving material products such as raw logs, plywood, or even machinery, but it is doubtful whether control can be effectively exercised over fees and charges for services such as marketing or management consultancy. For obvious reasons, therefore, revenue loss from transfer pricing may be difficult to document. One attempt at estimating such losses, based partly on gains estimated in favour of logging contractors, arrived

at a figure of around K193 million in 1993, when prices boomed (Duncan 1994).⁸

In their capacity as financiers, *sogo shosha* can further be relied upon for business expansion or diversification. Indeed, they have supported much of the downstreaming or value-added manufacturing undertaken by Sarawak timber companies (*Perkasa*, various issues).⁹ At the same time, the *sogo shosha* are not so powerful that they have been able to prevent competition from Indonesia. In the 1980s, 90 percent of Japanese plywood consumption was produced locally, but by 1994, with plywood from Indonesia flooding into the Japanese market, only 50 percent of plywood was produced locally (Dauvergne 1996). However, such competition, while certainly making an impact on their control of the plywood market, does not cause much of a dent in their domination of the raw log trade. Their position is backed by high tariffs on value-added imports into Japan. In 1995, the tariff for plywood imports into Japan was 15 percent for plywood less than 6 millimetres thick, and a 10 percent for plywood more than 6 millimetres thick – twice as high as those imposed by the United States (*ibid.*). Moreover, the Indonesian competition came at a price. It was a deliberate attempt at targetting the *sogo shosha* but, because of difficult market conditions, the strategy used by Indonesia was to sell plywood at below world market prices, thereby increasing demand while artificially depressing all plywood prices (*ibid.*). This practice had detrimental effects on Indonesian forests because plywood production requires raw logs and it is not certain that these raw logs are produced from projects which operate under acceptable logging standards.

There are other ways by which logging contractors operating in PNG could maximise their profits. They may make smart alliances with politicians, both provincial and national, and with landowners who are power-brokers in their own right. However, landowners do not speak with a unified voice.

Even when alliances have been established, smooth and continuous operations are no certainty. Landowners continually change their minds and positions. The same landowners who have been tempted by the prospect of a once-in-a-lifetime taste of 'development' goods, and who therefore want logging in the first instance, may later turn against the contractors when forest degradation follows logging operations. Alternatively, landowners may turn

⁸ It is worth noting here that Nissho Iwai, one of the *sogo shosha* with which Rimbunan Hijau has links, was named in the Barnett Inquiry as a company engaging in chronic transfer pricing which enabled it to make substantial 'hidden profits' (Marshall 1990:176; *Times of PNG*, 27 July 1991).

⁹ *Perkasa* is the quarterly magazine of the Sarawak Timber Industries Development Corporation (STIDC). In February 1996, Nissho Iwai signed a joint venture agreement with Samling for the production of a range of value-added products (*Perkasa*, April 1996:11). The Daikcn and Itochu Corporations of Japan are involved in a joint venture arrangement involving Procxcel (a subsidiary of Rimbunan Hijau), the Sarawak Timber Industry Development Corporation, and Limbang Trading to produce medium density fibreboard, largely for the Japanese market (*Perkasa*, June 1994:4), and production began in March 1996 from their plant at the Kidurong Industrial Estate in Bintulu, Sarawak (*Perkasa*, June 1996:2).

against logging contractors because the undervaluation of raw logs leads to dissatisfaction with the amount of royalty payments. Depending on the degree of frustration, landowners may resort to various strategies, including violence, designed to increase their share of the returns from logging.

On the other hand, windfalls may occur. After years of negotiation and uncertainty, resistant or deeply divided landowners may, because of a combination of timing and circumstance, suddenly decide to smooth over their differences and invite the loggers in (see Leedom, this volume). In mid-1996, landowners of the Weittin Valley segment of the Lak Timber Rights Purchase (TRP), whose land had been set aside for biodiversity conservation, decided have their land logged instead.¹⁰

The clear message to contractors in the field is that nothing is certain, neither the market, the timber volume, nor the landowners. As and when opportunities for logging present themselves, they must be seized swiftly. Moreover, time is not on the contractor's side. Experience must inform many logging contractors that tomorrow's landowners will not necessarily honour deals struck today. This uncertainty accounts for the unsustainable nature of logging in PNG. The logical logging strategy is to harvest as large an area as is allowable and do so as fast as possible (World Bank 1995:77-78). Logging is unsustainable when it does not take into consideration the general health of the ecosystem and, more narrowly, the regeneration potential of specific forest patches (see Louman, this volume). Unsustainability is partly fuelled by inadequate tools in the field, such as lack of good maps or a national forest inventory, as well as by the overall production and consumption system, already discussed, which is geared towards keeping the cost of production low and the level of consumption high.

Uncertainty drives logging contractors to devise strategies to minimise risk at many different levels. There may be attempts to directly influence public policy, either through the Forest Industries Association (FIA) or by cultivating direct access to key members of the political elite. The FIA is a natural platform for influencing policy because it has been constantly consulted in the national policy process and is formally represented on the National Forestry Board. In 1996, the chief executive of Rimbunan Hijau, Tiong Hiew King, was President of the FIA, and his views therefore received a good deal of publicity, all the more so because Rimbunan Hijau owned the English language daily newspaper, *The National*. The FIA's responses to policy issues have often reflected Tiong's views. For example, the FIA claimed, in August 1996, that the industry would suffer an attrition rate of 30 percent if the government implemented the World Bank's proposal to increase landowners' share of forestry revenues

¹⁰ This information was obtained from interview (dated 11 July 1996) with a landowner spokesperson who was also a director of the landowner company, Metlak Development Corporation. The Weittin Valley was set aside partly because the terrain was considered too difficult and inaccessible, thus uneconomical, for logging purposes, but once the surrounding areas had been logged, it may have become a commercially viable proposition.

(*Independent*, 23 August 1996). Tiong had publicised a similar claim a few months earlier, when he was a member of the visiting Malaysian trade delegation headed by the Primary Industries Minister, Lim Kheng Yaik, and his speech was published in full in his own newspaper (*National*, 13 March 1996).

In an attempt to influence policy, logging contractors also cultivate direct access to members of political elites in power. During Prime Minister Chan's official visit to Malaysia in April 1996, he and his Deputy were both honoured guests of Rimbunan Hijau in Sibiu, Sarawak (*Post-Courier*, 9 April 1996). During this visit, the Prime Minister reportedly agreed – at least 'in principle' – to review the new forest revenue system supported by the World Bank.

Indirect strategies may also be used. One such strategy is for logging contractors to persuade landowners to speak on their behalf in the public arena. Often they are successful. The controversy surrounding the World Bank's efforts to change the forest revenue system in 1996 provides additional evidence that some landowners identify their own well-being with that of logging companies operating in their areas, and are prepared to declare their affiliations quite openly. Landowner representatives are also inspired, to some extent, by a general unwillingness to allow governments to make decisions about land use that seem to infringe the constitutionally guaranteed rights of landowners themselves. In July 1996, the Vice-President of the PNG Forest Resource Owners' Association (PNGFROA) was quoted as follows:

We appreciate the fact that the additional royalty announced recently by the government is a step in the right direction – but where will it come from if the operators (forest resource developers) can't pay it? ... Our people know that any benefit we get essentially comes from *our* operators and we want to protect our interests. What alternative can the government offer? We have nothing so far and can't believe that is going to change if *our* operators leave ... (*National*, 16 July 1996, my italics)

Rimbunan Hijau could not have phrased these sentiments better. In this instance, they were able to persuade landowners to speak because these landowners may be directors or shareholders of landowner companies that are merely fronts for the contractors. In return, these shareholding landowners are supported in many ways, especially materially, by 'their' logging contractors, whether or not they represent the interests of many landowning clans from a given area (Taylor 1992:141). However, as is often the case in PNG, landowners do not speak with a unified voice (Filer 1996b; Holzkecht 1996a). At the precise moment when the PNGFROA was criticising the World Bank, another 'representative body' of landowners was defending it (*National*, 16 July 1996; *Independent*, 4 October, 11 October 1996).

Logging in the Lak TRP

Lak is one of those areas that romantics would like to preserve. When discussing Lak with some New Irelanders in Kavieng and Rabaul, notions of Lak

as the last bastion of culture and custom, of people relatively untouched by 'development', were regularly mentioned. One New Irelander in Rabaul, conscious of changes in Lak, commented: 'If I were in Lak, I would fight to keep the custom'. It is as if Lak not only represents 'custom', but as if 'custom' in Lak is seen as a static entity which has remained relatively untouched. Nevertheless, ideas about 'development' through large-scale logging and through more 'sustainable' forms of resource utilisation and conservation have been introduced into the area in rapid succession in the span of less than ten years.

The history of the Lak TRP may contain features which are peculiar to New Ireland Province, but it would not be surprising if the pattern of power, its negotiation and abuse, had relevance to many other parts of PNG, where questions of profit maximisation and risk minimisation, the manipulation of landowner companies, local forms resistance, and local negotiations with the power of the logging company are no less pertinent.

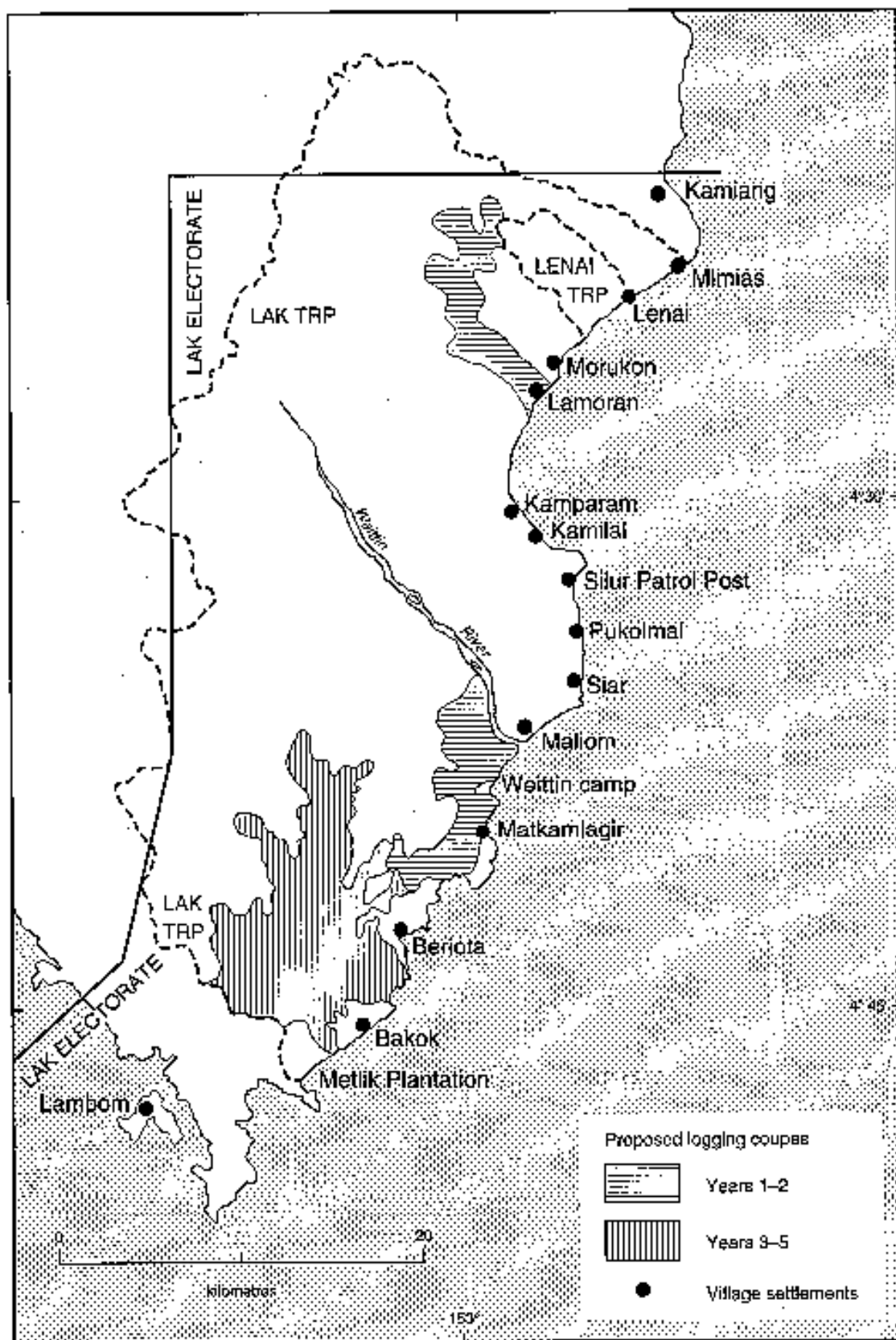
What may be distinctive about the Lak case, however, is the presence of a competing interest, namely that of an integrated conservation and development (ICAD) project funded by the Global Environment Facility and administered by the United Nations Development Programme (UNDP) and the PNG Department of Environment and Conservation (DEC). What may be doubly distinctive is that the ICAD project established its presence in Lak in 1993, approximately two years after large-scale logging had begun, and withdrew, for various political and administrative reasons, in September 1996.¹¹ On the other hand, Lak is only one of several priority conservation areas in PNG which have been identified as part of the ICAD 'process' (see Hedemark and Sekhran 1994).

An understanding of recent events in Lak must take account of the fact that ideas about large-scale logging, sustainable development, and forest conservation have been introduced into the area in rapid succession within a timespan of less than ten years. Materially, logging has produced roads and royalties in a way which has affected Lak society on an unprecedented scale and at an unprecedented rate. Logging roads link previously isolated villages. Company vehicles travelling to and from logging sites have been the main means of transport for both goods and people, apparently without cost.

ICAD project staff argued that NGL's style of logging did incur costs to the environment and to future generations. Under their mandate, the conservation of biodiversity in Lak meant nothing less than a complete halt to large-scale, unsustainable logging, and hence the removal of NGL from the area. Although the ICAD project itself was removed in September 1996, it was certainly a thorn in NGL's side for some time, and thus formed another element of the operational risk with which the company had to deal.

¹¹ There is not enough space to discuss the the reasons for this withdrawal in any detail here.

Map 6.1: The Lak Timber Rights Purchase.



The Lak TRP covers an area of approximately 80,000 hectares (see Map 6.1), and the timber permit allows for the removal of up to 100,000 cubic metres of timber each year under a selective logging regime (Hedemark and Sekhran 1994). Nevertheless, export volumes have been relatively low (see Table 6.1).

Table 6.1: Estimated timber export volumes from the Lak TRP, 1991-95.

Year	1991	1992	1993	1994	1995
Volume (m ³)	12,100	47,500	35,300	8,700	24,700

Source: personal communication, Nikhil Sekhran, 1996.

These figures are mere estimates, there are other sets available. Moreover, export volumes do not correspond with harvest volumes since they do not take full account of the damage caused during felling. Likewise, declared production levels do not take account of the temptation and tendency for loggers to underdeclare harvest volumes because royalties are assessed on them. With tighter surveillance now in place through the Forest Authority's contract with Société Générale de Surveillance, the potential for underdeclaring export or harvest volumes may have been greatly reduced, but this operation is a fairly recent introduction.¹² Consequently, the convention of calculating harvest volumes at a level 15 percent higher than export volumes may produce an underestimate. Nevertheless, even if the harvest volumes were inflated to a level 30 percent higher than export volumes, the former would still remain below the annual allowable cut in the Lak timber permit.

At the same time, operational costs may have been unusually high. NGL maintains the coastal road all the way from Weittin to Mimias, a distance of approximately 40 kilometres, having constructed a 27-kilometre section of that road at an average cost of K100,000 per kilometre (personal communication, NGL Operations Manager, 13 July 1996). Maintenance costs have been very high because the road was set too close to the coast and has been affected by shifting river mouths.¹³ It is common knowledge in Lak that the road may not last too long when logging is finished and NGL leaves. The road is substandard because of the company's effort to minimise sunk costs, but also, to some extent, because the history of the Lak TRP, like that of other logging concessions in PNG, is replete with factionalism. There had been disagreements among local clans before NGL secured the logging contract, because some clans had been supporting a New Zealand logging contractor, Leytrac (personal communication, Metlak Development Corporation Vice-Chairman, 11 July 1996). During these years, between 1989 and 1991, NGL had to make financial outlays in order to maintain its presence in the area by cultivating exchange relations with local

¹² SGS began its surveillance work in PNG in 1995 with financial backing from the European Union (*Times of PNG*, 6 April 1995). By July 1996, SGS surveillance of the Lak project was still in its infancy (personal communication, SGS Operations Manager, 16 July 1996).

¹³ Road design was the responsibility of the provincial government, which was mainly concerned to link the villages strung along the coast of southern New Ireland.

clans and key landowning groups which supported its own bid for the logging contract.¹⁴ When logging did finally begin, many rules were broken because of the pressure to recover the previous cost of maintaining a presence.

The pivotal personality behind the introduction of NGL (and later the ICAD project as well) was Ezekiel Weisale. In 1990, Weisale represented the Lak electorate and was also Finance Minister in the New Ireland Provincial Government. Provincial elections were imminent, and Weisale may have believed that his political future depended on the evidence that he could bring 'development' to his electorate. Approval of the timber permit had certainly been the promise on which he had been elected the last time around (Filer 1991a). Elections in PNG are a costly business.

In 1989, forty-seven Lak clan members had signed the TRP agreement, but government approval of the timber permit had become entangled in the moratorium that was imposed on the issue of new licences as part of PNG's commitment to the Tropical Forestry Action Plan in 1990, and on subsequent attempts by a government Task Force on Environmental Planning in Priority Forest Areas to assign a different kind of priority to the Lak area (see Filer 1991b). When the timber permit was finally issued, NGL could not afford to waste any more time. The Mimias to Weitin road was constructed in a hurry so that logging could begin, and front-end expenses could be recuperated, with minimum delay.

NGL has been found in breach of government logging standards on a number of occasions since the start of its operations in Lak. Operations were suspended for six months in 1993 for non-compliance with permit conditions and for severe environmental degradation. Operations were again suspended in February 1995, and this time the list of transgressions included irregularities in the construction of a log pond, the poor quality of snig tracks causing unnecessary damage, the poor standards of road construction and drainage, and excessive damage to residual tree stands.¹⁵ These irregularities seem to indicate poor engineering standards, but a key factor would have been the speed at which logging was done. Because of the delays and risks which have already been discussed, logging occurred at a frantic pace whenever it could be undertaken at all. The resulting problems have been aggravated by the poor quality of technical staff available to supervise field workers.

The Malaysian field supervisors were largely technical (bulldozer or chainsaw) operators who had been promoted. The poor quality of field supervision has been a well-known problem for some time in Sarawak, where most of the Fouchow companies are based, but it has only recently been recognised as such by the Sarawak Timber Association (*Perkasa*, June 1995).

¹⁴ In 1991, the group supporting the New Zealand logging contractor was persuaded to change its mind and support NGL instead (personal communication, Metlak Development Corporation Vice-Chairman, 11 July 1996).

¹⁵ These are itemised in a letter from the DEC dated 26 September 1995.

On the whole, logging crews in Sarawak are initially untrained; they learn through trial and error on the job. Trial and error in dense forest undoubtedly carries untold costs. The question is whether members of such logging crews, once promoted, have the capacity or the skill to identify their own and their workers' shortcomings, and to conduct on-the-job training in PNG forests. More importantly, even if they can train or supervise, do they have the inclination to do so, especially considering that most of the local workers whom I interviewed found it very difficult to communicate with their supervisors in either English or Tok Pisin? According to local Forest Authority staff (personal communication, 4 July 1996), Malaysian supervisors spend most of their time driving along the roads. It is true that the company has hired its own environmental officer, but his job has been to find ways of remedying, rather than anticipating and avoiding, the damage caused by logging (personal communication, NGL Operations Manager, 13 July 1996). Incompetent supervision has cost money because logging has occasionally been suspended. Together with relatively low production levels and high infrastructure costs, this means that the Lak project may not be Rimbunan Hijau's most prized operation in PNG.

The question is: if logging in Lak is not as profitable as it could be, perhaps hardly profitable at all, why does the company stay?

Rimbunan Hijau is a giant in PNG's logging industry, for it is reputed to control more than 50 percent of PNG's log harvest (Gumoi and Sekhran 1995:52; see also Filer, this volume). Profits can be transferred between different projects, and the company can afford to withstand losses in some of its ventures, so long as these can be recovered from others. Rimbunan Hijau (through NGL) maintains its presence in Lak as part of a long-term strategy which is possibly designed to secure sources of timber for a downstream processing plant at Alotau, in Milne Bay Province, which is planned to begin operations around the year 2000 (personal communication, NGL Operations Manager, 13 July 1996).

Furthermore, the potential for profit has been enhanced by the framing of the Logging and Marketing Agreement (LMA) between NGL and the local landowner company, Metlak Development Corporation (MDC), which was originally signed in 1991, then renewed and revised in 1994.¹⁶ Briefly, MDC was apportioned 30 percent of gross timber revenues, while NGL retained the balance. On the surface, this was a generous arrangement, when compared to the normal practice of assigning 7 to 10 percent of revenues to landowner companies elsewhere. However, out of its 30 percent share, MDC was to pay all export taxes, plus infrastructural, agricultural, reforestation and other levies. In 1994, the government increased export taxes by approximately 20 percent, with the result that MDC's debt to NGL has subsequently increased with each

¹⁶ NGL's exploitation of the landowner company is well documented in the 'MacKenzie Report' (MacKenzie 1995), and SGS staff also consider the Lak LMA to be 'a bad one'.

shipment of logs.¹⁷ MDC's interests were not enhanced by the revisions made to the LMA in the same year, because these only had the effect of increasing premiums (rather than overall returns) by a few percentage points. Further changes to the LMA cannot be made before 1998, and it is a moot point whether MDC's board of directors has learnt, or wants to learn, from the mistakes made in 1994.

The face of Rimbunan Hijau in the field is presented by its Malaysian field staff. Field staff are mostly technicians – surveyors, accountants and foremen. There are no foresters among the staff at Lak. The field staff are expected to cope with very complex work and social situations in a country with which they have little familiarity, but they have been given little preparation in human resource management. It was only in 1996, five years after the start of its operations, that NGL employed someone to undertake personnel work at Lak. This individual had no formal training in personnel work, but was formerly a storekeeper with some experience in office work (personal communication, NGL Personnel Officer, 29 June 1997). It was clear, therefore, that NGL staff members were very much left on their own to deal with local conditions as best they could.

Wage labour is evidently a new phenomenon in the Lak TRP area, even though local people were engaged in the production cash crops (especially cocoa and copra) for several decades before the arrival of logging (Albert 1986). The sparse population, the mountainous terrain, and the small production base often meant that boats from Rabaul bypassed the area, so local engagement in the cash economy was tenuous. Malaysian field staff were thus expected to deal as best they could with a local labour force whose members might not have any previous experience of regular wage labour, yet their authority was limited. The company's head office in Port Moresby took all major decisions regarding the application of inducements (whether carrots or sticks) to local workers, landowners, and decision makers at provincial and national levels.

Although local men were very keen to secure employment with NGL because of the fortnightly pay packet, they were in no hurry to accept the discipline of wage labour, whose negotiation therefore became a serious business. Workers have often spent the better part of the day, between the times of checking in and checking out, engaging in activities unrelated to their work, like gossiping. There has also been a high level of absenteeism. Both phenomena could be described as part of a strategy of avoidance – a culturally accepted way of withdrawing from an unpleasant relationship (Kingston 1996).

¹⁷ The Lak LMA (Clause 13.4) also sets no limit to the charges which MDC is to bear as commission for marketing agents, travelling and overseas expenses directly related to 'the marketing function', or 'demurrage expenses and specification claims' – whatever these may be. This is an example of the way that landowner companies can be squeezed by making the definition and the cost of services as vague as possible. A high marketing fee and travel charges incurred while marketing products overseas would mean higher sunk costs and less revenue available for overall distribution.

Such resistance to the discipline of wage labour was clearly connected to the confidence which workers derived from their status as landowners. Despite the high value associated with work for 'the company', nineteen of the twenty workers whom I interviewed had no intention of moving away from Lak once for they knew that their gardens would provide them with 'free food'. NGL demonstrated some flexibility in dealing with the high levels of absenteeism amongst local workers with different levels of skill – from log scalers up to mechanics. Company policy was to employ more workers than were actually needed in order to ensure that, on any given day, enough would turn up to keep the operations going (personal communication, NGL Operations Manager, NGL, 13 July 1996).

Under conditions of chronic uncertainty, company staff must constantly reinforce their relationships with timber workers who may also be landowners, but their capacities and their techniques for doing so vary with their personalities. Some field staff are 'top', while others get beaten up. Camp or site managers are 'top' when they show some compassion towards their workers, usually through the provision of material assistance in times of need, but also in their willingness to drink together (Kingston 1996). On the other hand, camp managers and field staff get beaten up for all sorts of reasons – refusing to allow the use of company vehicles for social purposes, failing to take sufficient note of workers' personal needs, or failing to represent their case for better working conditions to higher levels of management.¹⁸ One of the Malaysian field staff at Lak told me that 'timber workers look upon the logging company like god', but they do not make sacrifices to the deity. A former operations manager was said to have adopted a policy of 'bending with the wind' – providing financial or other assistance as and when requested. According to the current operations manager, 'he thought he was Jesus Christ', but he was soon recalled by head office and now languishes in happy anonymity back in Sarawak. Another manager fell victim to attacks of anxiety after being subjected to physical violence by timber workers on a couple of occasions, and he was also flown home.

Under conditions of chronic uncertainty, the company has established exchange relations with specific groups. Some clan leaders have used strong-arm tactics, such as roadblocks, to prise what they want out of NGL – compensation for trees used in road or bridge construction, for example, or vehicles to carry their children to and from boarding schools in town. NGL's strategy in such cases has been to placate them with money or gifts. For example, one clan in Kamilal village had the use of an electricity generator which was apparently stolen from NGL and also the use of a car which was officially reserved for a local landowner employed as a supervisor at NGL's northern camp. This individual had a brother who had previously been employed by the company, who had a reputation for strong-arm tactics, and was

¹⁸ For example, members of forest survey teams pay a lot of attention to the quantity and quality of their food rations during the periods when they live and work in the forest.

negotiating a hefty payout on his 'retirement' in July 1996 – partly in recognition of the key role which had previously played in NGL's campaign against the ICAD project.

In their dealings with the Metlak board members and other key players in the local political scene, NGL staff were entering into the sort of exchange relationships which made it possible to make inroads into Lak social. By these means, the company reified exchange relationships in order to achieve commercial ends (Kingston 1996).

The ICAD Project in Lak

By contrast, the ICAD approach was guided by popular ideas about grassroots participation in environmental planning (Sekhran 1996). These ideas were commendable enough, but it was not clear how they should be translated into Lak terms. Moreover, in practice, the structures available for channelling these ideas were hierarchical and bureaucratic.

In their pursuit of grassroots participation in environmental planning, ICAD project staff actually refrained from establishing exchange relationships with the local community. It appeared that the ICAD project was concerned with the sale of ideas about conservation and its long-term benefits for future generations. For their part, most people in Lak were interested in material signs or proof that these ideas would work in their favour in the short term.¹⁹ After all, their discontent with logging had more to do with their desire to get a fairer share of the material rewards from this activity than with any clash of principle between the values of forest exploitation and nature conservation. On the other hand, the show of support for the ICAD project at various public forums suggests that local people were not opposed or closed to alternative ideas. Material benefits may be important in winning support, but even more important is the way they are distributed. NGL did not pave the road with gold; it merely put up a few water tanks at Lambom, substandard community halls in various villages, teachers' houses at Weittin and Morukon, and one aid post at Bakok. Of course there were the private deals with some members of the Metlak board of directors, but generally speaking, material benefits to the community were carefully rationed. For its part, the ICAD project also spent money in the area –

¹⁹ Much of the data in this section derives from an informal meeting held with the local ICAD committee on 7 July 1996, followed a few days later by personal interviews with some of the members. The ICAD committee comprised the nominated representatives of several Lak villages. Committee members actively participated in planning and publicising various components of the ICAD project. They were treated as 'volunteers' by ICAD project staff, but did not accept this designation, and made several attempts to get the project to pay them for services rendered. In many societies of the 'Third World' the idea of 'volunteer' work is not necessarily a new one, but may not be understood in the same way as it is in the West. In Siar village, it was noted that local women formed groups in which they donated labour to meet the needs of various members, e.g. for clearing of bushes or planting garden crops. However, local people may not have seen the value of volunteer work on a long-term and unpaid basis because participants would normally need to be rewarded in order to live.

on repairs to the hospital at Silur, for example, and on a motor bike for the local *kiap* – not to mention the ‘invisible’ funds spent on surveys and research in the area. Likewise, the relative popularity of the ICAD project with some of its supporters in Siar village was probably due to the fact that some project staff had entered into personal exchange relations with the villagers. On the other hand, the project also offered some incentives which were visible and tangible, yet proved to be relatively inaccessible – like the dinghy and the truck which were used as bait to galvanise the community into getting rid of the logging company, and which later came to be seen and resented, by some local people, as rewards which were being withheld in the sort of treatment which is meted out to naughty children.²⁰

As noted earlier, the ICAD project’s mandate for conserving biodiversity required a complete halt to large-scale logging. This was a big ask when the local clans were not united, and the best that some clans could do was simply to show their support. The approach that ICAD project staff adopted in the field was encapsulated in the overarching question: What should Lak as a community do to get NGL out? In view of the complexity of the relationships between and within clans, the appropriate place to start would be the constitution of the clans themselves, since they appear to be the pivot of all collective action. In which case, it would have made sense to ask which particular clans were involved in making particular decisions about the use of land or forest resources, and to recognise the identities of one’s friends and enemies at the outset. The aim here would not have been to promote some sort of clan hierarchy through differential treatment, but rather to gain a knowledge of local power relationships as a guide to project implementation. In retrospect, what may have been lacking in the ICAD project approach was the ability to adopt effective strategies to deal with local power relationships. This failing was partly due to the politically naive assumption that Lak was a single community which could mobilise its members for the task of getting rid of NGL.

At the same time, we must recognise that the institutional structures within which the ICAD project operated were not conducive to political sophistication, precisely because of their hierarchical nature. In order to uphold the values of accountability and transparency in decision making, the project staff in Lak were at the end of a line, or the bottom of a pyramid, which included the Conservation Resource Centre (part of the DEC) in Port Moresby and the UNDP offices in Port Moresby and New York.

Admittedly, the choice of Lak as a project site was deliberate and political, in the sense that this was an experimental or pilot project intended to pit the

²⁰ Apart from meetings with the ICAD committee members, my account of local perceptions of the ICAD project is also based on discussions with clan leaders at Siar village and with government officials like the *kiap* and the forester. In June and July 1996, there was a widespread feeling that ICAD project vehicles were inaccessible to the people, despite the fact that one of them had just recently been used to transport some village people from Siar and Pukolmal to Kamparam, approximately ten kilometres away, for a *singsing* (village festival).

values of conservation squarely against those of 'development'. Furthermore, the project had to be established rapidly in the face of a logging project which was already operational. As a result, there was no time for prior social analysis. However, the belief of the national government and its overseas aid donors in the feasibility of this ICAD is revealing in itself, because it reflects a kind of naivety regarding the complexities of social life. Lessons from around the world suggest that the business of conservation has more to do with managing people and human relationships than with conserving flora and fauna (Utting 1993). Social relations are the key to decisions about the exploitation of the biological and physical world. The question why societies conserve or destroy forests is likewise a social question.

However, although there is certainly an awareness of the social dimensions of forest abuse in the conservation community, the model prescribed for predicting change often assumes that a more accurate understanding of the physical and biological mechanisms of abuse is the primary task. The irony, in the present case, is that NGL had an instant grasp of what was going on in Lak, partly because it had spent some years establishing a presence before it moved in at the opportune moment to promote its own self-interest through the actual business of logging.

Discussion and Conclusion

This chapter has suggested that the form and scale of logging in PNG are both tied to the global features of tropical timber production and consumption. Consuming countries, especially Japan and South Korea, dominate the world trade in tropical timber, especially raw logs, while intermediate countries such as Malaysia occupy a special niche as production agents. The roles are hierarchical and cannot be easily changed, although Indonesia has managed to modify the hierarchy to the point where it has gained significant control over the plywood trade by cutting prices and circumventing the *sogo shosha*. On the other hand, the Indonesian experiment has had substantial economic and environmental costs, and PNG should not seek to replicate it, even if this were a feasible option. But PNG cannot compete directly either with Indonesia or with Malaysia, where attempts have been made to attract Japanese investment to Sarawak with incentive packages which include a mixture of planned infrastructure and other services (*Perkasa*, March 1994, August/September 1996, September/October 1996).

The additional problem for PNG is that the consuming countries try their best to exclude any new entrants who threaten their own control over the tropical timber trade, as they do by imposing high tariffs on value-added products such as plywood, yet they have no desire to exercise any direct control over the production and importation of raw logs. This explains why countries such as PNG find it more convenient to continue producing raw logs. With changing patterns of production in consumer countries, the consumption of tropical raw logs has declined, and the trade may change direction with the substitution of other materials. There is no bright economic future in the production and export

of more raw logs, because prices will need to be kept low to meet the needs of plywood manufacturers in consumer countries, such as Japan, who already face competition from Indonesia. This means that PNG may have to produce more for less, with obviously detrimental effects on its economy and its forest resources. Hence the current need to explore the alternatives to large-scale logging.

The case of Lak suggests that local communities are interested in the alternatives, but these must operate within specific economic, political and socio-cultural conditions. Ironically, NGL was able to grasp the complexities of these conditions and used them to its own advantage. It expected and exploited divisions within the community, targetting useful power-brokers and manoeuvring to enter into exchange relationships with them, while disempowering those who were excluded from these relationships. This is not an approach which aspires to any semblance of social justice or popular participation, and it ought to be treated with extreme disdain. However, if there is a lesson to be learned here, it consists in the need to make sense of power and culture well before one tries to make sense of biology and ecology.

CHAPTER 7

LIVING WITH LOGGING AND BROKEN PROMISES: MADANG TIMBERS IN THE MADANG NORTH COAST TRP

BILL F. SAGIR

Introduction

The Madang North Coast Timber Rights Purchase (TRP) was negotiated in the pre-Independence era, and became an integral part of the Gogol timber project (see Montagu, this volume). It covers an area of about 14,990 hectares. A timber permit was issued over the area on 27 October 1971, and should have expired on 27 October 1995, but a one-year extension was granted by the PNG Forest Authority at the request of the current licence-holder and operator, Madang Timbers Pty Ltd.

Although the North Coast TRP covers a large area, much of the information presented here has been gathered from the smaller operational area known as Wasab-Yab-Yoidik, where I conducted fieldwork in 1991, 1994, and 1996. Some reference will also be made to the Ari area, which I visited briefly in April 1996, and for which I have gathered other information from reports kept in the provincial forestry office in Madang.

Local Policy Processes

Madang Timbers has engaged in a number of practices which can be regarded as the foundations of the 'local policy process' which governs its logging operation. These include:

- a strategy of 'appeasement', by which the company has consciously adapted its practices to meet the demands which local villagers have made on its resources;
- a policy of avoiding the threat of conflict with local villagers through the practice of 'patchwork logging'; and
- attempts to secure the support of landowners through false promises of future material benefits.

Appeasement and Accommodation

Since 1990, when the campaigns of non-governmental organisations (NGOs) caused an upsurge in landowner militancy, the logging company has embarked on a policy of keeping the landowners happy enough to prevent them from disrupting logging operations. In the Wasab-Yab area, the company agreed to

let villagers use its machinery to fell and haul logs from areas outside the TRP boundary into their villages. Villagers then used chainsaws and *wokabaut somils* to cut up the logs for sale both within and outside the village. People in Yab had a contract with the Catholic church in Alexishafen to provide sawn logs of various sizes. In this case, the use of company machinery seems to have been fuelled by the need to meet the church's demands for sawn logs.

The company knew that this practice was illegal, but the company and the villagers alike saw the need to accommodate each other's interests, just so long as the authorities did not get to know about it. In September 1995, however, forest inspectors who went to the area to check on the activities of Madang Timbers found out about this practice. Although they told the villagers that this was against the law, and should therefore cease, the villagers took no heed of their advice, but kept on using company machinery for their own logging operations. Madang Timbers was also warned that it should stop letting the villagers use its machinery in this way, and in October 1995, the company decided to act on this warning. This caused some unrest in the villages of Yab and Gabaksal, which resulted in some villagers being locked up in police cells. In the wake of these events, Madang Timbers reversed its previous decision and allowed the practice to continue, albeit on a limited scale. This was possibly due to its desire to finish cutting the commercial timber still standing within this part of the TRP. In January 1996, forestry officials issued a stronger warning to the company, which again decided to stop the practice altogether, provoking a second round of unrest. This time, the reason which villagers gave for their protest was the company's failure to build the classrooms which it had promised to build at Komindor community school, but the real reason may still have been their desire to keep using company machinery to fell and haul logs for themselves. By this time, however, Madang Timbers had already begun moving its equipment out of the Wasab-Yab area and into the Ari area, either because the first area had been logged out or else because this was another way to avoid further conflict.

Another plank in this policy of appeasement was company's willingness to fell of small logs by roadsides at the local people's request, thus increasing the volume of timber on which royalties could be calculated. The company itself had no market for these undersized logs, which therefore ended up in Jant's woodchip mill. When provincial forestry officers enquired about this practice, Madang Timbers responded with a letter which said that:

Landowners insisted that small logs must be extracted also from the roadsides and to maintain good relationship with the landowners, we accepted their request to take some small logs for royalty payment calculation.

The willingness of the logging company to keep landowners happy by doing such things, and the ability of landowners to manipulate this weakness, meant that both parties were collaborating in a form of environmental mismanagement by further depletion of local forest resources.

The need for this policy of appeasement is evident from those instances of conflict in which certain influential individuals in the local villages have fallen out of favour with the company, and then mobilised their followers to disrupt logging operations. One example from the Wasab-Yab area will illustrate this point. During its operations in the Yab area, Madang Timbers employed a man from a neighbouring village (Garup) as a mechanic. During the course of his employment, this man made use of company tools for his own ends. When the company found out, and the man was sacked, he persuaded his fellow villagers to disrupt the logging operation, complaining that the company was infringing into part of Garup territory which was not part of the North Coast TRP. The company had, in fact, been guilty of this infringement, and the mechanic knew about it, but he did not do anything about it so long as he was employed by the company and could use company tools for his own benefit.

This man was acting in much the same way as one of the local ringleaders in the protests against the company's decision to curtail the use of its machinery for felling and hauling logs to supply village sawmills. Both men were able to incite their followers to a level of violence which meant that police had to be called in to quell the disturbances.

Conflict Avoidance through Patchwork Logging

The patchwork pattern of logging is a forest management practice whereby the logging company operates simultaneously in several different areas. This can be justified on technical grounds, because it facilitates the continuity of operations when bad weather hampers work in particular parts of the TRP, but it also serves as a device for avoiding conflict with specific groups of landowners, and even enables the company to avoid its commitments to provide social services and infrastructure to local communities.

By logging several areas at once, the company has been able to maintain its operations, when there was landowner unrest in one area, by concentrating its equipment and personnel in the other areas. This strategy was evident when there was an outbreak of landowner unrest among the Yoidik people, neighbours of the Wasab and Yab people, in 1989. Madang Timbers was operating in parts of the Far North Coast TRP (under Timber Permit 12-6) at the same time as it was operating in the Yoidik area. When the Yoidik people disrupted logging operations because their royalty payments were long overdue, Madang Timbers was easily able to move its equipment to the Far North Coast TRP. As we have seen, the same strategy was evident in the case of the unrest which occurred among Yab and Gabaksal villagers in 1995, when the logging equipment was moved to the Ari operation area. And when landowners in the Ari area caused trouble with compensation demands for a villager killed by a company vehicle, the company again concentrated its operations in the Far North Coast TRP.

This policy was one which not only enabled the company to avoid open conflict with landowners, but also enabled it to escape from undertakings to provide social services to landowners. The lack of services was often cited

amongst the reasons for landowner unrest in the North Coast TRP. As previously noted, a contributing factor to landowner unrest in the Wasab-Yab area was the company's failure to build the three double classrooms which it had promised to build at Komindor community school. This was a promise the company made when it wanted the landowners to support its application for a one-year extension to the North Coast Timber Permit. When company officials were later asked why the classrooms had not been built, the response was that they would have been built if there had not been an outbreak of unrest which forced the company to leave the area. It appeared, in this case, that landowner unrest was being used as an excuse for the company to break its promises to provide essential services.

Promises, Promises

Madang Timbers has a policy to employ unskilled and semi-skilled manual workers (mostly men) from within its current areas of operation. Unskilled workers are those employed as road builders and those who tie logs to chains for hauling. Semi-skilled workers include drivers, heavy equipment operators, and log scalers. When it moves from one area to another, these workers are laid off and left behind so that new ones can be employed in the next area.

During the Wasab-Yab operations, in the decade from 1985 to 1995, sixty to eighty local men were employed at one time or another. In 1991, Wasab men complained during interviews about the long hours and weekends which they spent working on roads and bridges, motivated by promises of generous overtime payments which were never forthcoming. In April 1996, these very same complaints were raised again in Yab and Gabaksal. In October 1995, workers from Yab, Gabaksal, Wasab, and Wasab-amal stopped work because their wages had not been paid for such a long period of time. They joined forces with other landowners in causing disruption to logging activities, only to be chased off by police, and some of them ended up in police cells.

It is by no means clear that Madang Timbers or its predecessor, Wewak Timbers, ever really had a policy of providing infrastructure and social services to the people living within the North Coast TRP. In effect, the two decades of logging in the area have only seen the people *living with broken promises*. Promises of social services, such as educational and health care facilities, were made in the very beginning as a means of enticing the people to agree to logging in the area. More recently, when its permit was about to expire, representatives of Madang Timbers ran around the area, making frantic promises to provide infrastructure and social services if the company had its permit renewed or extended by at least one year. Landowners from both the Ari and Wasab-Yab areas agreed to an extension on this basis. In the Wasab-Yab area, the company promised to build three double classrooms at Komindor community school, build a house for a community health worker, upgrade roads in the area, and help the villages fell and haul logs to their villages. In the Ari area, the company promised to 'fulfil infrastructural requirements', build school facilities and an

aid post, and upgrade roads in the area. The failure to keep these promises has caused a lot of the recent disturbances among landowners.

Whatever roads and bridges have been built by the logging company were not meant for the long-term benefit of local people, but only for the specific purpose of extracting logs, and they have soon become unusable once logging is completed. Barnett (1992:97) described the situation as follows:

The dazed and disillusioned forest owners stood watching in disbelief as foreign operators removed their trees before moving on to the next area, leaving environmentally disastrous logged-over hillsides, temporary gravel/mud roads and rotting log bridges to erode and cave in to clog the watercourses [my italics].

This description certainly fits the case of the North Coast TRP.

The Actors and Their Interests

The Pre-Reform Period

In the period which ended with the major reforms of the national forestry sector in 1990, the main actors in the negotiation of the Madang North Coast TRP, in order of appearance, included the landowners, the colonial state, Fletcher Holdings (Wewak Timbers), the Japan New Guinea Timber Company (commonly known as 'Jant'), Gasmata Resources (Madang Timbers), and the Madang Provincial Government.

The Landowners

Australian patrol officer G.L. Szarka, after conducting a patrol through the Wasab-Yoidik area in 1952, noted the existence of a good stand of timber in the area, reaching as far as the inland village of Bunu. Tropical hardwoods like Taun (*Pometia* spp.), Kwila (*Instia* spp.), Talis (*Terminalia brassii*), and Cedar were said to be present in this area. Szarka also noted the possibility of bringing timber to the beach without too much difficulty, by making use of the Surumerang River, and thought that development of this forest area would provide a 'good opportunity for future native enterprise' (Madang District Patrol Reports).

In the 1960s, when resource inventories were carried out, the Australian administration told local people of the many benefits which would follow from logging. These included infrastructural development, in the form of roads and bridges, access to social services, and agricultural development once the forests had been cleared. Local political leaders made promises of substantial and regular royalty payments (De'Ath 1980:36). The people themselves, not only in the Wasab-Yoidik area, but also in other parts of the TRP, did then see logging as a 'good opportunity' for development. Logging presented an opportunity for them to *become* 'developed' and to 'catch up' with coastal villages which were seen to be more 'developed' than the inland villages. Landowners in the North

Coast TRP, like those in the Gum TRP, were not interested in reforestation as a post-logging land use option. They were interested in commercial agricultural development (Lamb 1990:75). In parts of the TRP area, this was seen as a way of stopping young men from migrating to work on coastal plantations.¹ On the whole, the proposed project seemed to elicit a sense of pride amongst people in the inland villages, and, for this reason, it was welcomed wholeheartedly by most of them, even if some may have welcomed it out of fear of the *kiap* and the colonial administration. In either case, at this point in time, they can still be seen as mere recipients of 'development' – people who accepted things without question.

The Colonial State

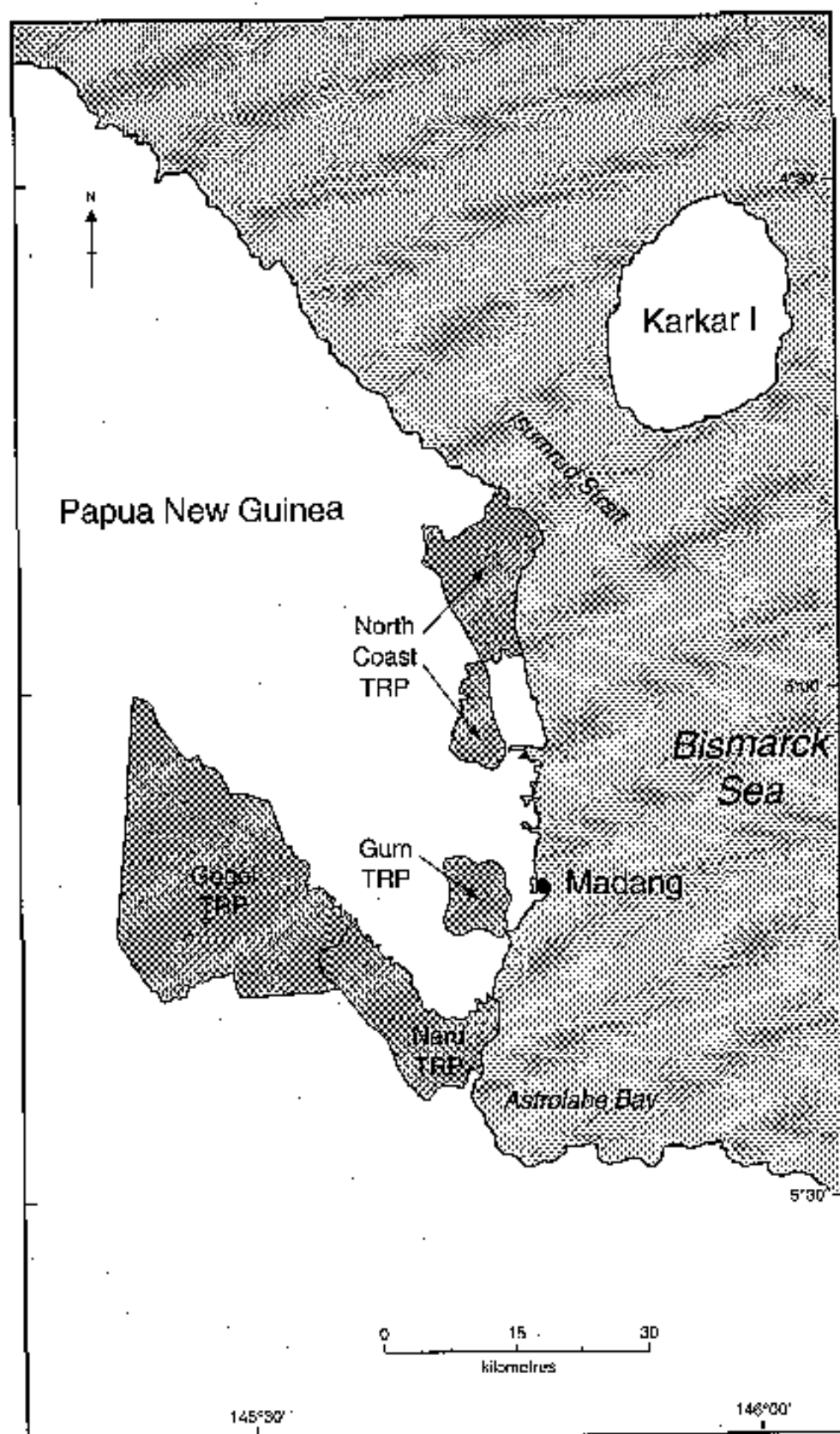
For the colonial state, in the period of transition to self-government, the logging project presented a good opportunity for economic progress to be made, not just on behalf of the local people, but also for the nation at large. As Ross (1983) notes, the colonial administration expected the exploitation and development of PNG's forest resources to support its own policies for social and economic development during this period of transition. However, his analysis also shows that the timing, scale, and financing of major forestry projects have normally been determined as much, if not more, by decisions and events occurring outside PNG as by the public policies laid down by the colonial and post-colonial state. This argument certainly applies to the case of the North Coast TRP.

Having completed its survey of the North Coast TRP, the colonial state made a down payment of A\$13,955 to the various groups of landowners within the TRP area as the purchase price of rights to extract timber from their land. The rights to harvest timber on four TRPs in Madang Province – North Coast, Gogol, Naru, and Gum – were unsuccessfully offered for public tender in 1964 and 1966 (see Map 7.1). When they were offered again, in 1968, the consortium of Japanese firms now known as Jant submitted an application and began feasibility studies to see if the variety of species present in the Madang forests could supply a pulping operation.² Their application was unsuccessful because the Japanese could not agree to Australian demands for Australian or PNG interests to hold a majority equity share in the pulpwood logging project. In 1969, however, Australia changed the equity requirement and asked the Japanese to apply again (see Montagu, this volume).

¹ In 1991, an old man in Wasab village told me that, when a *kiap* (patrol officer) and some local government councillors came and told his people about the project in the late 1960s, the people felt happy that this would release them from their role as *wokbois* (contract labourers) on mission and other privately owned plantations on the coast.

² Jant included a prominent Japanese financial institution, Nomura Securities, and a giant paper company, Honshu Paper Corporation. It was initially interested in developing an operation to produce cardboard from tropical hardwoods.

Map 7.1: The North Coast, Gogol, Naru, and Gum TRPs, Madang Province (courtesy of Simon Montagu).



Jant, Wewak Timbers, and Madang Timbers

Jant's second application was almost turned down when the company refused to forge a partnership with Wewak Timbers, which was already carrying out a selective sawlog operation in the Gogol area. It was eventually agreed that Jant would subcontract Wewak Timbers to continue its sawlog operation in the North Coast TRP, while Jant itself would concentrate its woodchip project in the Gogol, Naru, and Gum TRPs. On this basis, Jant was finally granted the permit (Timber Permit 12-3) for all four TRPs in August 1971. Jant's own logging operations have since been conducted on a scale far greater than the sawlog operation in the North Coast TRP, with a much more intensive training regime for local workers, and a far more substantial pattern of infrastructural development (see Lamb 1990; Montagu, this volume).

Wewak Timbers continued to operate on a much smaller scale, despite the fact that a controlling interest in the company had been acquired by the New Zealand company, Fletcher Holdings. The new owners built a sawmill in Madang town, not far from Jant's own woodchip mill, to produce sawn logs for domestic consumption as well as for export. Jant and Wewak Timbers agreed to exchange logs suitable for each other's purposes at mutually agreeable prices.

The logging roads built by Wewak Timbers in the North Coast TRP were far less sophisticated than those built by Jant in the other areas, and its sawmilling operation soon ran into difficulties when equipment imported from New Zealand proved to be unsuitable for sawing tropical hardwoods.³ In 1985, the high cost of processing timber in PNG, and the low international prices of processed timber, persuaded Fletcher Holdings to sell its interests to a Malaysian logging company, Gasmata Resources. At the same time, the Madang Provincial Government, then under the leadership of Premier Andrew Ariako, also purchased an 8 percent equity share in the business, which partly explains the change of name from Wewak to Madang Timbers. The new owners insisted that they could only make a profit by exporting raw logs, rather than processing timber for both export and domestic consumption. The government finally agreed to a compromise, whereby most of the logs could be exported in raw form, but some would still have to be processed for domestic consumption.

Donor-Funded Reforestation

In 1985, the New Zealand government approved a grant of NZ\$10.2 million, over a period of six years, for the implementation of a 'demonstration reforestation project' in PNG. The area around Wasab village was one of four locations selected for the implementation of this project. However, the New Zealand government, the PNG government, and the local villagers have never shared a common understanding of the purpose of this project.

³ The company had to fly in specialist technicians from New Zealand to handle major problems in servicing this equipment, and finally decided to replace it altogether.

The New Zealand government saw it as a *pilot* project to investigate the feasibility of government-sponsored reforestation on customary land by collecting cost and growth data which could later be presented to aid donors as part of a commercial plantation forestry programme. But the PNG government regarded it as part of an existing programme which embraced a range of other activities in each of the four provinces where the project was being implemented. Activities in the Wasab area were thus seen to have six specific objectives:

- to provide a commercially viable and sustainable alternative to harvesting natural forests, which were seen to be a rapidly diminishing resource base for established forest industries in Madang Province;
- to demonstrate the potential of commercial sawlog production for both export and local markets;
- to demonstrate efficient medium-scale plantation forestry as a viable form of land use, and as a means of restoring the productivity of logged-over forests in an area close to the provincial capital;
- to complement the existing reforestation projects in the Gogol Valley (designed to maintain the supply of pulpwood) through the development of plantations containing high-value crops, thus diversifying the range of local forest products;
- to build on the silvicultural and management experience of the Gogol project in order to: (a) determine the optimum range of species for the local climate and soil conditions of the project site, given specific end-use objectives; (b) introduce agroforestry systems combining wood crops with agricultural crops; and (c) compare the benefits of open and line planting of the major species selected for the project; and
- to establish a suitable framework of cooperation between national and provincial forestry staff, local landowners, and the forest industry (PNGDOF 1984).

For the people of Wasab and other local communities, the reforestation project presented itself as the latest means of achieving the benefits of 'development' and 'catching up' with their coastal neighbours. They 'gave' their land to the project in the hope that this 'gift' would be reciprocated by the PNG and New Zealand governments (Filer 1989). The PNG government was supposed to survey the land and then lease it from the customary owners. The landowners thought that they would receive substantial rental incomes once this process was complete, but it has never been completed. New Zealand's bilateral assistance for the project has come to an end, and no-one is now caring for the trees (mostly eucalyptus) which the landowners planted when they were employed on project funds. Since the lease arrangements were never completed,

the trees presumably belong to the local landowners, yet they may not even be aware of this.⁴

The Period of Reform

There have been some important changes in the identities, activities, and interests of actors engaged in the negotiation of the North Coast TRP during the present decade. The post-colonial state, with the support of overseas aid donors, has been seeking to impose a major reform of forest policy and forestry legislation in the wake of the Barnett Inquiry; NGOs have been much more active in their conduct of campaigns against large-scale logging operations; the Madang Provincial Government was suspended in 1992, then subjected to a nationwide reform of local and provincial government in 1995; and early in the same year, Gasmata Resources sold its stake in Madang Timbers to another Malaysian company, WTK Realty.

NGOs and Landowners

In 1990 and 1991, environmental NGOs were very active in their campaign against logging operations in Madang Province. Members of various groups, such as Wau Ecological Institute and Asples Madang for a Better Environment, walked the length and breadth of logging areas in the province on a campaign to 'critically raise the consciousness of the people' (personal communication, Otto Avorosi). Much of the campaign was aimed at Jant's long history of clear-fell logging in the Gogol and Naru TRPs, but the North Coast TRP was also included.

This campaign resulted in strong anti-logging *and* anti-Asian sentiments among the village people, as I was able to observe during my fieldwork in Wasab village in 1991. Wasab people now believed that they could cut down their own trees, process the timber with *wokabaut somils*, and then sell it to local consumers. So they felt, at this time, that large-scale logging was unnecessary and destructive. The men who worked for Madang Timbers, during its operations in the Wasab area, talked a good deal about the harsh treatment they received at the hands of Asian supervisors and the long hours which they worked without overtime payments. From these experiences, they had come to regard all Asians as greedy and dishonest.

By 1994, these feelings seemed to have mellowed, and there was less vociferous opposition to large-scale logging. The number of *wokabaut somils* in the area had certainly increased, but rather than telling the logging company to leave, the people felt that they could use the company to pursue their own interests. By this time, as previously noted, they had started using company machinery to fell and haul logs from outside the TRP boundary to the villages,

⁴ Section 8(f) of the National Forest Policy states that: 'Customary land owners will receive all proceeds from the sale of timber and other forest produce that are harvested from their plantations and woodlots.'

where the *wakabaut somils* could be used to cut them up. On the other hand, the logging company still got some of the blame when this activity was prohibited by regional forestry officials in 1995.

The Post-Colonial State

Following the introduction of the new National Forest Policy in 1991, and gazettal of the new *Forestry Act* in 1992, regional and provincial forest inspectors, who were now employees of a unified National Forest Service, began to carry out more frequent and intensive checks on the conduct of logging operations in Madang Province. In this way, the state was seen to be more energetic in its imposition of the rule of law, but this, in turn, disrupted some of the existing forms of collusion between the logging companies and local landowners, thus making life more difficult for both of them, and provoking the landowners to take action against the companies.

Meanwhile, the Madang Provincial Government remained in a state of suspension from 1992 to 1994, so provincial politicians lost much of their previous power to interfere in relationships between logging companies, government officials, and local landowners. When new provincial elections were held at the end of 1994, two of the new members elected to the Provincial Assembly were men who had been very active in the campaign against logging companies in the 1990-91 period. It was widely expected that these two men would join forces with other members to form a government which would bring new pressures to bear on the logging companies. However, the two men joined opposing factions in the Assembly, and all provincial members soon disappeared into oblivion when the old system of provincial government was abolished by the passage of the new *Organic Law on Provincial and Local-Level Governments* in 1995.⁵ The newly constituted provincial authorities have been too preoccupied with the process of institutional reform to take any significant action in the forestry sector. No consideration has been given, for example, to the possibility of selling the provincial government's 8 percent equity in Madang Timbers.

The Logging Companies

In early 1995, Gasmata Resources sold its interest in Madang Timbers to WTK Realty, despite the fact that the North Coast timber permit was due to expire in October 1995. Prior to the expiry date, company officials held a number of meetings in different villages in the North Coast TRP in order to convince the residents that the Forest Authority should grant Madang Timbers a one-year extension or a renewal of its permit so that it could complete its operations those parts of the TRP which still contained commercial volumes of timber. As previously noted, the villagers agreed to this proposal because of the

⁵ The new *Organic Law* abolished provincial assemblies made up of elected representatives from a set of provincial electorates, and replaced them with authorities which included the national members of parliament and the presidents of local government councils from each province.

undertakings which the company made to provide additional infrastructure and other material benefits.

Meanwhile, Madang Timbers had come into conflict with another logging company, called Taway Timbers, which one forestry official referred to as a 'ghost company', probably because he knew very little about it. This company was said to have been started by an Asian man who was married to a local woman, and who had entered into an agreement with his in-laws to fell trees on their land and sell the timber to unknown Asian companies. In 1995, Madang Timbers accused Taway Timbers of trespassing into its own area of operations at Ari. In a letter written to the Provincial Forest Officer in Madang, the Madang Timbers management alleged that, on 26 September 1995, when Madang Timbers had stopped the movements of its own logging trucks after heavy rains, a Taway Timbers truck carrying 'short length baby small undersized logs' had caused a lot of damage to the logging road in the Ari operation area. The letter went on to complain that these 'supersmall, undersized logs' had been left to rot away, and to demand K20,000 in compensation from Taway Timbers to repair the damage to the road. This demand brought no response from Taway Timbers, which now appears to be defunct.

At the time of my fieldwork in April 1996, Madang Timbers was already winding down its own operations in the Madang North Coast TRP. Operations in the Wasab-Yab area had ceased altogether, and those in the Ari area were about to follow suit. Substantial amounts of equipment had been moved to the Far North Coast TRP, whose permit is not due to expire until 1998, and Madang Timbers had also secured the contract to log the Sogeram TRP, whose current permit expires in the year 2000.

The Costs and Benefits of Logging

What have the landowners of the North Coast TRP, especially those of the Wasab-Yab and Ari areas, gained or lost, in wealth, power, and knowledge, from their experience of two decades of logging?

Wealth

In economic terms, it could be argued that the losses outweigh the gains. As we have seen, the colonial state bought the right to extract logs from the North Coast TRP for A\$13,955, but when this money was divided up amongst the landowners, individuals finally received less than A\$5 each. Landowners were promised that royalties would be paid every six months, but payments were initially made on an annual basis, and seem to have ceased altogether after 1980. In 1991, the cessation of royalty payments was a major political issue, and one on which I was repeatedly questioned by my informants in Wasab village.⁶

⁶ The Wasab villagers received a royalty payment almost as soon as I had left the field, and I was apparently given some credit for this, probably because I was known to have taken the matter up

Up until 1996, landowners have been entitled to 25 percent of the royalties which the government has collected from logging companies on the volumes of timber harvested each month (see Filer, this volume). Table 7.1 shows the volumes of timber harvested from the North Coast TRP, the total royalties paid to the government in respect of this harvest, and the 25 percent share which should have been passed on to landowners, during the period from 1978 to 1990.

Table 7.1: Annual timber production and royalty payments for the Madang North Coast TRP, 1978-June 1990.

Year	Timber harvest (m ³)	Total royalties (K)	Landowner share
1978	28,347.380	28,967.91	7,241.98
1979	33,048.291	38,622.47	9,655.62
1980	41,189.685	41,073.17	10,268.29
1981	32,698.480	37,585.67	9,396.42
1982	22,446.549	23,738.33	5,934.58
1983	21,244.435	32,070.12	8,017.53
1984	26,010.659	43,058.05	10,771.26
1985	17,707.672	36,145.69	9,036.42
1986	12,553.043	37,747.38	9,436.85
1987	4,101.034	13,520.17	3,380.04
1988	22,479.411	67,983.07	16,988.27
1989	12,368.000	52,424.14	13,106.04
1990	10,896.000	33,480.11	8,370.03
TOTAL	285,090.693	486,413.28	121,603.33

Source: Department of Forests records held at Hohola.

Note: 1990 figures are for the first six months only.

The statistics in Table 7.1 indicate that individual landowners would not have received more than K5 per annum in royalty payments, even if the payments had been made on time.

Apart from their problems with royalty payments, people in both the Wasab-Yab and Ari areas have complained about the lack of compensation for the damage which logging has done to their gardens and economic trees. Madang Timbers has consistently failed to pay such compensation, despite its promises to do so.

Employment of local people, especially men, has certainly contributed to their economic gains, although the logging company has rarely employed more than fifty at any one time, and most of them have occupied jobs with low levels of skill and correspondingly low levels of pay. In Wasab village, I found that men who were employed by Madang Timbers used most their wage incomes to

with provincial forestry officials, although it seems likely that the consciousness-raising efforts of local NGOs were also partly responsible. The more important point, however, is to ask why people had been denied their entitlement for such a long time.

purchase consumer and household goods, and my own household survey showed that households whose heads had worked on the logging project had more durable household goods than those of other households (Sagir 1992). In Yab and Gabaksal, most of the logging company's employees started their own trade stores, but most of these closed down after a few months of operation. A very small proportion of such wage incomes was invested in other income-earning activities such as cash cropping.

Economic losses are difficult to measure, but could be inferred from the statements made by people in both the Wasab-Yab and Ari areas, that game had been much easier to catch, and fruits and nuts had been much more plentiful, before the advent of logging. In the Wasab-Yab area, people complained about the disappearance of flying foxes, which are considered as some kind of delicacy in the local diet. Logging has removed the big trees which used to attract large numbers of flying foxes at certain times of the year, and local people are left to grieve over the recollection. The logging company's practice of leaving many trees to rot when they have been felled is also perceived by local people as a symbol of their economic loss.

The loss of wealth was conceived in cultural, as well as economic, terms. The spiritual significance of the forests was seen to be lost as logging destroyed many of the sacred sites (*ples masalai*) where ancestral spirits dwelt, and no compensation was paid for this destruction. Whenever sickness or misfortune has afflicted an individual or family, it has sometimes been attributed to the destruction of a particular *ples masalai* associated with the clan to which they belong. For example, when I was in Wasab in 1991, a child had to spend some weeks in the the general hospital in Madang, and the sickness was attributed to the father's decision to let the logging company fell trees in a *ples masalai* belonging to his clan.⁷

Power

In 1991, Wasab villagers were clearly suffering from what Filer (1996a) describes as the 'demoralisation effect' of large-scale development. The feelings of powerlessness and alienation were obvious, but obviously hard to quantify. Local people had welcomed the logging operation as a means to achieve 'development', but their expectations had not been fulfilled, and they could no longer identify with the forests which they had lost. The feeling of loss of power and identity is 'posthumous', in the sense that people grieve after their loss of control over an environment which they have sacrificed to the goal or thing they call 'development' (Filer 1996b).

The situation in the villages of Yab and Gabaksal appeared to be somewhat different. In these cases, they tried to maintain a sense of their own power, of maintaining some control of their own lives, by negotiating and collaborating

⁷ The child in question eventually dropped out of school, and this was also seen as a loss due to logging.

with the logging company in the depletion of their forest resources. To some extent, they were successful in using the company to pursue their own interests and achieve their own goals. However, this was really a false sense of control which was likely to disappear once the company had left the area, and the local people were left with the reality of a depleted resource.

Knowledge

Gains in local knowledge might be said to include changes in people's perception, and the accompanying practice, of 'development'. Initially, local people thought of development largely in terms of tangible benefits such as roads, bridges, schools, health centres, opportunities for cash cropping, and, most importantly, the acquisition of money. It was the promise of such things during the 1960s which had made them consent to logging in the first place. And there was no difference in the way that men and women had approached the question of development in these terms (see Sagir 1992, 1994).

By 1991, this perception of development had begun to change after the campaigns which NGOs had mounted against logging in the province. At that stage, I found that it was not only common for villagers to express anti-logging, anti-Asian sentiments, but they had also begun to talk about sustainable development, by which they basically meant the need to save some of their resources for future generations. Unfortunately, for the people of Wasab at least, most of their forest resource had already disappeared by this time. People in Yab and Gabaksal still had some of their resource left, and saw the *wokabout somil* as a means to pursue the goal of sustainable development, yet this aspiration was threatened by the impatience of some individuals to make quick money by using the logging company's machines as an adjunct to their own practice of small-scale forestry.

Through the work of NGOs, villagers within the TRP have also become more knowledgeable about the interests of other parties, such as government agencies and logging companies. The general feeling in this area was that the state does not represent the interests of ordinary landowners, or Papua New Guineans in general, but those of rich people and foreigners, especially Asians. Villagers in Yab and Gabaksal accused forestry officials in Madang of siding with the logging company, and arranging for the police to harrass, arrest, and detain those villagers who caused any disturbance, when they should have been taking care of landowners' grievances.

Local villagers have also acquired some knowledge of institutions like the World Bank, which now figures prominently in their discourse on 'development', although the accuracy of this knowledge is questionable. Villagers mistakenly believe that the World Bank has been responsible for the influx of Asian logging companies into the country because it wants the PNG government to repay its loans quickly. The Bank is also seen as a villain because of the part which it played in promoting the government's proposed

Land Reform Bill, which is thought to have been intended to take land out of customary ownership for sale to rich Papua New Guineans and foreigners.⁸

In 1996, I also found that certain forms of environmental rhetoric, which had not been present in 1991 and 1994, had become quite common in the Yab-Gabaksal area. For example, one could hear village people talking about land being 'our life' and the earth being 'our mother'. One elderly man who showed me around some of the areas which had been logged kept repeating the vernacular phrase *og ka in i ginen* ('this earth is our mother'). Such statements bear no relationship to any local myths of origin, but are evidently derived from the teachings of environmental NGOs.

Such gains in knowledge are offset by some significant losses. The most significant of these, according to people in the Wasab-Yab area, is the loss of magical knowledge associated with flying foxes. In the past, when large numbers of these animals had settled in a particular tree, anyone wishing to cut down the tree would perform this magic in order to make them remain on the tree when it fell. The older men say that it now seems pointless to teach young men this magic when there is no way they can practise it.

Another significant loss is the knowledge of how to make and use a particular type of cane fish trap, which resembles a basket with one end open. Although local women still know how to use these traps, and could pass these skills to their daughters, the young men are no longer willing to learn the art of making them, for the older men complain that they are more interested in going to dances and beer parties than in gaining such traditional knowledge.

Conclusion

How should we characterise the relationship between the local 'policy process' in the North Coast TRP and the recent reforms of national forest policy? The first point to be made in response to this question is that this particular logging operation began in the period before Independence, at a time when the colonial state was attempting to strengthen and diversify the country's economic base. From this point of view, recent policy reforms in the forestry sector have only had a marginal impact on the history of the North Coast TRP, because most of it had already been logged before these reforms were introduced. It is true that the state has recently done more to ensure that Madang Timbers complies with the laws and regulations which govern the forestry sector, but there are still some aspects of the National Forest Policy which seem to have made virtually no impact on the behaviour of the logging company. Despite a notional commitment to reforestation, for example, and the government's collection of a 'reforestation levy' from the logging companies, the only evidence of reforestation in the North Coast TRP is the result of a New Zealand-funded aid project.

⁸ These ideas seem to have been disseminated in 1995, at a public forum convened by university students in Madang town to campaign against the land reform bill.

On the other hand, it could be argued that the earlier activities of Madang Timbers and its predecessor, Wewak Timbers, were part of the national pattern of logging operations which prompted the establishment of the Barnett Inquiry, and thus contributed to the redirection of forestry policy during the 1990s. Some of the practices in which Madang Timbers has engaged are indeed very similar to those which were described and condemned in the various reports of the Barnett Inquiry. For example, the company has continually ignored the regulation which requires loggers to leave twenty-metre buffer zones on both banks of any permanent waterway; it has felled trees right across the course of the Surumerang River, dragged logs across streams, and blocked streams with the branches and leaves of felled trees. Likewise, many of the trees which have been felled have been left to rot in the bush (see Sagir 1992:56-57). Such practices could still be observed in the Yab-Gabaksal area in April 1996.

At the same time, there is no reason to suggest that the local 'policies' of Madang Timbers have had any specific influence on the national policy process. Its policies of appeasement and conflict avoidance, as described at the beginning of this chapter, have merely been intended to ensure the logging company's economic survival through the continued exploitation of the local timber resource. As stated earlier, some of these 'policies' have actually clashed with aspects of the new National Forest Policy, and in these instances, Madang Timbers has been obliged to change some of its own practices.

CHAPTER 8

PROCESS AND OUTCOME IN THE GOGOL: ISSUES IN FOREST PLANNING AND MANAGEMENT

SIMON MONTAGU

Introduction

The Gogol Valley lies approximately 30 kilometres southwest of Madang, on the north coast of Papua New Guinea (PNG). The valley has been the scene of large-scale, clear-felling timber operations for the past twenty-three years. Timber extracted from the valley is used in the production of woodchips for export and sawn timber for domestic supply. The Gogol project has the distinction of being the first operation in the world to utilise mixed tropical rainforest species as a source of woodchips for the international pulp and paper industry.

This chapter examines the historical development of the Gogol Woodchip Project and reviews the resultant outcomes. The review focusses on the resource planning and management activities undertaken by key participants involved in the development process. This focus reveals the ad hoc nature of the entire planning process, and the type of outcomes which this process produces. In so doing, it highlights the significance of historical circumstance as the driving force which has controlled the development of the Gogol project.

The chapter proceeds as follows:

- Firstly, I define the key participants involved in the development of the Gogol project, and describe the role which each of them had in the planning and subsequent management of timber extraction in the valley.
- Secondly, I review the general planning environment in which the project evolved, discussing the key regulatory and administrative instruments employed in the planning process.
- Finally, I review the outcomes of the planning process, and assess the relationship between the initial objectives of the project and the resultant outcomes.

Background

The historical significance of the Gogol Woodchip Project for the emergence of industrial-scale resource development in PNG has been reviewed extensively by

various authors (see, for example, Cavanaugh 1971; De'Ath 1980; Davidson 1983; Lamb 1990). Consequently, only a general overview need be given here.¹

The Physical Environment

The topography of the Gogol Valley is a mixture of steep low hills, broad floodplains, river terraces and swamps. The floodplains and swamps are low-lying (generally below 50 metres above sea-level) and subject to seasonal inundation. Hills are more dominant in the southern and northwestern portions of the valley. Elevations of more than 300 metres are rare (Haantjens et al. 1976:46; Lamb 1990:46). The rivers running through the valley² are unstable and change course regularly, creating a hydrological dynamic of perpetual erosion and deposition.

Landscape dynamics are accentuated by natural disasters. Geological evidence suggests that nearby offshore volcanoes periodically blanket the area with volcanic ash. A fault line runs through the Gogol Valley, roughly parallel to the Gogol River. Earthquakes and other seismic events are a regular component of the natural dynamics of the area, resulting in folding, faulting, land slumpage and slippage, and tsunamis. Over a longer period of time, seismic activity has also resulted in several changes in sea level. Within a shorter time frame, forest fires are a common occurrence during extreme dry seasons, and floods are a regular feature of the wet season.

The soils of the area are generally silty clays or clay loams, with deep, undifferentiated profiles and only moderate fertility (Saulei 1984:352). Close to the Gogol River, structureless loams or silts predominate. Textures become heavier, and silty clays predominate, away from the river. Surface drainage is slow because of the flat topography, and internal drainage is hampered by the heavy soil textures (Lamb 1990:52-53). Even on sites not regularly flooded, water tables are commonly at or near the surface during the wet season (Davidson 1983:57).

The climate of the region is tropical, featuring distinct wet and dry seasons. Rainfall is in the order of 3,000 mm per year, with most falling in the months of December to May.³ Rain falls on an average of twenty-four days per month during these months. Temperatures remain stable throughout the year, with maximum temperatures around 29° C in the wet season, and 33° C in the dry.

Vegetation roughly parallels the region's topography, with drainage acting as a major determinant. Vegetated areas can be divided into three main types: lowland hill forests, alluvial forests, and a mosaic of vegetation found near the

¹ Unless otherwise noted, the material presented was taken from De'Ath (1980).

² The main rivers are the Gogol and the Naru.

³ Rainfall data for the Gogol Valley has only been collected since the early 1970s. Most estimates of rainfall throughout the region are based on data from Madang town.

coast. The floristic composition of these forests is extremely rich, characteristic of closed-canopy tropical forest in general.

The lowland hill forests are found on the steeper slopes, away from the valley floor. Structurally, these forests consist of three tree layers above a ground layer of shrubs, ferns, and forest seedlings. The upper canopy trees average 36m in height, with occasional emergents up to 45m. The alluvial forests cover the low-lying plains that flank the rivers of the region, and are thus subject to seasonal inundation. While this influences floristic composition, these forest are structurally similar to the hill forests. The range of girth sizes of the canopy trees are more variable, however, and the sub-canopy layer is generally more dispersed. Species composition remains diverse.

Both of these forest types contain areas of anthropogenic disturbance, mainly in the form of regrowth over old subsistence garden sites. While this has generally resulted in secondary forest regrowth interspersed with fruit trees, some areas have converted to grassland.

The area closer to the coast is a more complex mosaic of vegetation. Higher population densities have ensured that garden regrowth and grassland areas are more prevalent. Furthermore, the lower relief of this area results in greater and more enduring inundation, creating a series of swamps and swamp forests (Robbins et al. 1976:106).

The Social Environment

Living within the valley are a number of 'clans' which maintain traditional rights of ownership and control over the land and its resources.⁴ These groups traditionally supported themselves through subsistence gardening practices combined with hunting and gathering in valley's forests. As in other parts of PNG, food production was not especially difficult, but health surveys undertaken before the start of logging indicated that their existence was not entirely idyllic (Lamb 1990:67).

While traditional subsistence activities continue throughout the valley, the advent of a cash economy has introduced a market-oriented dimension to these activities, with revenues from crop surpluses used to purchase foodstuffs and other merchandise from trade stores. Furthermore, clear-felling has significantly reduced the amount of forest available for traditional hunting and gathering practices, thus reducing the supply of bush materials and foods. The cash economy has also spawned a market for wildlife. Ownership of firearms has increased, and with it the capacity of landowners to take advantage of this new market for wildlife (Lamb 1990:63).

Estimates of the human population of the Gogol Valley vary. Missionary reports from the 1880s indicate that the area was densely populated when

⁴ The groups commonly identified as 'clans', both by government officials and by members of local communities, may not fit the definitions adopted by anthropologists.

mission stations were established west and south of the Gogol River. A dramatic decline in population, primarily the result of smallpox introduced by New Guinea Company personnel, occurred some time after the establishment of these stations, while malaria forced the withdrawal of all mission personnel from the valley by 1912. The decline bottomed out in the early 1920s, and the population was growing by the 1940s (Cavanaugh 1976:176).

The general consensus on population figures in the years prior to logging operations falls around 2-3,000 (see Table 8.1). However, De'Ath (1980:77) arrived at a figure closer to 4,100 by taking into account the impacts of migration and absenteeism. The 1980 census counted 4,872 residents (see Mitio 1984), suggesting some increase after logging had started. The 1990 census figures document a continuation of this trend, for they counted approximately 5,300 people living inside the Gogol, Naru, and Barum TRPs.⁵

Table 8.1: Population statistics for the Gogol and Naru TRPs, 1969.

	Gogol	Naru
Population	1183	1141
Number of villages	11	7
Number of clans	168	93
Area (hectares)	52,270	15,800
Crude population density (persons per 100 ha)	2.3	7.2
Average area (ha) per clan	311	170

Source: Lamb 1990:56

Genealogies compiled during the early years of the Gogol project identified over 250 distinct landowning groups across the valley, speaking eight separate languages (Colton 1976:193).⁶ Under traditional settlement patterns, these groups were scattered across the valley, living predominantly on their own clan lands and divided along linguistic lines. While some large villages now exist,⁷ villagers tend to frequent these only on major ceremonial occasions, residing instead in clan hamlets or in bush houses constructed near their gardens. Access to most areas has grown with the construction of logging roads, which have increased the mobility of the local people to areas across and outside the valley – including the Madang town. The increased use of Tok Pisin throughout the area has also lessened the impact of linguistic boundaries.

⁵ Local forestry officers have identified the relevant villages within the South Ambenob, Gal Utu and Trans-Gogol rural census divisions.

⁶ Over twenty-one languages are reportedly spoken in the region surrounding the Gogol Valley (Z'graggen 1975, cited in Lamb 1990:56).

⁷ This situation is largely an artifact of colonial efforts to bring people together in villages which were easier to administer, although roadways have also facilitated this centralisation.

Simple averages suggest that each clan owns between 170 and 311 hectares of land (see Table 8.1). In reality, the differences between landholdings are much greater. The overall effect is that some clans are relatively well off, while others are facing a land shortage. Most of the land is held in small blocks interspersed with the lands of other clans. As a result, disputes over boundaries have been, and continue to be, a source of great social tension (Lamb 1990:58).

The History of Forestry

Government interest in the forest resources of the Gogol Valley dates back to the early 1950s. Colonial forest policy of the time sought to establish a large number of small milling operations across PNG in order to supply local timber demand. The timber resources of the Gogol were evaluated in this light, in the hope of establishing a timber supply accessible to the township of Madang.

The initial assessment took place in 1959, at a broad reconnaissance level, to ascertain whether state acquisition of rights to timber was justified, and to gauge local attitudes towards such a proposal. This first report recommended further investigation of the area, with a view to developing it as an immediate source of timber for the local urban market and for export (Davidson 1983:48).

Following this recommendation, a second survey was conducted in 1962, lasting approximately five months. This survey undertook a more thorough sampling of forest types in the valley, with statistical analysis indicating a bias in favour of *Intsia* (*kwila*) species. As a result of these findings, a third and still more intensive survey was carried out in late 1963. On this occasion, the survey team was serviced by helicopter, and more than 600 quarter-acre survey plots were analysed (*ibid.*).

The findings of the third survey prompted the Administration to purchase timber rights over an area of 52,000 hectares for a term of forty years (Cavanaugh 1976:178). The purchase agreement offered a once-off payment of K50,000 for rights to all timber above 1.52 metres dbh.

The Administration unsuccessfully put harvest rights over this area up for public tender in 1964 and 1966. When the rights were offered for a third time in 1968, one bid was received from a consortium of Japanese interests. This bid served as the starting point for a long and, at times, rancorous series of negotiations between the consortium and the Australian government. These negotiations ended in August 1971, when the Gogol Timber Agreement was signed by the Administration and the Japanese consortium trading as 'Japan New Guinea Timber' – commonly known as Jant.

Following the inception and preliminary planning of the Gogol Woodchip Project, a fourth and more detailed assessment of the Gogol area was conducted in 1970. Unlike previous surveys, which assessed the area's potential as a source of selectively harvested sawlogs, this survey also evaluated tree sizes (greater than 25 cm girth) which were suitable for woodchip production (De'Ath 1980:33; Davidson 1983:48).

Motivations for Development

The development of the Gogol project did not take place in a vacuum. The economic, social and political events of the late 1960s, when the project was conceived, was to shape its ultimate direction. Locating the project in the broader context of the era therefore sheds light on the motivations which underscored its conception and development.

The colonial administration and the national government have both championed the Gogol project since its inception. Official enthusiasm for the initial concept appears to have flowed from its status as a 'world first.' There appears to have been a great deal of political optimism that the project would inspire other forms of development in the area. It was viewed as the anchor of a large-scale industrial complex based in Madang, centred around the manufacture of paper and paper-based products. The project was also seen as a model for the development of other resource-based industrial complexes elsewhere across the Territory.⁸

The inception of the project coincided with a period of significant policy change in the Territory. From the mid-1960s, economic development policy was refocussed to encourage the rapid utilisation of natural resources as a means to achieve greater economic and social development. Instrumental in this policy change was a report by the World Bank (IBRD 1965), which advocated a more rapid programme of development, centred in part around the greater utilisation of the Territory's forest resources. It saw considerable potential for expansion in the forestry sector (ibid:34), and recommended that the Administration facilitate this expansion as much as possible (ibid:158). The report also assessed the world market potential of the Territory's timber reserves, and argued that the Territory was well placed (both geographically and in terms of reserves) to capitalise on the expanding Japanese market for sawlogs and timber projects (ibid:157).

The recommendations of the World Bank report were given further momentum when the Administration produced its second five-year development plan in 1968. The forestry component of the plan sought an even greater expansion in output, and aimed to establish a forest industry based on large, integrated timber complexes, centred around 'big lick' concession areas. The initial Gogol proposal obviously fitted this bill when it was put forward in 1968.

The timing of the Gogol proposal also coincided with an international push for the independence of the colonial territories of the South Pacific. Australia played its own part in this movement, and was preparing for its eventual withdrawal from PNG at that point, in the early 1970s, when the Gogol project reached a serious conceptualisation phase. De'Ath (1980) argues that the

⁸ Particularly in light of the developments occurring in the mineral sector. Proposals for the Bougainville copper mine were circulating around the same time, and exploration around the site of the future Ok Tedi mine had just begun.

Administration, in its eagerness to ensure a strong economic base for an independent PNG, welcomed the proposal and became a strong advocate for its implementation.

Davidson (1983) suggests that support for the project was reinforced by the economic status and potential of the Gogol Valley itself. Without the development of a woodchip operation in the area, the valley had little else to attract other forms of development or to gain much priority from the state in the provision of public infrastructure and services. The area's forest resources were never considered to be very substantial, and further analysis actually downgraded the quality of the stock. Agricultural potential was always low as a result the area's low-lying topography, seasonal inundation, and naturally poor soils. Population density was low, and there is evidence to suggest that the various social systems of the valley were disintegrating at an increasing rate (Colton 1976:192). Frustration with the poor economic conditions in the area had prompted the formation of cargo cults and a high level of outmigration (Davidson 1983:62).⁹

The poor economic and social conditions of the area were apparently recognised by the local population. Colton's (1976) work, which was based on extensive patrols in the area, showed that the residents could see their chances for development were slight, and that health and education opportunities for their children were limited. Davidson (1983) adds that, despite numerous reservations about the project (particularly the likelihood of squatters moving into the area), the people agreed to dispose of their timber rights largely because of their feeling of economic backwardness and the lack of other development options.

The Gogol Woodchip Project

The Gogol Woodchip Project formally commenced operations after the Gogol Timber Agreement had been signed on 11 August 1971. The agreement gave Jant the rights to all pulpwood in the project area, while the rights to the sawlogs were granted to a small PNG logging company, Wewak Timbers.

Jant's permit to harvest timber for pulp was issued in July 1972. The company spent much of 1972 and 1973 tooling up and developing the necessary infrastructure – the woodchip mill and harbour facilities in Madang, and logging roads in the project concession areas. The first shipload of woodchips was sent to Japan in June 1974.

The operation of the Jant mill is dependent on a concession of approximately 68,000 hectares, made up of four separate Timber Rights Purchase (TRP) areas: the Gogol (52,265 ha), the Gum River (5,063 ha), the Naru (15,811 ha), and North Coast (15,001 ha) (see Map 7.1). Timber extraction

⁹ Colton (1976) suggests that the majority of the able-bodied men of the Gogol area were absent from the area when the project started.

was originally planned to proceed at the rate of 3-4,000 hectares per annum, with a 20-25 year lifespan placed on the resource. Although annual logging rates have remained around the proposed level, the predicted life of the resource has since been downgraded, following revisions of the quality of the timber resource in these areas.¹⁰ Jant's own estimations now suggest that the resource will last until late 1997, at a reduced harvest rate of around 1,000 hectares per annum. From that point on, operations will be dependent on plantations and local tree farms (personal communication, Joe Loreakena,¹¹ 1995).

Actual logging operations involve crews of loggers moving into designated logging coupes and clear-felling all trees above 20 cm in diameter. Felled trees are snigged by bulldozers to loading ramps, where they are sorted on the basis of size into sawlogs and pulplogs. These are separately loaded and trucked to Madang, then washed and weighed in the presence of a government inspector, and either cut into sawn timber at the mill belonging to Madang Timbers (the successor to Wewak Timbers) or reduced to woodchips in Jant's chipper.¹² The chips are stockpiled before being conveyer-fed onto Jant's transport vessel for shipment to Honshu's paper mills in Japan.

Principal Actors

From an analytical perspective, three primary groups of actors have been involved in the planning and management of the Gogol project: the government, the developer, and the landowners of the Gogol Valley. Each group has had a different input into the planning and management of the Gogol project, and the impact of each has varied over time. This section reviews the inputs and impacts of each group in turn.

Government Agencies

The impact of the Gogol project on the surrounding physical and social environment mirrors the comprehensive scale of the project. Clear-felling results in the total destruction of the forest ecosystem (at least temporarily), with an associated impact on other ecological, social, and physical systems. These impacts cut across the administrative turf of many government agencies at both the national and provincial level, and thus draws them into the planning process. Furthermore, the phased nature of the development of the project, and the differential impacts experienced through the different phases, has meant that the

¹⁰ The resource has proven to be more diverse in quality (for woodchips) than was originally estimated.

¹¹ Jant Public Relations Officer.

¹² I was told that sawlogs are now sold to a company called Tiway (or Taway) Timbers (see Sagir, this volume). The Madang office of the National Forest Service was using this company's fax machine in March 1995, after its own telephone lines had been disconnected for non-payment of bills.

input of different government agencies has varied in both form and extent over the life of the project.

In this process, it is possible to identify four national agencies with a long-term involvement in the planning process, whose principal planning and management functions are discussed in this section.

Madang Timber Working Group

The government's early involvement in the Gogol project was controlled by an interdepartmental body established specifically for the coordination and management of state activities in the area. This body was known as the Madang Timber Working Group (MTWG). The colonial administration established the MTWG in 1972, drawing representatives from the four departments directly involved in the Gogol project: those of Forests, Agriculture, Lands, and the Chief Minister (subsequently Prime Minister). The primary tasks of the line agencies involved in the MTWG are summarised in Table 8.2. These points are expanded upon in the sections below.

Table 8.2: Functions of the line agencies involved in the Madang Timber Working Group.

Agency	Primary Function
Forestry	Forest species and volume assessments Forest typing and land use classification Silvicultural research Regulation of environmental impacts of logging
Agriculture	Advocate for agricultural development initiatives in the area Provide extension services to agricultural projects established in the area
Lands	Delineation of clan land boundaries for royalty purposes Delineation of clan land boundaries for the drawing up of land leases (for reforestation lands)

Note: Due to the phased nature of the Gogol project, the primacy of these functions has varied over time to coincide with the different nature of operations through the different phases.

The departmental officers of the MTWG attempted to incorporate local perspectives on the planning and development of the Gogol project by making allowance for local representation on the committee. By 1976, the group included seven village leaders elected by the people of the Gogol area (Gegeyo 1976:185).

The MTWG served two major functions. Firstly, it attempted to coordinate the activities of the government departments which had a role in the planning and management of the Gogol project. Secondly, it attempted to perform a liaison function between the government, the local residents, and Jant.

In its liaison capacity, the first task of the MTWG was to patrol the areas to be affected by the project. Over a two-week period, the patrol team held village meetings throughout the Gogol TRP area, in which they tried to inform residents of the current state, and probable future impact, of the project. Group members also used these sessions as an opportunity to solicit local residents' opinions on the project, and their future aspirations for the area, and they introduced the departmental representatives on the MTWG in such a way that local residents would be aware that they had someone to help them in their dealings with the company and with different levels of government (Gegeyo 1976:186; Davidson 1983:65).

The hands-on, localised approach of the MTWG quickly made it the main agency of the Administration in planning and managing the development of the Gogol project. It was later to facilitate the compilation of genealogies and the survey of clan boundaries throughout the project area, and to coordinate the distribution of royalty payments, as well as serving as the mediator between the landowner and the developer (Lamb 1990:80).

Papua New Guinea Forest Authority

The PNG Forest Authority and its predecessor, the Department, of Forests, has been the principal government agency in the Gogol Valley for the past thirty years. The nature of the Gogol project has ensured a close association between forestry officers, local residents, and the resource developer since the inception of the project.

Before the project proposal was formulated, government activities in relation to the area's forests were exploratory and transitory. The Department of Forests established a permanent presence in the Gogol area in 1969, when it constructed the Baku Forestry Station near the village of Mawan. The Baku station initially served as a research laboratory, nursery and administrative office, though it is now in a state of disrepair.¹³ The local forestry officer still maintains an office there,¹⁴ but the research laboratory no longer exists, and the nursery is no longer fully operational.¹⁵

¹³ On one of my trips to the Gogol area (in March 1995), I visited the centre with Bob Thistlethwaite, a former forestry officer based at Baku Station. My assessment of the facility's decline is based on his comments and reactions.

¹⁴ Much of his time has been spent in producing and updating the only competent map of the progress of the logging project to date, but there is no evidence to suggest that his superiors have taken an interest in the results of this work.

¹⁵ I noticed that the nursery did have young seedling trees in it whenever I visited Baku station. It appears that they belonged to Gogol Reforestation Company, which has an agreement with the Forest Authority to use what remains of the physical plant (mainly the nursery 'standout beds') for the propagation of its own seedlings. In return, the Authority receives a percentage of the tree crop turned out from the nursery.

The permanent presence of the Forest Authority in the Gogol area, coupled with the phased nature of the Gogol project, means that it has played a diverse and, at times, controversial role in the planning and management of the area's forest resources. For example, during the inception phase of the project, from 1968 to 1971, the Department of Forests occupied a dual role, for it represented the interest of residents of the Gogol and Naru TRP areas in negotiations over the harvest rights for these areas, while also actively promoting the development of timber reserves in these and other locations across the Territory. It can be argued that this entailed a conflict of interest, and that, in theory at least, the ability of this agency to perform either task with authority was compromised as a result.

Some of the other key activities of the agency are summarised in Table 8.3.

Table 8.3: Key activities of the line agencies responsible for the Gogol forestry project.

Phase	Activities
Exploration and resource assessment	Survey timber resources of Gogol area Assess potential of Gogol timber reserves Negotiate acquisition of timber rights from traditional owners
Project inception	Advertise harvest rights for Gogol Valley Select potential developer Negotiate agreement between developer and state for harvest rights Liaise with local residents regarding timber agreement negotiations and seek their input
Pre-logging	Oversee pre-logging operations (road construction, etc.) Liaise between residents and Jant over pre-logging operations
Operational	Monitor logging operations Enforce legislative and administrative measures controlling logging operations Liaise between government, Jant, and Gogol residents over issues arising from project operations Arbitrate in disputes between residents and Jant Arbitrate at local level in disputes between residents and government
Operational (reforestation)	Advocate benefits of land leases for reforestation amongst Gogol landowners Negotiate land leases between government and landowners Provide local-level extension services for local tree farmers

Department of Agriculture and Livestock

The colonial administration and the individual proponents of the Gogol project always envisioned agricultural development as an integral part of their regional development strategy (Serjeantson 1976:201). The proponents advocated various schemes that would follow behind logging operations, capitalising on the value of the land cleared in the logging process. The challenge of implementing

these schemes has been the responsibility of the Department of Agriculture and Livestock (DAL) and the relevant divisions of its predecessor, the Department of Primary Industry (DPI).

The principal planning and management functions of DAL have comprised the promotion of various forms of agricultural development in the area, and to the provision of local-level extension services to any agricultural projects established there. DAL's advocacy role is revealed in the Gogol Land Use Plan, which reflects the perceived importance of agriculture as a post-logging land use. Although the main emphasis of the plan lay on the provision of land for future reforestation and the continued supply of pulpwood to the Jant chip mill, significant exclusions were made for the subsistence farming needs of present and future generations of Gogol residents, smallholder agricultural and cattle projects, and large-scale agricultural development. The final land use plan (discussed below) set aside approximately 15,300 hectares (about 23 percent) of land in the Gogol area for these purposes.

Despite these planning efforts, very little land in the Gogol has actually been converted to any form of permanent agriculture. This is probably the result of the natural limitations of the Gogol Valley, although low population densities have played a part. The low-lying topography and naturally poor soils of the valley limit agricultural potential, while low population densities limit the amount of labour available to any large agricultural projects.

DAL's extension services in the Gogol area have also diminished. This is largely due to the lack of agricultural activity in the area, but also to the general collapse of extension services which followed their decentralisation to the provinces, and to severe operating constraints placed on all government agencies by PNG's current budgetary and fiscal problems.

Department of Lands and Physical Planning

The role of the Department of Lands and Physical Planning (DLPP) and its predecessors, while complex and important, has been sporadic in comparison to those of the other government agencies involved in the project. The primary responsibility of DLPP has been the survey and mapping of clan boundaries, on which the distribution of timber royalties is based. While boundary adjustments have been required from time to time, as clans have questioned the veracity of earlier land claims, the nature of the work has not required DLPP to maintain a constant presence in the project area.

The demarcation of clan boundaries has been based on meetings held with members of adjoining clans in order to reach agreement over ownership and boundary position. The adjoining clans then elected guides to accompany a survey party while it used field survey techniques to delineate the boundaries and codify them into a mappable form (Leet 1976:205).

More recently, DLPP has also been responsible for the negotiation and administration of land lease arrangements between the landowners and the

government. These have been designed to secure sufficient areas of land for reforestation efforts in the valley. DLPP has often been required to conduct additional boundary surveys identifying lease boundaries, and to create and administer the lease agreements.

Jant

The planning and management activities of Jant have been conducted at a different level from those of the government. Jant's primary resource management concern has centred on the continuous supply of pulpwood to its chip mill in Madang. All other project-related activities in the area have been ancillary to the key task of extracting timber.¹⁶

It is difficult to describe the specific details of Jant's logging programme, since these details are not generally available, even though they can be inferred from the impression left on the landscape in the wake of logging activities. However, several observations can be made in an effort to characterise the nature of the resource planning and management activities undertaken by Jant.

Jant's logging operations, while very directional in their aim of securing a continuous supply of pulpwood to the chip mill, have nonetheless been flexible in their application. The environmental, political, and cultural environment of the project has had a considerable impact on the operational direction of Jant's planning processes.

Throughout the life of the Gogol project, Jant has had to incorporate a great degree of flexibility in its operational planning framework, as a result of numerous uncertainties in its operational environment. Many technical and operational dimensions of the project were developed through trial and error. Neither Jant nor anyone else at the time had a lot of technical or operational expertise in conducting large-scale clear-felling operations under the challenging physical conditions found in the Gogol area. Learning by trial and error has necessarily demanded a degree of flexibility in the decision-making process.

A great deal of the uncertainty surrounding the management of the natural resources of the Gogol area has also stemmed from the lack of specific regulatory guidelines. The colonial administration placed only loose controls over production scheduling and broader problems of environmental management, presumably on the assumption that existing regulations were sufficient for a project of this nature. As the project progressed, however, and it became apparent that this assumption was ill-founded, the government has made several attempts to introduce additional controls over various aspects of the project. Jant has generally attempted to incorporate such changes into its

¹⁶ These include the construction and maintenance of logging roads, the associated extraction of gravel from river beds, the operation of the Jant chip mill, and the management of company reforestation programmes.

operating procedures, and its ability to do so has been both a component and a product of the flexibility inherent in its operational planning framework.

In a similar vein, Jant has also had to maintain a considerable degree of flexibility in its operations in order to accommodate the ad hoc demands of landowners.

Landowners

Of the three groups with some stake in forestry operations in the Gogol area, local landowners have the largest stake. They 'bet the farm' on the project, hoping for the benefits which they thought, or were led to believe, would result from it. They have endured the fundamental changes in lifestyle which clear-fell logging brought about, and they continue to bear the brunt of the impacts of logging operations on a daily basis.

Despite the size of their stake, they have had the least input into the planning and decision-making process. Few avenues exist at the local level for any sustained and meaningful input into this process. Although landowner consent was required for the state's acquisition of timber rights, and although numerous attempts have been made to solicit landowner input over the life of the project, the system of timber rights transfer – the TRP Agreement – has marginalised the landowners within the planning and management process. Once the government had assumed control over the resource under the TRP agreement, and then transferred the harvest rights to Jant under the Gogol Timber Agreement, decision-making powers were transferred out of the valley, in both a figurative and a literal sense, and the residents themselves have become peripheral to the decisions which were made.

The lack of effective mechanisms for landowners to voice their concerns and express their desires has prompted landowners to resort to confrontational strategies in order to get a hearing. On occasions dating back into the early years of the project, disgruntled Gogol residents have blockaded roads, disrupted logging crews, and sabotaged Jant equipment in order to draw attention to their grievances (see *Post-Courier*, 5 July 1994). While these strategies have been successful in gaining the attention of Jant and the government, the frequency of their repetition indicates that they have led to few substantive changes.

Instruments of Forest Management

Resource planning activities relating to forest management in PNG take place within a framework defined by a range of legislative and administrative instruments developed to promote particular planning and management goals. The Gogol project has evolved within the planning and administrative framework defined by four main instruments:-

- The statutory regime governing forest use and management;
- The Gogol Timber Agreement;

- The various timber permits issued to Jant; and
- The Gogol Land Use Plan.

Statutory Regime

The implementation of national forest policy and the administration of a timber industry has been the responsibility of a separate, national-level line agency since the development of a formal forest management regime in the late 1930s (see Mantu 1985). At the time of the inception of the Gogol project, forestry operations were administered under the provisions of legislation dating back to this era, primarily the *Forestry Ordinance 1936/37* of the Territory of New Guinea (as amended to 1971). This ordinance and its supplementary regulations defined the procedure for the allocation of rights to harvest timber, and described the general context of government control over forest resource development.

The primary objective of the *Forestry Ordinance* was to provide the administrative and regulatory environment for a national forest industry based on small-scale, selective harvesting techniques. The emphasis of the regime was placed on broad, national-level goals, such as the acquisition and management of a national forest estate. Consequently, it provided little in the way of specific planning guidelines or resource management criteria operable at the project level. Instead, operating conditions were negotiated and administered on a project-by-project basis. The negotiated terms and conditions of each project were then formalised in either a Timber Permit or a Timber Agreement.

While this negotiated procedure was sufficient to handle 'typical' forestry projects in PNG, it became problematic in the Gogol case, simply because so many dimensions of the project were new and unknown. The unique nature of the proposal meant that very little technical expertise existed within Jant, the Administration, or the wider forest industry, which could comprehend the impact and ramifications of large-scale clear-felling in this tropical environment. Few specific guidelines could be drawn from the pool of institutional expertise and experience within the colonial forestry service. As a result, few specific terms and conditions were formally documented in the initial Timber Agreement.

Once the project became operational, and the impacts became clearer, efforts were made to develop project-level guidelines, but these generally lacked any specific or binding obligation. Their implementation by Jant was dependent on government persuasion and the developer's good will.

The uncertainty and ignorance which characterised these initial negotiations over the Gogol project do not account for the apparent lack of impact of more recent changes in the statutory regime. The longevity of the Gogol project has seen it survive, relatively unchanged, through numerous changes in the statutory and administrative regime pertaining to the natural environment in general, and forestry in particular. Statutory controls over forestry have undergone several changes, the most recent being the reforms ushered in by the findings of the

Barnett Inquiry. Other broader environment management initiatives have been formalised in the *Environmental Planning Act* and the *Environmental Contaminants Act* of 1978, and, to a lesser degree, in statutes like the *Conservation Areas Act* of 1978 and the *Water Resources Act* of 1982 (see Whimp, this volume).

Once again, however, the fundamental problem with these changes has been the singular lack of initiatives capable of providing a bridge between the high-level ideals of the statutory framework and specific, operational guidelines which can be implemented at the project level. Recent efforts have been made to close this gap, within the forestry sector, with the publication in April 1996 of a Logging Code of Practice by the PNG Forest Authority. However, it is too early to say whether these guidelines are having any impact on operations in the Gogol or in any other logging areas.

The impact of legislative changes has also been lessened by the lack of retrospective application of many new laws. In some cases, such as the *Environmental Planning Act* (1978), the option to apply new rules to existing projects is expressly ruled out.¹⁷ More often, however, a lack of institutional resources, capacity, and flexibility has made it almost impossible to implement substantive changes to the management of the environment.

The Gogol Timber Agreement

Beneath the national governance framework, the operations of the Gogol project are controlled through a negotiated Timber Agreement. The original Gogol Timber Agreement was signed in August 1971, and a renegotiated version (without any significant changes) was signed towards the end of 1995.

The content of the agreement is project-specific and very functional in nature. It lays out the various obligations of the government and Jant (mostly Jant) in relation to particular operational aspects of the project. Matters covered in the original (1971) agreement include:

- the utilisation of the timber resource;
- the state's option to acquire equity in the project;
- the woodchip pricing structure;
- the company's responsibility for road construction, and the obligations of both parties to undertake road maintenance;
- the Administration's right to view company contracts;
- the supply of electricity to the company;
- the company's obligation to construct a wharf and the state's prerogative to use the wharf;

¹⁷ According to Section 3(2): 'This Act does not apply to any project to which applies the - (a) Mining (Bougainville Copper Agreement) Act 1967; or (b) Mining (Ok Tedi Agreement) Act 1976; or (c) Petroleum (Gulf of Papua Agreement) Act 1976.'

- the company's obligation to train and recruit PNG nationals;
- the procedure for the leasing of land;
- the company's obligation to submit plans for waste disposal, noise and pollution control;
- the Administration's undertaking to provide for public peace and welfare;
- the Administration's undertaking to obtain land for reforestation;
- the procedure for the entry and stay of foreign personnel;
- the agreement of both parties on the capital structure and mode of financing of the project prior to the grant of a timber permit;
- the formation of an operational and incorporated company; and
- general legal applicability of the agreement

The commitments made in the agreement are couched in general terms, and there are no specific milestones or deadlines to mark their achievement. Most deal with particular facets of the business and operations of Jant. The agreement offers little in the way of specific directives for action in the planning and management of the Gogol forest resource. The two clauses that directly mention the forest resource (Clause 2 on 'Resource Utilisation' and Clause 13 on 'Reforestation') do so in only general terms:

2. Utilisation.

The company undertakes to establish an industry in accordance with its proposal and to the satisfaction of the Administration, in particular the company undertakes -

- (a) to arrange for the conversion of the sawlog component of the forest resource;
- (b) to ensure that arrangements made are such that a substantial viable sawmilling operation will result; and
- (c) to use its best endeavours to reach a suitable agreement with a local sawmilling company for the conversion of a sawlog component; or
- (d) if unable to reach an agreement with a local sawmilling company to provide evidence of the offer made, and to establish a sawmilling complex to utilise the sawmill component of the resource. The minimum annual intake to be 10,000,000 super feet log volume per year, to be achieved as soon as practicable.....

13. Reforestation.

The Administration will endeavour to obtain an adequate area for reforestation to maintain the industry at a viable level. The Administration may make arrangements with the company for Company participation in the reforestation on such terms and conditions as mutually agreeable. The terms and conditions may

include, *inter alia*, the utilisation of the harvest from the future plantations and the possible extension of the permit period.

Gogol Timber Permits

The regulatory schemes established under the *Forestry Ordinance* (and continued to the current day under successive *Forestry Acts*) have all required that logging operations only proceed following the issuance of, and in compliance with, a Timber Permit. Timber permits provide a binding commitment between the logging operator and the government. Generally speaking, they detail the particular rights and responsibilities incumbent upon the logging operator following the receipt of harvest rights from the government.

The formal and legally binding obligations established within a timber permit ensure that they are not readily available for public scrutiny. It is therefore difficult to comment on the resource planning and management obligations set out in the original Gogol Timber Permit (TP 12-1). However, discussions with forestry officers did provide the opportunity to examine the contents of the renewed version of the Timber Permit (TP 12-21, dated 24 June 24 1992). Some brief comments can therefore be offered, assuming that this permit is fairly typical of those applied, at various times, to the whole of the Gogol project area.¹⁸

In line with its specific administrative and regulatory function, the Timber Permit addresses the twin issues of resource planning and environment management. Clause 6 calls for Jant's logging activities to proceed in accordance with a five-year forest working plan, formally vetted and approved by the proper forestry authorities. The permit provides specific details (Clause 6.2) of the information to be included in this plan. It also outlines a procedure for the periodic review and updating of the working plans (Clause 6.4), as well as requirements for the submission of completion reports for logged-over areas (Clause 6.5).

Nothing within the permit defines the express purpose of such plans, nor of the process of having them vetted and approved. Given their production planning orientation, the presumed purpose is to provide the forestry authorities with an overview of the project's ongoing operations and the future sequencing of resource utilisation.

Stipulations for the environmentally sensitive management of operations in the project area are set out in Clause 7. The provisions of this clause address both general environmental management conditions and the particular

¹⁸ Following the significant increase in awareness of the environmental implications of large-scale logging, and in the wake of the findings of the Barnett Inquiry, it is probably safe to assume that this new permit is more specific and detailed than the original. The amount of detail given over to environmental matters, particularly in comparison to the original 1971 Timber Agreement, and the addition of clauses specifically addressing issues raised by the Barnett Inquiry (i.e. transfer pricing and arms-length pricing) offer credence to this assumption.

environmental impacts of logging operations, such as water pollution and soil erosion. Clause 7.2 provides an example of the more general management obligations proscribed in the permit:

Clause 7.2: Environmental Precautions

The Permit Holder shall use its best endeavours to overcome and minimise the deleterious effects caused by its operations on the physical environment and the inhabitants of the Permit Area and in particular shall comply with all environmental control conditions included in the approved Forest Working Plan and with the following provisions:

- (a) Logging will be selective¹⁹ and will take place only on slopes up to thirty (30) degrees;
- (b) there will be no logging on slopes greater than thirty (30) degrees;
- (c) there will be no logging within fifty (50) metres of rivers, streams or watercourses.
- (d) there will be no logging in proximity to villages, gardens, burial grounds or areas of cultural importance; and the Permit Holder shall identify such areas in consultation with the local people, taking into consideration existing and projected land-use patterns, and the nature and abundance of forest produce required by villagers; and
- (e) as a minimum requirement, there will be no logging:
 - (i) within one hundred (100) metres of any garden in use, burial ground, or area of cultural importance, or
 - (ii) within five hundred (500) metres of any inhabited village.²⁰

References to specific impacts of logging activities are made in twelve sub-clauses. These range from the control of soil erosion (Clause 7.6) and compaction (Clause 7.16), to fire prevention measures (Clause 7.14) and measures to promote forest regeneration (Clause 7.17). The following is indicative of the content of these clauses:

Clause 7.10: River Bank Damage

The Permit Holder shall take all precautions consistent with sound forest management practices to ensure that the banks of any river or stream are not damaged, and that the course of any river or stream is not altered as a result of the operations of the Permit Holder.

As with the Timber Agreement, the commitments set out in Clause 7 are notable for their generality and largely devoid of any specific criteria or standards that

¹⁹ It is not known why this specification was included in TP 12-21.

²⁰ My observations of logging activities in the project area indicate that all of these provisions have been violated at one time or another, some (such as logging within 50m of watercourses) more frequently than others.

would facilitate the monitoring of operational compliance. Vague commitments to take 'all reasonable steps' and to abide to unspecified 'sound forest management practices' are all that this clause offer.

Gogol Land Use Plan

Beyond the statutory and regulatory controls governing the Gogol project, a detailed land use plan was also prepared for the area. In 1971, the Department of Forests conducted an assessment of post-logging land use, which focussed on the need to identify sufficient land for the development of large-scale timber plantations. The government's planners recognised the need to ensure a continuous supply of resource to the Jant mill following the depletion of the natural forest.

The land use plan followed fairly standard procedures for land classification and assessment of suitability. The Gogol landscape was classified using a hierarchical model of 'land systems'.²¹ An existing land systems classification for the Gogol-Madang area (CSIRO 1976) was subdivided on the basis of terrain, with areas of similar terrain grouped into discrete 'land units'. Land units were further sub-divided into 'land components' on the basis of vegetation. Twenty resultant 'land-types' were defined, representing areas of unique vegetation (land components) and topography (land units). These are summarised in Table 8.4.

²¹ This approach was in widespread use across Australia and PNG, and was a standard resource assessment procedure for the Australian Commonwealth Government at the time. Large areas could be classified and assessed in relatively short periods of time using aerial photography. The procedure follows a hierarchical conceptualisation of the landscape as a spatial complex of various environmental parameters. Different parameters are used to distinguish different complexes down through the hierarchy.

Table 8.4: Land types of the Gogol Valley.

Terrain (land units)	Vegetation (land components)	Land type	Area (hectares)
Flat	Secondary forest	1	5,250
	Kunai grassland	2	460
	Pit-pit	3	860
	Floodplain forest	4	4,300
	Well drained terrace forest	5	4,570
	Poorly drained terrace forest	6	6,270
	Swamp forest	7	580
	Hill forest	8	780
Gentle	Secondary forest	9	1,840
	Kunai grassland	10	600
	Well drained terrace forest	11	740
	Poorly drained terrace forest	12	960
	Hill forest	13	7,530
Moderate	Secondary forest	14	2,060
	Kunai grassland	15	510
	Hill forest	16	12,830
Broken	Hill forest	17	4,440
Rugged	Secondary forest	18	1,310
	Kunai grassland	19	470
	Hill forest	20	10,400

Source: Adapted from Lamb (1990).

Each land type was rated on a five point scale for its suitability for commercial forestry and reforestation purposes. In the process, other non-forestry land uses were also assessed, although this was done primarily by reference to general physical characteristics (based on the land unit descriptions), and did not consider the effect of factors relating to managerial dimensions of these alternate land uses (distance to market, skill levels of operators or staff, market prices, etc.) (Davidson 1983:78). The resultant suitability rankings are shown in Table 8.5.

Table 8.5: Land suitability rankings for the Gogol project area.

Land type	Roading	Logging	Erosion	Reforest- -ation	Agri- -culture	Cattle ranches	Subsist. gardens
1	1	3	4	1	1	1	2
2	1	5	4	2	2	1	3
3	4	5	1	5	4	4	4
4	1	1	4	1	1	1	2
5	1	1	4	1	1	1	1
6	2	1	4	3d	2	1	4
7	3	1	4	4d	4	4	5
8	2	2	3	2	2	1	1
9	2	3	3	2	2	1	2
10	2	5	3	2	2	1	3
11	1	1	4	1	1	1	1
12	2	1	4	3d	2	1	4
13	2	2	3	2	2	1	1
14	2	3	2	3t	3	2	2
15	2	5	2	3t	3	2	3
16	2	2	2	3t	3	2	1
17	4	4	1	4t	4	4	3
18	2	4	1	4t	4	3	2
19	3	5	1	4t	4	3	3
20	3	3	1	4t	4	3	2

Notes: 1 = most suitable; 5 = least suitable; d = soil drainage is a major constraint; t = terrain is a major constraint.

Source: Adapted from Lamb (1990)

Based on this assessment, eight land use scenarios were developed, allocating land in different proportions to different land use priorities across the valley. Each scenario set aside at least 20,000 hectares for reforestation purposes, which was considered to be the minimum area required to sustain commercial forestry in the area.²² They also documented the location of areas suitable for partial or total conservation, land for agricultural development, and areas (such as swamps or steep hills) unable to support commercial forestry. Details of the land uses for these eight scenarios are presented in Table 8.6.

²² Experience with plantations elsewhere in PNG suggested that at least 20,000 ha grown on a 10-12 year rotation would be sufficient to maintain continuous supply to the Jant mill once the natural forest had been logged (Lamb 1990:83).

Table 8.6: Post-logging land use scenarios for the Gogol Valley (area in hectares).

Land use	Scenario			
	1	2	3	4
Small holder agriculture, no reforestation	3,900	3,900	3,900	3,900
Benchmark reserves	1,300	1,300	1,300	1,300
Reforestation plus smallholder agriculture (Land for reforestation)	25,100 (18,800)	26,900 (17,700)	25,600 (19,200)	27,800 (18,300)
Large scale agriculture	-	-	-	-
Cattle	-	-	4,800	4,700
Selective logging and enrichment planting	34,400	32,600	29,200	27,100
Swamps and river edges	3,000	3,000	3,000	3,000

Table 8.6 (continued).

Land use	Scenario			
	5	6	7	8
Small holder agriculture, no reforestation	3,900	3,900	3,900	3,900
Benchmark reserves	1,300	1,300	1,300	1,300
Reforestation plus smallholder agriculture (Land for reforestation)	25,900 (19,400)	28,400 (19,000)	26,300 (19,700)	28,500 (19,100)
Large scale agriculture	4,900	4,900	4,900	4,900
Cattle	-	-	4,600	4,700
Selective logging and enrichment planting	29,000	26,300	23,800	21,500
Swamps and river edges	3,000	3,000	3,000	3,000

Source: Adapted from Lamb (1990)

The eight scenarios were evaluated by the MTWG, and Scenario 3 was preferred. Two further modifications – 3A and 3B – were prepared, reflecting MTWG's assessment of landowner aspirations on the basis of its village patrols. Scenario 3B (detailed in Table 8.7) was eventually accepted by the MTWG and forwarded to Cabinet for its consent. It was adopted as the basic planning document for the area in 1974 (Lamb 1990:84).

Table 8.7: Post-logging land use in the Gogol Valley under Scenario 3B.

Land use		Hectares (%)
Clear-felled	Large-scale agriculture	1,160 (2)
	Cattle projects	3,140 (5)
	Plantation forestry	20,000 (29)
	Subsistence gardening, small-scale agriculture, agroforestry	6,000 (9)
Selectively logged	Enrichment planting, natural regeneration	14,840 (22)
Not logged	Benchmark reserves	1,280 (2)
	Village reserves	900 (1)
	Village smallholder projects*	3,980 (6)
	Swamps, rivers, etc.	2,000 (3)
	Hill forest on rugged terrain	14,840 (22)
TOTAL		68,140 (100)

* This category reflects Davidson's (1983) assessment of Scenario 3B. Lamb (1990) places this area in the clear-felled, small-scale agriculture category. Landowners of the area in question were initially not interested in logging, and thus their land was not expected to be logged in the post-logging scenarios. They did eventually agree to logging, however, which may explain why Lamb (1990) places them in the clear-felled category.

Source: Adapted from Davidson (1983) and Lamb (1990)

Outcomes

Collectively, these instruments create a limiting framework within which the planning and management decisions of the Gogol project are made. Their terms and conditions formally define the specific rights and obligations bestowed on the parties involved in the planning process. They inform and direct the activities of these actors.

There is considerable variation in the strength and specificity of the commitments produced by these instruments. This in turn affects the degree to which they are translated into meaningful or purposeful action. Analysing the current state of the Gogol project in light of these commitments offers one means of evaluating the outcomes of the planning process.

Impact on Post-Logging Land Use

What has been the impact of this limiting framework on the planning and management of land use in the Gogol Valley in the wake of logging operations?

The short answer to this question is: very little. The Gogol Land Use Plan offers the strongest statements on follow-up land use, but few of the land uses which it envisages have materialised as planned. The key land use – plantation

forestry – accounted for only 6,225 hectares by the end of 1994. Although planting targets of around 1,000 hectares per annum have been achieved over the past five years, total plantation area falls well short of the 20,000 hectares envisaged in the plan.

It is now seems unlikely that anything near the 20,000 hectares proposed in the land use plan will be given over to plantation forestry. Under Jant's latest planning schedule, only 10,000 hectares of plantation is required to supply the chip mill. This is largely due to a change in the species being planted. Initial planning estimates were based on plantations of *Eucalyptus deglupta*, and many of the early plantations were based on this species. However, further trials within the Gogol confirmed that *Acacia mangium* was a more suitable pulpwood source because of its shorter rotations, higher yields, and greater tolerance to a range of site conditions, especially surface water ponding (Thistlethwaite 1995:6). Jant anticipates an eight-year rotation from *A. mangium*, down from ten for *E. deglupta*.²³

None of the various agricultural schemes envisioned in the land-use plan have ever been fully realised. Several schemes were initiated, but few have either survived over the long term or produced significant alternative means of livelihood for large numbers of people. A small number of cocoa blocks were established by DAL, more as demonstration blocks than as operational ventures. Most of these were not maintained and have now been cut. Local residents have shown little interest in establishing blocks of their own, due largely to the limited marketing opportunities for such crops in the local area. Coconut and coffee plantings were also established, but most have since been abandoned.

Cattle ranching, once thought of as the best smallholder activity for the people of the Gogol area, also failed to take off. In 1978, there were thirteen separate projects, with 306 head of cattle altogether (Lamb 1990:170). Now there are three cattle projects operating in the valley, but with only a few head of cattle (ten to twenty) in each one, and they are limited to the supply of strictly local needs (Thistlethwaite 1995:10-11). Officers from the DAL branch in Madang are promoting local cattle production once again, but as small enterprises for the supply of fattened cattle to the local abattoir.

The unwillingness of landowners to make land available for the projects proposed in the plan appears to have been the largest impediment to its implementation. The large-scale agricultural project certainly foundered for this reason (Lamb 1990:91). Local people's negative experiences with logging, the government, and Jant made them wary of renewing any future commitments.

²³ With 3.5 by 3.5 metre spacing, the anticipated harvest volume of *A. mangium* at year eight is 160m³/ha, while yields from *E. deglupta* at year ten are around 120-130 m³/ha (Thistlethwaite 1995:7).

Their dissatisfaction with revenues received from logging operations, and with the level of returns from lease agreements, has compounded this problem.²⁴

In cases where landowners have been willing to lease land for plantations, the spatially dispersed nature of customary land ownership limits the viability of such ventures. Much of the land offered has been in small and dispersed blocks. The marginal cost of establishing and maintaining plantations on such blocks is high, it is expensive to construct road access, and difficult to arrange fire prevention and control measures.

The difficulty of coordinating Jant's logging operations with the conversion of land to uses outlined in the plan also caused the plan to founder. Land allocated for cattle ranching, for example, was in areas which were not designated for logging until well into the life of the project, and which were still unlogged in March 1995. Profits, prestige, and hence local interest in cattle have declined since the plan was adopted, and other smaller cattle enterprises have come and gone over the intervening years without a great deal of success.

Impact on Infrastructure Provision

One of the great desires of local residents was that the project should provide roads into and across the Gogol Valley (Colton 1976:192). The construction and maintenance of roads has since become one of the most contentious aspects of the project.

Much of the disagreement has revolved around differences in the allocation of responsibility for this work. Jant has tried to stick to the formal obligations to which it is committed under the terms and conditions of the Gogol Timber Agreement and the various timber permits. The costs of road construction have always been a substantial component of Jant's operating budget, and the company has been reluctant to spend more on road construction than is essential for the continuation of its operations.

Jant's formal interpretation of its responsibilities has sometimes brought it into conflict with local residents and with national and provincial government officials. The majority of landowners were not privy to the conditions negotiated under the various agreements, and therefore had no knowledge of Jant's obligations relating to road construction. The matter only became an issue once Jant withdrew from logged areas and discontinued the maintenance of roads in these areas. The design of the roads and the environmental conditions in the area ensured that these roads deteriorated quickly without maintenance. Local resentment towards Jant grew as the roads crumbled and bridges were washed away. Many interpreted Jant's behaviour as a sign of ill-will, unaware of the economic motivations behind the company's actions.

²⁴ Leases normally run for thirty years or more, with a rent of 50 toca per hectare paid in five-year increments. A 2.5 percent royalty has been paid to the landowners for timber subsequently harvested from the leased land. Landowners have generally been unwilling to lease land under these terms.

This is not to say that Jant has not tried to accommodate local requests for road construction. In the early days of the project, considerable community pressure was brought to bear on the company to construct roads ahead of its logging schedule. Jant acceded to these requests, and has cautiously continued to do so ever since. Jant's field supervisors will redirect heavy equipment from logging areas to assist in clearing or maintaining nearby roads, provided the request does not interfere with logging operations (personal communication, Joe Loreakena, March 1995).

Relations between Jant and the government have also been strained over the issue of road maintenance. Jant contributes approximately 35 percent of the cost of maintaining the paved roads between the Gogol area and Madang town. Both parties have voiced concern over the other's commitment to road maintenance over the years.

Jant has also been criticised for the haphazard development of its road network. Little strategic forethought has gone into the planning of roadways across the valley. Roads have been built without proper regard for environmental and ecological conditions, let alone the requirements of local landowners.

In Jant's defence, some of these problems can be ascribed to the uncertainty of company operations in the Gogol area. The combination of many different factors make it difficult to develop long-range operational plans. Individual landowners can object to logging activities and force the company off their land at any time, seasonal factors can force operations to be suspended, and the variability of forest quality can force changes to logging schedules. Jant has had to incorporate a considerable degree of flexibility into its planning horizons in order to accommodate these unanticipated operational changes.

The project does not appear to have boosted the development of other key forms of public infrastructure. Improvements in school and health care facilities have not kept pace with the population increase in the Gogol. De'Ath (1980) reported eight aid posts and two health centres (one at Utu mission and one at the Jant base camp) in the Gogol Valley. Two additional aid posts had been established by early 1995, bringing the total complement of health care facilities to twelve.²⁵ All but two of these facilities are constructed out of bush materials. Current facilities are not equitably located throughout the valley, requiring some villagers to walk for up to two hours each way to receive medical attention (personal communication, Dick Bart,²⁶ March 1995).

School facilities have not improved. Current enrolment in community schools across the valley is roughly 1,800 students. Many of the school buildings were constructed prior to, or early in the life of, the Gogol project, and have received declining levels of maintenance over the past twenty-five years.

²⁵ These figures were supplied by the Health Office, Department of Madang, March 1995.

²⁶ Health Officer, Department of Madang.

Some are now in a considerable state of disrepair. Other schools lack adequate housing for teaching staff (personal communication, Robert Solon,²⁷ March 1995).

Impact on Employment

Another anticipated benefit of the Gogol project was the employment opportunities which it was expected to create – both within the valley and throughout the Madang region. Initial estimates suggested the project would create around 1,500 jobs (Department of Forests Annual Report 1971/72, quoted in Lamb 1990:167). Employment seems to have peaked in the 1980s, when the project employed roughly 1,100 people. More recent statistics are difficult to locate, but current estimates are around 800-900.²⁸

In line with the wishes of the landowners (and subsequently the conditions of the Gogol Timber Agreement), Jant initially followed a hiring policy which gave preference to people from the Gogol Valley. However, most of the jobs are seasonal labouring positions which require low levels of skill and attract correspondingly low wages. Many local people found that there were few benefits in working for Jant, particularly given the fact that most of the seasonal work coincides with the period of greatest gardening and social activity. As a result, they only tend to join the Jant workforce on a casual basis when they have an immediate need for cash. Jant has consequently relaxed its employment policy, and obtains the majority of its workforce from Madang town.

As with all projects of this nature, the overall impact of the Gogol project on employment has been uneven. Jant has maintained a commitment to employ skilled Papua New Guineans, and has treated these employees well enough to cultivate a sense of commitment to the company.

Aside from wage employment, the project has opened up two other avenues for Gogol landowners to obtain a cash income. The first is the opportunity for contract labour in the business of tending Jant's plantations. The company sub-contracts some of the establishment work and most of the routine maintenance tasks to local clans or, alternatively, district church and youth groups. Conditions in the Gogol Timber Agreement and timber permits stipulate that local villagers get the first chance to bid for these contracts, although the small population in the valley often means that local contractors are unavailable, and others must be found elsewhere. Contract rates vary depending on the task, but estimates supplied by forestry officials indicate that they normally work out at around K4-5 per person per day.

²⁷ Education Officer, Department of Madang.

²⁸ My investigations revealed that Jant has not filed an Annual Return with the Investment Promotion Authority since 1987. Current estimates are based on conversations with managerial staff of Jant itself and with officers of the Madang office of the Forest Authority. Current field operations utilise three logging teams, down from the four or five teams at the peak of operations.

The second avenue is the establishment of tree farms. There are now believed to be around 120 tree farmers in the Gogol Valley, with an estimated 2,000 hectares under private plantings. Most of the established farms are small, with only two or three farms in the order of 15 hectares. The majority are less than 10 hectares, with the average around 2-3 hectares.

Tree farms are a largely unanticipated and unplanned spin-off from the Gogol project. They emerged early in the life of the project, after a few landowners working with Jant's reforestation teams began planting trees on their own land. These landowners established small areas of *Eucalyptus deglupta* (Kamarere), and Jant started logging these areas between 1986 and 1990. The farmers were surprised at how much they earned from the trees, particularly in comparison to their income from royalties, lease fees and stumpage rates on leased land. The perceived benefits of tree farming have spread rapidly, and demand for seedlings has grown significantly.

In the past, the government and Jant both supplied seedlings to interested landowners, and provided technical assistance free of charge, but budgetary constraints have reduced the role of the National Forest Service in recent years. Jant has taken over the operation of the nursery at Baku station, providing the Forest Service with seedlings in return for use of the facility. The Forest Service sells these seedlings for 10 toea each, while Jant gives the seedlings away. Table 8.8 shows the increase in Jant's distribution of seedlings between 1990 and 1994.

Table 8.8: Jant's distribution of seedlings, 1990-1994.

Year	Number of Seedlings	Estimated Area (ha)*
1990	23,650	38
1991	61,430	98
1992	65,561	105
1993	95,950	154
1994	130,000	208
TOTAL	376,591	603

* Area based on a nominal spacing of 4 x 4 metres (625 trees per hectare).

Source: Information provided by Jant, March 1995.

More recently, Jant has established a loan programme which provides interested tree farmers with small amounts of money to assist in the establishment of plots. Jant has also provided support for the establishment of several privately run nurseries to meet both its own needs and the local demand generated by tree farming.

Although interest remains high, the long-term viability of tree farming in its current form is questionable. Neither Jant nor the Forest Authority has done much to coordinate the establishment of farms. As a result, farms are scattered across the valley, few are contiguous, and many are either too small or too far

away from existing roads to make harvesting viable. Estimations of the cost of establishing and maintaining a five-hectare tree farm indicate that the venture is now marginal at best (Thistlethwaite 1995).²⁹ The combination of these facts led Thistlethwaite (1995) to conclude that Jant gives a 'very low second priority' to tree farming, and that current efforts are more a gesture of goodwill than a serious attempt to supplement commercial plantations through guided tree farming initiatives.

Broader Considerations

This sketch of some of the outcomes of the Gogol planning process serves to illustrate one critical point about this process: its impact has been very haphazard. This fact by itself seems to indicate some failure on the part of an organised and purposefully directed planning process. Yet this conclusion understates the influence of a number of historically and politically contingent factors over the planning process, as well as overstating the ability of the process to accommodate and counteract the influence of these factors.

The key point to emerge from the preceding discussion is that the overall planning framework – the statutory, regulatory, and administrative instruments used for forest management – provides only general guidance for the management of forests at the project level. In the Gogol case, the details of this task are left almost entirely to Jant, which understandably manages the resource with one purpose in mind – to ensure a continuous supply of pulpwood to its chip mill in Madang.

The management controls that do exist for the Gogol project derive from a broader set of controls intended to manage forestry on a national basis. No regulatory controls have ever been developed to deal specifically with the unique aspects of forestry operations in the Gogol area, most notably the clear-felling of natural forests for pulp wood. Resource control has derived from existing regulatory devices designed for the management of selective logging operations.

This lack of specificity is more a victim of circumstance than a product of design. This framework was shaped by various events which coincided with the start of operations in the Gogol area, and it therefore needs to be considered in a historical context.

Firstly, the uncertainties and unknown dimensions of the Gogol project were largely responsible for the lack of specific guidelines controlling the project's operations. The entire concept of clear-fell logging was unknown, from a regulatory point of view, at the time of the project's inception.

²⁹ Earlier estimates had suggested a return of around K1,000 per hectare (see Lamb 1990:172). Thistlethwaite's estimates are based on a yield of 125m³ from an eight-year rotation of *Acacia mangium* (on which the majority of all plantations and tree farms in the Gogol are now based), while Lamb's figures are based on a yield of 200m³ from a ten to thirteen-year rotation of *Kamarere*.

Commercial forestry in PNG prior to the Gogol project was on a much smaller scale and was based on selective harvesting techniques. In the absence of any projects of a similar nature and size, local knowledge about the issues and impacts associated with large-scale clear-felling of lowland tropical forest was minimal. Government personnel also had to contend with the fact that many aspects of the project's operations could only be roughly estimated when it commenced.

Wider events also had a bearing on this situation. Following its policy direction of the mid-1960s, the Administration was keen to establish large-scale industrial projects as the basis for economic development in the impending post-colonial era, and the Jant proposal fit the bill nicely in this regard. While a lot of effort was directed at ensuring that the benefits of development accrued to local landowners, considerable effort was also directed at accommodating the requirements of Jant. The Administration wanted to establish an environment conducive to large-scale resource development, foreign investment, and (hopefully) economic growth. Some of its dealings with other forestry projects had resulted in the erosion of its own credibility, prompting several timber producers to shift their attention to other parts of Southeast Asia. The Administration became wary of scaring off the Jant project – with its 'world-first' status – and hoped that the successful negotiation of an agreement with Jant would raise the visibility of a flagging timber industry.

The development of the Gogol project also took place in a period of great political uncertainty and complexity in PNG, as the country moved rapidly towards self-government and eventual independence. As late as 1968, the Australian Minister for Territories had been unwilling to set a target for even limited self-rule in PNG. By the end of the decade, however, political events in both PNG and Australia forced the Australian government to recognise that colonial rule was coming to end much faster than had been anticipated only a few of years earlier (Lamb 1990:12). The Administration found itself in an ambiguous position, and, as a result, opted not to engage the trickier problems of the day, such as the uneven impacts of resource development and the resultant social unrest, or difficulties of promoting development under PNG's customary land tenure system. Instead, it left these problems to an imminently independent government.

Negotiations over the Gogol project took place in this uncertain political and economic climate. The attentions of the Administration were drawn in several different directions as it prepared for its own withdrawal and attempted to balance competing national and local-level goals in an effort to maintain some semblance of national unity. Not surprisingly, the Administration was never in a particularly strong bargaining position with Jant. After the protracted negotiations, and the erosion of its credibility in the eyes of the international timber industry, the Administration was looking to save face and restore lost credibility by successfully concluding its negotiations with Jant.

The ultimate consequence of this situation was that, at the end of the negotiations, only vague commitments had been given on a number of critical aspects of the project, particularly reforestation and development controls, leaving all parties with a great deal of uncertainty. The Administration had only a vague notion of the operational dimensions of the Jant proposal, and therefore did nothing to control or regulate them in any specific manner. Jant had only vague prescriptions for its operating environment, and was left to interpret these largely on its own terms. Finally, the landowners knew little about what had been negotiated and what it would mean for their future way of life.

Conclusion

It is difficult to know what conclusions to draw from the Gogol experience. The project continues to hold a unique and prototypical status amongst forestry operations in PNG. No other project shares the technical specifications of the Gogol project, nor its place in the evolution of the modern state of PNG.

This is not to say that specific lessons have not been learnt from the Gogol experiment. Jant and the forest industry have developed the technical skills to extract wood chips from mixed tropical forests on a profitable basis.³⁰ Jant and the government have also accumulated a pool of expertise on the task of managing Western-style, industrial-scale development in a non-Western environment. The government has been given a lesson on the administrative and regulatory demands of industrial-scale resource extraction, while villagers in the Gogol have crashed headlong into the calculating rationality of the internationally defined marketplace.

From a natural resource planning perspective however, the conclusions are a little more indeterminate. It is difficult to know whether the problems of the Gogol project are a result of a complete breakdown in the planning process, or simply the result of historical and political circumstance. In reality, the truth probably lies somewhere in between.

On the one hand, the planning framework, consisting of the various statutory and administrative instruments that set the context for resource use and management, did not appear to provide the necessary guidance for the deliberate and intentional management of the Gogol's natural environment. No clear process existed to gently ease the project into the Gogol Valley, and none seems to have evolved since. The initiative for resource management has been left to the one group whose objectives are the most clear-cut – Jant.

Unfortunately, the objectives of Jant are also the most singular in focus. It has always viewed the Gogol as little more than a source of feedstock for its milling operations, and has managed the resource accordingly. As a result, broader management considerations and an integrated perspective on all the

³⁰ The continued operation of the Gogol project is perhaps the best indicator of its productivity – better than the history recorded in its balance sheets.

resources of the Gogol Valley have always been lacking. Some efforts have been made to take purposeful steps to implement an envisioned future for the valley, but these have been largely ad hoc and, for the most part, have missed their mark.

The invisible hand of history cannot be understated either. The historical sequence through which this project has unfolded has been shrouded in technical, administrative, and political uncertainties. The consequence of this is that the project has not really developed as *planned*, but has simply *evolved*. Events have unfolded in a contingent manner, with important decisions taken as and when required by the historical and political events of the moment.

In the final analysis, therefore, the Gogol experience makes most sense if it is evaluated in light of both the specific character of the governance framework, and against the backdrop of a politically and economically uncertain epoch, in PNG's recent history. The governance framework gave only a loose definition of the planning process, so resource planning and decision making has always taken place in an opportunistic environment. Under these conditions, it is not surprising that events of the moment can quickly overwhelm even the best laid plans. The history of the Gogol project suggests that they often do.

CHAPTER 9

CUTTING THE WOOD OF WOODLARK:

RETROSPECTS AND PROSPECTS FOR LOGGING ON MUYUW, MILNE BAY PROVINCE*

FREDERICK H. DAMON

Introduction

Elders from Woodlark Island in Milne Bay Province used to begin their origin myths by saying 'The Creator cursed us'. Insofar as logging is concerned, the island's recent experience suggests that the Creator did indeed curse the place. Although coconut plantations and expanding villages are beginning to transform the island's appearance, from a distance it seems to be dominated by dense rainforests. But the inference that might be drawn from this view – an untapped wealth of rainforest resources for contemporary logging – is illusionary. The island does have old forests. Yet truly impressive-sized *Eucalyptopsis* found in the volcanic region are often hollow and rotting. The island's prized ebony barely makes the grade, and many of the trees meeting the 50 cm dbh¹ limit often have little of the high-demand black heartwood. Furthermore, the ebony is often found in such treacherous terrain that machinery becomes stranded or

* Data for this chapter was gathered in the process of conducting ethnobotanical research across the northern islands of Milne Bay Province. This research was facilitated by a University of Virginia Sesquicentennial Associateship, for which thanks are given to the University's Centre for Advanced Studies. The project involves collaboration with Dr Linus Digin'rina of the Department of Anthropology and Sociology at the University of Papua New Guinea, to whom thanks are given for stimulating discussion of some of the issues which this paper engages. Voucher specimens for flora collected on the island have been deposited at the Lae and Harvard herbaria, and tentative identifications have been received from Mr Max Kuduk (Lae) and Dr Peter Stevens (Harvard); thanks go to both men and their institutions for much kind advice and help. A portion of the research entailed organising a study of tree growth on 'Woodlark', and I thank Dr Herman Shugart of the Department of Environmental Sciences at the University of Virginia for stimulating and partly funding that work, and officials of the National Forest Service in Lae, the Milne Bay Provincial Forest Management Committee, the Murua Local Government Council (especially its clerk, John Alison), and elders and helpers across the island for their contributions to the survey process. Rolly Christiansen also strongly supported the forest growth survey and held many conversations with me about the status of logging on the island: if it is not evident from what follows, I should say that I have the highest regard for Mr Christiansen and for what he is trying to accomplish. This paper also draws on innumerable Muyuw friends, acquaintances, and relationships which are now some twenty years old, as well as on conversations with forestry officials in Alotau and the island's two forestry project supervisors, Noel Dihela (1995) and Samuel Alosious.

¹ Diameter at breast height.

wrecked in the process of extracting it. Many other trees tend to be small. The island's logger reports that 80 percent of all but one significant genus – *Calophyllum* – are undersize. And even those trees that meet legal size limits often shrink below the minimum between the time they are cut and the time forestry officials take their measurements. Since the industry is now more tightly regulated (especially for those operators who cannot afford to pay bribes), significant logging on the island may now be a thing of the past.

Yet the Creator's curse may be a blessing in disguise. The problematic nature of the island's trees, the island's small size from the point of view of large-scale logging, and its remoteness, may make Woodlark unworthy for today's industrial logging standards. But these very factors might make timber activity on a different, smaller scale one of a number of attractive options for the indigenous population's future development.

In this chapter I shall review Woodlark Island's relevant ecological and social context, its logging history since the Second World War, as well as the current logging situation, and I shall then offer some guidelines for the future based on current indigenous land use patterns. In so doing, I attempt to deal with three of the four issues discussed by other contributors to this part of the monograph. These are:

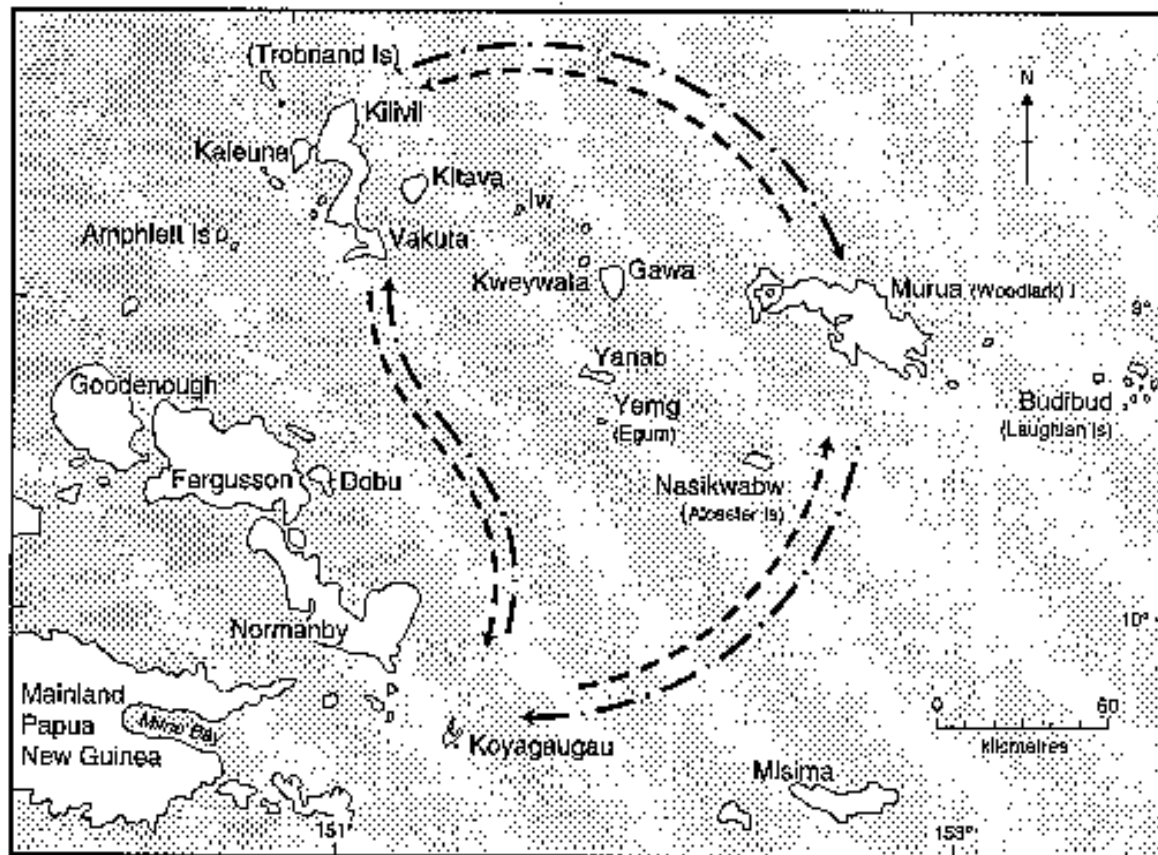
- the main turning points in the island's logging history;
- a description of the main stakeholders, their interests, plans, motives, etc; and
- what these people have gained and lost from the experience.

I exclude from serious consideration here the effects of the Woodlark experience in the provincial and national policy arenas because of the limitations of my own knowledge. As my description develops, I try to go from relevant ecological and ethnographic facts to real or potential policies as I have experienced them on the island. By 'policy' here I do not just mean the formal deliberations of governmental or political institutions; rather I include what I take to be the developmental presumptions of the European order that has increasingly come to dominate this island from some time in the first half of the nineteenth century. I offer this material as an anthropologist with some thirty-six months on the island, stretching from July 1973 to July 1996. My most recent research concerned the culture's ethnobotany, and thus I am able to draw on local knowledge directly relevant to the question of logging in contemporary Papua New Guinea (PNG), insofar as logging impinges on what is left of contemporary cultures. Prior to this, I have been concerned to describe Woodlark's place in the Milne Bay Province-wide regional system known to the anthropological world as the Kula Ring (see Map 9.1).² In this regional system, which remains a dominant force in many people's lives, social units continually pass two major

² This region of Milne Bay Province is one of the classic areas in anthropology. Consequently, there is a massive anthropological literature devoted to the area. Much of the significant literature written before 1990 is referenced in Damon (1990).

wealth items clockwise and counter-clockwise around a circle of inter-related islands. As will soon become apparent, a consideration of the island's logging resources and potential should take account of the local culture's place in this larger social setting.

Map 9.1: The Kula Ring.

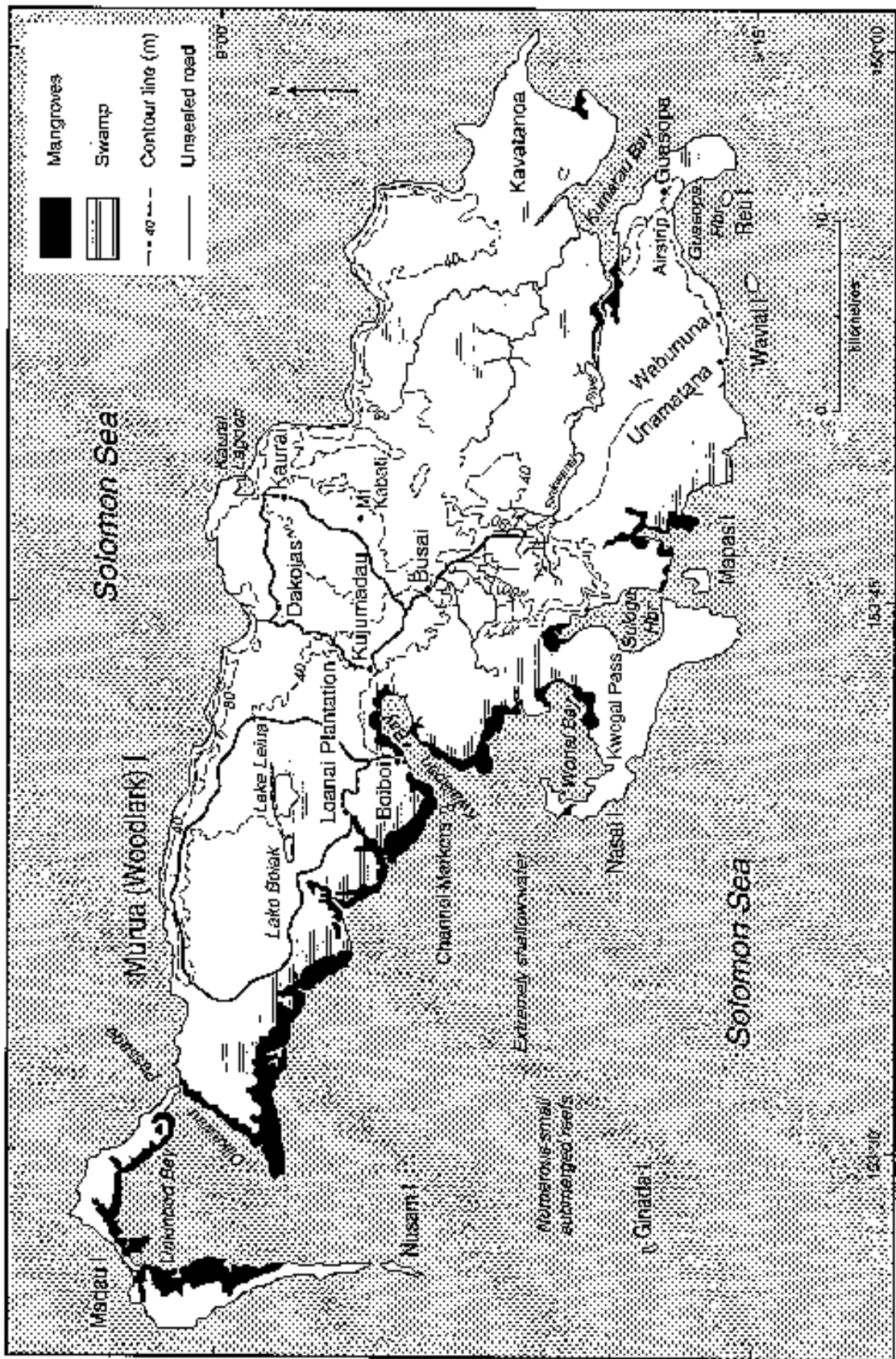


The Ecological and Social Contexts of 'Woodlark' Island

The island's common European name, Woodlark, dates from the late 1830s, while its current official (government) name, Murua, follows from a Trobriand pronunciation, and its real, indigenous name is Muyuw. In this paper I employ the indigenous name. The oldest European centre, now the centre for logging and mining activities, remains near Kulumadau Mountain in the centre of the island. The present administrative centre, together with an airstrip dating from the Second World War, is at Guasopa in the southeastern corner (see Map 9.2).³

³ I thank Auridian Consolidated NL for permission to reproduce Map 9.2, which is taken from the Inception Report on the Woodlark Gold Project Environmental Plan, prepared by Environmental Management and Monitoring Ltd in August 1996.

Map 9.2: Woodlark Island.



Located in the far northeast corner of Milne Bay Province, Muyuw is a mixed classic coral atoll, one of a number of islands on what geologists call the Woodlark Rise, a geological formation perhaps stretching from below the New Georgia Group in the Solomon Islands to the Huon Gulf. Gawa, Kweywata, Iwa, Kitava, and the Trobriand Islands are the other major inhabited islands on this formation. Although they may all be the result of volcanism, Muyuw is the highest of the group and the only one with evident igneous and basaltic foundations. It has a mountainous core with two named ranges, perhaps formed by a single eroded caldera, running on a northeast to southwest angle in the island's centre.⁴ The highest peak, Tabaku'y, is some 300 metres high. Several individual mountains – Kabat, Kulumadau and Ginaua – appear to be volcanic cones, although that may not be literally true.

The island rests asymmetrically around its volcanic base. There are several coral platforms which apparently rise to the north while they sink to the south, creating a landmass rectangular in shape, some sixty-five kilometres long and thirty kilometres wide at its centre. Relatively steep rises or sheer cliffs dominate the northern side of the island while much of the southern side is swampy. The outer edge of the coral platform extends for a kilometre (at the eastern end) or much further (at the western end) from the southern shoreline, providing lagoons with significant marine resources for the local population, and of indeterminate value for a national or international market.

The island's flora varies in accordance with geological and ecological conditions. One set of trees is found on the limestone platforms that dominate the eastern, northern and western portions of the island. A different set is found on the volcanic south-central part. This difference probably has more to do with soil variation than elevation. The 'mountainous' areas also tend to be swampier and far more difficult to traverse than the limestone dominated areas which readily soak up the rains (up to 4000 mm per annum). The island is a difficult environment – for Western life forms at least.

Nasikwabw (or Alcester Island), which lies some forty-five kilometres south of Muyuw's volcanic centre, is a raised portion of the southern reef system, most of which is under water. In the traditional economic system, Nasikwabw provides a base for a sailing community which facilitates communication between Muyuw and the island cultures to the south. Because of its sailing obligations, Nasikwabw's population depends on Muyuw for much of its food, and with the exception of some nut- and fruit-bearing trees, there is little exploitation of this island's landscape. In consequence, the island supports many ebony trees, a genus which seems to need undisturbed environments in order to thrive.

⁴ Recent geological exploration work by mining companies has created sufficient new data to rework 'Woodlark's' geology. However, the most useful physical descriptions of the island remain those of Ollier (1975) and Ollier and Pain (1978).

The flora of all islands resting on the Woodlark Rise is clearly the result of a complex interaction between each island's geological setting and the social systems created through human occupation of the region, which began at least 2,000 years ago, and the patterns here remain part of people's implicit or explicit knowledge of their environment – in other words part of their culture.⁵ The design from Gawa, just west of Muyuw, to the Trobriands is obvious and easy to define. Comparatively high forest growth rings each island, especially on the steeper sides. On Gawa, Kweywata, Iwa and Kitava, several tiers lead to an oval-shaped concavity entirely dominated by gardens and early successional forest growth monitored and significantly determined by the local inhabitants. The tiers are all gardened or planted with fruit- or nut-bearing trees, whereas the shorelines or steeper rises have higher forests monopolised by light-demanding trees which are also significant for local populations. Many species are also of commercial significance. Included are *Pometia pinnata*, *Intsia bijuga*, several *Calophyllum* species, including the common beach *Calophyllum* (*C. inophyllum* L.), and at least in some areas, *Endospermum medulosum* and *Palauium*.

There is multifaceted evidence suggesting that these floral environments are intentionally (or unintentionally) determined by the well-formed regional social system. First, most islanders believe their garden soils are reproduced by one commonly found tree – *Rhus taitensis* – which has similar names (*gweda/gwed*) in the local languages.⁶ This tree is not found in natural forest gaps, only in regions significantly transformed by roads or gardens.⁷ While some islands and villages allow it to sprout at will, others transplant seedlings next to root crops or alongside young nut or fruit trees.

Second, different islands or regions were planted with, or known for, trees of regional significance. Iwa grows a species of *Terminalia* (*T. catappa*, known locally as *saido*) which is thought to be unique in the whole province, and whose soft-shelled nuts are traded for the products of other islands. Gawa and Kweywata are known for producing the largest class of outrigger canoe, a craft

⁵ Aspects of this system have been described in the work by Hide et al. (1994). I particularly thank Dr Michael Bourke for numerous exchanges concerning aspects of the systems partly described in this work.

⁶ Other trees also play this role for people in more localised areas, e.g. several *Dysoxylum* species in southeastern Muyuw.

⁷ 'Woodlark Island' is famous internationally, and denoted as an environment worth protecting for biodiversity purposes, because of a unique species of cuscus (*Phalanger lullulae*). By the mid-1980s, timber cutting and gold exploration activities had developed to the point of appearing to threaten this animal's natural environment. Partly as a consequence, biologists from Oxford University (1987) organised two research trips to investigate the species. Although it had been presumed that this animal would tend to be found in the island's least inhabited zone, the south-central mountainous region, it appears to be more common around villages. The genus *Phalanger* is known to be an indiscriminate forager, but Muyuw people say one of its main foods is the nectar from the *Rhus taitensis* and a vine frequently seen in the first five to ten years of garden fallows. I thank one of the Oxford researchers, Dr Chris Norris, for discussing some of the relevant issues.

that plies the whole eastern half of the province, from a species of *Calophyllum* abundant on both islands (and also on the smaller and no longer inhabited Dugumenu). This tree is also one of the two really significant commercial *Calophyllum* species on Muyuw, and I shall discuss it again later in this chapter. Two other *Calophyllum* species found most commonly in Muyuw's volcanic region furnish the best masts for this same type of canoe, while several hectares of north-central Muyuw are known as the only reliable source of a leguminous tree used to fashion its outriggers.⁸ A species of pandanus found just east of the volcanic centre is (or rather has been until recently) a major source of leaves for the traditional sail. Budibud (or the Laughlan Islands), southeast of Muyuw, was and remains almost entirely planted with coconuts, and thus serves as a sort of coconut bank for Muyuw and other nearby islands. Although both maturing and sapling ebony trees can be found in many inaccessible Muyuw locations, I suspect that the ebony trees of Nasikwabw were deliberately placed on that island as an economic resource when ebony saplings were employed for making traditional weapons (such as spears for hunting larger sea animals such as turtles) and some tools. In any case, such examples could be multiplied.

Finally, most islands or island sectors are identified with a particular species of tree which is used locally as a source of firewood in 'ritual' and life-cycle contexts, and thus incorporated into the network of vital labour obligations between inter-married groups. Much of eastern Muyuw, for example, identifies with a tree which is only found in young fallow gardens, while north-central Muyuw identifies with a *Syzygium* species found in middle-aged fallows, and western Muyuw is linked to an old-fallow species. These trees symbolise the age of the garden fallows which these groups typically cut – young, middle, and old respectively. At the same time, south-central Muyuw is identified with a tree which is very hard and difficult to cut, symbolising the traditional indifference to gardening which accompanied that area's specialisation in stone-tool manufacture. Boagis, a sailing village at the southwestern extremity of the landmass, uses another tree that only grows near the sea, the wood from which is used as a critical component in the technology that ties masts to the keels of the largest class of outrigger canoe. Muyuw (and Gawa) people identify Gawa's tree as one that grows only along the beach – a hard and heavy species, whose cutting, splitting, and carrying for firewood represent the difficulties posed for, and transformations required of, a sea-based society perched on top of a column jutting 150 metres above the sea, since the bundled firewood has to be carried up the island's two sets of steep cliffs to the inhabited areas.⁹ Iwa is identified with a nut tree planted by its inhabitants, which is emblematic of its anthropogenic landscape. Dawson Island, one of the islands to the south of Muyuw, is

⁸ People from other islands sail to the village of Kaulay, which lies closest to this area, in order to refit their craft.

⁹ Although she was unaware of the use of this tree, Munn's (1977) analysis of the symbolism of fabrication entailed in the production of Gawa's famous canoes – canoes designed to ply the whole eastern half of Milne Bay Province – shows how this specific practice is part of a system of transformations.

identified with *Intsia bijuga*. Knowledge of these tree usages thus constitutes a kind of 'totemic' communication system (see Lévi-Strauss 1966). In reference to these trees and their distinctive usages, people locate themselves and others in a set of complementary roles and places in what is virtually a province-wide regional system.

Two conclusions may be drawn from the material presented up to this point. First, the data suggests that this region is similar to the environments which recent ecologically sensitive observers (for example, Posey 1985; Balée 1989) have begun to describe in the Amazonian region of South America. Such environments are parts of constructed social systems, not natural entities to which people adapt on the basis of what Westerners might regard as their 'limited' level of technological development.¹⁰ Second, it follows that these areas are, from the indigenous point of view, 'developed'. So, when outsiders enter this area presuming that something is lacking or that development is needed, they are creating an implicit or explicit misunderstanding between their own views and those of the inhabitants educated in this region.¹¹

Muyuw may therefore look like an island dominated by dense rainforests, but it is really part of a larger ecological and social region which is the subject of local knowledge, classification and use, and which is probably made to be the way it is. This point, however, raises a particular problem in the case of Muyuw because it looks so different from other islands to the west. Those islands are all densely populated, just fringed by 'rainforest'. Except for the areas immediately surrounding the current distribution of villages,¹² the interior of Muyuw, unlike the centres of the western islands, is not *now* a vast plane of garden land, but is covered by such rainforests. Why? This is not just an interesting academic question which may be answered by archaeological research; it also has some practical significance because of the distribution of many of the most commercially significant trees found on the island. I shall try to explain.

When compared to the population of some 20,000 in the Trobriand Islands, and the equally dense if not denser population distributions on the small islands from Kitava to Gawa, Muyuw's current population of under 3,000 is an enigma. It is known that the island suffered a major demographic collapse after the earliest colonial encounters of the 1840s, reaching a low point of some 800-900 around 1915. But the population estimates at the beginning of this decline are equally puzzling – several thousand certainly, but not as many as 10,000 or 20,000. Be that as it may, scattered artifacts found throughout much of the

¹⁰ The Woodlark Cuscus (*Phalanger lullulae*), which feeds off the tree *Rhus taitensis*, may be part of the island's human-created environment. According to Chris Norris (personal communication, October 1995), 'the current evidence suggests that cuscuses in general, and *Phalanger orientalis* in particular, tend to get moved around by human agency in this region'.

¹¹ 'Educated in this region' is, of course, a qualification which requires further discussion, since educational contexts are changing.

¹² Along the eastern, southeastern, and southwestern shorelines, the north-central part of the island, and several village locations on its western appendage, known as Mwadau Island.

uninhabited part of the island do suggest a different population distribution or size in the past, and this may serve to explain the incidence of two of the more significant commercial trees growing on the island, which are two out of some six *Calophyllum* species. The identification of these trees is not certain. One appears to be similar or identical to *Calophyllum peckelii* L., the other similar or identical to *Calophyllum leleanii* P.F. Stevens.¹³ Across the island they are known as *apul* and *kausilay/kosilay* respectively. The latter, *kausilay*, is the most significant because it is the main tree used to fashion outrigger keels. Both trees are gregarious; they normally occur in groves, and isolated trees are rarely encountered. The former species, *apul*, tends to be found on wetter ground that fringes swamps, especially in the southeastern third of the island.¹⁴ By contrast, *kausilay* is found on drier ground defined by uplifted limestone platforms. A most important fact about both trees is that in the high (30-40 metre) forest, where mature trees are found, one may see thousands of seeds and hundreds of sprouted seedlings but no saplings or middle-sized trees. I have only found small to middle-sized *apul* on the fringes of meadows in the lowland expanses dotting the island's volcanic uplifts. These meadows are named and apparently quite stable. If in some sense natural, they are also regularly burned after major dry periods as people traipse through them hunting wild pigs. Away from these meadows, to the east of the island's mountain ranges, mature *apul* are common,

¹³ These tentative identifications are courtesy of Dr Peter F. Stevens, who is a Malaysian systematist, Curator of the Harvard University Herbaria, and the expert on *Calophyllum* in Papua New Guinea. For Mr Rolly Christiansen, the owner of the island's logging company, Milne Bay Logging, there is a 'true' *Calophyllum*, plus the 'beach' *Calophyllum* and some others. His 'true' species is the one which Stevens suggests is *Calophyllum peckelii* L., and he does not distinguish it from *Calophyllum leleanii*. Although the former tends to grow somewhat larger than the latter, they are the only two trees consistently found and cut at about the 50 cm dbh minimum size for export logs. Not all Muyuw people clearly distinguish the various types of *Calophyllum*; only those who are engaged in their various, and complex uses for the manufacture of outrigger craft. *Kausilay* (*Calophyllum leleanii*) is the one used for outrigger canoes, and less knowledgeable people regard it as the prototype for the whole group (which is not named as such, but is clearly recognised as a group). Although my generalisations draw on empirical support from across the island, my understanding of *Calophyllum* derives from extensive interviews and observations with people in southeastern Muyuw. Their experience with the genus can only be described as 'studied'. It is impossible to deal with all of the complexity in the local understanding or ecology of the trees here. Nevertheless, these are vital issues for organising any commercial logging on the island. I am less certain of the facts with other commercial trees, yet many are found in environments similar to these two *Calophyllum* species. This is true of *Endospermum medulosum*, *Pometia pinnata* (undoubtedly a tree of a later successional stage than *Calophyllum*), perhaps several of the commercially significant *Sterculia*, *Dysoxylum*, and one *Aglaia* species. The *Sterculia* and *Dysoxylum* are cut, but are not as significant commercially as the others. When found inland, *Intsia bijuga* grows near young *Calophyllum leleanii* P.F. Stevens.

¹⁴ Another *Calophyllum* species is found in the swamps. Although it has also been cut for timber, it does not reach the sizes of the other two and, unlike all the others, it is a major food source for another of the island's resources, wild pigs. For the sake of future maintenance of the Muyuw culture and resource base, this tree (probably *Calophyllum vexans*) should not be exploited commercially.

but they are also beginning to rot, die, and fall. Once a guide casually mentioned to me that new ones would grow up in the gaps created by fallen older ones, but I saw no evidence of this, and I therefore wonder what conditions allowed them to grow in the first place – presumably a significant deforestation.

Like the *apul*, smaller *kausilay* trees are not found in the high forest, though the *kausilay* represents a somewhat different case because large trees are not just found in drier areas, but quite often on land which is unusually rocky. But more than this, saplings and middle-sized trees are only located on the edges of garden areas that have not been cut because the ground is so filled with coral limestone that it cannot be worked. Muyuw people know this, of course, and have a special name for this kind of 'land' – *sasek*. The avoidance of such land creates patchy garden regions, 'islands'¹⁵ of higher trees surrounded by gardens, or a much lower and distinctively different early-succession forest. In eastern Muyuw these patches tend to be small, with gardens forming around them. In north-central and western Muyuw, they tend to be long, as if the islands were ridge tops, with the gardens in valleys. In any case, people know that their intentional use of the landscape creates the conditions which this tree needs in order to reproduce in significant numbers.

My use of the term 'patch' to translate the concept of 'island' is intentional. I draw from Winterhalder's (1994) attempt to make the ecological notion of a 'patch' – meaning a spatially and temporally heterogeneous area – useful for anthropological analysis. Although they are not part of his purpose, Winterhalder cannot avoid the policy implications of this notion:

...it would be better to manage for the recurrence of desirable states than constantly try to force an ecosystem to maintain a particular state... [As for policy recommendations,] it is enough to note here that current approaches to policy almost universally adopt an equilibrium view: thus much environmental and developmental policy attempts to suppress temporal variation (e.g. fire control), homogenize spatial heterogeneity (monocrop tree planting), and introduce connectedness (industrial-scale timber harvesting), all of which promote constancy and stability at the expense of variability and resilience... (Winterhalder 1994:39-40).

Milne Bay Logging has created three monocrop tree plantations in its pursuit of systematic forestry.¹⁶ My own argument would be that Winterhalder's

¹⁵ The vernacular word is *tavin*, which is derived from the word for 'cut' or 'chop' and the word for 'island'. The concept is clearly motivated, and part of a convoluted indigenous system whose outlines may be suggested by noting that gardens are designed to represent all of the major social categories in the culture. Gardens are also understood to be boats, in part weaving their ways among the 'islands'. Aspects of the relevant system are discussed in Chapter 5 of Damon (1990).

¹⁶ Two of these are planted with species of *Planchonella* and *Catophyllum*, and may make reasonable progress because both trees seem to be require large amounts of light and usually only grow on the edges of higher forest. Although gregarious, they cannot be observed (on Muyuw at least) in the natural state in anything like the high concentration of the plantations. The third

'patchiness' is an intentional feature of Muyuw society, thought, and environment – as well as the larger system in which they are ensconced. This social system creates and organises itself around heterogeneity.

For the indigenous system of knowledge, the patches of older growth amidst early succession regrowth, created by the selective use of land, are important because the way in which the *kausilay* trees bend from shade to light creates the necessary curvature of an outrigger keel, and local people study this development over the years. These facts point to the conclusion that human action created the conditions for at least two, and perhaps more, of the island's most important commercial timbers. It therefore seems very likely that commercial logging has been exploiting a resource previously created by humans. Among other things, this means that random surveys of the island's 'commercial timber potential' may be very misleading. One survey line designed to gauge this potential in southeast Muyuw followed along a virtual corridor of *kausilay*, which I would guess to be the limit of gardening when the island's population was larger at some time in the nineteenth century, and was then used to project species numbers over almost 15 percent of the island. As a result, the southeastern third of the island is supposed to contain, as various people told me, a million cubic metres of timber. This may be a radical overstatement, because *kausilay* are rare or non-existent away from the route of the survey line. This situation does not appear to be unique to Muyuw.¹⁷

The History of Logging

'European' whaling ships probably ignored the island in the 1820s, when they first entered its waters. However, from an unsuccessful episode of Christian missionisation in the late 1840s down to the present day, the European order has looked at 'Woodlark' only to think that there must be souls or sales into which it can convert the island's perceived 'raw materials'. In the 1880s, copra from the Budibud coconut stands was the first botanical product to be commoditised. Thereafter, Europeans and some Muyuw people gradually started coconut plantations along the southeastern, southwestern, and western sides of the island. With one or two exceptions, most of these plantations have now reverted to forest. But copra production, even following the *Coconut Ordinances* effected in the 1920s and the re-emergence of indigenous planting after 1950, has always taken a back seat to the development of the island's mineral resources. Gold

plantation contains the island's species of ebony – a tree that appears to need mature forest cover to reach maturity itself.

¹⁷ Jean Kennedy (personal communication; Kennedy et al. 1991:116) reports a similar situation in Manus. Nearly 'pure stands' of mature *Calophyllum euryphyllum* are found, often over old village sites. During treks through the eastern, southeastern, and far western sectors of Muyuw, I got to the point where, if I came across *kausilay*, I would start looking for, and then quickly find, either evidence of dense coral outcroppings unsuitable for gardening, or potsherd or shellfish evidence of human occupation. My discussion of these findings with Rolly Christiansen prompted him to recollect his own experience of cutting the trees and concluding that these were 'regrowth' trees. Expanding garden areas in southeastern Muyuw are now downing dozens of large *kausilay*.

was discovered on the island in 1895, creating an instant gold rush, several mining operations, a European centre located near Kulumadau Mountain (see Nelson 1976), and a legacy which is now prompting a fresh attempt to mine the island's certain but probably small deposits. Europeans left when the Pacific War began, but 'Woodlark' and the Trobriands were the first islands which MacArthur invaded in 1943 on his way to the Philippines, though there had been no Japanese occupation of either place. Some 10,000 Americans camped on Muyuw for a few months – an episode which accounts for the island's only airstrip (originally used by fighter aircraft supporting the attacks on Rabaul) and the roads in the southeastern corner.

After the war, as the colonial frontier moved to new parts of the Territory, only one European family returned with any sustained interest and success. This was the family of Mr R.C. Neate, his wife, and their one son, Don Neate. It was Don who, with his own wife and six children, eventually cast off his father's fantasies of mineral wealth and established a company called Kulumadau Enterprises. The Neates and their company presented a model of European activity for Muyuw people, whose evaluations have shifted over the years.¹⁸ In a general sense, the Neates created the links that moved 'Woodlark' from its nineteenth century moorings to whatever the twenty-first century will bring. More concretely, Don Neate and his wife gathered island resources – marine resources, crocodile skins, copra – in a manner typical of other small European outposts of the era; created three trade stores; provided transportation, materials, and business support for companies engaged in the never-ending search for minerals (mostly copper and gold); organised local carving of ebony craft objects for an expanding national and international market;¹⁹ started cutting and exporting the ebony trees themselves; established a modest but increasingly efficient lumber mill which, in its best years (1975-77), cut some 500,000 superfeet of lumber annually; and last, but by no means least, when they left the island in 1978, they created an indigenous corporation called Woodlark Island Development Corporation (WIDCO).²⁰ I shall return to the Neates' social legacy later.

¹⁸ Muyuw people are intense and critical observers of what they see and imagine, and the Neates and Rolly Christiansen are very different people. Muyuw who were bitterly critical of the Neates in 1982 were using their activities as models of correct behaviour in 1996, at the expense of MBL, for which many people said they would no longer work. There is no space to discuss this issue here. However, as may be typical of situations like that of Muyuw, the Europeans who have marked the island have been so few, and their engagement so intense, that their 'personalities' and styles of business operation have become active forces in indigenous models of appropriate or inappropriate action.

¹⁹ Among all but the island's traditional carvers, who used to reside along an uplifted ridge in the southeastern sector of the island.

²⁰ WIDCO is currently engaged in an attempt to sort out landownership disputes, and remains at the centre of all non-traditional activities except those of the churches, whose influence is growing at a rapid rate.

The Neates' home, sawmill, and lumbering activities were all located in or around Kulumadau, the 'volcanic cone' and old European residential and mining centre. In the early 1970s, they had a truck, a small bulldozer, several small diesel-powered boats, and a barge for moving the bulldozer. Some of the trees they cut down were dragged to their mill or to nearby 'roads' by teams of villagers, usually from Dikwayas (or 'Dicoyas') and Kaulay (or 'Kauray') villages. As a result, the people of these two villages, and now the entire population resident on the north-central and south-central coasts, presume that they can partly or completely sustain themselves by periodic or regular employment in a European extraction sector.²¹ The Neates mostly cut *Calophyllum*, an undetermined species of *Syzygium* ('watergum'),²² *Pometia pinnata* ('taun'), *Manilkara*, and *Endospermum medulosum* ('basswood'). The boats that supplied their needs and carried away their exports were coastal trawlers that could rarely go further than Lac, or perhaps Rabaul. Communication with the outside world was by short-wave radio and, from some time in the 1960s, a fortnightly government charter which landed unpredictably on the airstrip at Guasopa, at a distance which sometimes required one or two days to be spent in further transportation on one of the Neates' diesel boats. By these means, and on a very small scale, the island's ebony gradually became known to the rest of the world. But for their time, which came at the end of Australia's overt control of PNG, the Neates had a relatively large operation.

This was dwarfed by the next real chapter in the island's logging history. After a couple of fitful years of trying to keep the Neates' operation going, WIDCO made arrangements with Milne Bay Logging Company (MBL) to cut the island's timber. MBL was created by another Australian, Rolly Christiansen, who had worked in the country – mostly in New Britain – as a logger since the late 1960s. MBL came to the island in 1980 and started cutting in 1982. Within its first six months of operation it cut 10,000 trees and sustained an annual cut of about 50,000 m³ through to 1991.

MBL changed the island's infrastructure and many islanders' expectations. When the Neates left the island in 1978, there were probably less than 20 kilometres of passable roads, of which a significant proportion in the southeastern corner were a legacy of the Second World War. By 1983, a road was cut from Kulumadau to Guasopa, while another circled the western half of the island (see Map 9.2). By 1988, there were some 200 kilometres of roads, and there was a growing expectation that villages situated along these roads should have several of their own vehicles, usually purchased from royalties rather than wages.²³ By the mid-1990s, in the central part of the island, people

²¹ Perhaps not paradoxically, plans and actions for indigenous engagement in the European sector are, in 1996, better established elsewhere on the island.

²² I know of five species on the island.

²³ These roads have been a source of continual conflict between MBL, the local population, and the provincial and national governments. As part of the conditions attached to its presence on the island, MBL has been obliged to construct various roads at its own expense. The road that

expected to ride on these vehicles and on MBL trucks from one village to another for sporting contests, especially soccer matches, held every Saturday. By 1988, MBL had as many as ten bulldozers, four logging skids, five fork lifts, two large dump trucks, road graders, and so forth. This was a scale of activity previously unseen by any of the island's younger generation, and otherwise only reminiscent of the Second World War.

The Neates' docking and loading area had been located at the mouth of a creek in the northeast corner of what is known as Kalopwan (or 'Kwaipain') Bay. For the new scale of activities a much deeper wharf, loading area, machinery repair area, and a village (and graveyard) for the workers' (some imported from Rabaul) were created close to Boiboi, at the mouth of the bay. The arrival of two or three freighters per month was not unusual up to 1991, though these vessels were not all filled with island timbers. MBL commonly had an arrangement to cut and deliver some 1,000 m³ of *Endospermum medulosum* ('basswood') each month. Most of the raw logs were sent to East Asian markets. By the mid-1990s, MBL had a satellite phone, a fax machine, and had created a global interest in the island's ebony. In 1995 and 1996, up to 100 m³ of ebony was being shipped to Japan to make ceremonial posts inside Japanese houses. MBL's owner spoke with Australian, German, Papua New Guinean, and United States businessmen about the wood. In 1996, it was no surprise that a planeload of Saudi Arabians swooped down to examine the ebony stands.

MBL's near decade of cutting were the first boom years for industrial logging in PNG. I have the impression that the company did what it wanted in the early years. But by the late 1980s and early 1990s, new rules were beginning to create difficulties. In mid-1990, the island was examined by members of a governmental Task Force on Environmental Planning in Priority Forest Areas, whose brief was to look for possible sites for the combination of nature conservation and sustainable development (see Filer 1991b, Young 1991).²⁴ In 1995 and 1996, local forestry officials told me of the enormous waste which they

encircles the western half of the island also facilitated a good deal of lumbering activity, but the required road to Guasopa, completed by 1983, did not have the same effect, and now remains a major expense for the company, especially with logging revenues next to non-existent. Eastern Muyuw people anxiously await another road, which is supposed to traverse the northeastern shoreline to the eastern side of the island, and complain about Christiansen favouring people in the centre who take their roads for granted. Christiansen now believes that he is performing duties that are more properly those of the government, and counts the various taxes and royalties that he and WIDCO pay against the services the island does not receive. Furthermore, there is no doubt that the roads which run through the island's mountainous terrain have transcended MBL's engineering capacities.

²⁴ From my own point of view, it is unfortunate that the island was not selected for further intervention along these lines, though the visit of the Task Force may still have prompted Christiansen to re-evaluate his own conception of sustainable development.

now had under control.²⁵ The company lost its permit to cut after 1991, just when tropical timber prices rose to unusual heights, and it was only renewed for a year from about May 1995 to May 1996, and this on land which had already been cut once. In the past, roads could be cut in any direction that seemed convenient, and any tree that could be sold could be cut down, so many trees had to be sold with the designation of 'small' or 'super-small'. But now roads had to be carefully monitored, and all trees marked before cutting and carefully measured to ensure sufficient size. Sample hectares, laid out ahead of time, were to be evaluated for damage after they were cut. MBL's owner saw all this as being too restrictive for an operation of his size, yet his operation was too small to afford the cost of paying bribes. The two young forestry officials, whom I got to know in 1995 and 1996, felt that they were introducing a badly needed system of control, yet they became bored because there was so little to do. Rolly Christiansen refused to cut any new wood in the area for which he was granted a permit, partly because there was so little wood to be cut, but partly also because of his ebony work and engagement in support activities for Auridiam Consolidated NL, the Australian gold mining company prospecting on the island. Christiansen had hired his own planner who, like the two forestry officials, was a young man from Milne Bay Province who had been educated in Lae, and whose own surveys led him to conclude that there was very little left which could sustain a profitable timber operation. Many hectares were producing less than 15 m³, less than 50 percent of norms elsewhere in the country,²⁶ and far less than in other tropical regions.

In 1982, MBL officials told me they had estimated there were twenty years' worth of timber left on the island. By 1991, after he had been cutting nearly 50,000 m³ a year, Christiansen told me that this rate could no longer be sustained. All the cutting to that time had been on the western half of the island. The company hoped to gain permission to cut the eastern half, but that was not forthcoming. Even if it had been, Christiansen now estimated that the island could only sustain a maximum cut of 28,000 m³ a year. Remarkably up to date on the state of the market and political dialogues swirling around tropical forests, Christiansen assumed that shortly nobody would be able to sell any tropical products unless they could prove they were 'green'. And he wanted to become that. He hoped 6-8,000 m³ out of the annual cut of 28,000 m³ would be earmarked for lumber production by a small mill which he had purchased, and by others which he hoped to persuade the local villagers to purchase on their own account. At the same time, he figured ebony cutting would have to decline to 20 m³ a year, rather than the rate of up to 100 m³ in 1995-96, and the only way to make this profitable would be to have the ebony turned into some kind of

²⁵ This is what I was told, but I do not have the ability to judge the quality of MBL's operations myself. In 1996, I surveyed two hectares which had been cut in the 1980s, and found that they were filled with young to middle-sized commercially significant trees, not unlike those that had been harvested. The regrowth was 'natural' and had not been organised by MBL.

²⁶ Harvest rates in West New Britain, which currently accounts for roughly half of PNG's total log exports, average 25-30 m³ (personal communication, Michael Bourke).

finished product on the island. Although, at the time of writing, it seems that governmental concerns with environmental controls over logging have foreclosed any future action on his part, Christiansen's creative and ambitious view of the future addresses the island's current situation rather than its history.

The Current Situation

MBL's owner, Rolly Christiansen, has also become the manager of WIDCO, the indigenous development corporation which the Neates established in 1978. Being married to a Muyuw woman, it also turns out that he is a brother-in-law to many of its officers.²⁷ Deeply embedded in the vagaries of local culture, in a way that almost inverts the distanced colonial manner of the Neates, he actively participates in many social processes. Closely tied to, and now a long-term observer of, the local social scene, he told me that he thinks the biggest threat to the future of logging on the island now is the way in which the islanders are cutting down the forests for gardening purposes.

He may be correct, for a number of interrelated reasons. New patterns are developing which will have serious long-term consequences for the island's environment and whatever social system the current trajectories generate. Clearly one factor is a rapidly increasing population, whose impact has several dimensions. First, although Muyuw's own population is a long way from challenging the island's resource base, it has exceeded 2,000 and is now pushing towards 3,000.²⁸ By contrast, the islands to the west are genuinely crowded. There is a continuing exodus of people from the Trobriands, Kitava, and Iwa, and although government officials do not believe their excess population can just shift across to Muyuw, as they did in the early 1980s, there is still a small but steady stream of people moving from west to east.

²⁷ WIDCO has a number of officers, a board of directors drawn from across the island, and a mass of shareholders comprising all those people resident in the Murua Local Government Council (LGC) area who have bought shares for a kina each. Although WIDCO's officers think things are going very well, few if any of the directors agree with them, and there is a near-total breakdown in communication between the manager and the officers, on the one side, and the board and most islanders on the other. Christiansen is an effective operator in his own way, but is playing too many roles not to become trapped by their contradictory effects. He bankrolled his father-in-law's participation in the inter-island exchange system without knowing it; he has helped many other people and keeps 'open house' to an extent which shocks government officials (both national and expatriate); and he has doled out money to help pay school fees in a manner not untypical of a traditional Muyuw big man. All of which has only prompted some Muyuw people to hold up his actions as examples of irresponsible financial dealings: 'A European would not act that way'.

²⁸ The population of the Murua LGC area, which includes all the islands from Iwa to Budibud, has just risen above 5,000. At least 2,000 people live on the outer islands. The main land mass of Muyuw has nearly 3,000 residents, including outsiders employed by MBL and the mining interests, plus a number of government officers and the school population located at Guasopa, and various Trobriand, Kitava, and other people from nearby islands who may or may not be permanent residents.

Alongside population growth, a second major issue is the way that people are cutting the forests for their gardens. Everyone thinks it best to cut the older types of forest, and they do so with relish. Consequently, scores of commercially valuable trees are being cut, and most are left to rot. There is also a different aesthetic sense and knowledge base among the new generations of people now practising the 'traditional' system, which brings us back to my earlier qualification concerning the locus of education. Most people have now been to schools, and increasing numbers have been educated in other parts of the country. A 'modern' landscape for them is one with no trees. Furthermore, the main message which many people have picked up in school is that their elders did not know anything. So they see no reason to avoid cutting down trees in places like the very rocky areas known as *sasek*, which formerly created the special 'islands' of vegetation. In the past, according to elders, these would have been left to provide stocks of seeds for the older types of forest, to cast longer shadows which force crops and younger trees to grow faster and larger, and (a mixed blessing in the traditional perspective) to provide homes for various fauna. If current trends continue, the patchy landscape of the traditional Muyuw garden area will be homogenised.

The impact of a growing population is combined with the effect of Western notions of land and its ownership being grafted onto 'traditional' Muyuw social categories. It is here that the legacy of the Neates has the greatest force. The idea behind WIDCO was that it would combine the island's landowners in a single body so that they could represent themselves as a unit to the island's probable future developers and receive a rent from that development. WIDCO has in fact distributed dividends - twenty times most people's original investments, according to Christiansen - and the desire for such income is so great that Christiansen believes any attempt to divert it to productive investment would lead to major tribulation.

WIDCO's intended purpose needs to be seen in light of the island's contradictory history of land tenure. As gold and copra production started in the 1890s, the colonial administration solved the problem of land tenure at a stroke by declaring 95 percent of it to be state land. The original development never proceeded as intended, and especially after the international economic collapse of 1929, there were no more new attempts to claim land for large coconut plantations. However, successive generations of outsiders and islanders have continually revisited the question of whether they should consider most of the island to be alienated government land or follow the 'indigenous' system of land ownership. And, as it turns out, this is a choice between an act of expropriation which nobody could now defend (even if some government officials take it as a fact of life) and a system which clearly varies with the eyes of the beholder, especially the Western beholder.²⁹ As all recent distributions of resources,

²⁹ 'Traditional' notions of landownership, as they emanate from the subclan construct called *data*, are discussed in Damon (1990), while the current situation is considered at greater length in a forthcoming article (Damon n.d.).

whether from mining or logging, have followed from these realities, some attention needs to be paid to them here.

In 1996, Muyuw people told me that, in 1978, the Neates organised a meeting of all the island's elders so that they could write down a record of the land owned by each subclan, and thereby create an enduring and official document. All copies of this document are now reportedly lost. The descriptions of the meeting which I have collected make it quite clear that no-one could figure out what was actually 'said' without a deep knowledge of the social personalities who did or did not make themselves heard, as well as a good understanding of the local rules of public discourse. Elsewhere I have described some of the rhetorical forms used in Muyuw public meetings (Damon 1983). Suffice it to say here that public speaking and decision making usually flows, as does much in the culture, through the negation of some initial perspective. Moreover, when people speak as they spoke in that 1978 meeting, they do not speak as autonomous persons freely entitled to their opinions. They speak as representatives of an indigenously defined distribution of resources whose understanding is, by our standards, situational. One aspect of that particular situation was the consciousness on the part of some younger participants that the older participants would soon die. As is the case throughout much of PNG, Muyuw life courses are structured so that most events and decisions can be reversed in the future. Consequently, there is no straight line to be drawn between an accurate record of that meeting and the present state of affairs, since a younger generation of spokesmen has redefined what was said.

'Subclans' are defined by Westerners and most government officials as the agencies which lay claim to land (as a source of rent). The Muyuw are a matrilineal people: everybody is in the same group as their mother. There are two tiers to their notion of a group, one containing the other. The superordinate category *kum*, customarily translated as 'clan', is not a land-holding, or other resource-holding, unit. Instead, it regulates marriage: people must find spouses from a different 'clan'. This is a formulation that is regional in scope. The clan identities of people from the north and west are virtually identical to those in Muyuw, and where they are different, in the south, there is a set of animal identifications which allows people to convert the terms of one system into those of the other. Unlike the system noted earlier in this paper, which designates differences between regions by reference to their special trees, this one specifies similarities or identities between peoples in this vast, nearly province-wide social system. In any case, there is a lower-level category, that of the 'subclan' (*dal*), and this is the category to which the ownership of resources is in principle assigned. So there may be two subclans in the same clan, but they will not necessarily own the same things. Their difference is represented by where they or their ancestors (often a brother and a sister) supposedly came out of the ground – usually on some mountain top, in a swamp or estuary, on a tiny island, or elsewhere in what is now Milne Bay Province. Just as there are people in Muyuw who think they came out of the ground on Rossel Island, for example, in the southeastern corner of the province, so there are other people elsewhere who think they came from Muyuw. Lots of people who supposedly came out of the

ground atop one of Muyuw's mountain ranges, Lukiduse, are to be found on Gawa, Kweywata, Iwa, and elsewhere. Sometimes people know, or once knew, the story of how their ancestors travelled from their places of origin to the vicinity of their current place of residence. Such knowledge actually increases as one moves west from Iwa to Kitava and the Trobriands – a difference that is recognised on Muyuw, and is a matter of no little concern to elders worrying about the future. Not surprisingly, in 1996, after twenty years of more intense Western resource exploitation on the island, there were lots of young people under thirty years old who were telling me much more than their elders could tell me back in 1975 or 1982. And several of those elders still alive in 1996 would ask me what I had been told, and then, in disbelief, correct it, or else call it a lie, and wince at some of the bizarre tales which were now being used to claim 'ownership', but which nobody would have imagined a few years earlier.

Taken as a set, many of these subclan stories are contradictory, or at least create contradictory claims about places of origin. Such contradictions have no bearing on significant resources and transformations in the society's traditional forms of wealth, which were located in affinal relations and not in subclans. The stories may have created differences, but they did not arbitrate or determine resource claims. The locations specified in myth were realities negated by further developments, in much the same way that speeches are negated in public meetings. Ambiguities over real resources (as opposed to places of origin) were resolved by a system of credits and debts which operated through the exchange of produced items or resources, pigs, and vegetable produce in mortuary rituals. Although they vary from one island to another, rituals of this kind are important everywhere in Milne Bay Province for defining the conditions of the future by actions performed over deceased persons and their relationships (see Damon and Wagner 1989). Access to resources, including significant garden and village land, and also such things as sago and betelnut orchards, was always regulated by the outstanding balance of debts and credits between intermarried groups. Land was not 'owned' as such, it was 'entitled' by this or that group making reference to debt relations which were always reversible if sufficient resources could be mustered to cancel outstanding debts. The future, so to speak, determined those realities which the West likens to contracts about land ownership which are fixed in terms of its own notion of the past or of 'precedent'. To the Muyuw elders, and most other people now more than forty years old, the dialectical relationship between mythical origin places and real resource claims was transparent, for it was mediated by ritual. To increasing numbers of younger people, and to the European social order, the relationship is opaque and the rituals are a waste of time.

Occasional government action, that 1978 meeting about 'landownership', and the arrival of resource-extracting companies like MBL and Auridiam (the mining company) have all helped to dispense with the old system and usher in a new one. External agencies want *unambiguous* claims to land to follow from people's places of origin, whether they came out of the ground or landed on the island. So now, claims to land are being made which elders still think, and virtually everyone twenty years ago would have thought, to be extraordinary and

sinister.³⁰ By any standards, of course, real money is involved. For example, WIDCO maintains absolute control over the island's ebony, but it contracts the cutting and selling to MBL. If MBL can effect some sales, WIDCO gives it a contract. Then MBL goes to people who have land claims and asks them to identify appropriate trees. MBL then harvests the logs and pays the 'landowners' a significant portion of the income from its sales. In 1995, this was K500 per tree, each of which might generate 1-3 cubic metres of black ebony which could be sold for about US\$2,000 per cubic metre. When I left the island, Christiansen was looking forward to disbursing some K80,000 in royalties to 'landowners', as well as dividends to WIDCO shareholders, Muyu 'individuals', 'business associations', clans or subclans, and 'villages'.³¹

Local people are increasingly making the assumption that land is owned by specific social units, and that all previous ways of dealing with resources are defunct. One consequence of this is that smaller units of people are moving onto 'their land', basing their claims on origin stories, so that they can keep an eye on it and, given the extent of overlap in origin and migration stories, make their presence incontestable when the time comes to distribute royalties. When they move to these areas, they garden on the land, and thus continue the process of cutting down older forests, usually following the aesthetic norms listed above – they cut everywhere. Muyu people who have actually lived on the island for the last five to ten decades are not the only ones doing this. When these new procedures were explained to me, I raised the question of the greater verbal abilities and propensities of peoples to the west. Friends in southeastern Muyu indicated that the government had already decreed against any claims from this quarter, thus protecting them from a problem they agree would otherwise exist. I then discovered some Kitavan men who came to the island when MBL was recruiting labour in the early 1980s, and who claim that they belong to a subclan which came out of the ground in Muyu and, in the process of moving west, gained a right to a large sector of land near one of the lakes on the western half of the island. These were dismissed as idle claims by some elders whom I questioned in central Muyu, and yet the young man serving as the Murua Local Government Council President completely agreed that the Kitavans owned the land because they were 'traditional landowners' – a statement he made in English, even though he and I conducted all our other formal and informal

³⁰ And thus capable of generating witchcraft (*bwagau*) accusations. At the time of writing, these seemed to be passé in the eastern third of the island, but a good deal of migration and new village construction on the western end of the island is the result of witchcraft fears.

³¹ Ebony harvesting does appear to be very wasteful, and if the forestry officials are correct in their understanding of how the trees mature, there is virtually no-one, from Rolly Christiansen down to the landowners, who knows how to deal with the tree. 'Landowners' merely walk through the deep woods looking for large trees, and then insist that MBL workers cut down the trees which they select. Sometimes they do not meet the limit Christiansen has imposed (55 cm dbh), but there is little the MBL workers can do when an irate landowner insists on the cutting. But the critical issue is how much of the blacker heartwood is in the tree. Large trees (over 55 cm dbh) might still have very little, and so end up being wasted almost completely, though some of this rejected wood is shunted into the increasingly active individual craft carving sector.

conversations in Muyuw. In short, not only is the population increasing, it is also spreading out, as people from near and far turn origin places and mythical wanderings into claims of ownership which they think they can best substantiate by their physical presence.

This shift in the definition of land ownership has a related consequence. Although government forestry officials have apparently denied MBL new permits to cut on the island, they have declared the whole island to be a single 'Forest Management Area'. This runs contrary to the inferences which local people are making from the 'new ideals' of land ownership. For one of the reasons why MBL has not been able to gain permission to log east of the central mountain ranges is that people who consider themselves to be the owners of that land want to find their own logger and have him set up a logging operation just for them. What is at issue here is an enormous portion of the southeastern part of the island, perhaps some 20 percent of the total. Although some people find these claims to be ludicrous, especially those holding major debts from the relevant subclan, most people agree that one subclan owns most of this land. The members of this group claim to have signed papers with an Australian who will soon turn up and start work. They believe that one of their subclan brothers, well-ensconced in the government bureaucracy in Alotau, the provincial capital, is actually organising and safeguarding their interests. Because of this, they say that they will refuse to release any of their land for mineral exploration or any other purpose.³²

Suggestions for the Future

The consolidation of new landowning principles, the operations of MBL, the exploration work by various mining companies over the last two decades – all leave the inhabitants of the island positioning themselves to claim royalties from other people's work. Their own work is another matter. In this section, I suggest how current 'traditional' land use patterns might be harmonised with small-scale timber extraction or lumber production. Small-scale extraction is consistent with what seems conceivable by the only resident with real experience in making commodity production viable on the island – Rolly Christiansen.³³ The nature of the market which exists outside the island, and the organisation of capital and labour which would be necessary or sufficient to acquire and reproduce this hypothetical system of production, are important issues which lie beyond the scope of my discussion here. Yet it might be pointed out, in this respect, that new activities to absorb the island's increasing population are

³² From conversation with this person in July 1996, I would say that nothing is going to happen, because the deal with the Australian logger has apparently dissolved. This case illustrates some of the divergence in viewpoints between islanders who live on the island and those who only frequent it for special occasions, some of whom regard the place as a vacation spot which they prefer to be undisturbed.

³³ In late 1996, partly due to Christiansen's influence, a villager in southeastern Muyuw purchased a small sawmill in the hope that he could do some cutting for his fellow villagers and other potential buyers.

urgently needed, and one of the most important reasons for this is the undermining of traditional forms of skill and knowledge, which means that something new must come to absorb an idle creativity.

The central fact which emerged from the earlier discussion of local ecology is that many, if not most, of the commercially valuable species of trees which grow on the island are trees that can or must grow from disturbances created by human activities.³⁴ The potential, then, is to take advantage of growth patterns created as part of the culture's normal agricultural periodicities. For several decades, current gardening practices that follow from island-wide desires to cut old fallows could result in much wood suitable for producing lumber. Many villages clear several hectares of old-fallow forests every year. In southeastern Muyuw, the older fallows tend to have lots of *Dysoxylum*,³⁵ as well as groves of *Calophyllum*, *Palaquium*, and *Endospermum medulosum*, the last of which appears very quickly and in great numbers along roads and in early succession growth from older forests. Odd numbers of several *Syzygium* species are also found in southeastern Muyuw, while in the north-central part of the island, along with *Pometia pinnata*, several *Planchonella* species and a different *Syzygium* species (the ritual firewood) are abundant. If one were considering the export of raw logs, this opportunity would not really exist because, with the exception of the *Calophyllum* and some of the *Dysoxylum*, few of these trees reach or exceed the 50 cm dbh limit. But if the point at issue is local production of relatively high quality lumber from trees with 20-45 cm dbh, many villages could generate enough wood to keep small sawmills running for as long as a market and local willpower are present.

Sooner or later, ecological, demographic, or other conditions will mean that it is inadvisable to simply cut down what appear to be the island's abundant and undisturbed forests for gardening purposes. The question then is how to adapt these conditions to gardening and small-scale logging requirements. Here again, traditional practices probably supply a key. The point on which to focus is the patchy environment which the traditional system already takes advantage of through its intentional creation of those 'islands' of higher trees surrounded by gardens. In southeastern Muyuw, I have found every significant commercial tree inside these islands (with the exception of *Pometia pinnata*). In some of them, *Calophyllum*, several species of *Sterculia* and *Dysoxylum*, and *Palaquium* and *Endospermum medulosum* are particularly common. In north-central and western Muyuw, *Palaquium* and *Endospermum medulosum*, *Syzygium*, and (in older areas) *Pometia pinnata* are abundant. Clearly these areas would have to be carefully monitored, but for small-scale production

³⁴ I am sure my knowledge is incomplete, but the only tree I know of that is commercially significant, and that does not seem to require major (human) environmental modification, is *Mastixiodendron smithii* M. and P. It is found in many of the island's environments, sometimes in very high concentrations, and sometimes clearly in late successional fallows.

³⁵ In eastern Muyuw, *Dysoxylum* are thought to be beneficial to crops, perhaps even better than the *Rhus taitensis* discussed above. Stable isotope analyses do indeed suggest that at least one species fixes nitrogen.

purposes this might not be difficult, and might even represent a continuation of the existing practice of monitoring the growth of *Calophyllum* for outrigger canoe production.

In short, 'current' ideals of land use present a viewpoint on consumption of the island's resources which might bring valuable practices from the past into a future where new values have to be produced – and reproduced.

Conclusion

I conclude this chapter by reviewing its main points and trying to answer the questions posed for this part of the monograph – at least insofar as their answers suggest a possible future for the island.

Muyuw, considered as an ecological and social entity, was, and significantly remains, a node in a vast social system, designed in such a way that it can endure, albeit problematically, through various natural and social perturbations. The islanders' skills, knowledge, and social relations were not conceived, and never have existed, in isolation. Europeans, and the new representatives of a European order, always think the place is far from home, forgetting that it *is* home for the people who live there. In any case, it is likely that the timber resources which the new European order has found on the island during the latter half of this century were created by the historical development of a pre-existing social system. I have tried to suggest that future development might appropriately be built on what is left of the traditional system, because that system may be useful for constructing a sustainable future. And the island's most recent history strongly suggests that a full-scale industrial logging system will *not* be capable of doing so.

The main turning point in the island's logging history is the replacement of the Neates' Kulumadau Enterprises by Milne Bay Logging. It may be that the most valuable resources created by that transition will turn out to have been the business models which both companies have bequeathed to the island. The Neates were perfectionists on a small scale, presenting a contrast, in many people's eyes, to MBL's broken machinery and apparent inattention to detail. Although he radically transformed the scale of business operations, developed Western infrastructure and Western desires, and created the promise (and even the reality) of integrated social relations, Christiansen has provided people with a problematic model of how to run a business.

If, out of the ashes of MBL's decade-long experience of industrial logging, there comes the successful institutionalisation of smaller scale lumber production based in several villages, whether in the hands of MBL or other islanders, then this too will be a major turning point in the island's history. It is evident, however, that there will be a decade or more of trial and error before that point can be reached.

Muyuw culture is the complex effect of the island's place in the northeastern corner of the Kula Ring (the traditional inter-island exchange

system) and its location at the very end of the Western world-system (which may or may not be laden with resources). Furthermore, local people's interests, motives, and knowledge vary radically with their differential perspectives. For those actively or passively ensconced in the traditional system, the periodic arrival and subsequent behaviour of Europeans have always been treated as extra resources to satisfy the long-term and never-ending demands of Kula and kinship obligations. In the mid-1970s, Christiansen's Muiuw father-in-law was an ambitious man from Dikwayas whose Kula aspirations were frustrated by the two most powerful elders of that village. After marriage, his luck changed: by 1995, he had received what is probably the most famous Kula valuable in the Kula Ring.³⁶ For younger Muiuw people, men mostly, educated in the church and government school system, MBL represents the latest failure in 'development'. Some told me that they thought they would find development in logging; and having learnt their lesson, they are now anxious to try mining instead. There are, of course, people between these two extremes who treat logging and its offshoot activities merely as a source of European exchange items useful for acquiring the 'things' of the 'new order' – from clothes to food to church buildings to school fees. Very few if any of these people have ingrained into their consciousness the labour requirements of commodity production. Focussed Western desires, for some commodities and activities, are becoming more apparent. Yet these desires are not as strong as the negative features which most associate with commodity production. There are a number of people from north-central Muiuw, between the ages of thirty and fifty, who once worked with the Neates, then with WIDCO in the late 1970s and early 1980s, some even with MBL, and who now enjoy themselves, their children, and their grandchildren back in their villages. This is another reason why small-scale lumber production, if it could be periodic, might represent a more realistic economic future than anything else. Few if any Muiuw people on the island have to work like Europeans, and WIDCO dividends are helping, in a way, to assure this outcome. Those interested in 'development' should perhaps remember what it took for European standards of work to become the implicit, tacitly accepted, order. For a while, at least, most Muiuw will keep to their own standards.

³⁶ The *mwal* Klibulaboul, which figures importantly in Damon (1983).

PART TWO

**NATIONAL AND REGIONAL
PERSPECTIVES ON THE
FOREST INDUSTRY**

CHAPTER 10

A STATISTICAL PROFILE OF PAPUA NEW GUINEA'S LOG EXPORT INDUSTRY

COLIN FILER

Introduction

The purpose of this chapter is to provide a summary account of the 'official statistics' through which the Government of Papua New Guinea (PNG) endeavours to assess the economic significance of the country's log export industry. Having considered the general size and shape of the industry in the period since Independence, I shall go on to consider three particular questions to which the government's statistical endeavours have recently been addressed. These are:

- the concentration of capital within the log export industry;
- the definition and measurement of 'sustainable forest management'; and
- the distribution of log export revenues between stakeholders.

I have also included two appendices which show the current state of knowledge, within the PNG Forest Authority, about the ownership, control, size, and output of each individual logging project in the country. While some readers may find this volume of information to be somewhat indigestible, I should point out that some of it has been quite hard to come by, and there is some evidence to suggest that the Forest Authority is currently engaged in one of the favourite pastimes of the national bureaucracy, which is the conversion of official statistics of all kinds into 'state secrets'. Hopefully, the publication of this chapter will serve, in some small way, to discourage this pursuit.

There are several measurable aspects of the log export industry which have not been discussed in this chapter, either because they are of rather limited interest as matters of current policy debate, or else because they are discussed by other contributors to the present volume. For example, little or nothing has been said about the income and expenditure of the Forest Authority itself, the economics of 'downstream processing' or 'small-scale forestry', the financial operations of landowner companies, or the 'non-timber' values of the rainforest.

In the final section of this chapter I shall briefly discuss the inferences which can be drawn from public debate about the significance of statistical information on the log export industry in an attempt to understand the relationship between 'science', 'capital', and 'politics' in PNG.

The Significance of Log Exports in the National Economy

Some economists would say that PNG is a mineral-dependent economy, while others might prefer to say that it depends on the extraction of a narrow range of natural resources – oil, gold, copper, fish, and logs. If we only consider the formal sector of the national economy, leaving aside the great mass of economic activity which is undertaken outside it, both forms of dependency are much in evidence. Extractive industry, almost entirely under the management of foreign capital, currently accounts for something like 90 percent of the value of PNG's domestic exports, and probably contributes about half of the government's non-grant revenues. From this point of view, PNG might therefore be described as a nation (and a government) of resource rent collectors (see Filer 1997b).

There has been a slow but steady increase in the significance of mineral exports in the period since Independence, from something less than half to something more like two thirds of all domestic exports. Raw log exports, by comparison, contributed less than 5 percent of domestic export values during the 1970s, between 5 and 10 percent from 1981 to 1992, but 16.3 percent in 1993 and 18.1 percent in 1994 (see Table 10.1). In 1994, the government collected about K131.3 million in log export taxes – more than 10 percent of all non-grant revenues, and almost half the amount which the mining and petroleum companies paid in corporate taxes during that year. However, the recent increase in the quantities of 'resource rent' captured by the state has gone hand in hand with a serious fiscal crisis and a substantial devaluation of the kina.

The figures shown in Table 10.1 are mainly those published by the Bank of PNG, on the basis of information supplied by the Internal Revenue Commission. These figures do not contain a breakdown of total export tax revenues, but it is normally assumed that log export taxes have accounted for more than 95 percent of such revenues in recent years.¹ Confusion sometimes arises because of the apparent discrepancy between the figures published by the Bank of PNG and those produced by the Forest Authority (and occasionally published in the *PNG Timber Digest*) on the basis of information contained in its own database.² Early in 1995, the figures produced by the Internal Revenue Commission showed that log export volumes had risen from 1.75 million m³ in 1992 to 2.43 million m³ in 1993, and about 2.8 million m³ in 1994, while the Forest Authority's figures for the same period showed an increase from 2.04 million m³ in 1992 to 2.76 million m³ in 1993, followed by a decline to about 2.5 million m³ in 1994. This discrepancy naturally flowed through to the calculation of log export revenues. When the Commission initially estimated that log export taxes would be worth about K141 million in 1994, the Authority was simultaneously

¹ The assumption in Table 10.1 is that log export taxes have constituted 96 percent of all export taxes throughout, though recent changes in the forest revenue system (discussed later in this chapter) would suggest that the proportion has recently been increasing.

² The establishment of this database was one of the achievements of the World Bank-funded Forest Management and Planning Project in the National Forestry and Conservation Action Programme.

estimating that they would only be worth K113 million.³ The explanation for this discrepancy seems to lie in the timing of the measurements made by the Commission and the Authority, because the former measures the volume and value of the log exports on which *taxes are paid* in a particular year, while the latter measures the volume and value of the logs which are *actually shipped out* of the country. Although this means that the Forest Authority's data are more 'up to date' than those of the Internal Revenue Commission, they are less accessible, and cannot readily be compared with other economic data published by the Bank of PNG.

Table 10.1: Volume, value, and revenue contribution of PNG's log exports, 1978-1999.

Year	Export volumes ('000 m ³)	Export values (K million)	% share of domestic export values	Log export taxes (K million)	% share of non-grant revenues
1978	421	11.8	(02.3)	n.a.	n.a.
1979	476	20.9	(03.0)	n.a.	n.a.
1980	618	30.0	(04.7)	n.a.	n.a.
1981	749	31.5	(05.8)	n.a.	n.a.
1982	1,063	49.6	(09.1)	n.a.	n.a.
1983	1,003	43.2	(06.5)	4.7	(01.1)
1984	1,278	69.9	(08.7)	12.4	(02.6)
1985	1,158	58.4	(06.5)	12.6	(02.3)
1986	1,299	68.0	(07.0)	13.7	(02.5)
1987	1,450	103.0	(09.3)	16.5	(02.5)
1988	1,348	90.5	(07.4)	15.6	(02.3)
1989	1,349	90.0	(08.6)	11.4	(01.4)
1990	990	65.2	(06.2)	12.2	(01.6)
1991	1,062	81.2	(06.2)	17.7	(02.2)
1992	1,601	140.0	(08.0)	25.0	(02.7)
1993	2,375	400.2	(16.3)	70.9	(06.3)
1994	2,944	483.1	(18.1)	131.3	(10.2)
1995	2,513	436.7	(12.8)	127.6	(08.6)
1996	3,000	564.0	(16.9)	144.0	(09.6)
1997	3,090	605.6	(19.3)	146.9	(09.7)
1998	3,180	648.7	(18.5)	149.9	(09.9)
1999	3,280	695.4	(19.8)	152.8	(09.5)

Sources: Bank of PNG *Quarterly Economic Bulletins* for all actual figures to 1995; 1996 Government of PNG *Budget Papers* (Tables 2.2, 2.3, 4.1) for 1996-99 projections.

³ Table 10.1 shows that the Commission later adjusted its figures downwards, but not far enough to match the estimates made by the Forest Authority.

Table 10.1 shows that, by the end of 1996, government planners were predicting an increase in the nominal export price of raw logs at the rate of K8 per cubic metre each year for the next four years. It also shows that they were projecting an increase in the physical volume of exports beyond the level of 3 million cubic metres per annum, which some commentators (including the World Bank) regard as the limit of 'sustainability'. The government's inclination to 'solve' its fiscal crisis by issuing new timber permits, despite the efforts of the World Bank to prevent it from doing so, is partly due to the fact that government revenues from log exports are worth considerably more, per unit of export value, than those obtained from the mining and petroleum sector. Log export taxes currently account for more than one third of log export values, while corporate taxes paid by mining and petroleum companies account for less than 12 percent of mineral export values. Furthermore, the 'production' of a new mining or petroleum project is a far more complex and time-consuming business than the issue of a new timber permit.

Figures produced by the PNG Forest Authority show that Japan is currently the destination for well over half of PNG's raw log exports, while South Korea accounts for slightly more than one quarter, and a variety of other countries import the remainder. Table 10.2 shows that the volume of Japanese imports fell quite noticeably between 1994 and 1995, and this is consistent with a long-term decline in the Japanese market, which is due to material substitutions in the Japanese plywood industry and competition from its Indonesian counterpart (see chapters by Cooke and Light, this volume). On the other hand, these figures need to be treated with considerable caution, firstly because they may represent short-term fluctuations which disguise the long-term trend, and secondly because of the level of 'political interference' with long-term trends in the regional log export trade.⁴ Figures for the first half of 1996 show that Japan imported more than 63 percent of the 1.4 million cubic metres exported in that period, while the South Korean share declined to less than 20 percent, and the Philippines accounted for nearly 10 percent, of this total. The rapid growth of PNG's exports to the Philippines over the last three years can be explained by the exhaustion of that country's own timber resources, and the consequent need to supplement the supply of raw material to its domestic plywood industry, but since that industry is also in decline, it is unlikely that PNG's exports to this market will increase much further (personal communication, Peter Dauvergne, 1997). Representatives of PNG's log export industry appear to believe that mainland China represents their best chance of compensating for any further contraction in the Japanese and South Korean markets (personal communication,

⁴ For example, PNG's share of the Japanese market may actually grow, while the total size of that market continues to shrink, because other countries in the region decide to follow the Indonesian example of imposing a log export ban in order to encourage the development of a domestic plywood industry. Furthermore, Table 10.2 appears to understate the volume of PNG's exports to Japan by a very considerable (and annually variable) margin. Data produced by the Japanese Lumber Importers Association show that Japan imported more than 1.9 million cubic metres of logs from PNG in 1994, and almost 1.6 million cubic metres in 1995 (personal communication, Peter Dauvergne, 1997).

Bob Tate,⁵ 1997), but there is as yet little evidence of growth in the Chinese market.⁶

Table 10.2: PNG log exports by country of destination, 1994-95.

Country	1994 exports		Av. price (USD/m ³)	1995 exports		Av. price (USD/m ³)
	('000 m ³)	(%)		('000 m ³)	(%)	
Japan	1,509.8	64.9	165	1,388.8	57.7	140
South Korea	601.0	25.8	137	656.8	27.3	116
Hong Kong	71.3	3.1	209	78.5	3.3	230
China	47.9	2.1	167	49.9	2.1	171
Taiwan	41.0	1.8	135	60.9	2.5	104
Philippines	35.2	1.5	111	126.9	5.3	104
Thailand	10.2	0.4	121	13.8	0.6	117
India	9.4	0.4	220	17.5	0.7	217
Malaysia				15.9	0.7	113
TOTAL	2,325.7	100.0	158	2,409.0	100.0	135

Source: PNG Forest Authority *Timber Digest*.

According to the Bank of PNG, raw logs currently account for between 97 percent and 98 percent of all exports of 'forest products'. Jant's woodchip exports from Madang Province account for most of the balance (see Montagu, this volume). The domestic market currently consumes about 400,000 cubic metres of timber a year, or roughly 15 percent of the current log harvest (personal communication, Bob Tate, 1997). Despite the appearance of a national policy consensus in favour of 'downstream processing', the raw log export business is still responsible for an unprecedented share of output and activity in PNG's forest industry.

It is thought that the forestry sector, as a whole, currently employs between 6,500 and 7,000 people (nearly all men).⁷ This represents about 3.5 percent of formal sector employment, which is roughly the same as the proportion of jobs normally occupied in the mining and petroleum sector. Of this total, there are some 500 public servants employed in the regulation of the forest industry, and perhaps another 2,000 people employed in the sawmilling business, while the rest are engaged in logging and log exports. There has been some public debate about the numbers of 'Asians' employed in the logging industry (see Henderson

⁵ Research Officer, PNG Forest Industries Association.

⁶ In the first half of 1996, PNG exported roughly 37,000 cubic metres of logs to China, which represented 2.6 percent of total log exports during that period.

⁷ A recent newspaper advertising campaign by the Forest Industries Association claims that more than twice this number of people are dependent on the forestry sector for their employment. This claim takes account of additional jobs which are thought to be generated by the industry's backward linkages (personal communication, Bob Tate, 1997).

1996a), but the poor quality of PNG's employment statistics does not warrant further discussion of this point.

The Concentration of Capital in the Log Export Industry

Under Part IV of the 1991 *Forestry Act* (Sections 104-114), all 'forest industry participants and consultants' are obliged to register with the Forest Authority before doing business in the forestry sector. The National Forest Policy (Ministry of Forests 1991:35) regards the process of registration as one of the strategies that was designed to secure the goal of greater national participation, but the Act treats it as an instrument for the control of malpractice. One of the outcomes of the registration process was an attempt by some senior staff and consultants of the Forest Authority to establish the form and extent of the interconnections between the various companies engaged in the log export industry.

During the last few months of the Namaliu government, and then again during Tim Neville's occupation of the Forests Ministry from 1992 to 1994, the main focus of public debate on this issue was the form and extent of the control exercised over the log export industry by one Sino-Malaysian company, Rimbunan Hijau (RH).⁸ The debate came to a head in June 1993, when the Minister seems to have concluded that this company was using all sorts of 'connections' to block the implementation of the National Forestry Development Guidelines (PNGMOF 1993b), even while it was supposedly seeking to influence public opinion in its favour by financing a new national daily newspaper. At this juncture, the *Post-Courier* published a feature article (Togarewa 1993) which claimed, amongst other things, that RH controlled 80-86 percent of PNG's log export market, and had made a profit of between K350 and K400 million on the export of PNG logs in 1992. These claims were vigorously denied by the directors of RH and its affiliated companies, who maintained that they only controlled 'about, or less than, 40 percent' of PNG's log exports, and could hardly have made such a remarkable profit on logs exported in 1992 when the total value of PNG's log exports in that year was only about K179 million (*Post-Courier*, 23 June 1993).

Official figures show that the value of PNG's log exports in 1992 was certainly not more than K179 million, and might even have been less (see Table 10.1).⁹ But the proposition that RH controls a very substantial proportion of PNG's log export market has been repeated in numerous writings on the subject. For example, Kürschner-Pelkmann and Callick (1995:39) cite two other 1993 newspaper articles, including one published in Malaysia, as evidence that RH already controlled at least 60 percent of PNG's log exports, while Henderson (1996a:143) mentions an 'internal report made for the Department of Forests'

⁸ 'Sino-Malaysian' companies are defined here as Malaysian companies owned or controlled by persons of Chinese ethnic origin.

⁹ The company directors were apparently quoting the Forest Authority's figures, rather than those of the Internal Revenue Commission.

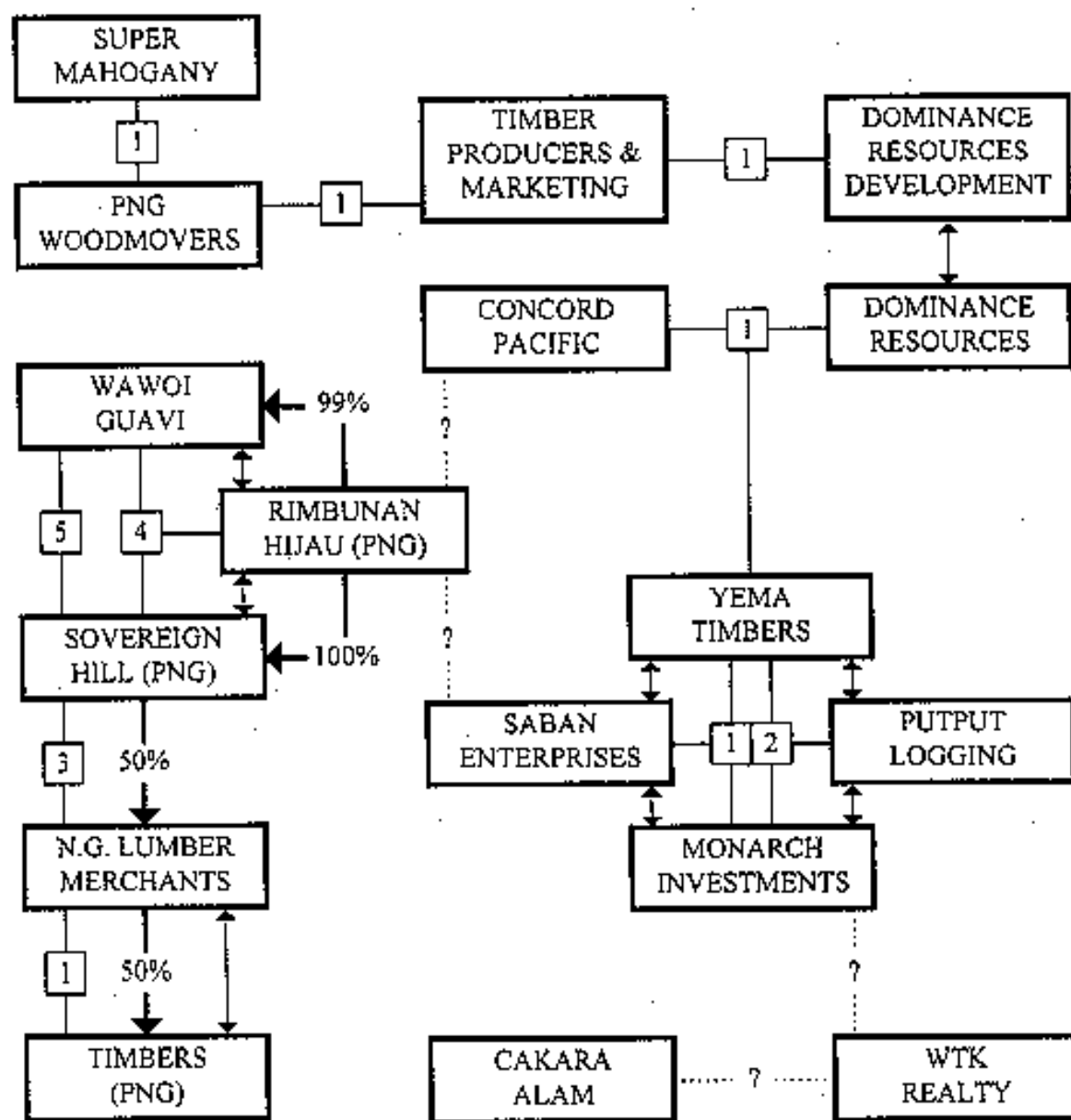
which held 'one Malaysian logging company' responsible for 86 percent of the total timber harvest.¹⁰ However, these claims cannot be substantiated directly from the Forest Authority's own register of 'industry participants', which was established shortly after the gazettal of the new *Forestry Act* in 1992.

Figure 10.1 shows, in summary form, the connections which could be shown to exist, in 1993, between those 'forest industry participants' who were thought to be part of a Sino-Malaysian cartel which was either dominated or controlled by RH. The evidence clearly revealed the existence of several distinct clusters of companies, each containing a combination of foreign companies (including some which were directly engaged in PNG's log export industry) and national companies (normally local landowner companies) with which they were obviously doing business. The foreign companies in each cluster were connected by mutual shareholdings, overlapping directorships, or shared office facilities (as revealed by common fax and phone numbers), while their links to the national companies were typically revealed by the use of sequential cheques from a single chequebook to pay their registration fees to the Forest Authority. In this way, it was possible to identify a core group of companies associated directly with RH, and five other companies or groups of companies whose links to RH and each other were either tenuous or dubious:

- Cakara Alam, a subsidiary of Land and General Bhd, which was contracted to export logs from the West, Central and East Arawe timber permits in West New Britain Province;
- WTK Realty and its local subsidiaries, whose main operations were in the Vanimo area of West Sepik Province, but which also had contracts in Madang and West New Britain;
- the 'Monarch group' of companies, all subsidiaries of a Singaporean company called Monarch Logging, whose main operations were in the Lolo area of West New Britain, but which also had contracts in Madang, Oro, and Milne Bay, and was effectively managed by Mr Hii Yii Ann;
- Dominance Resources, which held the Umbukul timber permit in New Ireland, and was one of a group of companies under the effective control of Dr Phillip Liag; and
- a group of companies registered in the Philippines, including Super Mahogany and Timber Producers and Marketing, which had one logging contract in Morobe Province.

¹⁰ Henderson's article was also written in 1993. In a paper written in early 1994 (Filer 1996b:289), I myself have previously estimated that RH controlled more than 70 percent of PNG's log exports, since this was the percentage suggested by one of the Forest Authority's own former consultants (PNGADCP 1993).

Figure 10.1: The putative Sino-Malaysian logging cartel, 1993.



— NN% → = direct shareholding (N%)

— [N] — = shared directorships (N)

↔ = shared office facilities

..... ? = suspected offshore linkage

Although the Forest Authority's database contained little or no evidence to show that RH actually controlled all or any of these other corporate interests, suspicions were converted into rumours, and even into 'facts', by the circulation of long lists and elaborate diagrams based on this body of data.

It is somewhat ironic that the Forest Authority's own efforts to prevent the continued 'leakage' of such information into the public domain have been accompanied by complaints from the Forest Industries Association (FIA), as well as from non-governmental organisations (NGOs), that the Forest Authority is now being far too secretive with its data. From information supplied by sources within the FIA itself, it is possible to confirm some of the linkages represented in Figure 10.1, but also to identify some changes (or some new revelations) in the pattern of corporate relationships since 1993.¹¹ These changes do seem to indicate that RH has strengthened its own position in the log export business, but not to the extent of directly controlling much more than 50 percent of it.

Table 10.3 shows that the core group of companies associated directly with RH has increased its share of the log export market from about 36 percent in 1994 to just over 40 percent in the first half of 1996. However, these figures definitely understate their current market share, and probably also understate the rate of its growth over the last three years. Firstly, the Hong Kong-based Seal Corporation sold its PNG logging interests to RH in 1992.¹² Secondly, the Monarch group of companies, though not shown to be part of the RH core group in the Forest Authority's database, appears to have been taken over some time in 1991, not long after RH had made its debut in the PNG logging industry.¹³ Monarch Investments, Saban Enterprises, and Putput Logging are certainly now regarded as RH subsidiaries by officers of the FIA, and there is widespread circumstantial evidence of collaboration between the two groups of companies over the last five years. On the other hand, the same sources maintain that the Dominance group, under the leadership of Phillip Ling, is still operating independently of RH, and that this group has increased its own share of the export market through the acquisition of Yema Timbers from the Monarch group, and through the exercise of greater control over the Super Mahogany group.¹⁴ WTK Realty is also widely regarded as a competitor of RH, despite

¹¹ Information in the following paragraphs is primarily derived from Bob Tate (personal communication, March 1997).

¹² These comprised timber permits in Manus (West Coast) and Western (Oriomo-Wimare) provinces, the latter being held through a subsidiary called Forest Management Services (see Appendix A).

¹³ If the takeover had been an offshore transaction, perhaps involving the purchase of ProExcel Sdn Bhd (the Malaysian parent company of Saban Enterprises), then this might explain the absence of any clear linkage in the Forest Authority's database. Majid Cooke (this volume) treats ProExcel as an RH subsidiary.

¹⁴ The Forest Authority database indicates that Monarch Holdings held a 70 percent stake in Yema Timbers in 1992 or 1993, but FIA staff maintain that Yema Timbers is now definitely part of the Dominance group. The Forest Authority database suggests that the Monarch, Dominance, and

the fact that these two companies are owned and controlled by separate branches of a single Chinese 'clan' which dominates the logging industry in Sarawak.¹⁵ And Cakara Alam hardly even qualifies for membership of the putative cartel, since the chairman of its parent company, Wan Azmi Wan Hamzah, is a member of the ethnic Malay business elite which has been promoted by the Malaysian government to counter the influence of the ethnic Chinese business community.

Table 10.3: Percentage share of PNG log exports produced by different corporate interests, 1994-96.

Interest group	1994	1995	1-6/96
Rimbunan Hijau core group	36.1	38.1	40.4
Seal group (under RH)	0.8	0.5	0.4
Monarch group (under RH)	10.5	7.6	5.0
Dominance group	1.8	2.0	2.2
Super Mahogany group	1.3	0.2	0.5
WTK Realty	13.3	17.4	14.6
Cakara Alam	9.8	11.4	10.0
Turama Forest Industries	6.0	4.4	6.2
Stettin Bay Lumber	4.7	2.4	5.8
Open Bay Timber	4.4	2.7	3.5
Nam Yang Timbers	3.0	2.7	2.4
Other/unknown interests	8.2	10.8	9.0

Source: PNG Forest Authority *Timber Digest*.

There have been suggestions that RH exercises some kind of control over Turama Forest Industries (TFI), either through its stake in an offshore parent company, or through the contractual relationship between TFI and Concord Pacific, but these suggestions do not appear to carry much weight.¹⁶ There is no suggestion that RH exercises any kind of control over the Japanese companies which run the Stettin Bay and Open Bay logging operations, or over the Korean company, Nam Yang Timbers. If we assume that RH controls half of the business assigned to 'other/unknown interests' in Table 10.3, but we do not

Super Mahogany groups were (and may still be) connected through the multiple directorships of John Boo and his wife, Delma Dumas, but Boo's role in the management of these companies may be limited to his professional capacities as an accountant.

¹⁵ The two branches of the clan, now commonly known as the Wongs (WTK) and the Tiongs (RH), are thought to have 'fallen out' some years ago. An article in the *Asian Wall Street Journal*, reprinted in the *Times of PNG* (3 March 1994), dates the 'family feud' back to 1975. On the other hand, they are still connected through financial institutions such as the Hok Hua Bank, which might therefore be regarded as the axis of any Sino-Malaysian cartel.

¹⁶ According to the Forest Authority database, the directors of Concord Pacific include the ubiquitous John Boo (see Figure 10.1 and Footnote 14), but TFI appears to have terminated its relationship with this company in 1995. TFI itself (along with PNG Forest Products) belongs to the Prime group of companies, which is listed on the Singapore stock exchange and controlled by ethnic Chinese interests, but I have no further evidence of a link with RH.

assume that it controls TFI or the Dominance/Super Mahogany group, then RH is left with approximately 50 percent of the total log export business. And we arrive at much the same result if we make the equally plausible assumption that RH *does* exercise some kind of control over the Dominance/Super Mahogany group, but only controls about 20 percent of the 'other/unknown interests'.

In either case, one would have to conclude that RH is certainly the dominant player in PNG's log export industry – a fact which is confirmed by Francis Tiong's present role as President of the FIA – but this does not amount to a monopoly. The role which RH plays within the log export industry might then be compared with the role played by Chevron, Placer Dome, and BHP, respectively, within the petroleum, gold, and copper export industries – in other words, a relatively standard pattern of capital concentration in the business of resource extraction.

Sustainable Forest Management

The Tropical Forestry Action Plan Review found a number of deficiencies in the way that the Department of Forests had dealt with the problem of defining and measuring 'sustainable forest management':

- the actual log harvest levels forecast in the revised National Forestry Development Programme of 1988 were not shown to be related to any clear conception of 'sustained yield management' (World Bank 1989:18);
- the Department's plan to achieve the goal of 'sustainability' by converting 10 percent of all logged-over areas to forest plantations was evidently contradicted by its plan to sell off the small areas of government plantations which already existed (ibid:19); and
- official estimates that each hectare of productive forest contained 50-60 cubic metres of commercial timber did not match the actual measured output of 20-30 cubic metres (ibid:21).

The World Bank produced its own calculation of sustainable yields from the natural forest by:

- estimating that 40 percent of the gross 'operable area' of 15 million hectares was actually available for logging;
- multiplying the net utilisable forest area of 6 million hectares by an estimated harvesting yield of 30 cubic metres per hectare; and
- dividing this total by an estimated rotation length of 50 years to arrive at a maximum annual allowable cut of 3.6 million cubic metres (ibid:21).

It was assumed here that the overall rate of deforestation would be roughly equal to the rate of reforestation, given that the area under forest plantations had grown from 23,580 hectares in 1979 to 35,896 hectares in 1988 (ibid:23), and that a good deal of government land was still theoretically available for this purpose

(ibid:26), even if the Department's own target of 100,000 hectares by the year 2000 was clearly unrealistic (ibid:27).¹⁷

In 1991, the new *Forestry Act* and National Forest Policy addressed the problem of sustainability by setting out the conditions for production of a National Forest Plan. According to the Policy (PNGMOF 1991:5), each provincial government was required to identify five different types of land within its own borders:

- 'production forests', meaning long-term timber production areas;
- 'protection forests', excluded from production by various environmental considerations;
- 'salvage forests', meaning forested areas to be cleared for other uses;
- land currently without forest cover which would be 'suitable for afforestation'; and
- 'reserve forests' – a residual category for forested areas which had not yet been classified.

It seems that this classification was meant to form the basis for a 'schedule for the management and utilization of forest areas within the province' (ibid:6), which would itself be part of the Provincial Forestry Development Guidelines, while the Provincial Forest Development *Programme* would be required to demonstrate a more specific commitment to 'sustained yield management' of those areas designated as 'production forests'. For this purpose, the 'allowable cut' would initially be set 'by dividing the total merchantable resource within the production forest by an assumed cutting cycle of 40 years' (ibid:6), this being a provisional estimate of the period of time which the average stretch of production forest would take to recover its timber value after selective logging. These calculations would then be incorporated into the National Forest Plan, allowing the latter to arrive at an annual statement of 'allowable cut' in each province for the succeeding year.¹⁸

Barnett (1992:109) took particular exception to this method of achieving the goal of sustainability, describing it as a 'simplistic and unsatisfactory device'.

This formula is not based upon research on Papua New Guinea forests, in fact the very concept of there being a scientifically determined

¹⁷ In 1988, roughly 70 percent of the area devoted to forest plantations was under government control. The government was attempting to enlarge the area of plantations on customary land through the New Zealand-funded Demonstration Reforestation Project (see Filer 1989), but the problems encountered by this project were cited by the World Bank as evidence of the implausibility of the official target.

¹⁸ This statement appears to be missing from the National Forest Plan which finally made its appearance in 1996 (PNGFA 1996).

sustainable yield cycle has been challenged by many competent authorities. Moreover, many of those who do believe in the concept would advocate a much longer cutting cycle of around 70 to 80 years. In any event, to work out a formula on a province-wide basis rather than to consider the characteristics and needs of each individual forest area would allow for gross and unnecessary overcutting of some valuable and irreplaceable forests on the rationale that other forests exist in the same province so that for the province as a whole, the annual allowable cut will not have been exceeded (*ibid*:115)

The National Forest Policy did state (1991:6) that the formula would be 'subject to review in the light of further research', and although there was no mention of such activities in that part of the document which was devoted to research policies and strategies, the National Forestry and Conservation Action Programme (NAFCAP) included a Rapid Resource Appraisal (RRA) project which was part of this process of review. This project was largely funded by the Australian government, and a report was produced in 1993. The main aim of the exercise was to produce an interim body of data which would enable the National Forest Service to produce the provincial and national plans required by the National Forest Policy, and thus to meet the conditions required by the World Bank and other aid donors for further funding of the NAFCAP (personal communication, John McAlpine,¹⁹ 1997). Some of the main findings of this study are summarised in Tables 10.4 and 10.5.

The consultants engaged in this study arrived at their definition of the 'maximum annual sustainable yield' for each province (see Table 10.5) through the analysis of data produced by the Department of Forests in respect of all actual and potential concession areas, and comparison of this data with other information obtained from the PNG Resource Information System.²⁰

- First, they deducted from the 'gross operable area', which amounted to a total of 12.6 million hectares,²¹ those areas which were not available for logging because of previous disturbance or problems of access, and thus arrived at a 'net productive area' totalling 8.8 million hectares.
- Having subtracted another 10 percent (800,000 hectares) from this total to allow for 'buffer zones' around streams and water holes, they estimated that approximately 712,000 hectares out of the remaining area had already been logged before 1993, while another 7.2 million hectares had not yet been harvested by that date (see Table 10.4).

¹⁹ Team Leader, Rapid Resource Appraisal project.

²⁰ The basis of these calculations was a map of forest types at a scale of 1:1,000,000 (see Saunders 1993), although some work was also done on the mapping of vegetation types at a scale of 1:100,000, in recognition of the fact that this interim study would eventually be supplanted by a more detailed forest inventory (personal communication, John McAlpine, 1997).

²¹ Rather less than the estimate of 15 million hectares previously made by the World Bank.

- A further 15 percent deduction was made from this combination of logged and unlogged forest in order to allow for roading and other infrastructural requirements of logging operations, thus leaving a 'potential forest area' of approximately 6.8 million hectares (see Table 10.4).
- Assuming that this would be the maximum area available to a regime of sustainable natural forest management, they proceeded to calculate the 'maximum annual sustainable yield' by making further estimates of the volumes of commercial timber contained in the area which had not yet been harvested, and the natural growth rates of commercial timber species after selective logging had occurred.²²

Table 10.4: PNG's commercial forest areas by province, 1993.

Province	Forest logged before 1993		Forest not yet logged in 1993		Potential forest area in 1993	
	'000 ha	(%)	'000 ha	(%)	'000 ha	(%)
Western	35.1	(4.9)	1,460.6	(20.2)	1,271.3	(18.8)
Gulf	35.1	(4.9)	925.5	(12.8)	816.5	(12.1)
Central	23.4	(3.3)	318.7	(4.4)	290.8	(4.3)
Milne Bay	40.0	(5.6)	81.4	(1.1)	103.2	(1.5)
Oro	60.2	(8.5)	181.5	(2.5)	205.5	(3.0)
S. Highlands	7.8	(1.1)	52.0	(0.7)	50.8	(0.8)
Enga	1.0	(0.1)	18.9	(0.3)	16.9	(0.2)
W. Highlands	-		13.6	(0.2)	11.6	(0.2)
Chimbu	-		50.5	(0.7)	42.9	(0.6)
E. Highlands	2.6	(0.4)	94.1	(1.3)	82.2	(1.2)
Morobe	22.1	(3.1)	380.9	(5.3)	342.6	(5.1)
Madang	58.6	(8.2)	449.7	(6.2)	432.0	(6.4)
East Sepik	-		662.7	(9.1)	563.3	(8.3)
West Sepik	42.4	(6.0)	836.4	(11.5)	719.9	(10.6)
Manus	4.8	(0.7)	70.2	(1.0)	63.8	(0.9)
New Ireland	133.5	(18.8)	262.0	(3.6)	336.2	(5.0)
E.N. Britain	103.2	(14.5)	311.1	(4.3)	352.2	(5.2)
W.N. Britain	118.4	(16.6)	893.2	(12.3)	859.9	(12.7)
N. Solomons	23.5	(3.3)	184.8	(2.5)	177.0	(2.6)
TOTAL	711.8	(100.0)	7,247.8	(100.0)	6,765.6	(100.0)

Source: McAlpine 1993.

²² These growth rates were estimated at between 0.8 and 1.0 cubic metres per hectare per annum.

Table 10.5: Provincial resources and estimates of sustainable yields, 1993.

Province	Commercial timber standing in 1993		Max. sustainable yield from 1993		Actual log exports in 1994	
	'000 m ³	(%)	'000 m ³	(%)	'000 m ³	(%)
Western	29,231	(17.3)	1,051	(16.5)	203	(8.7)
Gulf	19,435	(11.5)	757	(11.9)	171	(7.4)
Central	6,879	(4.1)	233	(3.7)	112	(4.8)
Milne Bay	1,864	(1.1)	103	(1.6)	37	(1.6)
Oro	4,582	(2.7)	205	(3.2)	43	(1.8)
S. Highlands	880	(0.5)	41	(0.6)	-	
Enga	844	(0.5)	14	(0.2)	-	
W. Highlands	747	(0.4)	9	(0.1)	-	
Chimbu	2,047	(1.2)	34	(0.5)	-	
E. Highlands	3,762	(2.2)	66	(1.0)	-	
Morobe	11,039	(6.5)	343	(5.4)	53	(2.3)
Madang	11,338	(6.7)	432	(6.8)	28	(1.2)
East Sepik	13,184	(7.8)	563	(8.9)	16	(0.7)
West Sepik	20,906	(12.4)	720	(11.3)	112	(4.8)
Manus	3,105	(1.8)	64	(1.0)	18	(0.8)
New Ireland	4,507	(2.7)	336	(5.3)	82	(3.5)
E.N. Britain	7,781	(4.6)	352	(5.5)	203	(8.7)
W.N. Britain	23,113	(13.7)	860	(13.5)	1,237	(53.2)
N. Solomons	3,800	(2.2)	177	(2.8)	-	
Unknown					11	(0.5)
TOTAL	169,047	(100.0)	6,359	(100.00)	2,326	(100.0)

Sources: PNG Forest Authority *Timber Digest*, December 1994 (1994 export volumes); McAlpine 1993 (other data).

If we compare the result of these calculations with the actual volume of log exports in 1994 (see Table 10.5), it would appear that a claim to 'sustained yield management' could be made in all provinces except West New Britain, which accounted for more than half of all the logs exported in that year. However, the authors of the study went on to point out that a substantial proportion of the 'potential forest area' would not continue to be available for timber harvesting, either because it would be set aside for conservation purposes or (more likely) because it would be converted to other uses – primarily agriculture.²³ In other

²³ According to the Biodiversity Country Study (Sekhran and Miller 1994), 25-30 percent of the area designated as 'operable forest' by the Forest Authority has biodiversity values which should warrant conservation. At the same time, over the last few years, there have been several so-called 'agro-forestry' development proposals which would entail the total clearance of substantial areas of forested land for oil palm or other tree crop plantations (see Wood, this volume). But the RRA considered that the main threat to the 'potential productive area' would be the subsistence gardening needs of a rapidly growing rural population.

words, the 'potential forest area' could not be equated with the area of 'production forests' defined in the National Forest Policy because parts of it would either become 'protection forests' or 'salvage forests'. The problem, then, was to arrive at a more realistic estimate of the 'probable', as opposed to the 'maximum', potential forest area. The authors of this particular study suggested that the figure could be as low as 3.7 million hectares, which would of course entail a corresponding reduction in the estimates of sustainable yield. Other commentators have suggested figures as low as 3 million hectares, with a sustainable log harvest of only 3 million cubic metres a year (see PNGADCP 1993; Nadarajah 1994).

There were already a number of additional reasons for doubting the sustainability of the harvest levels of 1994.

- Firstly, the official export figures almost certainly underestimated the actual export volumes, since there were bound to be some operators whose shipments were not fully reported to the government.²⁴
- Secondly, the level of harvest will always be greater than the level of exports. Over the last few years, the difference has been officially estimated at between 600,000 and 1 million cubic metres per annum.²⁵ This figure is understood to apply to timber which is subject to further processing before being exported or consumed by the domestic market.
- Thirdly, the volume of timber which is officially 'harvested' may not include a substantial number of full-size logs which are wasted in one way or another, and certainly does not include those very substantial volumes contained in the (mainly immature) trees which are critically damaged by careless logging practices, even though this second form of wastage represents a substantial deduction from some future harvest.
- Finally, the very uneven spatial distribution of logging operations (as shown in Table 10.5) was likely to create additional pressures for the conversion of forested land to agricultural use in those areas (such as West New Britain) where current harvest levels were extremely high, and those provinces in which harvest levels were obviously unsustainable would also be those in which logged-over forests were more likely to be cleared for other uses.

For these various reasons, it now seemed very unlikely that sustainable timber production would be possible if the country officially exported more than 2 million cubic metres a year for any significant period of time. But Table 10.1 shows that exports have substantially exceeded this amount each year since 1993, and that the government is currently projecting exports in excess of 3 million cubic metres for the foreseeable future.

²⁴ The volume of such 'concealed' exports may be less significant than their value, because they are likely to comprise those species (such as rosewood) which are subject to a species-specific export ban.

²⁵ Jant's woodchip mill alone accounts for 200,000 cubic metres of logs processed onshore.

In 1994, the PNG government was obliged by its own fiscal crisis to negotiate an 'economic recovery' (or 'structural adjustment') programme with the World Bank. The practice of 'sustainable forestry' was one of the main conditions which the Bank imposed on the financing of this programme. The numerical dimensions of this practice were specified in three government commitments:

- to limit the total annual log harvest from existing timber concessions to the level attained in 1994 (approximately 3 million cubic metres);
- to refuse requests from logging companies to carry forward unused permitted cuts from one year to the next;²⁶ and
- to limit the annual harvest in all new concessions (or extensions of existing concessions) to one thirty-fifth of the net loggable area.

During the course of 1996, however, the government appeared to back away from these commitments when the Forests Minister declared that the Forest Authority would speed up the allocation of new timber permits in order to raise the annual harvest to 5 million cubic metres, and sought to amend the *Forestry Act* in ways which appeared to raise the level of ministerial control over this process. These actions provoked a stand-off between the government and the World Bank, as the latter held out for restoration of the original commitments and preservation of the existing legislation before it would release the second tranche of the economic recovery loan.

The Minister's position was apparently supported by the Forest Authority's departure from the conservative calculations of 'sustainable yield' which had been made in the wake of the RRA. The 1996 National Forest Plan (PNGFA 1996:11) declared that the total area of 'production forest' was 11.9 million hectares, and the 25.7 million hectares of 'reserve forest' included another 8.2 million hectares of 'potential production forest'. The area of 'protection forest' was given as 1.7 million hectares, but no attempt had yet been made to specify the area of 'salvage forest'. It seems that the National Forest Plan was now equating the combination of actual and potential 'production forest' with what the RRA had defined as the 'gross operable area', and that the Forest Authority's estimate of the size of this area had grown from 12.6 million hectares to 20.1 million hectares. These calculations appeared to justify a projected annual harvest, from 1997, of 4.7 (or perhaps 4.9) million cubic metres, of which approximately 2.9 million cubic metres would be derived from existing projects (ibid:13).

At first sight, it may seem that these optimistic forecasts have received a measure of support from the Forest Inventory Mapping System (FIMS), the

²⁶ According to Max Aitken (PNGADCP 1993), the combined 'maximum allowable cut' under the permits issued before the end of 1994 was 8.45 million m³ in 1993, 7.82 million m³ in 1994, 7.49 million m³ in 1995, then falling to 6.44 million m³ in 1998 and 4.82 million m³ in 2001. Aggregate harvest levels have regularly fallen well short of the maximum allowable cut.

long-promised inventory of PNG's forest resources which has now supplanted the earlier RRA in the calculations of the Forest Authority. As in the case of the earlier exercise, construction of the FIMS has been funded by the Australian government, and the system was installed as a database in the Forest Authority's computers early in 1997. The system is based on a mapping and description of the nation's forest resources and other vegetation, at a scale of 1:100,000, in the years 1975 and 1996 (Hammermaster and Saunders 1995).²⁷ From the 1975 data, the whole country has been divided into a very large number of individual 'forest mapping units' (FMUs), each of which has then been allocated to one of fifty-nine 'vegetation types', of which thirty-six have been classified as 'forest types'. A further distinction has been made between forty-two 'forest zones', each of which contains those FMUs of the same forest type which also contain the same combination of merchantable tree species.

As in the case of the RRA, the definition and measurement of what is now called 'potential production forest' has been based on the progressive exclusion of other categories from the 'gross forest area'.

- First, the 'gross forest area', which is defined as the total area of forest identified in all vegetation types, has been reduced to an 'adjusted forest area' by the exclusion of small patches of natural or human disturbance.
- Second, those areas of land which ought to be excluded from logging because of the existence of extreme or serious physical limitations of altitude, slope, terrain, or inundation have been classified as 'non-potential production forest' within this 'adjusted forest area'.²⁸

The 'adjusted forest area' which existed in 1975, both 'potential' and 'non-potential' production forest, is then divided into four parts by reference to the change which has (or has not) occurred between 1975 and 1996:

- part has been logged and left to regenerate;
- part has been logged and then cleared for conversion to permanent land use;
- part has been cleared for conversion to permanent land use without being logged beforehand; and
- the remaining part has neither been logged nor cleared for conversion to permanent land use.

Tables 10.6 and 10.7 show the total areas of 'potential' and 'non-potential' production forest, respectively, which existed in each province in 1975 and 1996, and the areas which have either been logged (with or without being

²⁷ The 1975 data was based on air photographs taken over the years 1972-75, while the 1996 data was based on a combination of Landsat imagery and rapid ground surveys by Forest Authority staff and consultants. 1975 was chosen as the baseline year because there had been very little commercial logging activity before that date.

²⁸ This area of exclusion includes all land covered by mangroves.

cleared) or cleared without being logged in the intervening period. The summary data available to me do not provide separate measurements of the areas of 'potential' and 'non-potential' production forest which have been logged and cleared, but they indicate that the aggregate area which has undergone this particular transformation is 421,029 hectares, leaving an aggregate area of 2,374,232 hectares which has been logged and left to regenerate.²⁹

Table 10.6: Transformation of PNG's 'potential production forest', 1975-1996.

Province	Total area in 1975		Logged (some cleared)		Cleared but not logged		Total area in 1996	
	'000 ha	(%)	'000 ha	(%)	'000 ha	(%)	'000 ha	(%)
Western	4,694.6	(34.9)	175.4	(9.5)	108.2	(17.0)	4,447.5	(38.5)
Gulf	1,258.6	(9.4)	86.0	(4.7)	10.5	(1.7)	1,170.4	(10.1)
Central	682.6	(5.1)	193.9	(10.5)	25.7	(4.1)	522.6	(4.5)
Milne Bay	336.7	(2.5)	102.2	(5.5)	29.1	(4.6)	251.4	(2.2)
Oro	569.8	(4.2)	124.2	(6.7)	37.4	(5.8)	452.3	(3.9)
S. Highlands	403.8	(3.0)	2.3	(0.1)	40.8	(6.4)	375.4	(3.3)
Enga	474.2	(3.5)	-		19.1	(3.0)	460.3	(4.0)
W. Highlands	62.6	(0.5)	-		8.8	(1.4)	56.4	(0.5)
Chimbu	142.4	(1.1)	-		26.4	(4.2)	128.5	(1.1)
E. Highlands	90.1	(0.7)	7.4	(0.4)	11.3	(1.7)	82.2	(0.7)
Morobe	321.7	(2.4)	67.4	(3.6)	20.7	(3.3)	265.0	(2.3)
Madang	611.7	(4.5)	78.3	(4.2)	66.0	(10.4)	525.0	(4.5)
East Sepik	618.7	(4.6)	23.1	(1.2)	46.0	(7.3)	568.6	(4.9)
West Sepik	1,572.1	(11.7)	93.7	(5.0)	124.6	(19.7)	1,407.4	(12.2)
Manus	101.3	(0.8)	14.8	(0.8)	45.0	(7.1)	62.8	(0.5)
New Ireland	332.0	(2.5)	197.0	(10.7)	1.8	(0.3)	170.9	(1.5)
E.N. Britain	227.8	(1.7)	150.9	(8.2)	7.9	(1.3)	96.0	(0.8)
W.N. Britain	708.2	(5.3)	530.9	(28.7)	4.9	(0.8)	259.5	(2.2)
N. Solomons	244.8	(1.8)	-		-		244.8	(2.1)
TOTAL	13,453.5	(100.0)	1,847.3	(100.0)	634.0	(100.0)	11,547.1	(100.0)

Source: PNG Forest Inventory Mapping System.

²⁹ Observant readers may note that the measured decline in the aggregate area of both 'potential' and 'non-potential' production forest between 1975 and 1996 (a total of 3,053,416 hectares) is considerably greater than the sum of the areas which have been 'converted to permanent land use' (a total of 1,554,218 hectares). I have not yet been able to obtain a satisfactory explanation of this anomaly, but it may be due to the existence of substantial areas of logged-over forest which have been 'left to regenerate', but have not (yet) done so. It should also be noted that the statistics presented here are still regarded as provisional outputs of the database (personal communication, John McAlpine, 1997).

Table 10.7: Transformation of PNG's 'non-potential production forest', 1975-1996.

Province	Total area in 1975		Logged (some cleared)		Cleared but not logged		Total area in 1996	
	'000 ha	(%)	'000 ha	(%)	'000 ha	(%)	'000 ha	(%)
Western	1,046.7	(6.5)	48.3	(5.1)	47.5	(9.5)	971.4	(6.5)
Gulf	1,175.0	(7.3)	16.0	(1.7)	7.4	(1.5)	1,159.7	(7.7)
Central	1,251.3	(7.7)	44.1	(4.6)	13.5	(2.7)	1,205.4	(8.0)
Milne Bay	522.0	(3.2)	20.2	(2.1)	14.0	(2.8)	498.9	(3.3)
Oro	1,019.9	(6.3)	7.3	(0.8)	13.8	(2.8)	1,006.5	(6.7)
S. Highlands	1,500.8	(9.3)	5.6	(0.6)	86.3	(1.7)	1,442.2	(9.6)
Enga	242.2	(1.5)	-		14.8	(3.0)	229.0	(1.5)
W. Highlands	391.2	(2.4)	-		87.1	(17.4)	337.0	(2.2)
Chimbu	224.0	(1.4)	-		16.0	(3.2)	212.0	(1.4)
E. Highlands	440.3	(2.7)	4.5	(0.5)	11.8	(2.4)	430.7	(2.9)
Morobe	1,733.7	(10.7)	96.9	(10.2)	70.5	(14.1)	1,600.7	(10.6)
Madang	972.0	(6.0)	19.3	(2.0)	30.5	(6.1)	945.0	(6.3)
East Sepik	1,461.1	(9.0)	4.5	(0.5)	17.6	(3.5)	1,448.7	(9.6)
West Sepik	1,495.6	(9.2)	29.9	(3.2)	30.3	(6.1)	1,441.6	(9.6)
Manus	6.3	(0.0)	1.1	(0.1)	1.9	(0.4)	4.4	(0.0)
New Ireland	409.8	(2.5)	186.2	(19.6)	0.4	(0.1)	233.9	(1.6)
E.N. Britain	998.1	(6.2)	162.1	(17.1)	25.7	(5.1)	828.8	(5.5)
W.N. Britain	990.5	(6.1)	302.0	(31.9)	10.0	(2.0)	737.3	(4.9)
N. Solomons	324.4	(2.0)	-		-		324.4	(2.2)
TOTAL	16,204.8	(100.0)	948.0	(100.0)	499.2	(100.0)	15,057.8	(100.0)

Source: PNG Forest Inventory Mapping System.

If we now compare the provisional outputs of the FIMS (Tables 10.6 and 10.7) with the corresponding estimates made in the RRA (Table 10.4), we may be struck by the difference between the 6.8 million hectares of 'potential forest area' which was thought to exist in 1993 and the 11.5 million hectares of 'potential production forest' which is now said to have existed in 1996. If we assume that these are two attempts to measure the same thing, then it seems that the estimated area of 'potential production forest' was 70 percent greater in 1996 than it was in 1993. This discrepancy is all the more remarkable when we compare the earlier estimate that 712,000 hectares of forest had already been logged before 1993 with the current estimate that 2.8 million hectares had been logged by 1996, which seems to represent a simultaneous increase of nearly 300 percent in the area of forest whose potential production values have (at least temporarily) been realised. Should we therefore conclude that this new set of data justifies a corresponding increase in the estimates of aggregate sustainable yield, and therefore supports the claim implied in the National Forest Plan (and openly stated by representatives of the log export industry) that PNG's natural forest resource can sustain an annual harvest of approximately 5 million cubic metres, instead of the 3 million cubic metres implied by the calculations of the RRA?

The architects of the FIMS maintain that there are three main reasons why a positive answer cannot be given to this question:

- Firstly, the database shows that more than one third of the area which has already been logged falls is classified as 'non-potential production forest' (see Table 10.7), which means that it should not have been logged under a regime of sustainable forest management.
- Secondly, the area of 'potential production forest' includes several 'forest types' or 'forest zones' whose combination of tree species do not warrant commercial exploitation under current market conditions, and which are therefore excluded, in practice, from the area of interest to logging companies.³⁰
- Thirdly, and perhaps most importantly, the estimates which have previously been made of 'typical' regeneration rates, and which support the idea of a 'standard cutting cycle' of 30-40 years, are now regarded as maximum, rather than average, rates, and there are many 'forest types' or 'forest zones' in which the rates of regeneration are now shown to be much lower, and in which the 'cutting cycle' should therefore be twice or three times the 'standard' length (personal communication, John McAlpine, 1997).

From these considerations, it can be argued that the FIMS provides more reasons for the Forest Authority to limit the numbers and types of forest area which are made available for commercial logging than arguments in favour of extending the aggregate area of 'production forest'.

The Political Distribution of Log Export Revenues

During the period of national independence, logging companies have been obliged to share their revenues with the government and with local landowners in various forms and various proportions.

- At the time of Independence in 1975, timber royalties were levied at the rate of K3.18 per cubic metre. The rate was raised to K3.95/m³ in 1976, then to K5.41/m³ in 1981, and finally to K10/m³ in 1996. In the early years of Independence, timber royalties were divided between the national government, the provincial government, and local landowners in the ratio 1:2:1; from 1986, they were divided between the provincial government and local landowners in the ratio 3:1; as of 1996, local landowners are due to collect the entire amount, in recognition of their status as the true 'resource owners'.

³⁰ Although the FIMS contains estimates of 'gross merchantable volume' for both 'potential' and 'non-potential' production forest, these estimates are not presented here because they create the misleading impression that these are volumes of timber which can be profitably extracted and sold. According to Lamb (1990:35), a 'typical' hectare of forest in PNG yields only 30 cubic metres of marketable timber out of a 'standing volume' of 100-130 cubic metres.

- Any income which the government may have lost in the process of 'giving away' an increasing share of timber royalties to local landowners has been more than made up by the imposition of a log export tax, which was first imposed in 1979, and whose average rates have been raised on four separate occasions during the 1990s. From 1979 to 1995, different rates of tax were imposed on different species of timber, but tax rates have now been linked directly to the export price of logs.
- Local landowners or landowner companies have been able to secure a variety of additional cash benefits from logging contractors in the process of negotiating the development of specific projects. Before 1996, the value of such 'levies' and 'premiums' varied widely between one project and another, but the national government has now attempted to rationalise this form of redistribution through the creation of a standardised Project Development Levy.
- Finally, permit holders have generally agreed to spend some of their own revenues on the provision of 'social infrastructure' within their concession areas, and this may be regarded as a 'benefit in kind' to local landowners, or an indirect form of budgetary support to the government (which would otherwise pay for such provision). The value of such benefits has normally been equated with the combined cash value of royalties, levies, and premiums (see World Bank 1989).

The Tropical Forestry Action Plan Review criticised (and effectively stalled) the government's proposal to revise the fiscal regime in the forestry sector in such a way that royalties and export taxes would both be charged as a fixed percentage of export value, because it carried 'a potential political risk of exposing resource owners to the consequences of market instability, from which they are presently shielded' (ibid:32). It was also critical of the use of royalty rate allowances and indirect infrastructural levies as the preferred method of compensating for variations in the average cost of production between different logging operations, since low-cost producers would probably still have the upper hand, and inefficient loggers might also be inefficient in the business of providing social infrastructure (ibid:33).

Under Part VI of the 1991 *Forestry Act* (Sections 119-121), the government was committed to the establishment of a new 'forest revenue system', but no details were provided in the legislation. The National Forest Policy (PNGMOF 1991:40) promised an 'early comprehensive study on State taxes, levies, royalties, charges, and obligations to be imposed on the forest industry, and minimum rentals and purchase prices due to resource owners', and in the meantime undertook to maintain the existing method of calculating and distributing royalties, so that:

- 'Resource owners will continue to receive all royalties collected from timber and other forest produce harvested from natural forests.'

- 'The national and provincial governments shall continue to receive 25 percent and 75 percent, respectively, of royalties from timber and other forest produce harvested from State land.'

The Act allowed the Minister and Board a substantial measure of discretion in deciding the rate at which royalties and levies would be charged on individual projects; presumably so that the Act would not have to be amended in light of the revenue study promised in the Policy.³¹

The Forest Revenue Study, like the RRA and the FIMS, was funded by the Australian government as one of the projects implemented under the NAFCAP.³² The revenue study found that the existing fiscal regime in the forestry sector was 'reasonably efficient', but it was 'probably not fair, certainly not simple, and does not seem to encourage good forest management' (Shedden Agribusiness 1991:viii). It went on to propose that:

- resource owners should receive a royalty payment of between K4 and K5 per cubic metre of all logs harvested;
- the government should tax the logging industry by a combination of 'stumpage' charges on all logs harvested, and an additional export tax on all logs exported, and thus encourage downstream processing by subjecting processors to the former, but not the latter, charge;
- stumpage charges should vary with the value of the species being harvested, while log export taxes should vary with the export price; and
- tax receipts should be credited to a Forest Revenue Stabilisation Fund which would first be used to cover the government's own costs in regulating the industry, and surplus then made available to Local Area Development Funds in each concession area.

For reasons discussed elsewhere (see Taylor, this volume), four years elapsed between the completion of the revenue study and the introduction of a new forest revenue system in the government's 1996 budget. The recommendations of the revenue study were subject to a certain amount of interdepartmental consultation during 1992, but ran into opposition from the logging industry and landowner company representatives in 1993. In December 1993, Cabinet decided to defer its final approval of a new system pending further evaluation of its merits by a ministerial committee which failed to hold a single

³¹ Some commentators, such as John Millett (1991), complained that this would cause 'considerable investor uncertainty' because it gave no guarantee of a level playing field. Millett also expressed some doubt about the allowance made in Section 121 for the Forest Authority to meet its own costs out of levies charged on the industry, especially in light of its stated aim of achieving 'increased down-stream processing'.

³² It was, in fact, the first stage of a 'Forest Revenue and Financial Study' which also included a 'Corporate Planning' component which was designed to develop the financial administration of the new Forest Authority.

meeting throughout 1994. The introduction of the new system in the budget of November 1995 was largely the result of further pressure applied by the World Bank during the negotiation of the 'economic recovery programme'. Meanwhile, the government had attempted to reduce the extent of its fiscal crisis by the simple expedient of raising the rates of export tax levied under the old revenue system, once in the budget of November 1993, and then again in the 'mini-budget' of March 1994 (see Table 10.8).

Table 10.8: Export tax rates under the old revenue system, 1979-1995.

Species	1979-90	1/91-11/93	11/93-3/94	3/94-11/95
Kwila, Pencil Cedar, Planchonella:	10%	30%	33%	46%
Calophyllum, Mersawa, Taun, Walnut:	10%	20%	23%	36%
Burckella, Canarius, Gluta, Hopea, Terminalia:	10%	12%	15%	28%
All other species:	10%	9%	13%	26%
Weighted average:	10.0%	14.3%	17.3%	31.1%

Note: the weighted average represents the effective subsidy to downstream processors.

Source: PNG Forest Authority.

The government's failure to introduce the new revenue system, or even to raise the rate of taxes charged under the old system, before the end of 1992, seems to have created a substantial 'windfall profit' for the logging companies during 1993 and 1994, when prices were hovering around US\$170 per cubic metre. One economist (Duncan 1994) has estimated the size of this windfall profit to have been about K225 million – more than the sum of about K200 million which the government actually collected in log export taxes over the same period (see Table 10.1). Another economist (personal communication, John Millett, 1997) has estimated that the government would have made an extra K200 million in log export taxes over the four years from 1992 to 1995, if the new revenue system had already been in place during that time.

The new revenue system proposed in the 1996 budget differs from the one which was recommended by the Forest Revenue Study:

- resource owners were to receive a substantially higher royalty payment of K10 per cubic metre of all logs harvested (from which the national government would deduct a 5 percent royalty withholding tax), and a Project Development Levy whose value would also be greater than the various levies and premiums which they had previously been receiving;
- there would be no system of 'stumpage' charges on all logs harvested, only an export tax on all logs exported; and

- there was no provision to channel tax receipts through a Forest Revenue Stabilisation Fund in order to cover the operating costs of the Forest Authority.

However, the new revenue system does follow the prescriptions of the Forest Revenue Study in its creation of an export tax regime which is considerably more 'progressive' than its predecessor, because the rate of tax is tied directly to the export value of the logs, and so the government's share of the economic rent increases with the market price of the commodity. Table 10.9 shows how export tax rates are calculated under the new revenue system, while Table 10.10 compares the levels of tax collected under the old system and the new system at different log export prices. Tables 10.11 and 10.12 incorporate the effects of the new revenue system into a portrait of the changes which have taken place in the overall distribution of log export values between different stakeholders and different forms of income over the period from 1988 to 1996.

Table 10.9: Export tax rates under the new revenue system, 1996.

Price band	Tax rate
Up to K90/m ³	15% of f.o.b. value
K91-110/m ³	K13.50 + 30% of amount above K90
K111-130/m ³	K19.50 + 50% of amount above K110
K131-150/m ³	K29.50 + 55% of amount above K130
K151-200/m ³	K40.50 + 60% of amount above K150
Over K200/m ³	K70.50 + 70% of amount above K200

Source: PNG Forest Authority.

Table 10.10: Comparison of export taxes under the old and new revenue systems.

Log price (USD/m ³)	Log price (PGK/m ³)	Tax under old system		Tax under new system	
		(K)	(%)	(K)	(%)
110	147	45.80	31.2	39.50	26.9
120	160	49.85	31.2	46.89	29.3
130	173	53.90	31.2	54.82	31.7
140	187	58.27	31.2	63.72	34.1
150	200	62.32	31.2	72.06	36.0
160	213	66.36	31.2	80.56	37.8

Note: average log price in 1996 has been K175/m³, giving a weighted average tax rate of K56/m³ under the new system.

Source: PNG Forest Authority.

Table 10.11: Distribution of PNG log export revenues, 1988-1996 (in kina).

INCOME CATEGORY	1988	1990	1992	1993	93-94	1994	1995	1996
Average log price (Kina/m ³)	71.00	66.00	87.00	169.00	163.00	158.00	160.00	175.00
Income to local landowners:	6.34	6.21	6.73	8.79	8.64	8.51	8.56	21.11
Royalties	3.56	3.56	3.56	3.56	3.56	3.56	3.56	9.50
Other levies & premiums	2.78	2.65	3.17	5.23	5.08	4.95	5.00	11.61
Income to provincial gov't:	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.00
Income to national gov't:	8.29	7.79	14.36	26.80	30.78	50.42	51.04	57.59
Log export tax	7.10	6.60	13.17	25.61	29.59	49.23	49.85	56.09
Reforestation levies	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Royalty withholding tax	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.50
Income to logging contractor:	55.12	50.75	64.66	132.16	122.33	97.82	99.15	96.30
Assessed logging costs	38.23	42.51	47.33	49.50	49.50	50.29	57.79	66.96
Balance to logging contractor:	16.89	8.24	17.33	82.66	72.83	47.53	41.36	29.34
Balance in real 1996 Kina	29.58	12.98	24.51	111.82	98.52	63.28	47.93	29.34

Table 10.12: Distribution of PNG log export revenues, 1988-1996 (% shares).

INCOME CATEGORY	1988	1990	1992	1993	93-94	1994	1995	1996
Average log price	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Income to local landowners:	8.93	9.41	7.74	5.20	5.30	5.39	5.35	12.06
Royalties	5.01	5.39	4.09	2.11	2.18	2.25	2.23	5.43
Other levies & premiums	3.92	4.02	3.64	3.09	3.12	3.13	3.13	6.63
Income to provincial gov't:	1.76	1.89	1.44	0.74	0.77	0.79	0.78	0.00
Income to national gov't:	11.68	11.80	16.51	15.86	18.88	31.91	31.90	32.91
Log export tax	10.00	10.00	15.14	15.15	18.15	31.16	31.16	32.05
Reforestation levies	1.41	1.52	1.15	0.59	0.61	0.63	0.63	0.57
Royalty withholding tax	0.27	0.29	0.22	0.11	0.12	0.12	0.12	0.29
Income to logging contractor:	77.63	76.89	74.32	78.20	75.05	61.91	61.97	55.03
Assessed logging costs	53.85	64.41	54.40	29.29	30.37	31.83	36.12	38.26
Balance to logging contractor:	23.79	12.48	19.92	48.91	44.68	30.08	25.85	16.77
Balance in real 1996 Kina	41.66	19.67	28.17	66.17	60.44	40.05	29.96	16.77

Note: The '93-94' column shows the distribution of log export revenues between the budget of November 1993 and the mini-budget of March 1994. The adjoining columns show the distribution during the remaining months of those years.

Source: PNG Forest Authority.

The figures given in Table 10.11 for 'other levies and premiums' paid to landowners before November 1995 are estimated averages and exclude any additional non-monetary benefits (infrastructure, for example) provided by logging contractors or landowner companies. The Project Development Levy which now replaces these miscellaneous forms of income has a standard minimum rate (as shown in Table 10.11), though higher rates are to be charged when export prices are unusually high. It should also be noted that the figures shown in the final (1996) column apply to *existing* projects. The distribution of revenues arising from *new* projects is identical except that the 'reforestation levy' is transferred from the national government to the landowners, and is therefore added to the Project Development Levy.

Tables 10.11 and 10.12 show the logging contractor's residual share of log export revenues in both nominal and real prices. The bottom line represents the balance in terms of current purchasing power, and thus takes account of the fact that one kina could buy more in 1988 than it can now, because of the effects of devaluation and inflation. This balance is understood to contain the contractor's own profits and the cost of providing any additional benefits for landowners which may have been negotiated outside the terms of the official fiscal regime.

At a log export price of US\$130 (K175) per cubic metre, which is close to prevailing market prices in 1995 and 1996, Table 10.12 shows that the new system has the immediate effect of reducing the logger's share log export revenues from 62 percent to 55 percent of the gross revenue, while increasing the landowner's share from less than 6 percent to more than 12 percent. The government's share, which had been raised substantially by the 'mini-budget' of March 1994, has hardly been altered by the introduction of the new system.

In 1996, the logging companies have mounted a vigorous campaign against the new revenue system, even threatening at one point to mount a 'capital strike' against payment of the new royalty rates and the Project Development Levy. Industry representatives have argued that the government's figures overstate the size of the balance which will now end up in the contractor's pocket because they understate the average cost of production, which means that some operators will no longer be able to achieve a normal rate of return on their operations (*Post-Courier* 14 March 1996, 9 April 1996). The 'assessed logging costs' shown in Table 10.11 are assumed to be equivalent to US\$50/m³ in 1993 (when the US dollar had roughly the same value as the PNG kina). Economists associated with the World Bank and the PNG Forest Authority currently maintain that average logging costs fall within the range of K60-70/m³, while industry representatives claim that they fall within the range of K90-110/m³. If the industry representatives are right, then the typical logging contractor has hardly made any profit at all for the last three years.

Part of the problem here is to take account of the wide range of variation which is known to exist between the gross revenues and the production costs of individual logging operations. The Forest Authority's own database showed that logs exported from the Rottok Bay project during 1995 secured an average of US\$205/m³, while logs exported from the Gar project (also in East New Britain Province) secured an average of only US\$89/m³. There are currently no data that would permit an assessment of the extent to which this range of variation is due to the vagaries of corporate accountancy, rather than differences in the quality of timber being harvested. Nevertheless, the 'progressive' features of the new revenue system are partly intended to mitigate the effects of such variation on the profitability of different operations. But they do not take account of the separate, and possibly unrelated, range of variation in the costs of production.

The Forest Revenue Study did include an assessment of this second range of variation, based on a small stratified sample of logging projects in different parts of the country. The results of this exercise were later reviewed and

summarised by consultants working on the World Bank-funded PNG Forest Management and Planning Project (see Table 10.13). Their calculations have apparently formed the basis of the Forest Authority's decision to assess the average logging cost at US\$50/m³ in 1993. The recent burst of complaints from the logging industry has prompted the World Bank to promise a further investigation of this subject, but no such study had been undertaken by the end of 1996.

Table 10.13: Estimated range of logging costs in PNG, 1993.

Item	Low cost	High cost
Planning/survey	Nil	K2.50/m ³
Road construction	K10/m ³	K20/m ³
Felling (labour contract)	K2/m ³	K5/m ³
Skidding	K2/m ³	K5/m ³
Scaling (labour contract)	50t/m ³	K1/m ³
Loading/trucking	K2/m ³	K10/m ³
Log dump (sort/stack)	K1/m ³	K2/m ³
Shipping (barging)	K2/m ³	K7.50/m ³
Shipping (stevedores)	50t/m ³	K1/m ³
Fuel, oil and parts	10%	20%
Administration	10%	10%
TOTAL	K22.40/m³	K66.00/m³

Source: PNG Forest Management and Planning Project.

Conclusion: Science, Capital, and Politics

What might now be said, by way of conclusion, about the relationship between these various sets of numbers, apart from the fact that they all fit then original definition of 'statistics', being bodies of data collected on behalf of the state? The answer to this question needs to take account of the additional fact that these data have been assembled and interpreted as integral components of a single process of policy reform, in which donor-funded experts and their bureaucratic counterparts have sought to pit the force of 'scientific argument' against the powers of logging capital and the erratic qualities of national and local-level politics in PNG. The question itself can therefore be divided into three parts:

- How have the reformers themselves conceived the 'big picture' revealed by their numerical calculations?
- How have other stakeholders reacted to arguments which stem from such conceptions?
- What is the value of statistics as an instrument of persuasion in this political setting?

We may begin to assemble answers to these more specific questions by considering the relationship which may or may not exist between the calculus of 'sustainable forest management', taken as the middle term in our general equation, and the two measurable 'objects' which exist to either side of it – first, the distribution of log export revenues, and second, the concentration of logging capital.

Sustainability, Efficiency, and Equity

It should be apparent, from my previous discussion, that the World Bank's approach to the first of these matters tends to assume the feasibility of harnessing a progressive log export tax to the goal of maintaining a form of 'sustained yield management' which can be defined in terms of an aggregate national log harvest and the imposition of a standard 35-year cutting cycle on all new timber concessions granted by the Forest Authority. Although the Bank has been prepared, at times, to countenance a more complex definition of 'sustainability', and a fiscal regime whose own complexity might be justified in light of this definition, these complexities have apparently been sacrificed to the more urgent task of defending the fundamental provisions of the *Forestry Act* against a coalition of national politicians, logging companies, and landowner company executives who are unable or unwilling to grasp the merits of detailed scientific and economic arguments.

This is not a position which naturally recommends itself to the experts who have been paid to integrate measures of 'sustainability' into the planning process envisaged by the National Forest Policy. As we have seen, the natural scientists were obliged to produce a number of 'guesstimates' in order to satisfy the Bank's desire to keep the process of policy reform moving along a particular path, knowing full well that a great deal more time and money would have to be spent before they could produce the kind of database which would enable the Forest Authority or the Department of Environment and Conservation to make an accurate assessment of 'the likely physical environmental outcomes from any significant forestry operation' (personal communication, John McAlpine, 1997). From their point of view, it is hard to imagine a fiscal regime which could serve as an administratively simple method of transferring a larger proportion of log export revenues to the national government and local resource owners, yet simultaneously function to encourage the sustainable management of individual timber concessions. This is primarily because the very wide variation in the economic value and physical accessibility of different parts of the national forest resource provides a clear incentive for loggers to concentrate their operations in the most highly valuable and most accessible areas, to the point where these areas are 'over-exploited', while other areas are still 'under-exploited', even while the aggregate national harvest remains at a level which is theoretically sustainable.³³

³³ I am grateful to Gerard Ward (personal communication, March 1997) for providing me with a more detailed argument along these lines. The problem, according to Ward, is that 'one needs to

The planning process envisaged by the new *Forestry Act* and the National Forest Policy is one which actually militates *against* the application of a scientifically sophisticated approach to the business of sustained yield management, precisely because it requires each of the country's nineteen provinces to produce its own forest plan for national approval, but without the availability of sufficient scientific expertise at the provincial level, without due recognition being given to the private (communal) ownership of local forest resources (see Taylor, this volume), and without any statutory mechanism for ensuring consistency between these nineteen plans and their national counterpart (personal communication, Ben Everts,³⁴ 1996). The apparent contradiction between the practice of sustainable forest management and the pursuit of provincial participation has been further exaggerated by the more recent reforms of the provincial government system itself, as embodied in the *New Organic Law* of 1995 (see chapters by Nen and Taylor, this volume). In practice, the provincial planning function has been taken over by the newly centralised National Forest Service (see PNGFA 1994, 1995a), but the planning process as a whole has become a political football kicked back and forth between a Minister whose prime concern is to expedite the issue of new timber permits, by commanding the production of the National Forest Plan, and government officials who can still block his shots with their mastery of legal technicalities and scientific data.

This may help to explain why the World Bank has studiously avoided any reference to the planning process in the conditions attached to PNG's structural adjustment programme, and why some of the planners in the National Forest Service have concluded that the planning requirements of the *Forestry Act* are a positive hindrance to the achievement of 'sustainability' at the only level where this can be sensibly pursued – which is the level of operational project management. Any attempt to rationalise these aspects of the Act carries the obvious risk of encouraging politicians to continue their pursuit of more dubious amendments, of the kind most recently blocked by the World Bank's loan conditions, which would give them greater control over the National Forest Board. The main focus of bureaucratic reform has therefore shifted to the practical enforcement of the Logging Code of Practice (PNGFA/DEC 1995) and the Planning, Monitoring, and Control Procedures for Natural Forest Logging (PNGFA 1995b).

There is no doubting the need for greater regulation at the local level, with or without the warrant provided by national plans and guidelines, but the current pattern of relationships between logging companies and local communities, which has been documented at great length in the first part of this volume, does

get temporal and spatial sequencing running properly to attain effective national sustainability' and this cannot follow from the imposition of a 'simple annual maximum cut', whether by fiscal or other means.

³⁴ Team Leader, Forest Management and Planning Project. The discussion which follows is based on an interview with Mr Everts conducted in June 1996, at the conclusion of this World Bank-funded project.

not bode well for its achievement. Even if a broad consensus had been reached over the future direction of national policy, it might still be argued that the diversity of tree species and low timber volumes which are characteristic of PNG's forest resource mean that large-scale industrial logging is unlikely to remain an attractive economic proposition unless it continues to be carried out in an environmentally destructive manner. This is one of the reasons why commentators like Barnett (1992) have doubted the validity of the forty-year 'cutting cycle' which has commonly been used in calculations of sustainable yield. Such arguments have now been reinforced by the evidence of variable regeneration rates contained in the Forest Inventory Mapping System. But then one may wonder whether the 'fine-tuned' planning which is theoretically possible with the aid of this new database can be applied, in practice, to an industrial and political setting which has so many messy features.

Although the policy reformers have applauded the World Bank's apparent concern to raise the share of resource rent which ends up in the pockets of local landowners, they have generally failed to comment on the possibility that such an increase in landowner revenues will provide an additional financial incentive for landowners to applaud the unsustainable exploitation of their own forest resources. The disappearance of the 'reforestation levy' into their 'consolidated revenues' may likewise be seen as a way of discouraging the local pursuit of sustainability (personal communication, Gerard Ward, 1997). The reformers have tried to square this particular circle by suggesting that landowners have not previously possessed the knowledge, or perhaps even the power, to make a 'rational' response to market signals (see Brunton 1996), but it is not at all clear whether other stakeholders have now developed the capacity to convince landowners that the short-term financial gains from large-scale logging carry a long-term price which ought not to be paid by future generations or the global community (see Filer 1997b).

Meanwhile, the log export industry may have its own vested interest in pushing the definition of 'sustainable management' back to the national level, where its argument with the World Bank can be pursued as a fairly straightforward public debate about the impact of taxation levels on the aggregate national harvest. On the other hand, one of the few things which industry representatives currently share with many of their local critics is a high level of suspicion about the Bank's own motivations in the conduct of this argument. Amongst the ranks of the reformers, there are some who believe that the Bank's concern with 'sustainability' has always been subordinate to its other aim of distributing log export revenues in what it considers to be the most equitable and efficient manner, while others maintain that this concern has largely been driven by the need to gratify a Western green lobby which has very little idea about the best way to regulate forestry practice in a country like PNG. One of the government's forestry consultants has told me that the Bank's 'heavy-handed approach' has been motivated by the frustrations of its failure to influence the direction of forest policy in Indonesia, while an official of the Forest Industries Association attributes the same phenomenon to a desire to take revenge on the Malaysian logging industry for a similar refusal to toe the line.

In PNG's rumour-driven political system, which sits uneasily alongside its donor-driven policy process, it is hardly possible to assess the relative merits of such conjectures. But they do serve to show how the various sets of numbers recently installed in the Forest Authority's computers are primarily connected by the logic of stakeholder relationships.

State, Capital, and Community

The question of capital concentration is commonly treated, by all stakeholders, as a question about the extent to which 'monopoly power' may either hinder or facilitate the imposition of a regime of 'sustained yield management' and the optimal distribution of log export revenues between 'industry participants'. Those who complain about the dominant position occupied by a single company (RH), and who publicise figures which seem to exaggerate the extent of its control over the log export industry, are clearly convinced that this purported monopoly is inimical to the values of 'sustainability' and 'equity' alike. As we have seen, the 'battle against big capital' reached its peak in 1993, when the reforming zeal of the Forests Minister and the newly appointed General Manager of the Forest Authority resulted in a very public confrontation with RH, whose reputation as a monopolist has been firmly embedded in subsequent public debate about the log export industry (see Filer 1996b). This confrontation was coupled with the preparation of the Forestry Development Guidelines, which not only required the imposition of a new revenue system and the limitation of log harvests to 'sustainable levels', but also proposed an end to raw log exports by the turn of the millenium. In this way, it was implied that the economic power of RH was one of the main reasons for the *absence* of 'sustainability' and 'equity' in the log export industry, and the imposition of a log export ban was the most effective way of breaking this stranglehold.

As previously noted, it is the form, rather than the extent, of capital concentration which seems to warrant the suspicion that Sino-Malaysian domination of the log export industry is the main obstacle to the rationalisation of forest management in PNG, primarily because the relevant companies are not accountable to the shareholding public in the same way as their counterparts in the mining and petroleum sector, and therefore deserve to be portrayed as a corrupting influence on the body politic.³⁵ But this imputation is not amenable to statistical analysis, and despite its political appeal, it also tends to conceal a more complex dynamic in the mutual relationships of the major stakeholders.

Firstly, the loggers and the donors have found some common ground in their opposition to the log export ban proposed in the Forestry Development Guidelines, since the donors and their affiliated experts have consistently argued that 'downstream processing' is liable to diminish the proportion of economic rent which accrues to the resource owners without creating any new incentives

³⁵ Henderson (1996a) has published the most fulsome account of 'corruption' in PNG's log export industry.

for sustainability (see World Bank 1989; Duncan 1994).³⁶ Such arguments have helped the loggers to persuade some resource owners, or their representatives, to join in their campaign against the Guidelines, even while the donors have been funding other projects in the process of reform which seek to undermine this 'unholy alliance' (see Simpson, this volume), and also funding the activities of local NGOs whose members have continued to support the imposition of an export ban (see Brunton 1996).³⁷ Meanwhile, some of the 'reformist' elements within the forestry bureaucracy have come to the conclusion that it is easier for the state to negotiate the rationalisation of forest management with one or two 'big operators' than it is to deal with a larger number of smaller companies with less experience of PNG, with lower levels of investment, and with fewer reasons to participate in an efficient management regime. In this respect, the common ground between the larger logging companies and government authorities is the pursuit of *institutional* sustainability when dealing with a host of resource-owning groups whose own capacity to speak with a united voice is currently as limited as their capacity to deal with the statistics of resource development.

³⁶ The Indonesian government's promotion of its own plywood industry is held up as an illustration of this point (see Majid Cooke, this volume).

³⁷ In 1996, World Bank officials were dangling substantial financial carrots in front of previously hostile NGOs in order to attract their support for crucial features of the country's structural adjustment programme.

Appendix A: The Current Distribution of Timber Permits (June 1996)

Most of the information contained in this appendix is based on two sources:

- A PNG Forest Authority 'Projects List', dated 12 June 1996.
- Annex 4 of a report on 'Representative Resource Owner Bodies for Forestry Projects' (Whimp 1995), whose information is sourced to the PNGFA Company Registration Database as of May 1995.

All permits listed in either of these sources have been included in this appendix. Those which appear in the earlier, but not the later, of the two sources are presumably permits which had expired by June 1996. Footnotes are used to indicate any discrepancies between these two sources in respect of permits which are listed in both.

Most of the permits listed in either of these two sources are shown on the maps contained in the 1996 National Forest Plan, dated May 1996. Those permits which do *not* appear on these maps (and which have presumably expired) are marked with an asterisk.

Information on the identity of contractors (as opposed to permit-holders) is derived from the second of these two sources. Footnotes are used to indicate those cases in which such information is known to be out of date.

Provinces have been arranged in the order used by the National Census Office rather than the PNG Forest Authority. Projects within provinces have been arranged in an order which reflects their spatial relationship, initially by census district, but potentially by open electorate. This means that all projects which fall within the boundaries of a single district (or electorate) are grouped together.

There are two additional projects (Putput Freehold and Utan Plantation) which appear in the Forest Authority's records of 'Exports by Projects' for the years 1993-95 (see Appendix B), but which do not appear in any of the other three sources mentioned here. They are therefore omitted from this appendix.

PROVINCE & PERMIT	PERMIT HOLDER [CONTRACTOR]
WESTERN	
TP-1-6: Oriomo Wimare	Forest Management Services (PNG)
TP-1-7: Wawoi-Guavi Blocks 1-3	Wawoi Guavi Timber Co.
TP-1-9: Makapa	Innovision (PNG)
GULF	
FMA 2-12: Turama ^a	Turama Forest Industries [Concord Pacific]
TP-2-15: East Kikori/Urama Gopera	Gopera Investments [Rimbunan Hijau (PNG)]
TP-2-14: Vailala Consolidated	Shisei Enterprises Co.
CENTRAL	
TP-3-35: Ome Ome	Ome Ome Forest [Niugini Lumber Merchant]
TP-3-27: Iva Inika	Imi Development Co. [Kerawara] ^b
TP-3-26: Gorohu	Hams Forest Development
TP-3-32: Vanapa North	Koneri Development [Niugini Lumber Merchant]
TP-3-34: Edevu	Honori Timber Resources Dev't
TP-3-30: Orman Lako	T L Timber Development
LFA 3-2: Lako Inila	Abau Timbers ^c
TP-3-33: Marshall Lagoon	Landwell Resources
TA-025: Cape Rodney-Kupiano*	Landwell Resources
TL-3-8: Yaru Land Lease*	Landwell Forestry
TP-3-28: Benua Magarida	Magarida Timbers [Rimbunan Hijau (PNG)]
TP-3-29: West Gadaisu	Maisi Trust Co. [Santa (PNG)]
MILNE BAY	
TP-4-3: Sagarai Gadaisu	Ulabo Timber Co.
TP-4-6: Gara Modewa	Suau Investment Co. [Saban Enterprises]
TP-4-5: West Gurney	Hiai Magi Timber Co. [Ulabo Timber Co.]
TL-4-2: Woodlark Island ^d	Woodlark Island Dev't Corporation
ORO	
TL-5-2: Awowota State Land*	Ambogo Sawmill
TP-5-10: Embi Hanau	Ambogo Sawmill
TP-5-9: Ioma Block 4	Binandere Holdings [Green Mountain]
LFA-5-1: Yema Gaiapa	Yema Timbers
WESTERN HIGHLANDS	
TP-9-13: Kuli LPA	Angalimp Business Group
MOROBE	
TP-13-34: Morobe Coast	Golden Pines Sawmilling Co. [contractor unknown]
TP-13-32: Kui Buso & Extension	SKB Development [Timber Prod. & Mark. Co. (PNG)]
TL-13-15: Bulolo Forest Plantation	PNG Forest Products
TP-13-33: Watut West	PNG Forest Products
TP-13-31: Buhem Mongi	Low Impact Logging
TP-13-27: Umboi Island	Umboi Timber Investment [Rimbunan Hijau (PNG)]

^a The new PMA includes the old Turama Timber Permit (TP 2-12) held by Long-Term Trading Pty Ltd.

^b The current contractor has been identified by staff of the FIA (personal communication, Bob Tate, 1997). According to Whimp (1995), it was formerly Hong Jeon Co.

^c Whimp (1995) gives the permit holder as Landwell Resources.

^d Now shown as a Timber Permit in the National Forest Plan.

PROVINCE & PROJECT	PERMIT HOLDER [CONTRACTOR]
MADANG	
TP-12-18: Rai Coast	Raikos Holdings [Saban Enterprises]
TP-12-21: Gogol Valley	Jant
TP-12-20: Sogeram	Sogeram Development Co. [Madang Timbers]
TP-12-3: North Coast & Naru Gum	Jant [Madang Timbers]
TP-12-6: Far North Coast	Madang Timbers
TP-12-22: Kumil	Papir Development Corporation
EAST SEPIK	
LFA-11-1: Lower Sepik	Sepik River Dev't Corporation [Mosko Lumber (PNG)]
LFA-11-2: Hawain	Wongwong Logging [Sovereign Hill (PNG)]
WEST SEPIK	
TP-10-8: Vanimo Timber Area	Vanimo Forest Products [WTK Realty]
LFA-10-1: Bewani	Wawunai [WTK Realty]
LFA-10-2: Pegi Pulan	Wawunai [WTK Realty]
MANUS	
LFA-18-2: Kali Bay	Kali Bay Dev't Corporation [Rimbunan Hijau (PNG)]
LFA-18-1: Jaha	Jaha Development Corporation [Monarch Investment]
TP-18-2: Manus West Coast	Kai Bescu Kampani [Seal (Manus)]
NEW IRELAND	
TP-16-41: Mussau	Concord Pacific ^a
TP-16-48: Umbukul	Dominance Resources
TP-16-45: West Kaut	Kabato Development Co. [Timbers (PNG)]
LFA-16-1: Nakmai	Nakmai (1989) [Niugini Lumber Merchant]
LFA-16-2: Ujana	Ujana Timbers [Rimbunan Hijau (PNG)]
TL-16-2: Komale Plantation P.323*	Komale
TP-16-47: Konogogo*	Konogogo Timber Resources [contractor unknown]
TP-16-42: Central New Ireland	Basoma Holdings [Lombda]
LFA-16-12: Suralil Rasrik*	Sopathin Development Co. [Santa (PNG)]
TP-16-46: Lenai	Lenai Dev't Corporation [Lusco Enterprise]
TP-16-43: Lak	Metlak Development Co. [Niugini Lumber Merchant]
EAST NEW BRITAIN	
TP-15-49: Inland Pomio	Magasaki [Jumbo Enterprises]
TP-15-55: Waterfall Bay Extension	Mumore Co. [Niugini Lumber Merchant]
TP-15-59: Nutuve	Kisoi Development Corporation [contractor unknown]
TL-15-11: Bergberg	Palmalal Investments [Lombda]
TL-15-12: Bergberg Extension	Mid-Rivers [Niugini Lumber Merchant]
TP-15-45: Tokai Matong	Elmerc Legru [Niugini Lumber Merchant]
TP-15-56: Cape Orford	Balokoma [Niugini Lumber Merchant]
TP-15-44: Gar	Maden Co. [Bismark Industries]
TP-15-52: Senbam Extension	Muvanastum [Bismark Industries]

^a According to Whimp (1995), the permit was formerly held by a landowner company, Mussau Timber Development, with Concord Pacific as its contractor.

PROVINCE & PERMIT	PERMIT HOLDER [CONTRACTOR]
EAST NEW BRITAIN (cont.)	
TL-15-8: Warongi L.P.A.	Richard Gault Industries [Taraiwara]
TL-15-9: Taraiwara ^a	Taraiwara
TP-15-40: Gaulim Extension	Gaulim Logging Corporation [Richard Gault Industries]
TP-15-54: Vudal	Kairak Investment [Lombda]
TP-15-34: Kerevat Balsa Plant'n	Teperoi Timbers
TP-15-57: Ramandu Portion ^a	Urisikuat Timbers [Leytrac]
TP-15-58: Seraji	Nangal [contractor unknown].
TP-15-53: Open Bay Consolidated	Open Bay Timber
WEST NEW BRITAIN	
TP-14-41: Bakada Madcdua Ext'n ^b	Unevulg Development [Open Bay Timber]
TP-14-43: Ulanona Consolidated	Ulanona Sawmill Development [PNG Forest Resources] ^c
TP-14-38: Hargy Consolidated	Shin Asahigawa
TP-14-58: Maututu (Hargy) ^a	Kumo Development Corporation
TP-14-52: Ania Kapiura Consol'd ^d	Stettin Bay Lumber Co.
TP-14-57: Mosa-Laeim	Stettin Bay Lumber Co.
TP-14-50: Kapuluk & Ext'n	Nam Yang Timbers (PNG)
LFA-14-6: Aria Vanu Block 1	Aria Vanu Timber Co. [Rimbunan Hijau (PNG)]
LFA-14-13: Aria Vanu Block 3	Aria Vanu Timber Co. [Rimbunan Hijau (PNG)]
TP-14-56: Rottock Bay	Evenpio Investments [Rimbunan Hijau (PNG)]
LFA-14-2: Lolo Block 1	Lolo Development Co. [Monarch Investment]
LFA-14-3: Lolo Block 2	Lolo Development Co. [Monarch Investment]
LFA-14-12: Lolo Block 2 Ext'n	Lolo Development Co. [Monarch Investment]
TP-14-53: West Arawe	Milupol Development Co. [Cakara Alam (PNG)]
TP-14-54: Central Arawe	Central Arawe Resources [Cakara Alam (PNG)]
TP-14-55: East Arawe	East Arawe Timber Resource [Cakara Alam (PNG)]
LFA-14-4: Pulie Anu	G.R. Logging [WTK Realty]
LFA-14-5: Aou Alimbit	G.R. Logging [Fonseca Logging]
LFA-14-8: Alimbit Andru	Kandrian Timber Investment [Island Forest Resources]
LFA-14-10: Passismanua Block 1	Passismanua Inland Timber Res. [Timbers (PNG)]
LFA-14-14: Passismanua Ext'n	Passismanua Inland Timber Res. [Timbers (PNG)]
LFA-14-11: Andru Johanna	A J Timber Development [WTK Realty]
LFA-14-1: Atuvo	Menvuvu [Timbers (PNG)]
LFA-14-7: Atuvo Extension	Menvuvu [Timbers (PNG)]
LFA-14-9: Avio Amgen	Sare Resources [Timbers (PNG)]
NORTH SOLOMONS	
TP-17-13: Kunua	Northwest Bougainville Dev't
TP-17-14: Manctai	Asikopan

^a TP-15-57 apparently replaces TL-15-10 of the same name, as shown in Whimp (1995).

^b Also known as Extended Mengen.

^c Whimp (1995) records the permit holder as Archdiocese of Rabaul TA Vunapoc. According to FIA staff, PNG Forest Resources is not the operator, but purchases and exports logs cut by the landowner company, Ulanona Sawmill Development, which acquired the permit from the Catholic mission (personal communication, Bob Tate).

^d Includes TP-14-14 (Bulu) and TP-14-19 (Fulleborne Extension).

Appendix B: Log Export Project Profiles

Most of the information contained in this appendix is based on two separate outputs from the PNG Forest Authority database, both dated 12 June 1996:

- Information on current project status, timber permit period, project area, and estimated resource are all derived from the 'Projects List' which has also been used as the primary source of information for Appendix A.
- Information on actual exports for each year from 1993 to 1995 has been taken from a separate listing of 'Exports by Projects' for each of these years.

Information on projected harvest levels for the years 1996-2001 has been taken from Appendix 7 of the 1996 National Forest Plan.

The following codes are used to indicate the 'status' of each project in June 1996 (Column 1):

OP = operating;

NO = not operating;

AC = accepted;

PE = permit extended;

PS = permit suspended;

NA = no information available.

In those cases where information on exports during the years 1993-95 is not matched by any corresponding information on project status, permit period, project area or estimated resource, it can normally be assumed that the permit had expired by June 1996.

For ease of cross-reference, the permits listed in Appendix B are listed in the same order as in Appendix A.

PROVINCE & PERMIT [STATUS]	Permit period (years)	Project area (ha.)	Estimated resource (m ³)	Actual exports (m ³)			Projected harvest 1996-2001
				1993	1994	1995	
WESTERN							
TP-1-6 [OP]:	87-97	24,289	729,040				28,788
TP-1-7 [OP]:	92-02	474,078	3,228,912	328,373	285,591	275,014	1,983,156
TP-1-9 [AC]:	92-12	301,494	7,900,000				
Total		799,861	11,857,952	328,373	285,591	275,014	2,011,944
GULF							
FMA 2-12 [OP]:	88-08	187,733	2,716,077	171,526	285,591	104,918	970,176
TP-2-15 [OP]:	92-02	83,800	1,509,312	4,942		12,155	99,534
TP-2-14 [OP]:	91-03	88,680	1,431,508	3,601	2,926		92,400
Total		360,213	5,656,897	180,069	288,517	117,073	1,162,110
CENTRAL							
TP-3-35 [OP]:	92-02	25,870	376,667				115,152
TP-3-27 [OP]:	88-98	13,463	184,400				57,576
TP-3-26 [NO]:	89-99	23,641	965,752				
TP-3-32 [PS]:	90-00	78,422	300,000		27,049		5,945
TP-3-34 [OP]:	92-02	26,850	326,652				9,596
TP-3-30 [OP]:	90-00	20,275	357,652				43,182
LFA 3-2 [OP]:	89-99	45,000	900,000			13,166	7,134
TP-3-33:				29,254	17,803		
TA-025 :						15,545	
TL-3-8:				17,818	14,588		
TP-3-28 [NO]:	88-08	108,000	1,518,630	73,815	51,779		
TP-3-29:				12,285	5,446		99,534
Total		341,521	4,929,753	133,172	116,665	28,711	280,543
MILNE BAY							
TP-4-3 [NO]:	87-02	118,951	540,378				57,072
TP-4-6 [OP]:	90-00	23,000	129,200	46,720	36,399	17,722	59,448
TP-4-5 [NO]:	90-98	22,673	354,230				19,192
TL-4-2 [PE]:	93-96	30,332	70,000		3,953	2,179	
Total		194,956	1,093,808	46,720	40,352	19,901	107,176
ORO							
TL-5-2:				5,401		4,660	
TP-5-10:				32,432			99,870
TP-5-9 [NO]:	88-98	29,620	566,400				115,152
LFA-5-1 [OP]:	91-06	38,930	1,170,000	35,471	64,111	10,539	199,740
Total		68,550	1,736,400	73,304	64,111	15,199	207,381

PROVINCE & PERMIT [STATUS]	Permit period (years)	Project area (ha.)	Estimated resource (m ³)	Actual exports (m ³)			Projected harvest 1996-2001
				1993	1994	1995	
W. H'LANDS							
TP-9-13 [NO]:	88-98	1,618	35,000				
Total		1,618	35,000				
MOROBE							
TP-13-34 [NA]:	96-05	440,800	1,221,800				
TP-13-32 [NO]:	91-01	45,000	640,000	58,335	38,991	4,506	73,714
TL-13-15 [PE]:	96-31		4,500,000				
TP-13-33 [NO]:	92-02	31,950	436,840				172,728
TP-13-31 [OP]:	91-96	38,190	373,350				
TP-13-27 [OP]:	91-01	42,261	56,946	70,001	29,259	61,177	135,540
Total		598,201	7,228,936	128,336	68,250	65,683	295,618
MADANG							
TP-12-18 [OP]:	92-02	75,000	860,375	19,957	43,455	35,023	178,344
TP-12-21:							
TP-12-20 [OP]:	90-00	56,480	276,073				172,440
TP-12-3:							
TP-12-6 [OP]:	88-98	9,950	344,799	3,263			4,992
TP-12-22 [NO]:	95-04	59,200	592,200				
Total		200,630	2,073,447	23,220	43,455	35,023	177,888
EAST SEPIK							
LFA-11-1 [OP]:	91-01	39,978	640,000				141,830
LFA-11-2 [OP]:	92-02	40,000	1,282,000	9,107	16,178	14,966	35,667
Total		79,978	1,922,000	9,107	16,178	14,966	177,497
WEST SEPIK							
TP-10-8 [OP]:	91-11	287,428	311,100	135,820	182,639	194,934	920,244
LFA-10-1 [OP]:	88-03	38,600		54,577	71,814	78,209	231,336
LFA-10-2 [OP]:	89-98	10,000	500,000	769		25,385	233,448
Total		336,028	811,100	191,166	254,453	298,528	1,385,028

PROVINCE & PERMIT [STATUS]	Permit period (years)	Project area (ha.)	Estimated resource (m ³)	Actual exports (m ³)			Projected harvest 1996-2001
				1993	1994	1995	
MANUS							
LFA-18-2 [OP]:	91-01	10,067	84,000	41,479	21,176	6,146	66,580
LFA-18-1 [OP]:	89-99	9,000	31,500	22,326	38,107		57,066
TP-18-2 [OP]:	88-03	32,667	1,614,437	62,049	23,736	12,096	178,350
Total		51,734	1,729,937	125,854	83,019	18,242	301,996
N. IRELAND							
TP-16-41 [OP]:	91-96	35,736	236,000			33,421	23,638
TP-16-48 [OP]:	92-02	22,700	520,000	22,250	55,849	35,949	66,580
TP-16-45 [OP]:	91-96	11,190	219,750	30,460	5,481	13,370	21,400
LFA-16-1 [NO]:	74-96	110,050	800,000				
LFA-16-2:				40,424	6,572		
TL-16-2 [OP]:	92-96	347	10,400				
TP-16-47 [NO]	95-00	1,315	73,153				
TP-16-42 [OP]:	91-01	98,100	840,000	18,548	30,198	11,714	171,210
LFA-16-12:				1,224			
TP-16-46 [OP]:	92-97	2,290	48,830	3,478	2,421		4,162
TP-16-43 [OP]:	90-00	80,629	648,900	41,294	11,652	30,165	35,668
Total		362,357	3,397,033	157,678	112,173	124,619	322,658
E.N. BRITAIN							
TP-15-49 [OP]:	92-02	83,000	2,000,000	15,067	36,350	58,596	78,468
TP-15-55 [OP]:	92-02	15,860	300,000		5,200	8,696	
TP-15-59 [NA]:	95-05	52,600	1,052,000				
TL-15-11 [OP]:	92-96	2,900	60,000	11,243	15,031		
TL-15-12 [NO]:	92-97	5,000	150,000				35,668
TP-15-45 [OP]:	89-99	22,170	420,000	70,672	48,282	52,803	45,180
TP-15-56 [OP]:	92-02	33,760	1,821,913			51,615	83,225
TP-15-44 [OP]:	89-98	10,111	40,000	51,703	17,517	231	
TP-15-52 [OP]:	91-99	9,100	103,000		43,474	38,981	113,464
TL-15-8:				31,463	3,466	5,903	63,576
TL-15-9 [OP]:	92-98	17,000	300,000		20,589	9,859	8,323
TP-15-40 [PE]:	88-96	2,845	135,000				
TP-15-54 [OP]:	92-97	9,770	99,000				28,788
TP-15-34 [OP]:	87-97	120	36,000				
TP-15-57 [OP]:	95-05	23,592	812,800	32,585			
TP-15-58 [OP]:	95-05	15,000	300,000				
TP-15-53:				84,405	80,759	48,692	627,762
Total		302,828	7,629,713	297,146	270,668	275,376	1,084,454

PROVINCE & PERMIT [STATUS]	Permit period (years)	Project area (ha.)	Estimated resource (m ³)	Actual exports (m ³)			Projected harvest 1996-2001
				1993	1994	1995	
W.N. BRITAIN							
TP-14-41 [NO]:	86-96	57,100	680,000	47,211	51,879	17,454	243,735
TP-14-43 [OP]:	87-96	21,565	760,000	20,458	24,520	10,811	162,290
TP-14-38 [NO]:	88-98	25,300	400,000				
TP-14-58 [NO]:	95-05	14,045	613,906				57,576
TP-14-52 [OP]:	90-14	409,793	7,100,000	112,935	90,304	29,262	1,055,784
TP-14-57 [OP]:	??-02	20,980	685,645	67,490	53,194	29,742	
TP-14-50 [OP]:	89-09	169,140	3,500,000	75,444	93,045	64,794	577,824
LFA-14-6 [OP]:	89-04	39,650	1,107,000	69,647	47,667	32,868	116,516
LFA-14-13 [OP]:	92-02	39,650	1,035,000				191,920
TP-14-56 [NO]:	91-96	20,640	240,000		2,149	3,149	
LFA-14-2 [OP]:	90-99	39,500	800,000		10,678	38,844	117,705
LFA-14-3 [OP]:	90-02	40,000	800,000	63,006	52,054	34,813	228,276
LFA-14-12 [OP]:	92-02	40,000	676,000	32,123	77,021	56,385	335,280
TP-14-53 [OP]:	90-00	68,181	1,617,000	130,159	99,890	91,568	299,612
TP-14-54 [OP]:	91-06	63,500	1,397,760	32,527	105,236	104,839	266,324
TP-14-55 [OP]:	91-01	61,600	1,397,760	42,370	94,009	76,888	347,172
LFA-14-4 [OP]:	88-98	40,000	800,000	65,719	64,299	42,670	104,628
LFA-14-5 [OP]:	89-09	32,800	800,000	44,932	90,115	74,036	167,640
LFA-14-8 [OP]:	90-05	39,930	1,200,000	59,569	96,395	73,917	178,344
LFA-14-10 [OP]:	92-02	40,000	650,000	36,076	142,366	90,375	178,341
LFA-14-14 [NO]:	92-02	34,840	650,000				290,995
LFA-14-11 [OP]:	92-07	40,000	1,385,000	70,881	88,002	77,920	577,824
LFA-14-1 [NO]:	91-01	4,548					
LFA-14-7 [OP]:	91-01	40,000	1,000,000	115,848	104,550	62,486	271,080
LFA-14-9 [OP]:	91-01	37,980	1,000,000	147,009	110,602	54,931	117,705
Total		1,440,742	30,295,071	1,233,404	1,497,975	1,067,752	5,886,571
N. SOLOMONS							
TP-17-13 [NO]:	88-98	23,864	380,000				38,384
TP-17-14 [NO]:	88-98	24,070	327,310				
Total		47,934	707,310				38,384
UNKNOWN				13,607	12,480	52,879	
NAT. TOTAL		5,187,151	81,104,357	2,941,156	3,153,887	2,408,966	14,054,569

CHAPTER 11

THE STATE VERSUS CUSTOM:

REGULATING PAPUA NEW GUINEA'S TIMBER INDUSTRY

ROD TAYLOR

Background

A unique feature of the Constitution of Papua New Guinea (PNG) is its recognition of custom. Custom is defined (in Schedule 1) as 'the customs and usages of indigenous inhabitants of the country existing in relation to the matter in question at the time when and the place in relation to which the matter arises, regardless of whether or not the custom or usage has existed from time immemorial'. Except where it is inconsistent with statute law, custom forms part of the underlying law along with adopted principles of English common law and equity. Through custom, local kinship groups own 97 percent of PNG's land mass and most of its natural forest resources.

PNG's commercially accessible timber volumes are concentrated in lowland and coastal areas with low population densities. In these areas, people generally practise shifting cultivation within well-defined pockets of secondary vegetation (Allen 1993). Through kinship groupings, they claim customary ownership of the large tracts of natural forest, between their gardening areas, that contain the timber resources targetted for industrial logging.

At Independence, PNG inherited two very different forestry laws - the highly interventionist *Forestry Act* and the laissez-faire *Forestry (Private Dealings) Act*. Under the *Forestry Act*, only the state could acquire timber rights from customary landowners.¹ The state purchased these rights under a standard-form Timber Rights Purchase Agreement. Landowners received royalties at a prescribed rate, and had no legal say over which logging company held the timber permit, what infrastructure was built, or the rate at which the timber was harvested.

The *Forestry (Private Dealings) Act* permitted customary forest landowners to sell their timber privately. The usual practice was for a 'landowner company' to acquire timber harvesting rights from landowners and then on-sell the rights to a foreign logging company. Provided the Minister assented to the 'dealings', the logging company could operate without a timber permit and with minimal state supervision.

¹ The term 'landowners' is used in PNG to describe groups or individuals with customary rights to land and resources. The term covers resource rights, as well as land rights, and masks the distinction between group ownership rights and individual use rights (see Fingleton 1993:43).

In 1989, the Commission of Inquiry into Aspects of the Forest Industry (Barnett 1989c) documented an 'out of control' timber industry characterised by pervasive corruption, transfer pricing, and reckless logging practices. The new National Forest Policy (approved in 1990) and the new *Forestry Act* (passed in 1991 and gazetted in 1992) responded to the Commission's call for increased state control and planning in the forestry sector. The new Act incorporated the PNG Forest Authority and vested it with responsibility for timber industry regulation under the guidance of the National Forest Board.

Under the new *Forestry Act*, the state has reserved to itself a monopoly on the right to enter into a Forest Management Agreement with landowners. If they cannot strike an acceptable deal with the Forest Authority, landowners are barred from arranging industrial-scale logging on their land.² If a Forest Management Agreement is concluded, it is the National Forest Board, not the landowners, which selects a forest industry participant to implement the agreement and recommends to the Minister that a timber permit be granted.³

The Act also calls for the formulation of a National Forest Plan and requires all forest development to accord with it (Section 54). The Plan is intended to comprise a policy statement, the National Forestry Development Guidelines ('the Guidelines'), a development programme, and a statement of annual allowable cut (Section 47). While the Guidelines were approved 'in-principle' in 1993, the Plan itself did not make its first public appearance until May 1996 (see Filer, this volume).

The new Act saved all projects and agreements approved under former legislation, but gave the new National Forest Board power to make variations to bring them into line with the new regime (Section 137). As late as February 1996,⁴ the Board had not yet exercised this power nor issued any permits under the new Act. All current projects were operating under arrangements that predated the new regime.

Environmental Protection Measures

Strategic Land-Use Planning

The *Forestry Act* (Section 54) requires all forest resources to be developed in accordance with the National Forest Plan. According to the Forest Policy

² No timber permit over customary land can be granted unless landowners have entered into a Forest Management Agreement with the Forest Authority (Section 55). Logging can be carried out under a Timber Authority without a Forest Management Agreement, but the timber harvested cannot exceed 5,000 cubic metres per year and cannot be exported in round log form (Section 87).

³ It is possible for landowners, through the terms of their Forest Management Agreement, to insist that the selected industry participant be contracted to a permit-holding landowner company rather than hold the permit itself.

⁴ The first draft of the present chapter was completed in February 1996, and the remainder of the text makes very little reference to subsequent events.

(PNGMOF 1991:5), the Forest Authority should help provincial governments to identify forest areas for long-term timber production or protection for ecological, cultural, or environmental reasons, or clearance for other uses.⁵ These classifications are to form the basis for Provincial Forest Development Programmes within the National Forest Plan (ibid:13-14).

Forest classification, as proposed in the National Forest Policy, has proved difficult to implement. First, political friction between national and provincial governments has constrained provincial input.⁶ Second, the Forest Authority's part in coordinating the process called for close management and enormous technical input at a time when its attention was focussed on internal reorganisation and unresolved policy issues. But perhaps the major obstacle to completion of this exercise has been growing doubt over its ability to win the respect of landowners.⁷ The view came to prevail that landowners would reject, outright, any lines drawn on maps, at the whim of government officials or politicians, which purported to tell them what they could or could not do with their resources. The alternative of country-wide consultation with all landowner groups was simply not feasible.

Despite the lack of progress and widely-held suspicion that forest classification is an exercise in futility, no alternative basis for the Forest Development Programme has been agreed. A National Forest Plan remains a key component of the *Forestry Act*. Without a plan in place it is questionable whether permits can be legitimately granted, given the stipulation in Section 54 that forest resources can only be developed in accordance with the Plan.

⁵ The policy allowed provincial governments to defer a land-use decision by classifying an area as a 'reserve forest'.

⁶ Increasingly, provincial and national politicians saw themselves as competitors for control over the distribution of resources and delivery of government services. In the early 1990s, the national government considered a series of reform proposals clearly intended to undermine the political base of provincial governments (Axline 1993). The Bijartisan Select Committee on Provincial Government reported to Parliament in March 1993, recommending replacement of the existing tier of provincial politicians with provincial authorities. These were to comprise national government members from the province and local government leaders. The recommendations formed the basis of reforms that became law in 1995.

⁷ The unofficial demise of the classification endeavour can be traced through successive drafts of the Guidelines. The first draft presented to the National Forest Board in April 1993 merely acknowledged some slippage in the time needed to complete the task, nominating April 1994 as a 'realistic target'. The version approved by the National Executive Council in December 1993 omitted the whole chapter on preparation of the Forest Plan and made no reference to forest classification or land-use zoning.

Logging Practice Standards

Nearly all commercial forestry operations in PNG's natural forests are conducted under a 'selective logging' regime.⁸ Beyond this common ground, current timber permits, logging agreements, environmental plans, and forest working plans contain piecemeal, and often contradictory, controls on logging. The lack of consistent and comprehensive standards, combined with poor compliance monitoring, has resulted in excessive canopy removal, damage to residual trees, soil erosion, and siltation of rivers and reefs (see Cameron and Vigus 1993).

In August 1995, the Forest Authority and the Department of Environment and Conservation circulated a final draft Logging Code of Practice (PNGFA/DEC 1995). The two agencies intend for the code, once it is finalised, to be brought into force through regulations under the Forestry Act.⁹ The proposed regulations will give the Forest Authority power to enforce the code against all commercial logging projects, including those within Local Forest Areas that currently operate outside its jurisdiction.¹⁰

The draft code prohibits logging on steep slopes, permanently inundated land, karst country, and mangrove areas. Thus the code will operate as a land-use planning instrument, but one that is more manageable and less confrontational to landowners than a nationwide forest zoning strategy of the kind already described. The code sets clear and unequivocal standards for protection of watercourses and coastlines, curtailing soil disturbance and damage to residual trees, managing waste, and operational planning. If it can be enforced, the code should substantially reduce the environmental impacts of logging.

⁸ Exceptions are clear-felling operations for plantations, road-lines, and so on. In selective logging projects, the common bottom-line constraint is the prohibition on felling trees of less than 50 cm in diameter at breast height (dbh). It could be argued that the form of selective logging practised in PNG is determined purely commercially, due to the wide dispersion of commercially-valued species within the forest (Louman and Nicholls 1994:160).

⁹ According to the preface to the draft, comments are to be considered before a final draft is prepared and presented to the relevant ministers with a recommendation for adoption and implementation.

¹⁰ Operations in a Local Forest Area are conducted in accordance with a private agreement (usually between the resource owners and a 'landowner company') approved under the now repealed *Forestry (Private Dealings) Act*. With no permit to enforce in these areas, Forest Authority officers have had no direct role to play in monitoring logging operations. As it moves to bring logging operations in Local Forest Areas under its control, the Forest Authority may face considerable resistance to its intrusion. In-principle resistance to new controls might be avoided if forest landowners are given the option of bringing their operations under the code rather than having it forced on them.

Local Impact Assessment and Planning

Before the Forest Authority can sign a Forest Management Agreement with landowners, it must arrange a Development Options Study over the area concerned (*Forestry Act*, Section 62). According to the Guidelines (PNG Ministry of Forests 1993b:6), the study should assess social, economic, and environmental considerations in the area to identify possible uses of the forest with the potential of offering 'viable and sustainable development'. For uses acceptable to landowners, the study should make 'a preliminary assessment of their likely socioeconomic impact'. This information will be presented to landowners 'in order that they can make an informed decision on the nature of the project to be established'.

After landowners have signed a Forest Management Agreement, the screening process for issue of a timber permit requires the submission of an environmental plan for approval under the *Environmental Planning Act*. In preparing the plan, the project proponent is required to undertake an environmental impact assessment.

Landowners are the clients of the development options study, with responsibility for its completion falling to government. By contrast, the environmental plan is prepared by the private sector proponents of a project for consideration by government consent authorities. The government's record in fulfilling its obligations under either process is poor. With development options studies, the Forest Authority has failed to carry out any form of study resembling that described in the Guidelines with respect to the Forest Management Agreements it has made so far. As for environmental plans, the under-resourced Environment and Conservation Ministry has accepted poor-quality plans and undertaken monitoring on an ad hoc basis only (Hedemark and Sekhran 1994:341).

Sustained Timber Yield

Poore (1989:12) defines sustainable forest use as the practice of maintaining the forest's potential to provide a sustained yield of certain products while also maintaining the forest ecosystem in a desired condition. The National Forest Policy adopts 'sustained yield management' as a 'guiding principle'. If we assume that the 'forest condition' component of sustained yield needs to be addressed through the environmental protection measures examined in the previous section, we are still left with the problem of controlling harvest rates.

The *Forestry Act* (Section 47) requires the National Forest Board to prepare a yearly statement of the allowable cut for each province. This statement forms part of the National Forest Plan, and its purpose, according to the Act, is to ensure that designated production forests within each province are 'harvested on a sustained yield basis'. The Act provides no definition of 'sustained yield'. According to the National Forest Policy (PNG Ministry of Forests 1991:5), it means 'continuous production on a provincial basis with the aim of maintaining,

at the earliest practical time, desirable net growth at least in balance with harvest'.

The National Forest Policy proposes that the allowable cut for each province be set initially by dividing the estimated volume of merchantable resources zoned for production by an assumed cutting cycle of forty years. Statements of allowable cut are thus predicated upon the designation of production forests through the currently-stalled forest classification exercise. No official statements had been made by the end of 1995.

The National Forest Policy proposes a reduction in the 'permitted harvest volumes' where they exceed a province's allowable cut,¹¹ but is silent on the vexed issue of how to fairly apportion the reduction between existing projects. Any apportionment will need to take account of the poor correlation between permitted, actual, and sustainable cut levels. Another issue which has not been addressed is whether landowners and logging companies in existing projects should absorb the entire cut to the exclusion of those seeking new project approvals.

The Guidelines make no reference to allowable cuts by province. Instead, they introduce the notion of a 'sustainable unit', being an area 'large enough to provide a viable operation on a sustained yield harvest basis' (PNG Ministry of Forests 1993b:11). To achieve this, they propose a review process in which existing permitted cuts will be reviewed, as necessary, to achieve a sustained yield within each unit.¹² So far, the National Forest Board has not reduced the permitted cut for a single project on sustained yield grounds.

Capture, Distribution, and Investment of Rent

The state, landowners, landowner companies, and logging companies are in competition for the economic surplus from timber extraction. The state appropriates its share through the tax laws. The remaining surplus is distributed

¹¹ Presumably, such reductions could be effected under Section 137(2) of the *Forestry Act*. This transitional provision gives the National Forest Board power to vary any condition in an old permit or agreement that, in its opinion, is 'at variance with the provisions of [the] Act to an extent which makes it unacceptable'.

¹² The state faces possible legal challenges if it moves to reduce current permitted cuts. Landowners could claim that such reductions amount to unjust deprivation of their property rights in breach of Section 53 of the Constitution. In defence, the state could argue that landowners have contractual rights to receive royalties, but not a right to sell timber at a set rate, and thus will not be deprived of property rights through a cut reduction. Second, Section 53(5)(f) of the Constitution exempts property acquisitions reasonably necessary for the preservation of the environment – and arguably, sustained yield reductions can be characterised as environmental preservation measures. Alternatively, foreign logging contractors may challenge the reductions on the grounds that these will breach their investment guarantees under the Investment Promotion Act. In defence, the state could argue that any adjustment of permitted harvest rates does not comprise an expropriation because permits do not confer property rights, or because the 'creeping expropriation' through regulation is not protected by the guarantees against expropriation.

according to private agreements between the parties. Under existing contractual arrangements, the proceeds of log sales accrue to the logging contractor, who is then required to make distributions to landowners and, under more recent agreements, to the landowner company. The landowners' share has usually comprised an agreed package of infrastructural development plus payment of a kina amount per cubic metre of timber extracted. Landowner companies have usually received an unconditional payment known as premium and special purpose levies (Shedden Agribusiness 1991).¹³

Nearly all current agreements were made before the new Act commenced, and thus reflect the low log prices that prevailed up to 1992. Because landowner entitlements are inelastic to log prices, landowners were largely denied a share of the increased surplus when timber prices rose dramatically in 1993.¹⁴

The new *Forestry Act* (Section 119) calls for a new 'forest revenue system' of prescribed royalties and other charges. Few constraints are imposed on the charges that can be levied (see Section 121). The *Guidelines* proposed that these provisions should be used to install a comprehensive new revenue regime that would override existing contractual arrangements.

Draft Guidelines presented to the National Forest Board in May 1993 (PNGMOF 1993a) proposed payment of a set stumpage fee direct to individual landowner clans, plus an additional stumpage fee (essentially a share of the surplus on log sales) into a 'project area development trust'. This trust was to be managed under government rules, with application of trust account funds confined to 'economically sustainable enterprises – on a loan basis' or 'construction and maintenance of physical infrastructure – by way of conditional grants'. Given the high prices prevailing at the time, this proposal would have diverted a significant share of the proceeds of log sales away from logging companies and into the trust accounts.

Not surprisingly, the Forest Industries Association was highly critical of the proposal. Yet the strongest protests were voiced by the PNG Forest Resource Owners Association (PNGFROA), a body whose membership comprised the directors and senior management of landowner companies. The PNGFROA's motives were as mixed as the conflicting allegiances of landowner companies. The revenue proposal made no provision for landowner companies, and severely restricted their capacity to continue to secure premiums from contractors, given

¹³ The agreements typically earmark the levies for 'agricultural' or 'community infrastructure' development, but are otherwise silent on how the levy funds should be administered and applied. This means a great potential for misuse of the funds, which are often not held in an account separate from the operating funds of the landowner company.

¹⁴ In some projects, landowners and landowner companies achieved more favourable arrangements by renegotiating these arrangements during the 1993 boom. The average f.o.b. price per cubic metre of mixed logs from PNG stayed within the US\$50-80 range from 1987 to 1992. In 1993, prices boomed to a peak of US\$200 before slowly declining to around US\$100. In 1994, prices peaked again at US\$150 then declined to a new plateau of around US\$110, where they remained up to the end of 1995 (ITTO 1995:113).

the large rental share which was now due to go to the new trust accounts. PNGFROA members also relayed the concern of landowners in general at having their money locked up in trusts. PNG experience suggests that money set aside for a common purpose is likely to be spent wastefully, if not misappropriated, by those entrusted with its management. Landowners had an understandable desire to see the money in their hands rather than in a remote trust account. PNGFROA members were also inextricably linked with the logging companies. Not only were landowner companies dependent on logging companies for their income stream, but some also shared offices, fax numbers, and even bank accounts with them (Whimp 1995:16; also Filer, this volume).

As much as anything else, feelings of indignation drove the PNGFROA's protests. Many landowner company principals saw themselves as enterprising proponents of self-help. Where the state had failed to deliver even basic social services to their respective areas, landowner company principals, in negotiating the logging agreements, had procured roads, cash incomes, and economic activity. Landowner company principals considered that they had justly earned their prominent positions through the role which they had played in brokering progress. They were outraged by the state's complete failure to acknowledge their past efforts or current status. This emotion was compounded by the fear that the proposals would expose them as having bargained poorly on the landowners' behalf. As Simpson (this volume) observes, any public show of weakness or uncertainty on the part of landowner company directors would have opened the door to rival aspirants to their positions.

Proposed controls over additional stumpage were substantially revised in response to the PNGFROA-led protest. The final version of the Guidelines, approved in principle by the National Executive Council in late 1993, proposes that additional stumpage be paid to 'a representative body appointed by landowners in each project area'. Thus the Guidelines left open the possibility of landowner companies securing the additional stumpage by gaining recognition as representative bodies. However, these concessions were not enough to win the PNGFROA's endorsement. In the face of continuing opposition, the state abandoned the original revenue proposals in 1994, yet alternative models that would override existing contractual arrangements remained under active consideration (Whimp 1995), and a modified revision of the fiscal regime was actually introduced at the end of 1995 (see Filer, this volume).

In the meantime, the state moved swiftly to secure a better revenue share for itself. It made two successive increases in export duty on round logs in November 1993 and March 1994, but no intervention was made on behalf of landowners. Their share of rent continued (until 1996) to be determined contractually under arrangements which predated the timber boom, while their potential to negotiate a larger proportion of the economic rent was constrained by the hike in export duty.

Justifying State Intervention

So far, this paper has chronicled the PNG government's forestry reform efforts across diverse objectives – environmental protection, sustained timber yield, and equitable rent sharing. On all three fronts, implementation has faltered over reforms that threaten the right of customary landowners to exploit their forests as they see fit. The state's waning commitment suggests growing doubt, on the part of politicians and bureaucrats, that the proposed forestry interventions are warranted.¹⁵

A state usually claims protection of the public interest as the justification for its private sector interventions. In the language of economics, the state intervenes in the market to correct or prevent negative externalities. In legal terms, the state exercises common property rights in order to restrict private property rights. In political terms, the elected government has a mandate to curb private interests in the public interest.

Another possible justification for state intervention in PNG is paternalistic protection of customary landowners. Given that customary systems have generally evolved to serve subsistence and barter economies, those systems, and people who control natural resources within them, are newly exposed to the intricacies, technology, and scale of commercial industry. Arguably, state intervention is justified, at the interface between custom and commerce, to protect customary landowners who are vulnerable because of their inexperience. This justification is founded on the questionable belief that landowners will do better under the state's benevolent guidance than if they are left to make their own naive choices.

The Local Public Interest

Under the PNG Constitution, customary authority and state authority coexist. Locally at least, the two forms of authority are in competition for the right to govern community affairs. State intervention on public interest grounds thus raises a threshold issue of whether customary authority or the state should divine the local public interest. Intervention grounded in paternalism raises a similar issue. If the state assumes the right to decide what course of action best serves the interests of local landowners, will it be better placed than customary authority to do so? The state's options are to:

- make its own judgment of the local interest; or
- accept the preference of those who claim customary authority.

¹⁵ This trend is evidenced by the state's policy rhetoric. The National Forest Policy makes the bold assertion that 'overall responsibility of ensuring that the country's forests are managed and replenished will rest with the state' (PNG Ministry of Forests 1991:7). Only three years later, the state's official stance had softened. According to the Guidelines, 'Responsibility for forest management will be allocated between landowners and the [Forest] Authority according to the terms of the forest management agreement' (PNGMOF 1993b:12).

Principles of Self-Determination

At one extreme, it can be argued that customary processes command automatic respect because they have been honed by the wisdom of the ages and underpin community life. The counter view is that the state should judge customary systems on their merits, and support only those that meet reasonable standards of governance. The Constitution suggests a course somewhere between the two. Its fifth goal calls for development 'primarily through the use of Papua New Guinean forms of social, political and economic organisation'. Yet under Schedule 2.1, custom is not recognised as part of the underlying law if it is 'repugnant to the general principles of humanity' or inconsistent with state-made laws.

A developing body of international law supports the view that customary leaders should self-determine the development paths of their constituents.¹⁶ In the PNG context, respect for these principles would require the state to defer to customary authority rather than define the local public interest itself. The state could intervene to protect and strengthen customary decision-making processes, but its objective should be to support, rather than supplant, custom.

Would state definition of local priorities be respected in any event? As Jackson (1992:82) notes, 'clans or other localised forms of loyalty are of far greater importance to most Papua New Guineans than are loyalties to the state'.

Technical Capacity

The state might lay claim to the right to define the local interest on the ground that it has technical skills and resources which rural landowners lack. While landowners may have direct knowledge of local ecosystems, social relationships, culture, and aspirations, they may lack the capacity to assess impacts beyond their experience. Without first-hand exposure to large-scale logging operations, landowners are likely to underestimate physical and social impacts. Even after logging commences, there is a time lag before long-term effects on subsistence lifestyles, such as contaminated water supplies, loss of bush foods and medicines, decline of fish stocks on silt-covered reefs, and increased malaria due to ponding, become apparent.

¹⁶ The draft United Nations Declaration of Indigenous Peoples' Rights sets a contemporary standard for state relations with indigenous peoples (UNWGIP 1993). Article 26 describes a right of indigenous peoples to 'own, develop, control and use' their traditional lands and resources. This includes the right to full recognition of their 'laws, traditions and customs, land-tenure systems and institutions for the development and management of resources' and the right to the benefit of 'effective measures by States to prevent any interference with, alienation of, or encroachment upon these rights'. These rights are buttressed by Article 30, which describes the right of indigenous peoples to 'determine and develop priorities and strategies for the development and use of their lands and resources'. This includes the right to 'require that States obtain their free and informed consent' before approving projects affecting their lands and resources. Article 31 asserts a right of 'autonomy or self-government' in relation to a range of matters including 'economic activities, land and resource management, environment and entry by nonmembers'.

Yet the skills base of the state is heavily concentrated in urban centres, and notoriously absent in the sparsely populated rural areas where large tracts of natural forest are found. Problems of mismanagement, waste, incompetence, corruption, disruptive political conflict, over-government, and neglect further constrain the state's ability to make efficient use of its resources (Axline 1993:5). In forestry, the state has a poor record on technical input to help define the local interest. It has not managed to arrange a single development options study, and its scrutiny of environmental plans has been poor.

Even if the state is better equipped than landowners to make technical assessments, the weight attached to these assessments is ultimately a matter of political judgment. The state can make its assessments available to landowners as readily as it can to its own politicians. The state is not a disinterested party – its self-interest as a rent-seeker undermines any claim to neutrality. If landowners are armed with technical information as well as local knowledge, they are arguably in a better position than the state to judge the local interest.

The proposed code of logging practice neatly demonstrates these issues. While preparation of the code is clearly an efficient use of state expertise, the code is ultimately a value judgement on the merits of competing environmental and commercial interests. Landowners may or may not agree with that judgment. If landowners are to define the local interest, they should have the option of adopting the code, adjusting it to local circumstances, or rejecting it.¹⁷ To ensure that the code is not rejected out of ignorance, the state will need to educate landowners on how it works.

If landowners adopt the code, the real challenge will be its enforcement. The state might best deploy its resources to train landowners to do their own monitoring, rather than field its own massive inspectorate. Landowners should be very effective in enforcing the code, given their local knowledge, proximity to operations, and self-interest motivation.

In summary, on grounds of technical capacity alone, the state cannot make a stronger claim than custom to the political task of defining the local interest. The state can deploy its technical capacity to supply landowners with resource management expertise and knowledge, yet refrain from imposing its judgment of how their commercial, social, and environmental concerns should be balanced. In adopting a supportive rather than coercive role, the state is more likely to mobilise landowners to monitor the timber industry themselves. In doing so, it should greatly reduce the pressure on its own resources of having to field inspectors for every logging project.

Political Capacity

The local interest in a logging project needs to be defined at two levels. First, a single landowner group needs to decide whether, and on what conditions, it

¹⁷ The code, or elements of it, might nevertheless be imposed on national interest grounds. Processes for reconciling the local and national interest are discussed later in this chapter.

should exploit its timber resources. Second, the collective interests of the various groups within the catchment or catchments affected by the logging need to be reconciled.

Under most customary systems in PNG, the landowning group or clan is the basic social and political unit (Power 1994:3; Lakau 1994:80). Clan leaders are well-practised at making decisions at the clan level, though seldom with as much at stake as when a logging project is proposed.¹⁸ Traditional Melanesian forms of political organisation seldom extended to broader levels than the clan or village. Thus, in agreeing to take part in logging ventures that covered many clans and villages, most landowners were acting in concert on a scale beyond traditional experience (Hide 1990:17). It is at this level that custom's ability to steer events in the direction of the local interest is most open to question.

Yet generalisation on custom's sway over events across a catchment is difficult. For example, in some areas, bush groups may get away with approving logging that damages the reefs of saltwater groups, but without compensating them. In other situations, a saltwater group may use a bush group's dependence on continued access to marine resources as leverage to persuade the bush group to restrain logging that would harm the local reef ecology (Hviding 1992:6). In some areas, non-assertive marginalised clans will be unable to enforce claims against dominant clans. In other situations, a clan that is excluded from a logging agreement that purports to cover its resources will be able to invoke custom – or perhaps a state-sponsored mechanism for resolving customary disputes – in order to be instated as a party to the agreement or to exclude logging in its area.

One method of testing custom's effectiveness at a catchment level might be to explore the question of whether it ranks the competing factional interests through some form of due process. However, the flaw with this approach is its assumption that customary systems should only be relied upon to define the local interest if they conform to external ideals of fairness. Customary systems, even when not distorted by new pressures of scale and urgency, are unlikely to meet such criteria. Filer (1990) debunks the romantic notion that Melanesian customary societies typically choose their leaders by consensus, settle arguments by compromise, or ensure that everyone enjoys the same condition of 'subsistence affluence'. While authority derives from popular consensus, leaders have traditionally won power through competition, and have often wielded it autocratically (Lawrence 1971:14). Tradition often excludes women from important village meetings. Customary resource rights tend not to be matters of fact capable of objective identification and protection, but the outcomes of constant, and often aggressive, assertion and counter-assertion (Wolfers 1992:246). Thus, if the state expects custom to meet standards of participatory democracy, custom is likely to fail, not just within the context of

¹⁸ Some local residents may not be members of any landowning group. However, they will derive their land occupation rights from the landowning groups under custom, and thus be incorporated within the customary tenure system.

logging negotiations, but generally. Unless the state is prepared to intervene systematically, wherever custom fails to require procedural fairness, then it should not do so over forestry issues alone.

A second approach is to accept custom's systems as having inherent legitimacy, and not evaluate them against external criteria of good governance and equity. Assessment of custom's ability to resolve the local interest across a catchment would then become an investigation of whether negotiations with logging companies occur within customary systems or outside them. The difficulty is in identifying what is and what is not a custom-sanctioned action. Custom is unwritten, constantly evolving, and differs from place to place. Customary authority is not administered by discrete and accessible institutions, but pervades all facets of village life. Traditionally, rules were manipulated to provide 'elbow room' for political manoeuvring (Lawrence 1971:16).

Where custom is confronted with issues of a scale and complexity beyond its traditional experience, innovative and opportunistic behaviour can equally be diagnosed as a breach of custom or as a healthy adaptation to modern times. A thin line separates anarchy and progressive adaptation. Ward and Kingdon (1995:15) suggest that many practices evolving to meet new conditions in the Pacific are 'neither traditional, nor customary, nor legal'.

Experience with landowner companies illustrates the complexity of these issues. On one view, the landowner company is the vehicle that has evolved to take custom into the new territory of project-wide cooperation. Landowner companies can claim political and commercial legitimacy through having received legal or de facto endorsement from landowners.¹⁹ Privileges enjoyed by landowner company principals (salaries, housing, travel, vehicle use, and 'entertainment') might be regarded as custom-sanctioned rewards for initiative and leadership. The community of right-holders under custom could be seen as having consented to logging and its internal distributional inequities. If less assertive clans were not consulted, or did not secure a share of royalties, these are custom-sanctioned outcomes of competitive claim making. Custom always has been responsive to 'pressure of circumstances and dominant interests' because of to the general lack of a superior neutral body charged with its administration (Harding 1972:606).

The counter view is that landowner company directors and executives, in concert with foreign logging interests, have unfairly exploited custom's inability to control events at the scale and pace of a logging project. In operating beyond the reach of traditional customary checks and balances, they have pushed personal and factional interests with little regard for the local public interest.

¹⁹ Under the *Forestry (Private Dealings) Act*, the legal expression of this endorsement was the making of the Dealings agreement with the landowner company, rather than directly with a logging company. Where landowner companies secured permits over Timber Rights Purchase areas under the old *Forestry Act*, the endorsement is not so obvious, but can be traced through the fact of formation of a landowner company and unchallenged lobbying of the Minister to grant it the permit.

From this viewpoint, a catchment or project area can be regarded as a plurality of individuals and factions which is not effectively constrained by custom, and whose self-interested behaviours generate externalities. Because customary authority cannot be asserted at this level, the local public interest is unprotected.

Conflicts of interest, and apparent lack of accountability, of landowner companies and clan agents support this view. Both landowner company principals and clan agents may have conflicting loyalties to the logging contractor that helped to install them in the process of setting up the project. Individual landowner company shareholders are rarely bound by any trust deed formally requiring them to act on behalf of their clan. Legal requirements, such as lodgement of company returns and calling of general meetings, are often not understood and are poorly enforced. Landowner company headquarters are often located in provincial capitals rather than the project area. Clan agents are largely unchecked in their distribution of royalties.

Future projects have better prospects of achieving project-wide representation for landowners through bodies with greater formal accountability than existing landowner companies. The *Forestry Act* (Section 57) encourages landowners to form 'land groups' under the *Land Groups Incorporation Act* before entering into a Forest Management Agreement (see Holzknicht, this volume). Through this device, clans become legal corporations which are run according to customary law. These land groups can then become building blocks for larger representative bodies with commercial or welfare objectives. If future landowner companies can be encouraged to incorporate along these lines, they will be less susceptible to allegations of unrepresentativeness than the current models.

Assessment of whether custom can cope with the events surrounding a logging project will also depend on whether a short-term or long-term view is taken. A snapshot analysis presents a gloomy picture. Timber resources have been sold cheaply, and to date only a small portion of the proceeds have been reinvested productively. Reckless logging practices severely diminish the capacity of the forest to supply clean water, halt erosion, and regenerate commercial timber. Pressures of change and the influx of cash have escalated alcohol abuse and associated violence (particularly against women) and have heightened internal tensions (for example, between land claim disputants, saltwater and bush clans, landowner companies and 'splinter groups').

Yet a dynamic analysis may yield a conclusion that is less bleak. Involvement of landowners in the timber industry so far can be viewed as one stage in a longer-term process of self-determination. Landowners have retained their land, have generally not been displaced from their traditional villages, and are not under immediate threat of encroachment by new settlers. Past mistakes and negative impacts might serve as important, though expensive, lessons for the future. Evolution of landowner companies, despite the initial impetus provided by foreign logging companies, might result in the development of corporate experience that can serve local communities in the mid to long term.

It is too early to judge whether landowners will emerge from the landowner company experience in a stronger position to advance their own welfare. An important test will come with the cessation of logging. Some groups may have squandered too much of their 'wealth' through consumption spending, environmental damage, and delinquent social behaviour. The greed or apathy of the current generation may seriously disadvantage future generations. Other groups may take remedial action before it is too late. They may negotiate a better resource rent, or establish agricultural enterprises and other investments to provide for the years between logging cycles. They may make their contractor employ less destructive logging practices. Their landowner company may evolve into a socially responsible organisation which reinforces custom by helping it to adapt to the times.

National, Future, and Global Interests

The National Interest

If the state is to trust in the open-ended processes of custom to decide local preferences, it will need to play a role in reconciling those preferences with the national public interest.

The sustained yield issue shows this very clearly. Existing logging agreements show that the combined preference of landowners and logging companies favours rapid, rather than sustained, timber extraction. For logging companies, the high portability of equipment, the cost of maintaining roads, economies of scale, and uncertainty of tenure due to the prospect of land disputes, are all incentives to harvest as quickly as possible. Most operators have not invested in substantial milling facilities, and thus do not require a steady timber supply over the life of the mill.²⁰

Sustained yield may also run counter to the financial interests of landowners. If mature timber in a forest is regarded as a fully grown crop, landowners have an incentive to harvest the crop as quickly as possible, in order to take advantage of economies of scale and allow production of the next 'crop' to start sooner. Provided the same selective logging practices are used in both cases, the harvest rate should have a neutral effect on the forest's capacity to regenerate the desired mix of timber and to supply subsistence services. Both logging companies and landowners may want flexibility to increase production when market demand is high, and reduce production when demand is low.

However, from a national perspective, sustaining the timber yield offers clear advantages. For the national economy, continuous timber production provides a constant revenue flow, encourages installation and maintenance of permanent infrastructure, and offers lasting employment. These national

²⁰ Even if a mill is installed, this will not necessarily create pressure for a sustained yield – if the plant is to be written off over fifteen years, for example, the operator may prefer a higher wood flow for that period than a permanent supply at a slower rate.

interests may be reinforced by external pressure. For example, the International Monetary Fund and World Bank require the national government to adopt sustained yield policies as a condition of the current structural adjustment programme.

Future Interests

The state has a constitutional duty to protect future generations from the self-interested actions of the current generation. The Fourth National Goal requires that natural resources are 'conserved and used for the collective benefit of all [Papua New Guineans] and replenished for the benefit of future generations'. All government bodies are under a duty to pursue the goal, though the duty is not enforceable through the courts.²¹

Future generations of landowners have an interest in maintaining their inheritance of natural, financial, and manufactured resources, yet lack a direct voice in today's market. Their preferences are external to current commercial dealings, except to the extent that the current generation is concerned with their welfare. Arguably, the Constitution gives the state a mandate to curtail the decisions of current customary leaders on grounds of intergenerational equity.

Global Interests

According to neoclassical economics, the global interest in the biodiversity and anti-greenhouse values of rainforests should only concern rational landowners to the extent that it offers a potential 'in situ' market for their forest resources. The market in these global values is generally weak because of the 'free-rider syndrome'. People in faraway places cannot easily be excluded from enjoying a rainforest's 'option' and 'existence' values or its carbon sequestration services.²²

Sekhran (1994) investigates the potential of various mechanisms to reward PNG landowners for global benefits derived from the maintenance of biodiversity within their forests. The problems and countervailing pressures that have been identified suggest that short-term prospects for successful application of such mechanisms are poor.

Foreign interests are increasingly imposing their environmental concerns through the demand side of the timber market. According to the International Tropical Timber Organisation's Target 2000, all exported tropical timber is to be sourced from 'sustainably' managed forests by the year 2000 (ITTO 1990:i). Environmental pressure groups and government timber purchasing policies in

²¹ See Section 25(2) of the Constitution. The Ombudsman Commission can investigate alleged neglect of the duty, but can only recommend, not order, remedial action.

²² 'Existence value' refers to the non-consumption benefits derived from the mere knowledge that a thing exists. 'Options value' refers to the benefit in keeping future use options open by not destroying a thing (for example, the undiscovered uses of existing species).

developed countries have prompted timber trade associations to develop sustainability criteria and audit systems which enable 'eco-labelling' of timber. Yet the prospect of these measures taking hold has provided landowners with a perverse incentive to harvest their forests as quickly as possible in order to beat the Year 2000 deadline.

Where global interests in maintaining PNG's forests fail to establish real markets for landowners, the state may need to intervene to protect the national interest insofar as it is aligned with these global interests. The nation may have an interest in honouring commitments under environmental conventions, avoiding the consequences of global warming, and capturing donor funding which is conditional on forest conservation efforts.

Reconciling Local, Future, National, and Global Interests

While a strong argument can be made that custom should define the local public interest, non-local interests which are external to the market require protection through state intervention. The state could intervene unilaterally as a regulator (for example, through mechanisms such as the National Forest Plan, provincial harvest limits, and statutory revenue system). Alternatively it could seek to negotiate contract-based outcomes with the other stakeholders (for example, through Forest Management Agreements with landowners, and project agreements with landowner and logging companies).

Under the latter approach, the state could retain its monopoly power to make Forest Management Agreements with landowners as its negotiating base. Landowners would also negotiate from a position of strength due to their property-based veto over logging. Where agreement is not reached, no logging could proceed. The state's fragile rule over remote areas would serve as a pressure against its adoption of belligerent negotiating positions. The alternative of restricting landowners with detailed regulations and nationwide plans is flawed by the state's inflexibility and poor enforcement capacity. Customary autonomy and resource rights would face the threat of creeping regulation, with landowners having no comeback other than to defy the imposed rules.

Protection of the right of landowners to bargain in their own interest is particularly important, given the government's limited accountability to the electorate. In PNG, political success depends primarily on maintaining support in the local electorate, and has little dependence on party politics. Politicians, including ministers of state, derive personal legitimacy from delivering goods and services to their electorates, and have little interest in the wider legitimacy of government (Jackson 1992:82; Oh 1995:10). The Westminster systems of executive responsibility and parliamentary democracy are thus less able to check government actions. Landowners need property rights derived from custom as a means of checking the government where the ballot box fails to do so.

Whereas regulations tend to be inflexible and insensitive to local circumstances, negotiation can be a 'quick, flexible and less adversarial means'

of managing land-use conflicts (COA 1993:102). The conflict generated by the state's proposal to impose a statutory revenue system illustrates this point. Had the state and the PNGFROA (or individual landowner companies) sought to negotiate new revenue arrangements, they might have found an acceptable compromise on the issue of landowner company accountability, while advancing their mutual interest in extracting a higher share of rent from the logging companies (see Simpson, this volume).

A negotiation process could help landowners to acquire political, administrative, and technical skills. Landowners should also have better awareness of environmental safeguards and enforcement rights if they have had to negotiate for them.

In a contractual framework, landowners would also negotiate with logging companies.²³ Yet past experience confirms the vulnerability of landowners in dealing with logging companies. By playing a prominent role in setting up landowner companies, foreign logging interests were able to 'install' sympathetic directors and clan agents (see Wood, this volume). They used various inducements and advances to compromise the ability of landowner representatives to negotiate at arm's length. They were able to exploit the volatility of local politics to push quick agreements with landowner leaders who were keen to entrench their prominence while they had the chance. Some landowner representatives were illiterate, many had no business experience, and nearly all had very limited knowledge of the logging industry and the complexities of legal contracts.

To avoid these problems, the state could take steps to improve the bargaining strength of landowners, without attempting to bargain on their behalf. Measures to strengthen landowner negotiation capacity could include:

- publication of model contract provisions;
- legislation providing for court review of manifestly unfair contracts;
- redirection of government planning and enforcement resources to landowner capacity strengthening;
- finance arrangements where landowners can borrow against future income to pay for preliminary investigations and professional advice; and
- founding a non-government negotiation service for landowners (perhaps funded by international donors).²⁴

However, in any system where the use and management of forest resources is resolved through negotiation, landowners will ultimately have to look after

²³ Under the current *Forestry Act*, Forest Management Agreements can be crafted to give landowners the right to hold equity in the operating entity or a say in the selection of a contractor.

²⁴ Some steps in this direction have recently been taken by the GTZ-funded Landowner Awareness Project, which is part of the National Forestry and Conservation Action Programme.

themselves. In the end, they will be negotiating against the state. The state's recent moves to raise export tax without raising royalties shows very clearly that it is a competing stakeholder, not a benefactor. As Wolfers (1992:244) notes, 'interests which [rural landowners] might wish to oppose have little reason to help them to express or organise themselves'.

Conclusion

Proposed PNG timber industry reforms have faltered over the issue of control of forest resources on customary land. The state has shied away from implementing reforms that challenge the right of landowners and landowner companies to manage and exploit these resources as they see fit. This paper questions whether the reforms were justified in any event.

Where custom can divine the local public interest, it displaces the need for state intervention. Given custom's resilience and pervasive influence, the state should be cautious in assuming its demise. Emerging institutions such as landowner companies should not be dismissed as aberrations of custom simply because they are not egalitarian, whether judged against fantasies of how custom once operated or against introduced ideals of participatory democracy. Where custom seems to be failing, the state should not presume that it can do what custom cannot. The state's inability to deliver services and leadership to remote forest areas is what sparked the rise of landowner companies in the first place.

In addressing local resource management issues, the state might achieve more by supporting customary authority rather than usurping its role. The stalled forestry reforms are a failed attempt to do the latter.

The state can legitimately claim a role in balancing local interests with the national interest, although the forestry experience suggests that it lacks the political confidence and enforcement capacity to impose its will over customary land. Negotiated resolution of national and local interests would seem to be a more realistic and sensitive approach. Only through negotiation, with all its perils to novice participants in the timber industry, can landowners hope to achieve the capacity to protect their interests in the long term. The alternative of unilateral state regulation leaves landowners exposed to the dictates of ministers who lack accountability beyond their own electorates, and urban bureaucrats who tend to favour national or provincial concerns over local ones.

These conclusions suggest that the state should abandon nationwide land-use zoning through forest classification, statements of provincial allowable cut, and inflexible statutory controls over distribution and investment of the landowners' share of logging revenues. These reforms are all based on the flawed assumptions that the state is the best judge of the public good and can readily enforce its will. Environmental protection, sustained yield, and revenue distribution objectives should, instead, be balanced against conflicting interests through project-specific negotiation. For new projects, the state, landowners, and logging companies could rely on forest management and project agreements

to set the terms on which logging is conducted. If the state is less absorbed in nationwide planning and policing work, it should be more able to resource the conduct of development options studies and scrutiny of environmental plans, such that they serve as useful components of the negotiation process. For existing agreements, the parties can rely on periodic review clauses and the transitional review power in the *Forestry Act* (Section 137) to negotiate project reforms. The code of logging practice will serve as a useful standard for incorporation in new or revised agreements.

The role of the state would thus change from that of a regulator to that of a stakeholder. The state could offer extension services to ensure that landowners are sufficiently organised and informed to participate effectively in project negotiation and enforcement, again deploying resources formerly allocated to its regulatory function. Yet, given the state's conflicting interests, landowners could not count on such assistance, or accept it without question.

CHAPTER 12

SMALL-SCALE COMMUNITY-BASED FORESTRY:

ISSUES IN THE CONSERVATION OF PAPUA NEW GUINEA'S BIODIVERSITY

RON MARTIN

Introduction

This chapter sets out some of the issues involved in small-scale, community-based, environmentally sensitive timber extraction from natural forests. Any discussion of the sustainability of community-based forestry businesses must take cognisance of the widest sense of the term 'sustainability' – that is, encompass its ecological, economic, and social parameters. This discussion examines those parameters in a general way in an attempt to place ecotimber¹ extraction in the context of biodiversity conservation in Papua New Guinea (PNG), in order to outline a direction which the fledgling industry might take, and to point out some of the implications for planners in this area. The comments made here reflect the author's observations and experience which are, in the main, confined to Morobe Province.

The idea of operating a small business, owned by oneself, in which the rewards come from one's personal endeavours is well-established in Western societies. It has found a place in Papua New Guinean societies in the towns and, to a lesser degree, in rural communities. The trade stores of the villages, PMV² services on both land and water, small coffee, cocoa and betelnut plantations, and family fishing ventures all bear testimony to rural Papua New Guineans' interest in establishing such small businesses to capture the cash which they feel they need.

Small-scale forestry businesses, owned and managed by Papua New Guineans, are a relatively new phenomenon, driven by a multitude of forces, many of which differ from those that have given rise to other forms of small business. The nature of the chain from production to market, the capital cost of the production equipment, the lack of prior similar experience, and a need for operating capital and outside extension services, together render the problems to be faced of a different order to those faced by the other types of small business previously mentioned.

¹ The term 'ecotimber' will be used throughout this chapter to mean timber extracted from natural forest with one goal being the maintenance of the ecological integrity of that forest.

² Public motor vehicle.

Nevertheless, many small sawmills have been introduced to the forests of PNG. This number is certainly in excess of 700 (Henderson 1994b:10) and perhaps as high as 2,000 (Bun 1996:5), of which less than half are intermittently producing at any one time (Arentz and Holzknicht 1991; Mamun and Konabe 1992; Senn 1993). The vast majority of these sawmills are not individually owned but are the property of church organisations, or village or clan groups.

In recent years, small numbers of small-scale, community-based sawmillers have formed the nucleus of an attempt to model, in conjunction with other income-producing ideas, a way of providing development options that allow the ecological integrity of PNG's forests to be retained. Small-scale forestry, indigenously owned and managed, offers a theoretical potential for diverse interest groups to realise their objectives in cooperation with each other. The motivations of these interest groups are partly economic and partly social, and are directed both to conservation and self-fulfilment. If a self-sustaining small-scale forestry industry is to eventuate, the positive conjunction of these motivating factors is required, and that requirement, in turn, has significant planning implications.

A Short History of Small-Scale Forestry in Papua New Guinea

Small-scale timber harvesting operations using low-cost portable mills have a short history in PNG. From initially fulfilling the function of providing sawn timber to missions and plantations in remote areas, they have recently been adopted as community projects by local villages or clan groups.

Small-scale production of sawn timber was originally introduced to PNG by church and mission groups that were seeking to provide building materials in places of difficult accessibility. The lumber that has been produced has mostly been for community projects in which labour has been donated as a community service (sweat equity), or cash payments have been of a minimal nature. The trees used have not been harvested with the ecological integrity of the forest in mind. Rather, they have been the by-product of garden clearance, or have been chosen for other pragmatic reasons such as proximity to the site of application. Mechanisation, in the form of portable or transportable, low-production and low capital-cost mills, only began in the mid-1970s with the importation of this type of mill from Germany, Australia, New Zealand, and the United States (Henderson 1994b:10).

The ownership of portable sawmills which are capable of reasonably accurate dimensioning of timber was opened up to a wider group with the beginning of local production of the 'Wokabout Somil' by Natequip (or rather its predecessor) in Lae in 1986. This machine was much cheaper than imported models, and in several ways simpler in design, and thus more suitable to PNG operating conditions. Concern that the skills required to operate the machines were limited, and that the potential existed for destructive forestry techniques to be used, induced the directors of Natequip to decide to sell training along with their machines. They employed Sasa Zibe Kokino, a forester with a strong

conviction in favour of retaining the forest resource base, to carry out this work. However, many people who bought Wokabout Somils did not purchase the training package along with the machine. Later, Sasa Zibe established the Village Development Trust which, although separate from Natequip, continued to carry out its training programme, but also involved itself in awareness raising activities in an effort to contain the activities of industrial logging companies, especially in Morobe Province.³

Other embryonic attempts at influencing the harvesting practices and general forestry behaviour of small-scale sawmillers appeared in the early 1990s. In Milne Bay Province, a number of people using chainsaw mills were organised to supply a cooperative which was attempting to export to 'green' consumer markets on the western coast of the United States. In East New Britain Province, a private initiative by a plantation manager, Max Henderson, to diversify into small-scale forestry led to the establishment of a community-based 'ecoforestry'⁴ project by the Bainings people. Later again, the Pacific Heritage Foundation was created, with Max Henderson as its Executive Director. The Foundation is involving itself in awareness raising campaigns in several parts of PNG, assisting with the establishment of small-scale forestry programmes with low ecological impacts, and progressively improving the operations of existing small sawmill operations, with a view to having them certified under Forest Stewardship Council (FSC) guidelines. The last two years have seen other non-government organisations (NGOs) supplement the provision of education or awareness about the conduct of ecologically sensitive forestry, with the establishment of forest management plans which are designed to preserve the general structure of the forests being worked in the long term (with 30-40 year rotations), and to make the business ventures economically self-sustaining.⁵

The shift to a self-sustaining commercial orientation for ecotimber production has coincided with changes in the technology of portable sawmills which have brought greater accuracy, better portability, and higher rates of production with lower labour requirements.

Accommodating Ecological Sustainability

Donor organisations are beginning to apply pressure for ecological accountability, and the documentation of management plans and monitoring

³ Awareness raising campaigns aim to raise the consciousness of rural villagers to the long-term unsustainability of industrial logging operations and the short-term nature of the benefits returned from entering into partnerships with logging companies. Small-scale ecoforestry is offered as an alternative.

⁴ The term 'ecoforestry' refers to any collection of human uses of natural forest which have, as one of the goals, the preservation the ecological integrity of that forest. In the context of this chapter, one of those uses is the production of ecotimber.

⁵ These initiatives have included those of the Village Development Trust in Lae, the World Wide Fund for Nature in Kikori, and the Foundation for Peoples of the South Pacific in the Sepik region.

techniques is gathering pace. A few small-scale sawmill businesses are working to management plans which can be considered ecologically sensitive. Their managers, operators, and the NGOs assisting them are gaining experience with time, but they lack proven knowledge and harvesting techniques which can guarantee that the ecological systems of the forests in which they work will remain intact. However, their forestry practices are aimed at limiting damage and leaving the forest ecosystems unchanged if possible. From a biodiversity conservation viewpoint, this is preferable to other forms of forestry being practised in PNG, given the dearth of scientific knowledge available.

Ecotimber Production in Context

Of the small-scale portable sawmills currently operating, only a small percentage are working to well-defined forest management plans that focus on harvesting timber in ecologically sensitive ways. Senn (1993) has referred to thirty-eight mills which are practising some kind of sustainable yield forestry management. Sustainable yield is not necessarily ecologically sensitive forestry that has been designed to conserve biodiversity. The author of this paper believes that this was an overestimate, given his knowledge of the operations referred to by Senn. Those which are able to meet the criterion of following management plans with an ecological conservation focus may well be less than half his estimate. What can be said is that the intermittent nature of individual operators' work schedules has meant that the impact of small-scale sawmilling, in the majority of cases, has been slight when viewed in the context of the damage being done by large industrial logging operations, and the size of PNG's remaining primary forest.

At this point in time, the author is aware of eleven small sawmill operations that could reasonably lay claim to detailed forest management plans which have been designed to cater for the long-term ecological sustainability of the forest. Of these, only one project in the Baining area, consisting of three portable and one transportable mill, has had its operation tested under Forest Stewardship Council guidelines (personal communication, Wesley Watt,⁶ 29 October 1996). However, there are quite a number of other groups with portable mills, or on the point of obtaining them, which are in various stages of developing management plans that purport to allow for the long-term viability of forest ecosystems. These include mills in West New Britain that are funded by the European Union, and some twenty mills to be introduced in the Huon Peninsula by the Lutheran Development Service and funded by a German donor.

The Precautionary Principle

Conserving biodiversity requires the integrity of ecological systems to be sustained. This can only be guaranteed if tropical rainforest ecosystems are not subjected to the pressures of increasing human intrusion, or of those

⁶ Wesley Watt is a forester with the Pacific Heritage Foundation.

environmental changes which are external to the forest but are part of larger systems which incorporate the forest ecosystem. The scientific evidence simply does not exist to quantify what levels of human impact, or other forms of impact for that matter, the biodiversity of the forest can sustain while remaining intact, or at what new biodiversity levels the systems will stabilise, given certain forms of intrusion (Louman and Nicholls 1994:155,162,165). While considerable research is being done in tropical forests to determine growth rates of commercial trees and the structure of the forest for future commercial timber extraction following industrial logging of whatever type (selective, clear-fell, shelterwood, and so on), there is little evidence of significant research into the ecological changes wrought by this exploitation (*ibid*:165).

The precautionary principle, given such a context, would dictate that the forests be left alone until the necessary scientific knowledge has been accumulated. This is impractical in PNG, given the aspirations of rural resource owners for cash and 'development', government demands for revenue to meet social and political objectives, and external pressures such as the 'need' for foreign exchange. The lack of central control over the forest resource, and the fragmented nature of land and resource ownership, which is constitutionally guaranteed, is without precedent elsewhere in the world, and means that new solutions have to be sought.

Accountability

Small-scale forestry ventures, using low-cost portable or transportable mills, have offered those whose primary objective has been the conservation of rainforest ecosystems a possible alternative in their battle against the destructive practices of large-scale logging. In the past, the output of around 0.5 m³ per day per mill has meant that the impact on the forest at large is extremely limited, yet the potential income to rural villagers holds out the hope that their aspirations for cash can be met, and that some forests at least might thus be denied to industrial logging companies. A consequence of this has been that donor agencies with conservation or social agendas, or both, have been prepared to fund a considerable number of these small-scale ventures by direct donation or revolving loans. The anxiety of such agencies to prevent the rapid loss of representative examples of unique ecosystems, or to capture a reasonable portion of the value of the forest for the indigenous resource owners, has meant that the actual nature of the small-scale forest harvesting has been only superficially dealt with. The provision of a mill, along with appropriate training in technique, and sometimes awareness education in conservation needs, has not previously been accompanied by definitive forest management plans or any checks and balances on the type of forestry being practised.

The exposure of PNG's forests to industrial logging has continued apace. Small areas of forest (insignificant in the larger national context) have been temporarily 'saved' from large-scale logging by the provision of portable mills to some communities. The need to build markets, produce commercially viable businesses, and convince donors that their money is not going into a bottomless

pit, and that rainforest ecosystems are indeed being preserved, has led to pressure for more accountability, and thus for the production of forest management plans and an examination of ways of monitoring compliance.

Compromise with Social and Economic Realities

Changes in harvesting practices, and forest management practices in general, are discernible as commercial and social realities impinge on conservation criteria. In essence, early attempts at management plans sought to minimise openings in the forest canopy, avoid compaction of the soil, avoid residual damage to surrounding trees, and regenerate species in ways which maintained the original species structure of the forest. This included cutting trees in rough proportion to their distribution in the forest. An example of a set of guidelines for the production of management plans can be found in joint proposals by the Rainforest Information Centre and the Village Development Trust to the Australian International Development Assistance Bureau (RIC 1991).

A comparison of actual practice with these guidelines reveals a number of differences and reflects certain social, economic, and educational realities. In one area, where a sawmill had been operating for some years, there were instances of only rosewood being harvested in some extensive sections of forest. The elements of the ecoforestry harvesting plan were being adhered to, except for cutting in proportion to the species mix in the forest (author's observation near the Waria River). This was a reflection of the lack of infrastructure to shift lower valued timbers to Lac and still make a profit, and to the lack of a local market for lower valued timbers. In another instance, a mersawa tree had been cut only fifteen metres from the bank of a river. In addition, vines had not been cut prior to the tree being felled, with the result that two other quite large trees had been brought down with the felling, thus opening up an unacceptably large gap in the forest canopy (author's observation, central southeast Morobe coast). When this was pointed out to the sawmill operators, there was consternation as to what their trainer from the Village Development Trust would say when he discovered it. In fact, education had been provided on areas to avoid and on proper preparation by eliminating larger vines prior to a felling, but it had not been effective in this case. Other fellings in the area had met the guidelines in the 'Trainer's Manual' provided by the Village Development Trust. In training small-scale operators, mistakes like this are bound to be made. However, it does emphasise the need for a lengthy period of extension training and regular monitoring.

Another aspect that impinges on the conservation of the forest relates to compaction of the soil and damage to residual trees. The small-scale harvesting guidelines referred to here required the sawn lumber to be carried out of the forest on the workers' shoulders. In this way, compaction of soil and damage to residuals is slight. However, this has proven too difficult to achieve. Villagers have been unwilling to carry the lumber more than short distances (generally less than 1.5 kilometres in the author's experience, and more often only a few hundred metres), and human carrying capacity has limited the dimensions of the

lumber that can be cut. This latter situation has meant that market requirements and production realities do not always complement each other.

The Bainings Ecotimber Group in East New Britain Province did not start with such rigorous criteria. Transportable mills (carried on the back of, or towed behind, a truck) and snigging trails were used initially. The mill was located in one position for several months, a small bulldozer was used to construct tracks, and a tractor and jinker used to transport logs to the mill. After operations in an area are completed, the tracks are replanted (the author noted good regeneration of forest at the milling sites and snigging trails, but not on the access track constructed to service the milling sites). Henderson estimates that compaction and damage to residuals is limited to 9 percent of the area worked, while in the average export logging operation 'up to 70% of the ground area is trashed by machinery' (Henderson 1994b:20). The Pacific Heritage Foundation is now recommending much lighter and more portable saws, so it may be possible for them to reduce the area of damage to below 9 percent in the future.

Experiment and Experience

The Village Development Trust has been very reluctant to move to mechanisation to overcome the problem of removing timber from the bush. It has been experimenting with the use of water buffaloes,⁷ pulling either a small sled or trailer. While this experiment is in its early stages, the response of one 'ecoforester' interviewed by the author has not been promising for the use of such animals. This small-scale forester is working an area that contains some swamp forest and hillside forest. He finds that neither is suitable for the buffalo and is reluctant to use his employees to regularly work the animal (personal communication, Kiliki Asunu,⁸ 14 October 1996). Buffaloes must be worked almost daily if they are to retain their training, and thus their efficiency. They also need to be rested for several hours during the hottest part of the day. The owner-manager of this operation was anxious to dispose of the buffalo, and indicated that he needed a small tractor and permission to construct some trails in his hill areas if his transport problems were to be overcome. The forest management plan for this area already makes allowance for some roading into the hill area (VDT 1996a:12).

The remaining significant problem with ecological sustainability relates to the period of rotation. In the case of operations sponsored by the Village Development Trust, this has been set at 30-40 years. The two management plans examined by the author (Puseka Logging Area and Masing Logging Area) provide 800 hectares and 1,000 hectares respectively of commercial forest area, with the latter being worked by two portable mills. Although there is considerable variation in the topography and in the vegetation from hectare to

⁷ These animals are bred in Madang, provided with training, and the castrated animals then sent to the field sites.

⁸ General Manager of KDN Enterprises.

hectare, the yearly worked area will be approximately 20-25 hectares under a 'cut and leave for 30-40 years' regime. The minimum harvest to make the business commercially viable is of the order of 20 m³ of sawn lumber per month (personal communication, Bill Girard,⁹ 2 October 1996). This translates to 240 m³ per year for the Puseka management area, and slightly more for the Masing management area.¹⁰ This would suggest a recoverable harvest of at least 10 m³ per hectare. It seems to the author that this is at the high end of the scale, given a recovery rate of 40 percent, and can lead to fairly large gaps being created in the canopy, given the nature of the forestry to be practised. There are different cutting regimes that may reduce this problem, although it can, over time, lead to an overall change in the density of very large trees in the forest.

The Solomon Western Islands Fair Trade (SWIFT) project uses a system whereby forest is classified into nine categories depending on the number of large trees greater than 60cm dbh¹¹ per hectare and the number in the range 30-59cm dbh per hectare.¹² Each class has a *maximum* number of trees greater than 60cm dbh per hectare which can be cut in any five-year period. As trees are cut, a hectare plot may move 'down' in the class hierarchy, giving rise to a lower allowable cut in the next five-year period. This can continue until a point is reached where the forest is at Class 9, in which cutting of further trees is disallowed. The harvest is thus spread out, and depends on the state (or health) of the forest in any five-year period. This method has resulted in resource owners continuing to show a strong interest in one-hectare blocks over time, regularly inspecting them and measuring the growth rates of trees. Thus it is proving of educational value in improving resource owners' knowledge of the dynamics of their forest (personal communication, Willem Quist,¹³ 29 October 1996).

The point made in the two previous paragraphs brings discussion back to the question of the knowledge base from which these 'ecoforestry' groups are working. Insufficient knowledge exists on the structure of forests, their regeneration, and the effects of various forms of timber harvesting, including those practised by groups marketing their product as ecotimber. Both the Village Development Trust and the Pacific Heritage Foundation, as examples of NGOs promoting forestry of this sort, have included record-keeping practices in

⁹ Director, Planning and Development, of the Village Development Trust.

¹⁰ The primary mills in both areas are new Lewisaws, while the second mill in the Masing area is a reconditioned Wokabout Somil previously owned by the clan working the area.

¹¹ Diameter at breast height.

¹² In this scheme, Class 1 forest has more than 35 trees >60cm dbh/ha, and trees in the range 30-59cm dbh are not counted (4 trees per hectare >60 cm dbh can be cut in a five-year period). Class 5 forest has 20-24 trees >60cm dbh/ha and less than 15 trees in the range 30-59cm dbh (2 trees per hectare >60cm dbh can be cut in a five-year period). Class 9 forest has <15 trees >60cm dbh/ha and <15 trees in the range 30-59cm dbh. No cutting is allowed in this class.

¹³ Senior forestry officer of SWIFT.

their management plans, with the intention of building a database which can act as an indicator of change in the forest over time, and sampling plots which will be measured and evaluated annually to determine forest growth rates and, hopefully, any ecological changes occurring (PHF 1993:12; VDT 1996b:7,14).

Despite working on the establishment of small-scale, environmentally sensitive forestry for several years, relevant NGOs, their donor organisations, and community-based groups with sawmills are short on experience and knowledge in the techniques best suited to achieving their goal of conserving the forest resource, and the criteria to be assessed in determining their degree of success.

Accommodating Economic Sustainability

Even with the assistance of NGOs, community-based ecotimber producers have only been established in places where competition from large-scale logging companies has been non-existent or minimal. Nevertheless, their commercial viability requires that costs of production are met, and that there is sufficient profit to cover rural villagers' aspirations for cash. NGOs are following a strategy of reducing costs through achieving economies of scale and some reprocessing of lumber, along with improvements in productivity and quality control. The attitudes generated in cash-poor but time-rich societies are an obstacle for developing the Western business-centred approach that is implied by the strategy, and demanded by the size of the loans needed to purchase modern equipment.

Refocussing Goals

Without its commercial viability being successfully tested, this type of forestry cannot be a positive contributor to the preservation of the ecological systems of PNG's rainforests. Commercial viability requires the cost of operations to be met, along with the aspirations of the resource owners for an improved quality of life. Much has been written about the short-term nature of those aspirations (see Brooks 1996). The attitudes encompassing them are open invitations to the large industrial logging companies to meet their immediate concerns in the Asian marketplace, and reinforce short-term profit-taking endeavours at the expense of long-term goals that are more suitable to the preservation of natural forest ecosystems.

The biggest task facing the NGOs, in the short term, is to demonstrate that their rhetoric can be realised in a practical way by meeting rural villagers' aspirations. Part of that task is to refocus those aspirations on medium- to long-term goals. This is not proving easy. Wherever small-scale forestry has been offered as an alternative to income generated by large-scale logging, the latter has been preferred. This has been true, even when large sums of money have been spent on promoting alternatives, and when that alternative has been medium-scale, reduced-impact logging rather than small-scale logging, as for example in the Lak Integrated Conservation and Development (ICAD) project in

New Ireland Province (McCallum and Sekhran 1996:6). The greater size of the return in the short term, the ability to distribute some of the returns across a community, and the lack of any need for physical labour to extract that return, have been far more attractive than the work required to service a loan for a portable mill, the business of arranging to market a product, and the prospect of disputes arising from the lack of any means to redistribute the resulting income with some degree of equity around the community.

How the refocussing is to be achieved is still very much an open question and the subject of some current debate (see Orsak 1996c). Part of that process is itself long-term, in that it involves the improvement of general education levels in rural communities. Another part involves the establishment of successful alternative models. There are plenty of examples of the lack of benefits which rural communities derive from entering into partnerships with the large logging companies, and these can be the subject of awareness 'tours' which form part of a re-education process. However, this raises other perceptual problems, such as when a rusting steel roof atop a frame of offcuts from a large sawmill nearby somehow equates with 'progress'. Some reasons for optimism may be found in the small proportion of the young educated elite who are choosing to return to village life and form the focal point for information dissemination and resistance to short-term solutions to the problems of cash-poor societies, as in the Maisin community of Collingwood Bay in Oro Province (personal communication, Larry Orsak,¹⁴ 14 September 1996).

Opportunities for Establishing Ecotimber Businesses

Where small-scale operations have been set up, they have often been in conjunction with large-scale logging, such as when the small-scale sawmillers use logs that have been discarded by the logging company because of defects, or simply because they were overlooked. In other cases, the operations are in areas that are under little or no pressure from logging concerns. These areas may have been logged in the past but only specific species taken (as at Puseka); or else a physical impediment has raised the cost of extraction by large-scale logging methods (as at Masing); or the species structure of the forest has simply made other areas far more attractive (as at Kamiali). The point here is that small-scale, community-based ecotimber projects are generally found in areas where other opportunities to generate cash income are rare.

This scenario may be starting to change slowly, as evidence of the short-term duration of income provided by large-scale logging, and the lack of change in peoples lives over the medium to long term, becomes transparent. This appears to be the case on the southeast Morobe coast, where responses to the author's questions in Kamiali were heavily laced with descriptions of what the people to the south of them had not achieved after twenty-one years of logging (eighteen years by South Pacific Timbers and three years by Timber Products

¹⁴ Director of the Christensen Research Institute in Madang.

Marketing Corporation). For instance, it was difficult to see any gains of significance in the village of Kui, in whose forests a logging company had operated for only three years before depleting the resource and moving on. There is some evidence that more garden land was opened up along the logging road which was rapidly deteriorating (author's observation, March 1996). However, from a biodiversity point of view, this is hardly a gain.

Becoming Cost Effective

Whatever the impediments to large-scale logging, which have led to some villages or clans seeking the support of NGOs to start small-scale forestry programmes, there is still a need to demonstrate some measure of short-term economic return from the ecologically sensitive harvesting methods being proposed, as compared to the benefits of extracting timber in non-sustainable processes. This has led to attempts by the Pacific Heritage Foundation and the Village Development Trust to secure some advantages of scale, and seek to guarantee producers some returns on a wide range of species through the development of central buying centres, a local market, and an export market.

Part of an examination of the commercial aspects of a sustainable ecoforestry industry has involved looking at the strategy adopted by the Village Development Trust in developing a cooperative of small-scale ecotimber producers in Lae. This NGO is attempting to reach a situation in which full account is taken of the costs of the small-scale operator. These costs include burdens not previously borne by those who have operated mills in the past. In the past, there has been plenty of donor funding to cover the cost of extension services, and these have been supplied by Village Development Trust foresters free of charge. It is planned for the services of Village Development Trust staff to be gradually incorporated into the cost structure. Ten percent of the sale price to the buying centre is to be put aside for these purposes. Initially, while the number of sawmillers in the cooperative remains small, this 10 percent surcharge does not cover the costs of the services being provided. The Village Development Trust estimates the break-even point at about six millers. When the number of millers is more than six, the intention is to refund the difference between the charge and the cost back to the sawmillers. At this stage, the actual costs cannot be determined with sufficient accuracy to make predictions and set firm values into the future. For instance, it is expected that the costs of carrying out inventories of commercial tree species in the forests will fall with experience and as techniques of accurate sampling are developed. As a greater pool of trained operators becomes available, the time which foresters spend on training may also decline. However, it is too early to predict what manpower will be necessary, and at what rate these costs will fall.

The Value of Time and the Value of Cash

At this early stage, the embryonic cooperative is extremely vulnerable to a wide range of competing interests. One of the attractive aspects of the strategy is the creation of a central buying point which guarantees to take all the timber

produced by the cooperative's millers. Timber derived from a wide variety of species is bought in three grades at a fixed price for each grade – K180/m³, K250/m³ and K350/m³. Higher prices can be obtained by sawmillers for a few selected species of furniture grade timbers (up to K450/m³) by dealing directly with furniture manufacturers, and occasionally for construction timbers as well. This requires the sawmill operator to spend time searching around for a buyer. If the search is successful, a higher price is obtained, but if the few buyers in the market already have sufficient stocks of timber, then the miller is left with lumber on his hands and must wait until demand picks up again. More often than not, the actual milling ceases while the owner/manager seeks a market for the timber, and if it is not immediately found, then the operation remains closed down until stocks are sold. This shutdown is often necessitated by the lack of sufficient cash to pay the workers.

The theory upon which the Village Development Trust is basing its organisation is that consistent production, promoted by a guaranteed market for the product at a timber yard, will produce, over time, a higher cash return than intermittent production for which higher prices are paid. This is not proving an easy concept for sawmill managers to understand or come to grips with. Their experience is generally limited to cash-poor communities, in which the marginal value of cash is higher than the marginal value of the time put in to obtain that cash; that is, where there is a shortage of cash but no shortage of time, then time will be expended freely in order to obtain extra cash. An example of a distorted version of this notion in the small-scale forestry sector came to the author's attention recently, when an operator in Madang found that he could obtain K400/m³ for his kwila in Lae, but only K300/m³ in Madang. The timber was then trucked to Lae at a price in excess of K50/m³, but in the meantime, the operator's mill lay idle while he made the arrangements and located a buyer. A greater profit per unit of time was available if the mill had kept operating and the timber had been sold at K300/m³, even if a greater profit per cubic metre was available by trucking it to Lae. The total amount of cash generated within the community would clearly be greater in the first instance, as the workmen would still be receiving wages, and it is questionable whether the owner/operator was financially better off, given the lost production. At the village level, examples abound of time sacrificed for a larger cash return. In these cases, though, the time sacrificed would either have been spent on the production of subsistence goods, social activity or *sindawn nating* ('sitting around doing nothing'), and not in alternative cash-generating activities. For example, in the village of Kamiali, the fresh fish project periodically collapses as the costs outweigh the returns because of the inconsistent amounts of time spent on fishing. One of the contributing reasons for this is that dried fish bring slightly higher prices in the Lae market than fresh fish bring at the buying point in Kamiali. No account is taken of the fact that much more time is spent in drying fish, taking it to market and selling it, than would be spent on catching and selling fresh fish.

The capacity to have a longer-term perspective of a business operation seems limited at present, and will only be overcome with education gained through experience. A challenge for the Village Development Trust is to hold its

cooperative together long enough for this experience to be gained, and for some economies of scale to enter the equation. One operator, with a history of several years of production resulting in sales of the order of K40,000 to K70,000 a year, said that he was thinking of getting a bank loan to pay off his loan from the Village Development Trust and then going it alone. Two reasons were mentioned – the 10 percent levy to cover the services of the NGO, and the prospect of obtaining higher prices elsewhere.

The higher prices are generally obtained for a limited range of species. This may encourage the overharvesting of such species in certain areas of forest and thus change its character to a greater extent than allowed under the forest management plans, whose aim of preserving the species constitution of the original forest depends on a wide range of species being selectively harvested over a fixed area.

In light of comments made to the author by rural villagers who are engaged in small-scale ecoforestry, the local commitment to sustainable forestry, in an ecological sense, must be questioned; or perhaps one might say that an internalised understanding of what forestry practices are necessary to achieve a situation approaching ecological sustainability must be questioned. For the NGOs involved, the pressures to compromise ecological standards in order to meet economic and social realities are ever-present.

Changing the Orientation of Community Ecotimber Groups

The establishment of a sawmillers' cooperative supplying timber to a central buying/processing centre has a number of objectives, but these are ultimately dependent on the commercial viability of the operators and the timber yard. Part of this viability involves becoming competitive in the local market, and this requires economies of scale to reduce costs. Production of timber in ways which can be described as ecologically sensitive (or sustainable) incorporates direct costs which are externalities for the large logging companies, and consequently do not show on their balance sheets. Part of that difference can be accounted for by eliminating profits going overseas, while part can be found through government intervention in the market which gives preference to indigenous small-scale operators (though past history suggests that this is unlikely in the short to medium term). The remainder must be made up by the owner/operators reducing their own costs.

In order to reduce these costs, the small-scale sawmill operators need to move much closer in their orientation to Western business practices, and their adoption of a long-term perspective, than has been the case in the past. Past practices have been directed at meeting relatively short-term goals, even for those purporting to operate on a commercial basis. Cash generated by the business has tended to be spent in the short term, both for necessary consumer items and for the creation and maintenance of social networks. As a consequence, there has often been insufficient operating capital or monies set aside for investment in new equipment, even where the original equipment was

largely donated by external sources. Loan repayments have frequently not been met, which has led to a reluctance by banks to finance small-scale operations generally (Farley, Gladman and Martin 1993:58). The value of the business is often not recognised, only the cash left in the pocket after the direct costs of wages, fuel, and so on. As a consequence, the physical assets of the business are often not maintained with a long-term operation in mind.

The idea of only working for cash when you need it (a practice that is well-established in rural PNG) does not sit well with the maintenance of an effective business. It is conceivable that a situation could exist where a large number of sawmillers, each producing intermittently, could provide the economies of scale required for a small-scale industry to develop, especially if the cost of the production equipment was not too high in relation to wages and the return on the timber. In the past, this was the case with early models of the 'wokabout somil' and chainsaw mills. It may still be the case with chainsaw mills. However, the need for quality in the export grades, in particular, has meant that a new generation of portable circular mills offering greater accuracy, speed, and lower manpower needs has made an appearance. A substantial increase in price has accompanied the introduction of these new machines. While K4,000 to K5,000 was required to set up a Wokabout Somil operation only a few years ago, the price is now around K30,000 for a machine (such as a Lewisaw) and its accompanying equipment, and another K6,000 to K10,000 in operating capital, a total approaching K40,000. The proportion of the production costs that must be allocated to servicing the loan has risen, and a consistent and appreciable quantity of timber must be produced.

Accommodating Social Sustainability

As the preceding two sections illustrate, it is impossible to consider the components of sustainability in isolation from one another. Many socially relevant issues are raised in those sections, and complement some of the following discussion.

Two groups, with differing characteristics, form the basis of a future ecotimber production industry. The point at which the two groups separate is in relation to the infrastructure that is available for the marketing of their product, and in the orientation of their producers to consistency of supply. One of these groups will, for some time into the future, produce intermittently, with its operators heavily engaged in the subsistence activities of their communities. The part-time nature of their contribution will warrant a different approach in the provision of NGO support than will that of the full-time producers with modern equipment and 'modern' loans to service. This latter group faces problems in adapting to practices consistent with full-time production, and with putting together extractive areas of sufficient size to guarantee the ecological functioning of the forests. Communities are not being prepared for the rapid social changes resulting from sudden and relatively large inflows of cash.

Part-Time Ecotimber Producers

In an examination of five portable sawmill operations that are claiming ecoforestry status in southeast Morobe, it was clear that the mills were used to service local community needs such as the construction of community buildings, churches, school guesthouses, and so on. They operated only when materials were required. They were not commercial ventures, and were not organised in a way which would make them commercially viable in the future. One mill was generating cash income on occasions by milling high value timber, such as rosewood, and selling it in Lae for K450/m³. The profits were used to cover the costs of a club which, on occasion, visited festival sites around the country to put on performances. The young men who were members of the club gave their sawmill services free in order to raise the money to attend these festivals and perform. Resource owners were paid in timber, not cash, for lumber extracted from their land.

The use of sawmills only when there is a definite need for cash or materials in a community is a common story. It is made possible by the initial donation of capital costs, which removes the necessity to undertake consistent production to service a loan. Because the cash costs are relatively small, labour is donated, and access to markets is limited or information on marketing unavailable, such operations are not seen by the villagers themselves as an alternative to the income that is generated when their timber resource is sold to large-scale logging companies. This is the case even though the mills may have originally been donated as an incentive to refuse the offers of logging companies.

In a rural community, the demands on people's time for subsistence needs and for social activity within the community are high, irregular, and in many cases immediate – such as a death in the village, the destruction of pig fences, the arrival of schools of fish, and so on. Even though many villagers have experienced the time demands and constraints of wage labour while working in the towns, the social and subsistence demands in the village place such labour in a quite different context. Nevertheless, there is considerable potential for the many 'older' portable sawmills in these villages to become cash-generating options, and thus acceptable alternatives to large-scale logging, if they could be brought into the commercial strategy in some form. The point to be made is that this type of production is likely to remain intermittent because of the social context in which the producers operate and the nature of the sawmill's history.

Full-Time Ecotimber Producers

The need for those groups using modern equipment, and with ready access to a major centre, to produce consistently has been canvassed in the section on economic sustainability. There is another question about the ability of producer groups to obtain the rights to sufficiently large sections of forest to operate in an ecologically sustainable fashion. In the two examples given earlier (Puseka and Masing Management Areas), the production forests were at the very bottom of the size range for ecological sustainability, given the harvest demands placed on

them. In one of these, the usage rights were dependent, to a significant extent, on the standing of the manager in the community, his past contributions to the community, and his donation of one day's sawmill production per week to the community (personal communication, Kiliki Asuna, 14 October 1996). In the other, the usage rights were more firmly held by the clan owning and operating the sawmill, yet there was still an unresolved land dispute on one boundary of the extractive area (personal communication, Bill Girard, 2 October 1996). In both of these cases, expansion of the business depended on making arrangements with adjoining landowner groups to use the resources on their land, and reaching an agreement on royalty payments or the sharing of profits. From an ecological perspective, the larger the units that can be put together, the greater the chances of retaining the area's biological diversity. However, the incorporation of sections of land owned by different groups under one sustainable management plan poses a whole range of problems and future uncertainties.

The problem of interruptions to production, due to social obligations or the demands of families for help in subsistence activities, is a major problem for the full-time producers. There are expectations of, and strong pressures on, a manager to employ workers from amongst his or her own family or clan group. Meeting these pressures exacerbates the production problems because death, marriage, or festivals can result in the related group all attending, and production ceasing for lengthy periods of time. In the Puseka Management Area, the manager has overcome these problems to a large extent by employing workers from a number of clan groups. In this way, he hopes to avoid interruptions but, initially at least, seems to have paid a price for this by having an oversized labour force for his mill.¹⁵ He has been using two teams of six men and a female book-keeper, but is currently trying to reduce this number. The tree-felling, the operation of the Lewisaw, and the stacking of timber can be adequately handled by three or four men per team.

Social Accounting

The introduction of a small-scale forestry business, especially one which is producing consistently, can mean a relatively large increase in cash flow from wages and profit when compared to the previous experience of a rural village community. This increase may in fact double the income of a village and bring with it the same sorts of problems and social dislocations that are observable in villages absorbing the income derived from large-scale logging. While the increased cash may spawn new businesses in the village, and thus lead to further redistribution of the wealth created, it is inevitably an uneven redistribution. The community is faced with rapid changes in income differentials between families, and with changes to its social structure. These are changes that are unexpected, and the villagers generally lack the means for dealing with them. The preparation of villagers for a sudden shift from a largely subsistence economy to a mixed subsistence and cash economy is not being addressed any

¹⁵ This solution to the problem is unique in the experience of the author.

better in ecoforestry initiatives than it has been in areas where there has been an introduction of income from large-scale logging. The NGOs involved in promoting small-scale, community-based ecoforestry need to put more of their resources into preparing village communities for change in their societies in order to alleviate the need to deal with unforeseen consequences.

Directions for an 'Ecoforestry' Industry

The general strategy for the development of an ecotimber industry involves the development of markets and the creation of central buying and processing centres which are able to guarantee the purchase of all the timber that is produced by community-based groups. The central buying centres and the actions of overseas 'green' consumers are controlling agents for adherence to forest management plans. Certification of ecotimber seems to be a direction to pursue, but there are many problems to be overcome and a need to deal with future uncertainties created by changing attitudes and involvement of the regular timber trade.

The two distinct groups of ecotimber producers identified here have to be incorporated into the commercial strategy of NGOs that are involved in this business, and the fledgling ecotimber industry has yet to see itself in a wider context where it is integrated with other small-scale, community-based or regionally-based income producing activities.

Strategies for Developing a 'Cottage' Industry

A direction is being set for the future development of a small-scale sawmilling industry with a charter that includes the conservation of primary forest biodiversity. This direction is being shaped by forces both within and outside the country. It is by no means certain that it will survive with its charter intact. Also, it is important to recognise that it is a minuscule industry in comparison with the large-scale logging ventures which are currently being undertaken in the country, and that it is very much an experimental industry, with a multitude of problems yet to be solved in each of the three relevant areas of sustainability – ecological, economic, and social.

The general strategy of the main players is to create markets which can guarantee the purchase of all the timber being produced by small-scale millers, *and to make the sale of the timber to central buying points attractive enough to act as a controlling factor in the type of forestry being practised.* The initial development of a local market is to be followed by the development of an export market to 'green' consumers in the 'overdeveloped' countries such as Australia, the United States, and those in Europe. The export market is to apply pressure for adherence to ecologically sensitive harvesting practices and to reduce the vulnerability of the industry locally to attempts by large-scale competitors to

flood the market with cheap sawn timber.¹⁶ It is also necessary to create a diverse export market, because the small-scale ecoforesters will be able to produce more than the local market requires in the short term, if current plans by the NGOs assisting in the creation of cooperatives and the central buying centres are realised.

Markets

At present, the only markets that are willing and able to take a wide range of grades are those in Europe, where there is a clearly defined and sizeable 'green' consumer segment of the market, and construction grade timbers have considerable value. Other markets exist, but they tend to be far more selective because the 'green' consumer group is less developed, or because there is a plentiful supply of construction grade timbers at low prices. While there may be a small premium for ecotimber, it is not large enough to make anything other than furniture grade timbers competitive in Australia, where there is a good market which is willing to take certain species in small quantities because of the nature of the furniture trade (Martin 1996:9-11). The west coast of the United States also seems to fit this latter category.

In the medium to long term, markets in Asia need to be developed for ecotimber. The potential there is unknown, as little in the way of market research has been carried out, and the voice of 'green' consumer groups is muted. Some recognition of the need to address the potential of this area for ecotimber was evident at the 'Consultative Meeting on Sustainable Timber' in Rabaul in September 1996. Given the focus of this meeting on the European market, and the Netherlands in particular, practical ways of addressing the issue were not developed.

Certification

Timber merchants in both the United Kingdom and the Netherlands who have been dealing with sustainably produced timber, such as the Ecological Trading Company in the UK and Swift Hout in the Netherlands, have been struggling to make themselves viable businesses. However, the interest of the general timber traders has been increasingly focussed by the notion of certification,¹⁷ and the demands of an increasing percentage of their clients for timber sourced from well-managed forests. These merchants are also preparing to import large quantities of certified timbers. For example, one timber merchant in the Netherlands intends to import several thousand cubic metres a year from a certified timber operation in Brazil, which is large-scale and has considerable

¹⁶ At present, the ecoforestry industry is small enough to be ignored, but this may not always be the case.

¹⁷ 'Certification' refers to an auditing and monitoring system that assures buyers of the timber carrying the certificate that they are getting what they pay for in terms of it coming from well-managed 'sustainable' forests.

investment in mills using laser technology (personal communication, Igor Mousasticoshvily,¹⁸ 25 September 1996). Certification would appear to be a direction in which the fledgling ecoforestry industry in PNG must go. At present, this matter is complicated by a number of competing certifiers and certification schemes, by the power of the large producers, merchants, and retailers to contain their costs and their markets, and by the appreciable cost of the certification and monitoring process itself. At present, the cost of obtaining certification under FSC principles is prohibitive, except for large cooperatives. Current certification carried out in the Solomon Islands and in PNG has, to date, been accomplished with the generous help of international donors.

Accommodating Part-Time and Full-Time Producers

While the organising NGOs concentrate on assisting a group of small-scale sawmillers to reach standards of consistency and quality which ensure that the requirements of the various markets are met, and the loans on new generation mills are serviced, there remains a large number of sawmillers, mostly in areas remote from the large towns and ports and easy means of access to these, who want to work their forests to capture some cash income. These sawmillers, who obtained their equipment some time ago, do not have the loan obligations of the former group. Due to circumstance and social organisation, they are not able or willing to produce large quantities of lumber consistently, but they still require extension services and help in constructing management plans in accordance with the long-term preservation of their forests. As a group, they give rise to a different set of problems from the sawmillers working their machines and forests in a full-time manner; and thus require different approaches to the solution of those problems.

A major problem lies in transporting sawn timber, in excess of local community needs, to the central buying points and reprocessing plants. The southeast Morobe coast provides an example where a number of community owned and operated sawmills are producing intermittently, but in excess of village requirements. The owners of the mills have focussed on finding ways of transporting their product to Lae. In one case, the subclan that is managing the mill is attempting to build a *mon* – a large coastal canoe capable of carrying up to five cubic metres of sawn timber.¹⁹ Another case which illustrates the situation can be found in the vicinity of the Waria River, where a manager has to wait for an indeterminate time until a suitable ship is in the area (on another purpose) to carry several cubic metres of timber to Lae.

A solution would seem to lie in convincing these intermittent producers to build local drying yards for their product, and in arranging for them to accept payment for their timber at fixed points in the year, when a single ship can be

¹⁸ Forest economist at the Instituto Socioambiental, Brazil.

¹⁹ In this case, the villagers have shown considerable initiative in attempting this solution to their problems, as the construction represents new technology and new techniques to be learned.

sent to service all the local drying and storage yards in a section of the coast. In short, the full-time sawmillers would supply the central timber yard and reprocessing plant with the certainty of meeting orders and delivery dates demanded by the export market and some larger local users of the timber, while the intermittent producers could contribute to the remaining sales.

Small-scale, Community-Based Forestry in Context

Given a history of commercial utilisation of forests by large logging companies,²⁰ it comes as no surprise to find small-scale ecoforestry being defined rather narrowly, in the minds of the stakeholders, as the production of sawn timber. Even where there are other income-producing forest activities being conducted in the same general area as ecotimber production, the mind-set is one which views them in isolation. The areas set aside for different activities may even be geographically separated, without an accompanying economic rationale, although there may be social reasons based on the existence of subclans and their differential land ownership or usage rights.

While the term 'integration' in the concept of Integrated Conservation and Development (ICAD) is generally understood by community members as a linkage between conservation and development (even if they do not internalise it), it is not so well appreciated when it comes to integrating the returns from various forest activities into a single concept of benefit. This is particularly true of ecotimber production outside of ICAD projects. Being community-based and operated means that ecotimber production has to be linked into other services which are available in the community, and that some of the costs of production, which cannot be captured locally in the case of industrial logging operations, will circulate as cash in the village communities. Mutual benefits from the integration of forest activities, leading to a conservation of labour and material costs, are also possible. A maximisation of the integrated benefit to the community, and an accurate and comprehensible estimate of its value, offers a more attractive comparison with returns from the industrial logging of the forest than what appears to be the piecemeal approach taken at present. The author's observation is that 'projects' are initiated by, or proposed to, communities in isolation from each other, without the interactions and linkages elaborated, and often in a generally *ad hoc* way which helps underscore the tendency to assess their value in isolation from each other.

This approach reinforces the perception that the immediate quantity of cash generated, or the provision of a physical asset, should be the measure of a project's worth, instead of the project or activity being seen in the context of the opportunities it creates for other business activity and cash flow through a community. An example of this was recently demonstrated in the Kamiali community's dismay at finding that they did not 'own' the training centre being

²⁰ The activity of these companies is confined to the extraction of logs and, in some cases, their processing into sawn timber or woodchips.

built (with portable sawmill timber) on a leased section of their land. Only with considerable difficulty was the idea conveyed that benefits could flow from its presence in the area. Even then, one village delegate to a meeting, which was trying to resolve the community's closure of the construction site, expressed his belief that wages earned at the site were not a benefit because they had to be worked for (author's journal, 11 October 1996).

A challenge exists for the NGOs that are conducting awareness and education campaigns, which are designed to convince rural communities to develop their resources themselves in environmentally sensitive ways, rather than hand their resources over to large multinational companies, to incorporate a consciousness of the wider or more 'integrated' benefit of their own initiative.

Planning Implications

There are four groups to consider at this point in time:

- the communities making the choice to follow a line of development that includes 'ecoforestry';
- the NGOs providing information, education, and skills that are lacking in the communities (and for the time being acting as middlemen between the producers and the timber merchants who are supplying the markets);
- the international donors; and
- the PNG government at its various levels.

Up to the present, the government and the commercial timber industry have largely ignored small-scale, community-based ecoforestry. It has not proven to be a serious competitor for the resources sought by the large logging companies, since its production levels have made it uneconomical for the trade to take much notice of, or for the government to become concerned with, its revenue-making potential. Nevertheless, the rising demand for certification of the production history of timber imported to 'overdeveloped' countries, the continued interest of international institutions concerned with quality of life issues for rural Papua New Guineans or the preservation of the biodiversity of tropical forests in funding new ecotimber extraction operations, and the improving organisation and scale of the cooperative ventures promoted by national NGOs, may change this situation.

Governments

Governments and their relevant departments need to address small-scale portable sawmilling generally, but especially the activities of those groups lying outside the umbrella of the few NGOs that are promoting ecologically sensitive management plans. Since these mills allow landowners to harvest pockets of forest left behind by other timber extraction operations, or to work terrain that is too difficult for the large-scale logging companies, the potential exists for them

to add to the damage done by the earlier industrial logging. Current legislation allows small timber operations, which are producing less than 500 m³ of sawn timber for non-commercial use, to work without any permit, authority, or licence (Van Helden 1996:97). While trees are rarely cut on steep-sloping land, there are plenty of instances of portable mills operating in swamp forest, close to rivers, and in a follow-up to large-scale loggers.

There is also a need for the government to take a more contextual view of the benefits to be obtained from various forms of log or timber extraction from forests. The relative benefits of the sort of large-scale logging which is promoted at government levels, and that of less ecologically intrusive forms, need to be rigorously compared and critically assessed in their social, economic, and temporal dimensions, including the sort of attitudes to self-fulfilment which the nation wants to inculcate in its people, before one sort of timber industry is promoted at the expense of another.

Meeting the nation's goals for intergenerational equity, as outlined in its Constitution, also warrants government intervention to ensure that representative and viable examples of the nation's ecological systems are preserved. The achievement of this goal would seem to suggest, in the opinion of the author, a need for the government to smooth the road for those activities which positively reinforce biodiversity conservation. In the context of PNG, where the locking up of large tracts of forest is difficult, if not impossible, this would suggest that ecoforestry should be considered as one of those activities. While this does not mean giving preferential treatment, it may mean taking account of the externalities that give an advantage to the large company sawmills in the domestic scene. It may also mean providing protection to ecotimber producers, if the large company sawmills decide to saturate the market with cheaper timbers.

Donor Institutions

Most international donors, whether government or non-government, have still to come to grips with the commercial realities of the long-term viability of an ecotimber industry. There appear to be significant amounts of money available for building the capacity of national NGOs, for training purposes, and for hardware such as portable sawmills, in cases where there is not an obvious commercial component. While this assistance is helpful at the production stage, it is the putting together of a viable marketing chain that will produce the successful models which are likely to be followed by others. While attempts have been made in the past to demonstrate that a marketing chain really can be put together, these have been restricted by the lack of economies of scale, by a general unwillingness of the commercial trade to take the risks inherent in

becoming involved, and by the inexperience and non-commercial orientation of the NGOs, both national and international.²¹

A consultative meeting on sustainable timber, held in Rabaul in September 1996, and funded by the Interchurch Organisation for Development Cooperation, attempted to address the issues involved in setting up such a marketing chain. It is the author's considered view that there was a gap between the producer and the importer which is at present enthusiastically but inadequately filled by the NGOs which are mainly involved in developing the production end of the chain. The presence and input of commercially oriented middlemen with a sound knowledge of Melanesian social organisation and the realities of marketing, both locally and internationally, seems to be needed at this point in time.

National Non-Government Organisations

While scale and consistency of supply remain the biggest hurdles to overcome, the strategy of the national NGOs, such as the Pacific Heritage Foundation and the Village Development Trust, in developing central buying and processing points, seems sound. Financial support from donor organisations for these centres in the short term, in order for them to develop their potential as commercially viable operations; is warranted. Commercial viability means costs being met, and so the support, wherever possible, should be in the form of loans rather than gifts in order to encourage efficiency leading to self-sustainability. This same argument applies to the provision of finance for the purchase of the means of production in village communities. The planning of support for ecoforestry ventures should also include a rigorous accountability component. An efficient ecotimber industry needs not only training in the skills of small business operation, but the experience of having to plan to meet future contingencies and costs. It is with monotonous regularity that one finds small business groups in rural villages, whether engaged in forestry or other ventures, seeking repeated 'start-up' funding for the continuation of their businesses.

Community Ecoforestry Groups and Communities

While the raising of community awareness about the implications of various income-producing activities, including ecoforestry, are questions of planning for 'outside' groups, local communities also need to prepare for the changes in their lives that will be brought about by the introduction of these activities. There is a need for community members to clearly define the objectives behind an increasing cash flow, and to decide what aspects of their traditional lives they want preserved or isolated from the effects of the shift to a mixed subsistence and cash economy. The question of unequal income distribution, and the ways in which redistribution will occur in the village, are examples of issues for which preparatory thought needs to be given at the local level. Planning for change and

²¹ For a description of an attempt to build a marketing chain to Australia, see Farley, Gladman and Martin (1993).

the mitigation of undesirable aspects is an important element of preparation, if there is anything to be learned from the lessons of disrupted social life in the industrial logging areas.

Conclusion

The government has largely ignored small-scale, community-based forestry to this point in time. However, the numbers of portable mills that are operating, and their potential for environmental damage, suggest that regulation is warranted. The achievement of constitutional goals for intergenerational equity and the redistributive and self-fulfilment aspects of ecotimber production are issues for the government to consider in depth.

Donor agencies and institutions need to take on board the viability of the marketing chain from producer to consumer if they are to meet their objectives. The manner in which funds are supplied is also relevant in developing a commercially viable industry.

NGOs that are working for development of the industry need to rigorously account for their expenditure of donor funds in terms of outcomes, and to make the costs of production transparent, if they are to shift small-scale producers to a commercially competitive position.

Finally, village communities that are embarking on ecoforestry ventures need to prepare for the social changes inherent in the choice which they have made, and to plan to mitigate any undesirable consequences.

CHAPTER 13

THE POLITICS OF LARGE-SCALE TIMBER CONSUMPTION IN JAPAN

ANJA LIGHT

'I don't want to live in comfort while others suffer at my expense. We Japanese are being made to live barbarously without even knowing it. I hope that you, as the leader of Japan, will be the first to realise this.' (Message from a Japanese citizen to the Prime Minister of Japan as part of the Japanese tropical timber campaign.)

Introduction

The fate of Papua New Guinea's (PNG's) forests and people lies not only in the hands of decision makers in PNG (whether they be in the village or the national parliament), but in the hands of policy makers, corporation bosses, and average citizens in timber consuming countries.

No country consumes more imported tropical timber than Japan. Effecting change in Japanese national politics or in the practices of multinational corporations to ensure their support of ecologically sustainable and socially equitable forest management has been extremely difficult. What has been more productive to date is the growing grassroots movement to effect a change in Japan's timber 'over-consumption' habit. A reduction in demand for tropical timber and an increase in demand for domestic sources in Japan can only have positive effects on the world's forests, increasing their economic value and recognising their priceless value in sustaining life.

A challenge to those of us on the 'outside' of Japan is to try to understand Japanese culture before hoping to change the practices of the Japanese government and corporations through international pressure. Japan has risen from complete military defeat four decades ago to become the world's most economically powerful nation. Six of the world's ten largest multinational corporations, as measured in terms of sales, are Japanese. The powerful *sogo shosha* ('general trading companies') deal in almost every commodity in almost every country. Japanese government policies support processes of industrial expansion and resource development that are very often carried out by these *sogo shosha*.

But, as we are all aware, material wealth does not always bring well-being. Japan's own people have little choice in what these multinational corporations do; rather, they are almost completely dominated by them. It comes as a

surprise to many that the decline of Japan's own plantation timber industry has caused hardship to local communities in Japan, and that continuing exploitation of Japan's scarce remaining primary forests is strongly opposed by the indigenous people of Japan, the Ainu.

In the first part of this chapter, I shall look at the current trading trends and the history of tropical timber consumption in Japan, with a focus on PNG. The second part introduces Japan's domestic forest situation and its relation to timber imports, and studies the stages and impacts of grassroots campaigns to reduce consumption and waste of tropical timber. In the final, part I discuss the tactics that local campaigners have used to influence local government policies, and give some examples of typical responses from the national government of Japan.

The information presented is drawn largely from the research of Japanese non-governmental organisations (NGOs), in particular the Sarawak Campaign Committee (SCC) and the Japan Tropical Forest Action Network (JATAN), in addition to my own personal experience in seven years of forest campaigning in Japan.

Consuming Passions

Tropical Timber Imports

With only 2 percent of the world's population, Japan is the world's largest consumer of tropical timber, accounting for some 30-40 percent of the world's trade (see Table 13.1). Imports account for 75 percent of Japan's overall timber consumption of 110 million cubic metres per year.¹ There are two major reasons why the Japanese are the biggest consumers of tropical timbers. Firstly, the wasteful use of timber and timber products, excessive waste, and a throwaway mentality that seems an inexorable part of any economic boom, perpetuate the seemingly insatiable demand for more logs. Secondly, the structure of the Japanese economy makes the exploitation of domestic timber sources more expensive than imports.

¹ Taiga Rescue Network, 1995, 'The Taiga Trade'

Table 13.1: World trade in tropical hardwood logs, 1991.

Importing countries	% share	Exporting countries	% share
Japan	39	Malaysia	74
China (incl. Taiwan)	18	Papua New Guinea	5
South Korea	14	Gabon	4
Thailand	5	Cameroon	3
France	3	Burma	3
India	3	Liberia	3
Hong Kong	2		
Other	16	Other	8

Source: FAO Yearbook 1991, reprinted in SCC 1994.

Papua New Guinea exported 1.5 million cubic metres of logs to Japan in 1995. They were used, like most of the tropical timber which Japan imports, largely as a sort of waste product. More than 75 percent of tropical logs are converted to plywood, of which half is used in the construction industry (see Table 13.2). Around 20 percent of plywood is used as mouldings for concrete formwork, and used only once or twice before being thrown away. Other uses for tropical plywood include cheap furniture (called 'colour boxes') and packing crates. It is common to see plywood used to 'protect' other materials – like concrete walkways or the interiors of lifts – while construction work is taking place. Another Japanese phenomenon is the use of plywood boards during elections to display the posters of the various parties. During the national election for the House of Councillors in the summer of 1992, poster boards were set up in 343,000 locations nationwide. The amount of plywood needed for this, if stacked vertically, would have made a pile 14 kilometres high. It was reported that 80 percent of the poster display boards remained empty the day after the election period started.²

Table 13.2: Consumption of tropical timber in Japan.

Form	Constr'n	Furniture	Packaging	Flooring	Other	Total
Plywood	39%	27%	8%		3%	75%
Sawnwood	11%	6%	4%	4%		24%
Woodchips					1%	1%
TOTAL	50%	33%	12%	4%	4%	100%

Source: SCC 1994.

Compounding the consumption problem is the short lifespan of constructions in Japan. Japanese houses and buildings are torn down and rebuilt after an average of 20-30 years, resulting in tremendous overconsumption and waste, not only of tropical timber, but of many other resources. Housing starts averaged 1.61 million during 1987-1991, exceeding those of the United States

² Yomiuri Shimbun (Japan), July 1992, in *Mori No Koe*, March 1996.

every year during this period, even though Japan's population is only half that of the USA.³ Japanese rainforest groups rightly point out that promoting alternatives to tropical timber without addressing these examples of planned obsolescence will merely transfer the problem of unsustainable resource management to other timber-supplying countries.

There are two common misconceptions about Japan's role in forest destruction. One is that the use of disposable chopsticks is a major cause of tropical forest destruction. While disposable chopsticks do represent a conspicuously wasteful use of timber in Japan, they account for less than one percent of Japan's overall timber consumption and are not primarily sourced from tropical hardwoods. The second misconception is that Japan purposefully protects its own forests while overexploiting overseas forest resources. In fact, large imports of cheap timber have been disastrous for Japan's forests. Japan's own forest industry, as a result, is in financial strife. This means that jobs are lost and plantations cannot be properly maintained, so there is a decline in the quality of the timber they supply. According to Professor Minori Kumazaki, who teaches forest management at Tsukuba University in Tokyo, domestic plantation forests can provide enough timber for Japan's needs but they cannot compete economically with the cheaper imports.⁴

Campaigns to reduce tropical timber waste in Japan have been effective, both in real terms and in raising general awareness about forest issues. At the same time, organisations in Japan point out that much more needs to be done to ensure that:

- Japan's own plantations are sustainably utilised as a timber source;
- policies to reduce timber waste are vigorously adopted;
- research into, and adoption of, ecologically sustainable alternatives to tropical timber are both increased; and
- any imports are sourced from independently monitored sustainable forestry operations.

Basic Trading Trends

Japan's 1995 tropical timber imports totalled 11,695,000 cubic metres (see Table 13.3). Over the past few years there have been increases in imports of tropical plywood, particularly from Malaysia, while there has been a gradual reduction in hardwood log imports. Since the 1980s, there has been a general downward trend in tropical timber imports. What is not so clear is the extent to which this

³ Kazuko Matsue, Report to Conference on Sustainable Forestry, New Delhi, April 1994.

⁴ Email conferences, 1995, 'Environment-Japan: Wood Imports Soar as Local Forests Flourish', by Suvendrini Kakuchi.

is due to a reduction in supply, a reduction in overall demand, or increasing substitution of temperate timbers.

Table 13.3: Japan's tropical timber imports, 1988-1995 (in millions of cubic metres).

Form	1988	1989	1990	1991	1992	1993	1994	1995
Raw logs ^a	11.7	12.6	11.1	10.1	9.9	7.4	6.8	6.5
Sawn wood ^b	1.2	1.7	1.3	1.2	1.2	1.4	1.3	1.3
Plywood ^c	1.8	3.0	2.8	2.9	2.8	3.8	3.7	4.0
TOTAL	14.7	17.3	15.1	14.2	13.9	12.6	11.8	11.7
= RWE ^d	17.9	22.6	19.8	18.9	18.5	18.6	17.8	17.9

Notes:

- ^a Tropical hardwood log import data prior to 1995 do not include statistics from Africa.
- ^b Data for 1995 tropical sawn wood imports are totals for January-November 1995 from Nihon Nanyozai Kyogikai (Japan South Seas Timber Council) January 1996 statistics. Data for other years are for the full year and are from Nikkan Mokuzai Shimbun.
- ^c Tropical plywood import data for 1988-1992 are for imports from Indonesia only (which constituted more than 95 percent of the total), whereas data for 1993-1995 are for imports from Indonesia and Malaysia.
- ^d Roundwood Equivalent (RWE) is a measure of the 'underbark' log volume which would have been necessary to obtain one unit of volume of the processed product. Statistics for roundwood (volume) equivalents have been calculated on the basis of the conversion coefficients (1.82 for hardwood sawn wood, and 2.3 for plywood) used by the FAO (1991).

Source: Compiled by SCC from the Nikkan Mokuzai Shimbun, 25 and 27 March 1993; 26 May 1994; 6 February and 8 March 1995; 15 February and 1 March 1996; and Japan Lumber Reports, 2 April 1995. RWE statistics calculated by SCC.

Log imports from PNG increased by 10.1 percent to 1.9 million cubic metres in 1994, but then decreased by 17.9 percent to 1.6 million cubic metres in 1995, while imports from the Solomon Islands increased by 12.8 percent to 338,000 cubic metres in that same year (see Table 13.4).⁵

⁵ *Mori No Koe*, publication of the Sarawak Campaign Committee, Issue No. 8, March 1996.

Table 13.4: Sources of Japan's tropical hardwood log imports, 1992-1995 (in thousands of cubic metres).

Source	1992	1993	1994	1995
Sarawak	6,363	4,922	4,463	3,902
Sabah	2,064	293	0	6
Papua New Guinea	1,161	1,754	1,932	1,586
Solomon Islands	309	346	338	381
Laos	13	13	40	30
Burma	13	76	22	17
Africa	0	0	0	531
Other	46	30	5	0
TOTAL	9,969	7,438	6,802	6,455

Source: As for Table 13.3.

The History of Japan's Tropical Timber Trade in Asia and Papua New Guinea

Japanese trade in tropical timber dates back to the second decade of this century. Many Japanese companies were already involved in logging operations in the Philippines in the 1930s. There was a hiatus after the Second World War, but from 1950, the trade resumed in earnest, far surpassing pre-war import levels. By 1960, imports had reached 4.5 million cubic metres, and this amount had more than doubled by 1966. Japan's own forests were severely depleted during the war effort and imports were an essential factor in the country's reconstruction. Tropical timber was one of the fuels of the post-war recovery, and then of the rapid economic growth of the 1960s. However, during these processes, intensive logging in the Philippines, which was the main source at this time, put that country's forests almost beyond recovery, and many Filipinos were marginalised through the loss of their traditional land.⁶

The Japanese timber industry foresaw that log supplies from the Philippines would soon run out and, using resource development funds from the Ministry of International Trade and Industry, as well as other sources of finance, they targeted Kalimantan and Sumatra for future timber supplies.

The forests of the Philippines were virtually logged out in the 1960s and Japanese trading companies moved on to Indonesia through the 1970s and early 1980s (see Table 13.5). An Indonesian ban on log exports from 1980 to 1985 forced Japan to seek new sources and it set its sights on the dense dipterocarp forests in the Malaysian states of Sabah and Sarawak. Sabah instituted a similar ban on log exports in 1993, and since that time, the major suppliers of logs have been Sarawak, PNG, and the Solomon Islands.

⁶ Yoichi Kuroda, cited in *Mori No Koe*, April 1993.

Table 13.5: Japanese imports of logs from tropical timber producing countries, 1950-1989 (in thousands of cubic metres).

Year	Philippines	Malaysia	Indonesia	Other	Total
1950	111	8	0	1	119
1955	1,846	160	18	0	2,024
1960	3,475	1,145	17	3	4,682
1965	5,632	3,471	104	99	9,306
1970	7,542	6,020	6,091	585	20,238
1975	2,853	6,660	7,298	522	17,333
1980	1,073	8,580	8,639	663	18,955
1985	510	11,293	138	1,001	13,001
1988	33	10,621	0	1,001	11,655
1989	52	11,323	0	1,184	12,650

Note: 'Other' refers to PNG, the Solomon Islands, and so on.

Sources: Statistics for the period 1950-65 and 1988-1989 are from 'A History of Timber from the South Seas' (Japan South Sea Lumber conference), and those for 1970-1985 are courtesy of the Japan Plywood Manufacturers Association.

Sabah's ban on log exports, and a one-month moratorium on logging in Sarawak (the largest supplier of tropical logs) in December 1992, have both shown that supply restrictions can result in increased prices. The price of meranti logs from Sarawak jumped from US\$172-180/m³ in October 1992 to US\$400-430/m³ in March 1993.⁷ This may be important to note when assessing the impact of any restrictions on the export of PNG timber to the international market.

The general attitude of Japanese traders, when faced with dwindling supplies from any one source, is summed up in comments made by the head of Mitsubishi's Environmental Affairs Department. When asked what would happen after his company's Malaysian concession ran out of logs, he said: 'Probably we would like to seek another source' (EIA 1996).

In recent years, Japanese companies have increased their imports of temperate timbers and have set up operations in Siberia and North America. However, it is likely that they will continue to purchase tropical timbers from Malaysian transnational logging companies who have recently been expanding their operations into Vietnam, Laos, Cambodia, Zaire, Cameroon, Guyana, Surinam, and Brazil, as well as the Pacific region.

The impact of large-scale industrial logging in the countries which have supplied Japan's tropical timber habit to date have been devastating. The Philippines has experienced major floods which have killed thousands of people and devastated their farmlands. Disruption of weather patterns has affected traditional planting of crops and compounded the destructive effect of wild fires

⁷ *Gekkan Mokuzai Joho*, April 93.

in Kalimantan. Losses of biodiversity are incalculable, and the impact on the role of forests as a carbon sink will have global implications. More than five hundred tribal people in Sarawak have been arrested since the late 1980s for erecting peaceful blockades on logging roads in attempts to prevent their lands from being logged.

Japanese Logging Companies in PNG

Japanese logging companies featured prominently in the Barnett inquiry into logging in PNG. Some companies have since pulled out of PNG. However, Japanese corporations are still buying timber produced by companies highlighted in the report for their unsustainable and corrupt practices. The corporations take little responsibility for ensuring that the timber they buy is sourced from a sustainable logging operation.

Japanese companies were among those which Justice Barnett found to be ignoring measures to lessen the impact of logging. Gaisho, for example, ignored every one of the environmental clauses of its permits, causing rivers and streams to become blocked or silted with eroded soil (see Barnett 1989b). Mitsubishi also featured through United Timber, a front company created entirely through its loans. Mitsubishi had concealed profits of US\$1.5 million through undervalued purchases from United Timber (Barnett 1989c). This company has recently pulled out of PNG. Stettin Bay Lumber Company, a subsidiary of Nissho Iwai, claimed in 1994 to be a 'model company', but, according to PNG's National Alliance of Non-Government Organisations (NANGO), it is causing serious environmental and social problems.⁸ Representatives from NANGO and the Solomon Islands-based Development Services Exchange met with Nissho Iwai on 1 March 1994 in what was described as a 'very heated' discussion.⁹

Case Study: Jant and Action in Japan

The most infamous Japanese operation in PNG is undoubtedly the Japan and New Guinea Timber Company (JANT), which is controlled by the Honshu Paper Company. It operates in the Gogol-Naru area in Madang Province, PNG. For over seventeen years it has been logging and chipping virgin rainforest to make cardboard boxes. The local people claim they have been paid only K1.25 per person per year in royalties.

Jant's operations began in Madang in 1973 on a 67,000 hectare concession. Plans to replant the area covered only 6 percent of the area which had been clear-cut and entailed a monocrop of eucalyptus (see Montagu, this volume). The company is alleged to have conducted a number of illegal activities in PNG,

⁸ These problems were raised in an open letter from NANGO to Japanese trading, plywood, construction and housing and furniture companies which import or use tropical logs from PNG and/or the Solomon Islands.

⁹ Trip Report, Visit to Japan in March 1994 by Environmental NGOs from PNG and the Solomon Islands, Chronology of Activities, JATAN.

including continuing to log after its contract expired in August 1991, cutting on areas with slopes steeper than 30 degrees, and felling trees within 50 metres of a river.

In 1990, more than 2,500 of the 3,000 villagers living in the Gogol-Naru area signed a petition addressed to the Jant company and the PNG government, stating that their 'sacred grounds are no longer visible [...] ... the top layer of the soil is beyond repair [and] ... fresh meat for the daily diet is a luxury that is now no longer entertained in the huts of the Gogol-Naru peoples...'. When their pleas for compensation for the damage to their lands were ignored, local landowners took to blockading Jant's operations for five days in November 1990. They ceased their blockade in good faith, on the understanding that the company would keep to its newly made promises for compensation. However, the company stalled and delayed any action on these promises, and was accused of using bribery and threats to wear down the resolve of the people.¹⁰

In May 1991, the people of Gogol-Naru took their case directly to the Honshu headquarters in Tokyo, Japan. James Jogamup, representing the people of Gogol-Naru, joined members of the Rainforest Information Centre and JATAN outside Honshu's head office in a colourful demonstration. James Jogamup toppled a three metre high tower of cardboard boxes bearing Honshu's name in Japanese and English. The delegation also presented the company with 2,500 signatures as evidence of the people's dissatisfaction with the company's operations. After initially refusing to speak with Jogamup and his colleagues, four executives of Honshu Paper finally agreed to meet. The discussion was disappointing – the executives refused to offer any compensation, and maintained that the demands by the Madang landowners were unreasonable.

With respect to consumer awareness and political pressure on Japan's international forest policy, the action contributed greatly to knowledge of PNG's forest situation and the role of Japanese logging companies. Some fifty Japanese people joined the demonstration – the biggest ever in Japan on this issue. The story was covered by eleven national and international television stations. Jogamup's comment after pushing over the mountain of cardboard was: 'These boxes come from my people's forests, what an incredible waste!'¹¹ This was heard by millions of people around the world.

Forest Politics

'As NGOs we are to keep a watch on government and industry while being a voice for the citizens and environmental victims.... The ideology behind the concept of sustainable development implies the use of non-violent, conservation

¹⁰ Asples Madang Press Release, 12 May 1991.

¹¹ *PNG Post-Courier*, 20 May 1991.

oriented techniques of using resources and producing goods on the one hand and restrictions on wasteful consumption on the other.¹²

Forests in Japan

Forestry in Japan is in trouble in many ways – financially, socially and ecologically – according to the Sarawak Campaign Committee, Consumers Union of Japan, Friends of the Earth (Japan), and other Japanese citizens' groups. These groups issued a joint statement in response to the comments of the Director-General of the Japanese Forestry Agency, Takahisa Tsukamoto, at the Fifteenth Session of the International Tropical Timber Council. He had stated that 'the Japanese government has continuously carried out sustainable management of Japan's forests'. The truth, according to the above-mentioned groups, is that Japan's Forestry Agency is fighting a snowballing US\$24 billion debt that grew by US\$1.5 billion in 1992. The government is drastically cutting workers to reduce this deficit, with their workforce of 72,000 people in 1973 dropping to just 20,000 in 1994. Without enough labour input, the plantations are not being managed properly, and the timber they produce is poor in quality. At present, only 25 percent of Japan's forest stock is cut each year.

Two-thirds of Japan is covered by forests. Fifty percent of these are plantations of Japanese cedar or cypress. Despite this, Japan's scarce remaining primary forests are still targeted as a timber and pulp supply. It is estimated that 70 percent of Japan's terrain has been damaged by logging or other human activities.

Table 13.6: Japanese consumption, production and trade in industrial wood, 1888-1985 (in millions of cubic metres).

Year	Consumption	Production	Exports	Imports
1888-92	6.4	6.4	0.0	0.0
1903-07	11.6	12.1	0.6	0.1
1918-22	17.3	16.8	0.6	1.1
1933-47	24.2	22.0	1.1	3.4
1948-52	37.8	37.7	0.2	0.2
1960	54.8	49.0	1.8	7.5
1970	101.6	46.2	1.1	56.4
1980	108.1	34.6	0.8	74.4
1985	92.5	33.1	0.4	59.8

Source: Abstract prepared by the SCC, from a paper prepared by Dr Minoru Kumazaki (Professor of Forestry, Tsukuba University), published in *Mori No Koe* (SCC newsletter), 1993.

¹² Statement from the second Asia-Pacific NGO Environmental Conference, Seoul, 28 March 1993.

It is Japan's primary forests that provide the main wildlife habitat. Exploitation has decimated populations of species such as the Tsukinowa bear, and very little of what remains is protected. Out of 7.62 million hectares of national forest, a mere 1.43 million hectares (3.8 percent of Japan's land area) is off-limits to logging. While national parks cover 14.1 percent of Japan's land area, logging is still allowed in all but 5.12 percent. The few remaining islands of natural forest are already fragmented by roads, railways, towns, tree plantations, and golf courses.¹³

Indigenous people in Japan are still fighting to protect the remaining primary forests in Japan's north. The Ainu, who have demonstrated the sustainable use of their forests for thousands of years, are still struggling to be recognised as a distinct people in Japan. Oji Paper, linked to the Honshu parent company of Jant and the giant Mitsui corporation, have ravaged huge tracks of forest in Hokkaido. The Ainu people, represented by Tadashi Kaizawa, have appealed to the Mitsui Corporation to return the mountain forests in the area of Nibutani to the Ainu people.¹⁴

The harvesting of primary forests is something like a mining operation. In the first extraction, you can easily make quick profits. If you have to spend time and money maintaining a plantation or regrowth, with thinning and proper management and long-term planning, the profit margin decreases. Around the world, virgin, old-growth forests are the preferred source for trading companies because their product is usually cheaper.

Forest Campaigns in Japan

In September 1986, at the world's first international NGO meeting on the crisis of tropical forest destruction,¹⁵ Japanese representatives revealed the extent of Japan's involvement in the destructive tropical timber trade. In 1989, Nectoux and Kuroda published their book, *Timber from the South Seas: An Analysis of Japan's Tropical Timber Trade and Its Environmental Impact*, which further informed the world about Japan's complicit role in global forest destruction. The Japan Tropical Forest Action Network (JATAN) was formed out of the Japanese branch of Friends of the Earth in Tokyo. Its aim was to raise awareness on global tropical forest issues, put pressure on Japanese corporations involved in the timber trade, and provide information about Japan's role in global forest exploitation to the rest of the world.

Since that time, other groups have formed, including the Sarawak Campaign Committee (SCC), which focuses on campaigns to lower consumption of tropical timbers. The Japan Catholic Commission on Peace and

¹³ Kengou Furubayashi, Tokyo University of Agriculture and Industry, cited in SCC's *Mori No Koe*, March 1996.

¹⁴ Takeda Shigenori, Green Earth Network, *Shisamu Tsushin*, Vol. 32.

¹⁵ 'Tropical Forest Crisis in the Third World', held in Malaysia.

Justice has been active on issues specifically relating to the situation of PNG and the Solomon Islands. One way that they have raised awareness to influence policy in Japan is by inviting representatives from affected areas to bring their message directly to the people of Japan. In March 1994, Marius Soiat, the Environment Committee Chairman of NANGO, and Moses Sylvester Bariri, the Environment Training Officer of Development Services Exchange (DSE) of the Solomon Islands, were invited to tour Japan by JATAN and the Japan Catholic Commission on Peace and Justice. They met with their Japanese NGO counterparts, Japanese government officials, and Japanese companies which are importing or using timber from PNG or the Solomon Islands. They also conducted a number of lectures in Japan to inform citizens of the situation facing their forests. During their meetings, it became apparent that there was a very low level of awareness about PNG and Solomon Islands forestry issues. At one meeting, with the Japan Department Stores Association (which sells furniture made from tropical timber), executives stated that they were not aware of the problems in PNG and the Solomon Islands, they did not know the origin of the wood in the furniture which they sell, nor that forestry is an important industry for tropical countries.¹⁶

Trading Houses

Japanese companies are mutually linked through complex corporate structures, known as *keiretsu*. At the core of these industrial groupings is usually a bank and an insurance company. They operate at all levels of the international trade in tropical timbers. They supply the logging companies with machinery to build roads and bridges and to cut and transport trees. They also ship logs and process them. Others provide engineering and business expertise on various aspects of the logging industry. For instance, Sumitomo Forestry and Marubeni have invested in joint ventures with Malaysian firms to establish plywood factories in Sarawak.

Early campaigns in Japan boldly confronted major corporations involved in the logging and importation of tropical timber, using street theatre and other colourful actions. These demonstrations were well covered by the Japanese media, and brought information to the general public. In one action, the President of Marubeni was lured to the front entrance of his corporation's building to collect an award from the Japan Tropical Forest Action Network. The award turned out to be a giant chainsaw marking his company as Japan's principal destroyer of tropical forests. In 1991, a 20-metre long 'Godzilla', emblazoned with the corporate logos of the ten largest tropical timber traders, wove its way through the streets of Tokyo. It stopped at the head offices of each of these corporations, spitting out pieces of tropical plywood with messages to end the unsustainable trade.

¹⁶ Open letter from NANGO (PNG) to Japanese trading, plywood, construction, housing and furniture companies which import or use tropical logs from PNG or the Solomon Islands.

In the late 1980s, international organisations around the world initiated a campaign which focussed on Japan's major timber trading houses. Soon after, almost every major corporation set up its own environment department. The US-based Rainforest Action Network still runs a 'Boycott Mitsubishi' campaign – exposing Mitsubishi's involvement in temperate, as well as tropical, forest destruction. Unfortunately, major corporations have, in the main, responded to international concern through extravagant 'greenwashing' techniques and by taking steps to try to hide their trail of destruction. In a classic case of corporate propaganda, Mitsubishi produced their own comic book in 1991 and distributed it free of charge to every school in Japan. It erroneously portrayed tribal people as the major rainforest destroyers through their traditional swidden farming techniques, while Mitsubishi (a major importer of Sarawak logs) was shown to be helping protect the forests through replanting schemes (later revealed to be entirely inadequate). The Sarawak Campaign Committee immediately launched a successful campaign to recall the comic books from schools.

Some campaign efforts in Japan have focussed on forcing major corporations and aid agencies to make their activities transparent and open to public scrutiny, as the government of Japan claims that it does not have any real control over the activities of these corporations. In recent years, Japanese corporations have withdrawn their own logging companies from many countries, including PNG, Sarawak, the Philippines, and Russia, but continue to buy their timber. One could speculate that this has been in response to the international spotlight on their activities. It appears that Malaysian logging companies have taken their place, expanding their operations to many countries and maintaining the supply of timber to these Japanese trading companies.

In 1992, campaigners took to the streets hoping to encourage the Marubeni Corporation to disclose the details of its tropical timber imports from Sarawak. After a hunger strike and a nine-day vigil by ten people outside their head office in downtown Tokyo, Marubeni finally released their import figures. Other major corporations soon followed suit. Some of the hunger strikers managed to meet with executives from the timber trading department. Their general response to our concerns (about their buying massive volumes of timber from sources known to be causing suffering to indigenous people and destroying irreplaceable forests) were typical of other corporation's positions:

What can we do? Japanese people want to buy the timber and we, as good corporate citizens, are making a product available to them. If people want to buy it, then we have a duty to supply it. It is up to the country to manage its resources.

Bringing the message about why rainforests are being destroyed directly to the people of Japan, and asking them to reduce their personal consumption of tropical timber products, has been an ongoing activity of JATAN and the SCC. Indigenous representatives from affected areas have visited various cities in Japan on many occasions. Volunteers from the Australian based Rainforest Information Centre (RIC) have helped carry out two nationwide multi-media

'Rainforest Roadshows' to raise awareness and, in particular, to encourage the formation of rainforest action groups to work locally for a reduction in tropical timber consumption.

Local Government Campaigns

In 1994, there were over sixty groups or individuals throughout Japan working to protect tropical forests. Since 1991, they have been meeting on a biannual basis to exchange information and discuss future actions. Most of them have actively lobbied their local governments for a reduction in the use of tropical timber in public works. Sarawak government officials have complained that these campaigns have contributed to a reduction in demand for Sarawak timber.

Some of the highlights of the ongoing efforts to lobby local governments to reduce tropical timber use include:

- January 1994: The Japanese Ministry of Construction published a paper outlining guidelines for addressing environmental concerns. For the first time ever, the Ministry clearly stated that reduction in the use of tropical timber was a policy objective and called for the adoption of explicit reduction goals.
- July 1994: The SCC sent a questionnaire regarding tropical forest protection to all 761 Japanese Diet (Parliament) members. As of 20 September 1994, 170 had responded, of whom 85.3 percent said they 'intended to take action for tropical forest conservation'.
- August 1994: The SCC met with the Environmental Conservation Bureau of the Tokyo Government to discuss progress in the implementation of the tropical timber use reduction policy adopted by Tokyo in June 1993, which called for reduction of tropical timber use to 50 percent of 1993 levels by 1996 and to 30 percent by 1998. The Bureau informed SCC that 52.5 percent of the plywood panels used for moulding concrete in Tokyo's public constructions were made of nothing but tropical timber and that these panels were used an average of 1.8 times.
- April 1995: The citizens' group JATAN-Ehime mailed letters of appeal for tropical forest conservation to seventy local governments in Ehime prefecture. As of September 1995, seventeen had responded, and five said that they were making efforts to reduce tropical timber use.
- October 1995: The Housing Bureau of the Tokyo Metropolitan Government announced that it would make efforts to reduce the use of tropical timber, not only for *kon pane* (concrete formwork panels), but also for interior finish work.¹⁷

¹⁷ See *Mori No Koe*, Issue No. 8, March 1996.

The experiences of a local network of rainforest groups in the Kansai area highlight the challenges inherent in changing policy in Japan, yet also indicate the success that can result through persistence. Osaka city in the Kansai area followed Tokyo's lead back in 1991, when Tokyo first announced that it would reduce tropical timber use. As of February 1994, a total of seventeen out of forty-five local governments in Osaka Prefecture had begun some kind of effort to accomplish this goal. The group known as 'Hutan' had also initially targeted the major trading companies with visiting delegations of indigenous people from Sarawak, writing letters and making other attempts to negotiate – all to no avail. They consequently shifted their focus to targeting local governments with the rationale that they were more accessible to the average citizen and that this type of campaign had been effective in Western countries. Reactions from local governments ranged from claims that they had no knowledge about tropical forests, that diminished use of tropical timber would put people out work, that the forest grows back quickly after harvesting, and that slash-and-burn farming is destroying tropical forests. Later, officials began to say that they would follow the lead of the national government if the latter made guidelines first. Finally, the mayor of Osaka responded to a letter from the mayor of Osaka's sister city, San Francisco, calling for a halt to tropical timber use. In January 1992, the mayor of Osaka announced a reduction policy to the media (incidentally without having informed the 'Hutan' group).

Yoshio Nishioka of 'Hutan' says that there is a kind of peer group pressure to which governments react: after a number of policies have been passed, it seems that local governments start to worry about being left behind. He lists some lessons about lobbying local governments in Japan:

- when approaching assemblies, it is important to try to get widespread support and not become too dependent on particular assembly members;
- technical constraints make a total ban on tropical timber highly unlikely – it is much easier for local governments to take action to reduce use;
- instead of just criticising, present alternatives;
- it is best to target prefectural (state) governments first, and if you are successful, municipalities will follow suit;
- if you hit a wall, use the external pressure of letters from sister cities overseas and the internal pressure of letters and requests for negotiations;
- get information to the media, politicians, and so forth;
- provide officials with data;
- once reduction efforts are started, push for clear reduction goals and requirements in specifications; and above all
- NEVER GIVE UP!

One of the main arguments that the groups use when convincing local governments to implement tropical timber policies is the availability of alternatives, particularly in the case of the concrete formwork panels which make up around 20 percent of the tropical timber use in Japan. They are commonly used only once or twice before being thrown away. A study group was formed in Tokyo that includes the expertise of architects and others involved in the construction industry. There are a range of options which can be used instead of tropical plywood for concrete formwork panels, including the use of pre-formed concrete made with steel forms which can be used indefinitely, the use of plantation softwood species for plywood, and painting the surface of the timber so that the forms can be used many times over.

Responses of the Central Government

When the then Prime Minister of Japan, Mr Muruyama, was asked at the G7 meeting in 1992 about Japan's implementation of its obligations for tropical forest protection following the Rio Earth Summit, he responded with the fact that Japan was a signatory to the International Tropical Timber Agreement (ITTA), and that, through this forum, Japan was helping developing countries to achieve their goals for sustainable forest management.¹⁸ In the meantime, the policies of the International Tropical Timber Organisation (which was the organisation formed from the ITTA) have been repeatedly and soundly criticised by international NGOs.

In 1993, members of the Rainforest Information Centre and the SCC met with representatives of the Japanese Forestry Agency to discuss the government's response to the demands of a petition entitled: 'Petition for the Protection of Tropical Forests and the Human Rights of Indigenous Peoples'. The first demand was to establish an immediate moratorium on importation of tropical timber from Sarawak, Malaysia, and other regions where sustainable forestry management has not been achieved and logging has resulted in severe human rights violations against indigenous peoples. The Forest Agency position (in brief) was as follows:

- Both conservation and sustainable utilisation are needed to realise the maximum potential of tropical forests as an economic and environmental resource.
- Japan is working towards achievement of the ITTO's goal to limit the tropical timber trade to timber from sustainable sources by the year 2000.
- The Japanese government must respect Malaysia's sovereignty.
- The Japanese government will have to wait for the formation of an international consensus to judge whether human rights violations and

¹⁸ Personal question to the Prime Minister asked at a press conference at the G7 summit in Munich.

environmental destruction can be considered sufficient to warrant measures that overstep Sarawak's sovereignty.

- The Sarawak government is carrying out logging in a systematic manner on the basis of its forestry plans.

In August 1993, another series of meetings was held with government officials from the Forestry Agency, the Ministry of Foreign Affairs, and the Environment Agency. There was little change in their response. The SCC, which organised the meetings, reported that it was unable to persuade the government to take any concrete measures on tropical forest issues.

The government of Japan is extremely reluctant to take any action which may disrupt a profitable trade in tropical timber or in their international relations with trading partners. The overall policy is to stick with the process of the ITTO. The ITTO is a commodity agreement between forty-three nations which jointly control the vast bulk of the tropical timber trade. Voting power within the ITTO is proportional to the country's level of production or consumption of tropical timber. Therefore, most power is held by Japan (as the major tropical timber consumer) and by Malaysia and Indonesia (as the largest producers).

When the ITTA came into force on 1 April 1985, Japanese and international NGOs were cautiously optimistic and sent representatives to observe meetings. By 1995, they had almost completely abandoned the process and called for an end to its existence, since it was proving to be 'worse than useless' in protecting tropical forests. It is hard to believe that an organisation dominated by the countries with most profit to gain from the timber trade will ever sincerely implement practices that may restrict logging rates.

The ITTO has made much of its claim to meet a deadline for sustainable forestry in the year 2000. ITTO's own 1995 mid-term review revealed that only Malaysia, Indonesia, and Ghana were likely to meet this target. Most international NGOs would hotly contest the view that any of these countries are on the path to sustainability.

Most NGOs have transferred their efforts back to campaigns for lowering timber consumption. In addition, they have supported steps for the independent monitoring and certification of logging practices through organisations such as the Forest Stewardship Council, and have supported small-scale community forestry projects as models for future forestry practices.

It appears that Japan is not playing a prominent role in discussions on timber certification, despite the fact that, as the largest importer, it should be making the greatest effort to be able to reassure its citizens that its imports are sustainable. A representative of the Forest Ministry of Japan at the International Conference on Certification in Brisbane, Australia, in May 1996, had little to say about his country's involvement or interest in this issue. It appears that the main impetus on this front is coming from European countries.

Conclusion

In the words of Yoichi Kuroda of JATAN: 'By altering business and trade policies, passing legislation and informing the general public, the Japanese will be accepting the responsibility that an economic power of its size must bear.'¹⁹ However, actually convincing the government of Japan and Japanese trading companies to take responsibility is a mammoth task. If they *can* be persuaded to shift their enormous economic power from destructive trade practices to sincere efforts to sustain not only the timber 'resource', but its myriad of other functions, it will be one of the best hopes for the forests and people of PNG.

I have attempted to present some of the campaign methods that have been employed by groups in Japan to effect change in policies regarding the tropical timber trade, but there are, no doubt, many which I have missed. It can only be hoped that further momentum will be added to their progress, and that there will be more creative ideas to influence policy and stronger links between NGOs and indigenous peoples in Japan and PNG.

This movement in Japan would not exist if it were not for a handful of exceptionally dedicated, talented, and courageous individuals working in minimally funded non-government organisations. I believe that one of the best ways in which this policy debate can move forward is to support their efforts in any way possible.

Let me conclude with part of a message delivered to the Prime Minister of Japan as part of the Japanese tropical timber campaign: 'The age of thinking only about oneself is over. It is important to think about where something has come from before one buys it. If the forests disappear, the people making a profit from logging will not be able to live either.'

¹⁹ Paper from the Biennial Conference on the Fate and Hope of the Earth, Nicaragua, June 1989.

CHAPTER 14

THE ECONOMICS OF SUSTAINABLE DEVELOPMENT IN PAPUA NEW GUINEA

JOHN MILLETT

Introduction

This chapter examines the economics of sustainable development in Papua New Guinea (PNG) forestry. It investigates the concept of 'sustainable development' itself and such associated concepts as 'constant capital stock', 'irreversibility' and 'the precautionary principle'. The remainder of this section introduces the principal stakeholders in the enterprise of sustainable development and the principal activities in that enterprise. A simple descriptive social system model is then outlined and sustainable forestry positioned within it. Next, relevant aspects of the global environmental debate are canvassed briefly, as is forest policy in PNG, before consideration is given to the economics of sustainable development.

In PNG the forests are owned by the people. Owing to the country's late entry into the modern era – some centuries later than its Southeast Asian neighbours – it has a small, scattered population, and ten times the land area per capita (70 percent of it still forested) than neighbouring Asian countries which are also home to substantial tracts of moist tropical rainforest.

Particularly since the Rio Earth Summit in 1992, moist tropical rainforests have become a major subject of interest to international environmental movements concerned with global warming and biodiversity issues. The Government of Papua New Guinea discharges its international responsibility and authority with respect to environmental management and resource development in the context of private customary ownership of the resource. Just one and a half million hectares of a total forested area of 36 million hectares have been logged. For many landowners the forest is an obstacle, and its exploitation a quick method of access, to development. Their needs are simple, modest and consistent – roads, schools, health centres and economic opportunities to earn money which retains its purchasing power over time. Government failure to deliver related services has led them to exploit their forests to meet these needs. Forest owners in PNG and international environmental non-governmental organisations are thus very differently motivated.

In this triangle of stakeholders, the national government sides with the resource owners for fiscal as well as political reasons. Reflecting the nation's economic youth, the demand for infrastructure, health and education services far exceeds government's capacity to finance their delivery. Realising the economic

rent potential of the forest is a quick way to ameliorate the chronic fiscal deficit.¹

Resource owners will look beyond timber values, to the alternatives advocated by environmentalists, for ways to benefit from their forest only when the alternatives are put to them in comparable financial terms. But markets for non-timber forest values are not well formed, particularly in the case of conservation for biodiversity or recreational uses. Conservation strategies imply a non-production subsidy and hence raise the question of who pays – producing resource owners, PNG's taxpayers, or the international community (see Taylor et al. 1994:15)? Furthermore, eco-forestry (see Martin, this volume) has yet to demonstrate its financial viability, while downstream processing on a large scale, as a substitute for raw log exports, has the same drawback despite its popular appeal. In any event, export logging will be the opportunity benchmark for evaluating alternative strategies.

Social Systems and Forestry

Society is served by four types of organisations: productive (or economic) organisations, maintenance organisations, adaptive organisations, and managerial-political organisations (Katz and Kahn 1966). Productive organisations are concerned with providing goods and services, and include producers in the mining, farming, forestry, manufacturing, transportation and communication sectors. Maintenance organisations are concerned with the socialisation and training of people for roles in other organisations and in the society at large. Schools and churches are the major examples of maintenance organisations. Adaptive organisations are intended to create new knowledge and innovative solutions to problems. The research laboratory is the prototype of such organisations, and universities (as research organisations rather than teaching organisations) would also belong in this category. Managerial-political organisations have to do with the coordination and control of people and resources, and with adjudicating among competing groups. The national state and the agencies of government at local and provincial levels provide the major examples of this category, although community groups, labour unions, business groups, and other special interests would also be classified as managerial-political organisations.

The boundaries between the four systems are sometimes blurred. For example, education is increasingly seen as the formation of human capital, an activity analogous to the way the productive system forms physical capital. Both forms of capital are essential for development; and without either of them, natural resources will not deliver development. This point is particularly relevant to a 'late starter' like PNG. The country's endowment of natural resources is always and often remarked upon by leaders and policy analysts alike. But only rarely and reluctantly do they recognise that half the nation's

¹ See Filer (this volume) for comparison with the fiscal potential of the non-renewable resource sector.

primary school age children are not in school. This apparent confusion of cause and effect in the *process* of development may explain much of the pervasive disappointment with the *rate* of development. Natural resources are created rather than given – a point taken up later, in some detail, in the case of forestry.

The productive system must put out more than it takes in. The surplus is necessary for the operation of the maintenance and adaptive systems on which the productive system itself depends. The managerial-political system allocates the nation's resources among these systems, including some to itself. How well does it allocate the nation's resources? Does it absorb too much of them itself? These are not trivial questions. On the contrary, it is fashionable today to talk about governance as a resource. Good government is as important to a country's socio-economic success as are its natural resource endowment and the productivity of its economic organisations. PNG's productive system is operating far below potential, and its managerial-political system is absorbing much of its output. Together, these weaknesses have put pressure on the forestry sector to expand, raising questions about sustainability. The opportunity to expand has come from increased export demand for logs, as other countries in the region have banned log exports.

Harvesting old growth forest yields an economic rent. Since nature itself cannot collect the rent, the managerial-political system must do so, and then distribute it amongst the stakeholders, including nature. This attracts politicians, as well as businessmen and professional advisers, to the opportunities for immediate gain, thereby expanding the number and range of stakeholders beyond the primary three: resource owners, loggers and the state. Some of these extra stakeholders have a global perspective.

The Global Context

The world is not about to run out of wood, although a few low-income countries do face shortages of wood which they use for fuel and shelter. Forests still cover three and half times as much of the earth's surface as cropland (Cairncross 1991:12). Four-fifths of the forests that existed at the dawn of the industrial era remain today. The losses occurred mainly in the temperate forests of Europe and North America. However, as a consequence of the passing of the steam age, there are more trees in these parts of the world now than there were a century ago.

Today's deforestation occurs in tropical countries. According to Vincent and Binkley (1991:99), for example, 62 percent of Peninsular Malaysia was forested in 1972, and 58 percent of the forest was old-growth. By 1982, both proportions had declined to 52 percent. Over this period old-growth forest was depleted at the rate of 2.8 percent per year.

Rich Man's Lament

Rich countries worry about tropical deforestation because it raises the world's temperature and lowers its biodiversity. For the poor countries who own the forest, deforestation is a way of converting natural physical capital into human capital and human-made capital and, hence, into rising living standards. But, say the mainly rich-country conservationists, preserving forests guarantees a better living than converting them.

Why? Because, according to the conservationists, poor-country governments typically exaggerate the economic gains from conversion and ignore the costs of it. They exaggerate the gains by not capturing for their countries enough of the economic rent derived from logging for export. They ignore the costs by not enforcing good practice and by allowing fragile soils to be exposed to erosion which has the effect of silting up waterways, mangrove swamps, and coral reefs. They ignore the opportunity costs of conversion by not knowing the economic values derivable from intact forest.

PNG has some basis to claim at least partial exclusion from this stereotype. With its resolve stiffened by the assistance of the World Bank and the donor community, the government's new forest revenue system of progressive export taxes and royalties captures a fair proportion of the economic rent (see Filer, this volume). Furthermore, in 1996, the industry adopted a new Logging Code of Practice, though it is too early to say how well it is being complied with.

Is the World Really Warming Up?

Whom should we believe – the 2,000 scientists who make up the Intergovernmental Panel on Climate Change (IPCC) or the twenty-four scientific dissenters whose book, *The Global Warming Debate*, finds fault with the IPCC's work?² Does it make sense, ask the dissenters, to measure global temperatures with mainly land-based thermometers when oceans make up two thirds of the earth's surface? Which are right – terrestrial thermometers which record rising temperatures since 1979 or satellite thermometers which show no warming trend?

Even if the world is warming, is man responsible or are sunspots? Carbon dioxide and methane gases trap the heat the earth receives from the sun, but otherwise would reflect, preventing the earth from freezing like its neighbour Mars – a natural greenhouse effect. Modelling this effect with predictive accuracy has proved difficult. Like these gases, sulphates are also released into the atmosphere by burning fossil fuels, but as aerosols with the opposite effect – reflecting incoming radiation and cooling the earth. Including this countervailing effect has wrought a better fit between the IPCC model and reality. Yet the dissenters say it is a fudge. Other scientists say that this

² See the debate in *The Economist*, March 23-29, 1996, page 91.

century's shortening of sunspot cycles, which have been tracked since the sixteenth century, is what has warmed up the planet.

Even if the world is warming and man is responsible, putting an end to the logging of moist tropical rainforests would not make it cooler. The best that a halt to tropical logging in poorer countries could achieve would be to slow the warming rate. Growing more trees in the richer countries with temperate climates would achieve the same result. Offsetting the warming effects of emissions from fossil fuels would require continual additions to the forest stock – a practical impossibility (World Bank 1992:163).

A Not-So-Fragile Environment

In contrast to the conventional belief that living matter is passive in the face of threats to its existence, James Lovelock (1995:9) explores the theory that the earth's air, oceans, and land surfaces form a complex system which has the capacity to keep Earth a fit place for life.

Life first appeared on the Earth about 3,500 million years ago. From that time until now, the presence of fossils shows that the Earth's climate has changed very little. Yet the output of heat from the sun, the surface properties of the Earth, and the composition of the atmosphere have almost certainly varied greatly over the same period.

The chemical composition of the atmosphere bears no relation to the expectations of steady-state chemical equilibrium. The presence of methane, nitrous oxide, and even nitrogen in our present oxidising atmosphere represents violation of the rules of chemistry to be measured in tens of orders of magnitude. Disequilibria on this scale suggest that the atmosphere is not merely a biological product, but more probably a biological construction: not living, but like a cat's fur, a bird's feathers, or the paper of a wasp's nest, an extension of a living system designed to maintain a chosen environment. Thus the atmospheric concentration of gases such as oxygen and ammonia is found to be kept at an optimum value from which even small departures could have disastrous consequences for life.

The climate and the chemical properties of the Earth now and throughout its history seem always to have been optimal for life. For this to have happened by chance is as unlikely as to survive unscathed a drive blindfold through rush-hour traffic.

How Much Biodiversity Does the World Need?

The economist Malthus, writing at the end of the eighteenth century, warned that it was man's destiny to starve since he would run out of land to feed himself. Almost two centuries later, in 1972, the world's population having trebled and average living standards having increased five-fold in the interim (UNDP 1996:12), the Club of Rome proclaimed that the world would run out of essential commodities within a hundred years. But the prices of these commodities

continue to fall, signalling relative abundance, not scarcity. The concern most often expressed now is not with the planet's capacity to provide human beings with raw materials but its capacity to absorb their waste and maintain its own biodiversity.

Biodiversity is good for humanity. It is the source of the wild strains that plant breeders introduce into domesticated crops as insurance against the pests and diseases which are encouraged by genetic uniformity. It is also the source of some life-enhancing medicines and drugs. But how much of it does the world need? The low price that rich countries are presently prepared to pay poor ones to preserve the biodiversity values in their moist tropical rainforests suggests that the world has more than it needs. Perhaps humanity does not yet understand the true value of biodiversity. Perhaps this ignorance presents a marketing opportunity for PNG to raise biodiversity awareness and the non-timber value of its forests. Current policy, however, is geared almost exclusively to realising timber values; and, on the basis of this brief canvassing of relevant aspects of the environmental debate, properly so.

Policy Overview

PNG forestry pursued a processing policy until 1979. A very large increase in statutory minimum wages between 1972 and 1975 reduced industry competitiveness. Faced with a shrinking industry, government changed its policy to promote landowner participation in log exports. The Barnett Inquiry in 1988 and 1989 revealed an industry in a policy vacuum with corrupt interventions, operating to poor environmental and financial standards.

As a result of this inquiry, the government placed a moratorium on the issue of timber permits and once again adopted a processing policy. Government also breached the moratorium on several occasions, most notably just prior to the 1992 elections. Consequently, the permitted cut is far in excess of the sustainable cut. In 1993, assisted by sharply rising prices, the actual cut also exceeded the sustainable cut. At the same time, however, the National Forestry and Conservation Action Plan (NFCAP), a K50 million multi-donor aid programme, was helping PNG to regain control of its forestry sector. NFCAP's major and most urgent challenge is to reduce the permitted cut to the sustainable level and raise operational standards to best practice (Taylor et al. 1994:13).

Under a structural adjustment programme and economic recovery loan coordinated by the World Bank, the PNG Code of Logging Practice was adopted in 1996, while a new revenue system was adopted in two stages – a progressive export tax in November 1995 and a progressive royalty in July 1996. The industry claimed incapacity to pay the extra royalty.

The forest revenue system in PNG comprises royalties, export taxes, specific-purpose levies and contract-specific premiums. Until November 1995, royalties and export taxes varied with species groups. Royalties were charged on volume and export taxes on value. Stimulated by rising log prices and fiscal

pressures, export tax rates which were 10 percent, 20 percent and 30 percent in 1992, had risen, by March 1994, to 26 percent, 36 percent and 46 percent respectively. The second and largest of the two incremental increases occurred after prices had peaked and were declining. The 1996 budget changed the royalty and export tax schedules to a progressive *ad valorem* basis applying to all species (see Filer, this volume).

Two other revenue systems have been suggested for PNG – stumpage and auction. The stumpage system was proposed by the National Forest Authority but never accepted by the National Executive Council. Gillis (1992:144) considers that the conditions necessary for feasible auctions prevail in few countries with sizeable tropical forests, and that many of the benefits of annual auctions may be secured without auctions. Duncan (1994:5) describes the annual auction system as superior to all the others, mainly because it provides an incentive, lacking in other systems, for loggers to compete amongst themselves on cost, maximise log prices and hedge price risk, and because it could also help to break down the high degree of concentration of ownership of logging activity evident in PNG. The putative disadvantages of the export tax are that: it forces an income transfer from landowners to domestic users of logs or to government; it devalues trees, and therefore forest conservation, in the eyes of the landowner; and it encourages landowners and loggers to collude in illegally shipping logs (AusAID 1995:40).

Sustainable Development

How well are PNG's forest policies geared towards sustainability? Let us begin by considering the pursuit of 'integral human development', the first of the National Goals and Directive Principles enshrined in the Constitution. Though complex, this is held to embrace, at least, material living standards rising above the level of mere subsistence – the stable state that has existed for 10,000 years. Sustainably rising living standards or consumption levels require some investment – that is, foregoing some current consumption. Government is required to undertake the leading investment, for example, in physical infrastructure and in human capital formation.

PNG's fourth national goal deals specifically with the environment and places a constraint on development:

We declare our fourth goal to be for Papua New Guinea's natural resources and environment to be conserved and used for the collective benefit of us all, and to be replenished for the benefit of future generations.

Analysis across countries and over time reveals that development is characterised by pervasive structural change in the economy and society. Among the more important trends are the transitions from rural to urban and from agricultural to industrial society, and from an economy dominated by the self-employed to one in which employee status dominates. Second, only a small portion of the growth in per capita output may be explained by the growth in per

capita inputs. Third, trade is not the main engine of growth, although it is important. Fourth, the fundamental engines of growth appear to be technological and institutional change – that is, the capability to derive more than ever before from the resources at hand. The generation and productive use of new technologies and new institutional arrangements are both intimately related to investments in the capabilities of human agents – the process of human capital formation. By their nature, technological and institutional changes are unlikely to proceed incrementally but in quantum jumps.

The environmental load generated by development comes from increasing numbers of people, rising consumption per person, and the cost per unit of consumption of using the environment as a raw material source and a waste sink. Environmentalists worry that the global environmental load will soon exceed its capacity. Do they worry unnecessarily? Consider plausible trends in the three components of the environmental load. First, developed world population is projected to stabilise around the middle of the next century, global population a century later. Second, there are biological and psychological reasons for believing that mankind's material needs are entirely satiable. Third, technology tends to reduce the environmental load due to a unit of consumption. These three trends together imply that the global environmental load will stop growing at some time and then decline. The sustainability question is whether environmental capacity will allow the peak to be reached or whether global development needs to be truncated. If the world does face truncated development, enforced by an environmental constraint, questions of distributional equity across nations and between generations arise.

The degree of truncation would depend on the nature of the constraint. Beckerman (1995:128) notes 'strong' and 'weak' concepts of sustainability in the literature. The strong environmental constraint is enshrined in the 1987 Brundtland report:

The loss of plant and animal species can greatly limit the options of future generations; so sustainable development requires the conservation of plant and animal species.

According to Beckerman, keeping open future options in this way, at the expense of alleviating acute poverty today, is 'morally repugnant, as well as totally impracticable'. The weak concept of sustainability allows for the running down of natural resources to be compensated by the building up of other resources, including man-made capital. Because the acceptability of the substitution is judged in terms of sustaining human welfare, Beckerman finds that 'weak sustainability' is no different from the economist's concept of optimising welfare.

Both of these constraints are, in fact, man-made ones, and are not imposed by the limits of environmental capacity to either supply man's material needs or dispose of his waste.

A stable world population and per capita consumption – that is, zero growth of global consumption – would require the environment to yield raw materials and dispose of waste at constant rates. This holds out the theoretical prospect that, as a waste sink, environmental capacity need not truncate human development. Recycling technologies, which act to reduce both these rates, enhance that prospect. Recycled materials, instead of adding to the disposal load, reduce the raw material load. But, unless recycling technology can achieve 100 percent efficiency, the environment would have to yield a positive flow of raw materials, even at a constant rate of global consumption – something which a finite planet could not sustain in perpetuity. However, truncating development by achieving zero global consumption growth at a lower level of global consumption would not change this condition – it would merely lengthen inescapably finite life. Nor is there an obvious moral basis for favouring longevity over quality of life.

One's preference between conventional goods and services, on the one hand, and environmental quality, on the other, depends also on how much of each one has. Poorer people's incentive is to favour more goods and services over the environment in general. In the same way, poor countries would be foolish to sacrifice economic progress in the longer-term interests even of their own environment, let alone of the world in general. Nor does it make sense for the developed countries to grow more slowly in order to leave resources available for the growth of the developing countries. Their growth is essential to provide the expanding markets for the exports of the primary producers.

As people get richer, as their basic needs for food, water, clothing and shelter are satisfied, they attach importance to other ingredients in total welfare, including the environment. Accordingly, communities will be more willing and able to allocate resources to this purpose. The changing pattern of output in advanced countries reduces the relative burden on the environment. At higher levels of income, industry accounts for a smaller share of GDP, whereas relatively non-polluting services increase their share. Industry itself experiences a shift away from highly polluting heavy industries towards those which employ relatively more skilled human capital and use relatively less energy or raw materials. Policies to combat pollution have been introduced mainly in richer countries, since they have the resources to implement their shift in priorities. Consequently, higher incomes are clearly associated with environmental abatement.

Even if the developing countries themselves do not see the threat of climate change as warranting the cost of reducing their emissions of 'greenhouse gases', the greatest potential to do so rests with them. This is because of their high population growth and low, but rising, levels of per capita energy consumption compared to the developed countries. By contrast, the developed countries have the resources to take effective action to moderate global warming, but less incentive to do so, given the small share of agriculture in their national products. A global solution to the problem, if indeed it is one, would require a transfer from the developed countries to the developing ones.

Economic Concepts of Sustainability

Economic concepts of sustainability cannot be divorced entirely from other concepts of it, such as social and ecological ones. The well-being of a society depends on more than the consumption, production and investment activities of households and businesses. The good society is concerned not only with the aggregate of material well-being that a sustainable economic system may bring, but also with how it is distributed amongst its members. It is concerned, particularly, with alleviating poverty amongst those of its numbers who are unable to participate fully in the economic system. This is not to suggest, however, that economics concerns itself only with growth and efficiency, and not with equity. Economics is driven by both of these principles, and by the interaction between them. Growth provides a better basis than non-growth for equitable distribution of both the inputs and the outputs of the economic system, while equitable distribution in turn provides positive feedback for sustainable growth.

Just as the good society is concerned with the social impact of a strong economy, so it is concerned with its ecological impact as well. The economic system takes raw materials from its bio-physical environment and puts back waste. At different times, economists have worried about the capacity of the biosphere to yield the quantities of raw materials needed for the economic system to maintain the living standards of a rapidly growing population. Today the concern is more with its capacity to absorb waste from the rising living standards of a growing population without threatening its own health and sustainability. It would be wrong-headed, however, to associate environmental damage only with high-technology modern industrial economies. It is rather the case that technology twice blesses society. First it enhances the capacity of the environment to supply raw materials to the economic system; second it cleans the waste that the economic system disposes to the environment. Nor are subsistence economic systems, at the other end of the technological spectrum, ecologically neutral. Instead, they are often the chief cause of deforestation. Economic growth and development in such societies, which requires capital formation, can reduce their demands on the forest.

Constant Capital Stock

Three economic concepts are particularly relevant to the idea of sustainability: constant capital stock, irreversibility and the precautionary principle. Maintaining constant capital stock is a limiting case of the general condition in capitalist economies of accumulating capital stock. Only when populations stop growing and reach a steady state, and all needs are being met, may the capital stock also stop growing. Although no economy has yet reached this stage, it is a plausible global condition.

The law partially protects the capital stock owned by corporations from diminution. For example, company directors may normally distribute to shareholders only profits made after providing for replacement of the capital

stock used up in producing the output and associated profit. Similarly, the authorities may levy income tax only on such profits. In order to maintain constant capital stock, the company must replace consumed capital. In order to accumulate capital stock, directors normally distribute as dividends only part of the profit, retaining the remainder in the company to finance future capital formation.

Whereas the law protects the capital stock from diminution through income tax, it does not do so with respect to other forms of taxation. For example, royalty and export tax constitute input costs to the logging industry, not contingent taxes on profit. It is conceivable, therefore, that particular combinations of market prices and input costs could result in negative profit, hence a diminution of the capital stock of the logging industry – a condition which is currently said to exist by the industry in PNG.

Such an unsustainable and unstable condition may be remedied only by the loggers reducing the costs over which they have control, or by the resource owners and government reducing the costs over which *they* have control, or both. The currently situation in PNG is that the loggers are doing all of the cost reduction. Inevitably, they claim, part of this reduction will be in the capital stock, which means less royalties to resource owners and less taxes to government in the future. Log export volumes in 1995 were 15 percent down on the previous year; but for the first three quarters of 1996, they were 4 percent up on the same period in 1995. It is not easy to tell the extent to which these changes in output were due to weather conditions, to landowner disputes holding up operations, or to withdrawal of capacity from areas made unprofitable by excessive tax rates.

Whereas the law and economic managers pay close attention to what happens to the man-made capital stock, they are less concerned about the natural capital stock – a form of myopia of great concern to environmentalists. In old-growth forest, in which mortality equals net photosynthetic activity, any harvest rate will exceed growth, and the timber stock will decline. To see that this is so, imagine clear-felling a long strip of uniform width in an extensive forest. If the harvest rate in the old-growth forest equals the growth rate of secondary forest, then, when the first of the secondary forest is reaching old-growth density, the average timber stock in the strip, now all secondary forest, is approximately half the original old-growth stock, in quantity if not in quality or value. It is important, therefore, that the financial proceeds from liquidation of natural physical capital such as old-growth forest is used to finance the accumulation of man-made capital – physical infrastructure, directly productive assets, and human capital – as the means for raising standards of living for society. Measuring the capital stock and how it changes over time is a necessary starting point.

Stocks and Flows

A man-made asset is valued in two ways: first, at the cost of creating it or, more correctly, of replacing it; and second, at the present value of the future periodic income flows that it generates.

The first method is the more certain one, simply because it relies on more reliable past or present information, whereas the other relies on less reliable present information about the future. But it is also the less relevant one, because the principal reason for creating an asset is to enjoy the future flow of benefits it generates. This is why value is said to rest in the eye of the beholder. Some beholders deal with uncertainty by varying the discount rate that links future income flow value with present asset stock value. Others vary the value of the income flow. The second way is the more rational one, because it is the flow whose measure is uncertain, not the discount rate. It is also a less risky way, because a negative flow value, which we might wish to avoid, would not escape detection, whereas it might do so if uncertainty were dealt with by varying the discount rate. Today's forecast measurement of a future economic variable is more properly represented, not by a single number, but by a probability distribution of numbers. The distribution, at a minimum, would be specified by a measure of central tendency and another of dispersion. Negative values which would be revealed in the measures of dispersion could be concealed in the measure of central tendency and cause unwanted future surprises.

Discounting the Future

Individuals generally would rather receive a benefit now than in the future. Conversely, they would rather face a cost in the future than now. The more time-distant the benefit or the cost, the less its significance to the individual now. This behaviour may simply reflect impatience or, to use the more scholarly term, 'time preference'. It may also reveal the understanding that capital is productive; that a benefit received and invested today will generate increasing benefit in the future. Both behaviours discount the future. The rates at which they do so influence the allocation of resources in an economy. Theoretically, for an individual, the two rates are identical, but taxes and imperfect markets make them different in practice. Furthermore, they would vary from one individual to another. Smil (1996:16) cites a poll of 2,600 people which revealed implied discount rates of 7.4 percent per year over 25 years reducing to 4 percent over 100 years. The government uses a 10 percent discount rate in evaluating its public investments.

Economic growth raises the discount rate. The more an individual expects to have in the future, the less willing will he be to make sacrifices today in order to obtain even more at a later date. But poverty also raises the discount rate. The satisfaction of immediate needs for food is more compelling than the assurance of long-term food security. Much of the literature argues that high discount rates work against the environment: they lead to faster depletion of

exhaustible resources and more intense harvesting of renewable ones (but see Pearce, Markandya and Barbier 1991:143).

In the Eye of the Beholder

PNG's forests are vastly more difficult to value than any of its man-made physical assets. On one hand, using the cost approach to asset valuation, it might be argued that, since the forest cost PNG nothing to create, it has no value. It could also be said that this is the main explanation for the unsustainable harvesting observed in parts of the country. On the other hand, the prices loggers pay in royalties, levies and export taxes puts a value on the forest. In recent years, government has raised those prices and that value. Loggers claim government has made some forests so 'valuable' that it is too costly to harvest them. If loggers are efficient and their claim is true, then such forests would have no timber value because they would generate no future timber incomes. Value increases until it crashes to zero!

When man arrived on the part of the earth's crust which has been called Papua New Guinea since 1975, the forest was already here, and perhaps in much the same condition as it is now. The forest yielded food, shelter and fuel to the hunter-gatherer, and also some spiritual and aesthetic values. In time, the hunter-gatherer learned how to be a farmer of plants and animals, and thus to be a more efficient economic unit. This transition reduced the value of the forest, and increased that of the soil, to its human occupants. As population increased, cropland displaced forests.

Recently, the autarchic farmer became the trader engaged with the rest of the world. This engagement created potential values for both competing forest and cropland. The rest of the world wants wood, biodiversity, eco-leisure, a carbon sink. Does the change from a closed economy to an open one therefore warrant a world market valuation of PNG's forests at K76 billion (Sekhran 1994b:34) or K100 billion (Henderson 1996a:131)? Clearly not. The rest of the world has to pay for these things before value is created. An income value to PNG of K3 billion is more relevant and realistic, as detailed later.

Diversity is not only characteristic of PNG's forest ecology, but also of the analyst's assessment of the sustainable rate of harvest, and hence of the value of the productive forest. At one stage, the World Bank (IBRD 1965:143) reckoned that about a quarter of the forest (some 10 million hectares) had commercial potential. It called for the annual log harvest to increase from 200,000 cubic metres in 1962-63 to 750,000 cubic metres in 1969-70. At a later date, the World Bank (1989:21) estimated the sustainable harvest at 3.6 million cubic metres annually from six million hectares of net utilisable forest. The Australian government (PNGADCP 1993:1) has estimated an annual sustainable harvest of three million cubic metres from three million hectares, after allowing for conservation and agricultural conversion.³ Interestingly, the most recent of

³ Before these allowances the sustainable cut would be 6.4 million cubic metres.

these estimates comes close to the 2.6 million hectares assessed as far back as 1970 by McIntosh and Granger for a viable processing industry (World Bank 1989:16).

The World Bank's later estimates were based on natural regenerative growth of 0.75 centimetres per year in stem diameter at breast height (dbh) and a mean annual increment of 0.6 cubic metres per hectare. White (1976:9) provides sample survey data on five forests. These data and the natural dbh growth rate imply annual merchantable volume growth (stems 50 cm dbh and larger) of 2.3 percent. Nadarajah (1993:38), citing data provided by the PNG Forest Authority, reveals that a grand total of 4.76 million hectares have been allocated for harvest at approximately 25 cubic metres of merchantable logs per hectare.

Of the total area allocated, about 60 percent remains unlogged, providing, at current harvest rates, a further 20 to 25 years of old-growth logging. Provinces such as West New Britain, where harvesting rates far exceed the average, face much shorter logging lives. The process of allocating the remaining 20 percent of the productive forest began with the government's simultaneous call for expressions of interest in six new areas.⁴ Upon allocation of the total productive forest, an annual harvest of more than 3.5 million cubic metres would exceed the natural regenerative growth rate.

Currently the rest of the world is paying about K450 million f.o.b. per year for PNG's logs. Sales value exceeds natural capital value by the cost of generating sales. These costs include operating costs, consumption of the man-made capital employed, and normal profit on that capital. Natural capital value comprises royalty, export tax, other charges by the state and resource owners, and profits in excess of normal profit. The industry says there are no excess profits. Royalty, export tax, and other charges would account for approximately one half of sales value. Sixty percent of the allocated portion remains to be logged and 20 percent of the estate remains to be allocated. The current harvest rate is 2.5 percent per year of the allocated area, implying a weighted average remaining life of 27 years of old-growth merchantable stock. At an 8 percent discount rate, this would be valued at K3 billion, equivalent to annual per capita income of K70.

The very large difference between this value and the larger ones cited earlier is explained as follows. The largest one is the current purchaser's value to an overseas processor or, equivalently, the sales value to a foreign logger in PNG of the entire stock in 15 million hectares of operable forest carrying 32 cubic metres per hectare of merchantable stems. This approach assumes, impractically, either instantaneous liquidation of the entire stock or a zero interest rate. Thus the higher value relative to the lower one will be 3.7 times on

⁴ This was done in the week after Parliament gave effective control of the National Forest Board to the Minister, thus breaching a position agreed with the World Bank under the economic reform programme – a decision which has since been reversed.

account of area, 1.3 times on account of stocking rate, 2.0 times on account of price, and 3.6 times on account of timing.

Will nature replenish the K3 billion of merchantable wood stock?

Selective Logging's Broken Promise

Photosynthesis makes wood grow, driven by the sun's radiation. Wood is estimated to grow in the moist tropics at a rate up to 1.5 cubic metres per hectare per year. Harvesting of mature trees at no greater rate would leave the stock of wood per hectare unchanged – constant working capital stock in perpetuity! This is the alluring idea behind sustained selective logging. Yet practically nowhere does it work in practice.

The International Tropical Timber Organisation (ITTO) reckons that only about one-tenth of one percent of tropical logging is conducted on a sustainable basis. Fraser (1982:75) reports on Thailand: a teak forest, inventoried in the early 1920s and harvested according to a management plan, was re-inventoried at twenty-year intervals; each measurement showed a 20 percent reduction in stock and a steady reduction in mean diameter.

Sustainable selective logging might work if it could be done with the precision of the surgeon's scalpel. But it will not work when heavy equipment, incompletely skilled operators, and weak regulatory enforcement leave 70 percent of stems mortally wounded and unable to survive the ensuing ten years (Cameron and Vigus 1993, cited in Selkran et al. 1995:163). Vigus recommends in PNG that not more than 25 percent of the canopy be open, and that any opening be no more than 300 square metres in area.

Tropical forest is the most species-diverse ecosystem in the world, making it hard to use for both timber and non-timber products. This is one of the reasons why people want to cut it down and replace it with a single-species ecosystem (Prance 1994:179). Single-species plantations may yield ten times as much wood as the natural forest, but they may also take 30-50 years to achieve such yields. More than 10 percent of the forest would therefore have to be replaced by plantations to sustain, say, a twenty-year cutting cycle. Fraser (1982:56) reports for Solomon Islands that conversion of 45 percent of the natural forest to plantations of native species would be necessary to replace volume and (because of lesser mean diameters) 65 percent to replace value.

The failure to realise selective logging's promise of sustainability stems from collateral damage more than from excessive harvest rates. This means that there are three remedial options:

- invest in the human skills that will eliminate collateral damage;
- adopt a harvesting technology that won't cause the collateral damage; or
- replace parts of the natural forest with plantations, thereby increasing the capital stock.

It would seem that investment in human capital formation would yield a very high return, and would serve to advance the other options as well. Alternative logging technologies such as aerial ropeways and helicopters do not appear to have been widely adopted. The higher productivity of plantations may be appealing but, being a very long term investment, it requires land tenure rights which have proven difficult to secure under customary law. This raises the crucial point about forestry in PNG: the central issue is not the question of whether the logging rate is sustainable; it is the absence of a clear land use strategy. The economic concept of irreversibility is relevant to choices about land use.

Irreversibility

Faced with the combination of commitment (or irreversibility) and uncertainty, the business executive may well feel the need to keep his options open. This common concept is the basis for elaborations of two fundamental microeconomic principles: operationally, expand production until marginal cost equals price; and in capital formation, invest where the present value of the future benefit flows exceeds that of costs, where both future flow streams are discounted by the cost of capital.

A price-taking firm that could produce and sell an extra widget at a cost which is less than the price of widgets, would sensibly produce and sell it. If the firm reckoned that next year widget prices would rise, it would not postpone some current production until next year, when higher profits could be available; it would maximise profit this year and next year as well. If the firm reckoned that widgets were being replaced by thingummies in consumers' preferences, it would begin reshaping its capital stock to produce thingummies. During the product transition, it would produce each product to the quantity which equated price and marginal cost. There is nothing in the theory of the firm which says that you should put off until tomorrow production that can be sold profitably today.

Replace widgets with trees in the moist tropical rainforest of PNG. What differences between a tree and a widget would make the logger behave differently to the widget-maker? The empirical evidence says that old-growth forest is non-renewable under existing production technology and practice. That is to say, a particular forest has a finite life as a source of old-growth wood. But, just as the thingummy may replace the widget as a value to mankind, another form of valuable land use, perhaps a wood plantation, may replace the trees (but not the biodiversity) of old-growth forest.

In this sense, logging the old-growth forest is in itself a mining activity. The difference between logging and mining is that the logger's capital stock may be replaced *in situ*, in value though not in physical quality, whereas the miner has to find another existing ore body in another location. Policy in PNG, however, has made loggers more like miners because it cannot give them tenure over the land and, therefore, after logging out one forest they move onto another.

Confronted in this way with a finite resource, the logger knows that the last tree felled today will not be there to be felled tomorrow. If tomorrow's prices will be higher than today's, would it pay the logger to leave the tree standing until tomorrow? Yes, if the rate of price increase exceeded the interest rate. This means that the marginal cost, in the textbook rule which says 'expand production until marginal cost equals price', should include the opportunity cost of foregone profit as well as direct cost (Salant 1995:95). The higher the interest rate, the lower the opportunity cost of foregone profit, and the more likely that the logger will fell the tree today.

The weights of irreversibility and uncertainty are greater in making decisions about investment than about production. Once the capital stock is installed, it cannot be put to new uses without incurring a substantial economic cost. For example, dedicating a forest to timber production in practice virtually precludes the opportunity to use it for its biodiversity values. These values, being uncertain, create value in delaying the commitment to logging or, in other words, keeping the logging investment option open, or creating a 'logging option value'. Therefore the decision to commit to logging would be taken when benefits exceeded costs, including the option value. This point is central to the issue of downstream processing.

Adding Value?

Many people say that PNG should not permit the export of logs, only processed timber. But it is not possible to assert, *a priori*, that this would be good for the forest or the people. On the contrary, limiting the range of markets for a product would tend to reduce its price. Opting out of the log export market and into the processed timber export market, hypothesising that this would generate higher incomes, could in practice reduce the value of the forest. It would also probably increase the rate of harvest, and hence the rate of damage to the forest or deforestation. This condition stems from the relatively higher level of investment required to generate a unit of output in processing than in logging.

It is straightforward in principle to test the hypothesis that timber generates higher incomes than logs do. It would entail comparing two operations with identical logging capacity and operating conditions. One operator hauls the log harvest to an export ramp and bulk log ship, and pays wages to Papua New Guinean workers, royalties (including reforestation and development levies) to the resource owners, and export taxes and company taxes to the national government. The other operator hauls the logs to a sawmill and produces sawn timber or plywood which is then hauled to a conventional wharf for sale domestically or overseas. It makes the same range of payments as the log exporter. The operation generating the higher sum of these payments would be the one producing greater benefit for the economy.

Finding two such operations for direct comparison could be difficult. Summing the payments for a sample of operations in each sector, and computing the amount per unit volume of log harvest, would be easier in practice. Whereas

direct comparisons of payments for royalties and for taxes can be made between the two sectors, employment comparisons are more complicated. Processing seems likely to generate both more employment directly, and a higher employment multiplier, than log exporting. However, there are reasons to believe that the higher payroll generated by processing would come at the expense of lower royalties to resource owners and taxes to the state; and that total national income per unit of log harvest would be lower under processing. This condition stems from the less integrated nature of the PNG economy as compared to those of Japan and Korea, our principal markets. A sawmill or a plymill in these countries is able to sell into secondary markets a significant proportion of a log for which a mill in PNG would have to incur the cost of disposal in an environmentally sound way.

The result of such a test is not obvious *a priori*. The presumption in favour of processing is based on a different comparison, namely that of unit sales value, not income per unit of log harvest. A feasibility study to be carried out as part of the current structural adjustment programme should reveal the best strategy for PNG to follow in developing its wood resource.

Precautionary Conclusion

Sound scientific doubts remain about whether the world is warming up and about whether, if it is, man can prevent it rising further by switching to new technology. What counsel does the precautionary principle offer the world's politicians in this circumstance? First, it would say that the issue here is the risk of world catastrophe, and that scientists can say neither what the level of risk is, nor whether the proposed course of action to reduce the risk will succeed. Second, it would say that action should nevertheless be taken.

This still leaves some flexibility on the method of switching technologies. First the new technology, though less environmentally expensive than the old one it is replacing, will reduce existing living standards. Second, reducing living standards hurts poor people more than it does rich people; and there are more poor people in poor countries than in rich ones. These two points suggest that the developed economies should lead the way, allowing less developed countries, by delaying the switch, to reduce the income gap between themselves and the richer countries. But reducing the income gap requires developed economies to continue to grow and generate demand for poorer countries' exports. Delaying the switch in developed countries would be sensible, too, if the cost of the new technology were responsive to research and development expenditure.

Globally, the precautionary principle would seem to favour increasing technological research and development over reducing economic growth as the appropriate response to the global warming concern. How PNG develops its forest resource has very little bearing on this matter.

The precautionary principle carries a message for Papua New Guinean leaders, just as it does for world leaders. As they create a vision to motivate and guide the country's development into the new century, they might ponder on what the forest would be like in the year 2020 under a continuation of existing practice. Forests would still cover much of the land surface. But none of the valuable select species of today would be in them. These would have been harvested (or destroyed as a result of harvesting), and exported either as logs or as sawn timber or plywood if government decides to subsidise large-scale industrial processing. Very little of the K3 billion of liquidated forest value would have been transformed into other forms of capital. The nation would have experienced a significant diminution in its capital stock.

To avoid this outcome, PNG badly needs a land use strategy which will create man-made capital, for example tree crop farms including wood as a crop, as the natural forest stock is depleted. Biodiversity need not be a victim if arrangements can be agreed with the developed countries for conservation of part of the forest estate.

PART THREE

**CONSERVATION AND
SUSTAINABLE DEVELOPMENT
IN PRACTICE**

CHAPTER 15

BIOPHYSICAL PARAMETERS FOR SUSTAINABLE UTILISATION OF PAPUA NEW GUINEA'S FORESTS

BAS LOUMAN

Introduction

During the 1992 UNCED Conference in Rio de Janeiro, many organisations expressed their concerns for the continued existence of forests and the negative impact which their disappearance may have on local communities, watersheds, coastal areas, future development, and the global environment. The resulting agreements stimulated governments all over the world to develop principles, criteria, and indicators of sustainable forest management as tools for the planning and evaluation of forestry operations. Thus evolved the Helsinki process in Europe and Russia, the Montreal process for North America and parts of the South Pacific, the Tarapoto process involving the Amazon basin countries, and the Lepaterique process in Central America. These processes attempt to standardise the definition and evaluation of sustainable forest management practices on a regional and national scale, leaving sufficient space for national adaptations of these criteria and indicators.

During preparations for the Rio Conference, a working group was formed to develop a 'blueprint' for sustainable use of Papua New Guinea's (PNG's) forests (henceforth called the PNG Blueprint). The working group developed a set of criteria and indicators of sustainability of forest use in PNG. These criteria and indicators are based on the assumption that sustainable utilisation requires us to:

- understand and maintain ecological processes and functions within the forests;
- maintain species and genetic diversity;
- maintain aesthetic and cultural values;
- ensure that resources are appropriately managed in order to provide both market and non-market benefits;
- maintain the productive potential of renewable resources; and
- contribute positively to global environmental quality and ecosystem functioning (CSIRO 1992:7).

The requirements are still under review (Unua 1995).

Parallel to these processes, the Forest Stewardship Council (FSC) also developed a set of principles and criteria, which are basically meant to guide the

process of certification of forestry operations in natural forests and plantations (FSC 1995). So far, the FSC is the only acknowledged accreditor of certification processes. In 1996, the FSC asked representatives of stakeholder groups in the PNG forestry sector to look at a set of internationally acceptable principles, criteria, and indicators for PNG's forest use, based on the general principles and criteria developed by the FSC.

The principles, criteria, and indicators are meant to assist in the evaluation and monitoring of current forest policies and practices. As such, they will play an important role in determining whether such policies work for forests and people. To be able to function as intended, parameters should exist which describe them, and which are easily detected, recorded, and interpreted (CIFOR 1995).

This paper focusses on the biophysical parameters that can be used to describe the criteria and indicators of the PNG Blueprint (CSIRO 1992). Parameters are understood to be the value of the indicators and/or verifiers which are characteristic of a population (in this case the forest ecosystem) in a certain condition at a specific time. An overview of commonly used parameters is followed by a brief discussion of what we do and do not know about these parameters, based on the availability of data in the environmental plans of forestry projects. Some suggestions are given on which parameters are easily detected, recorded, and interpreted, and on what needs to be done in the short term and the long term to make effective use of the PNG indicators relating to biophysical aspects of forest management, be it those already developed in the PNG Blueprint or those developed in its revision.

Criteria and Indicators Proposed in the 'Blueprint'

The criteria and indicators developed by the working group mentioned previously have been directly derived from PNG's constitutional goals and directive principles. They also take into consideration the principles of sustainable forest management outlined by the International Tropical Timber Organisation (ITTO). The most relevant criteria and indicators for current purposes are:

1. The general criterion of *environmental quality*, whose indicators are:
 - declining population pressure on forests;
 - improved or stable water quality and soil condition; and
 - status of APEX indicator species.
2. Arrangements to *enhance conservation practices*, whose relevant indicators are:
 - publication of a national conservation strategy that includes criteria for the selection of different classes of conservation areas;

- an increase in the area of land defined as a Biosphere Reserve, World Heritage Area, national park or similar area;
 - increased data on the distribution and density of PNG flora and fauna;
 - an increase in activities which monitor the impacts of logging on forest systems; and
 - information on wildlife use, including the extent of illegal exports.
3. Research efforts to assist in development of the economic, ecological, and social sustainability of tropical rainforest use, whose relevant indicator is an improvement in the database on forest ecological production and socio-economic information.

Biophysical Parameters Relevant for Evaluating Sustainability

Observations of scale and sampling method and design should always be considered in selecting the parameters to be measured in investigating whether the different forests in PNG maintain their environmental quality. In this section, I shall discuss the importance of scale and sampling method and design for the interpretation of data before entering into an overview of potential parameters for each of the relevant criteria of the PNG Blueprint.

The Importance of Scale

In contrast to most of the parameters of socio-economic and policy criteria and indicators, those used to evaluate biophysical impacts can readily be used at different levels of administration. In the first instance, they may be evaluated at the local level, after which the results of such evaluations in different locations can be combined for use in the assessment of impacts on a regional, national, or even international level.

It is at the local level that we collect most or all of our data. We match these to regional, national, or even international criteria to see whether these criteria are met. When they are met, we consider the environment to be 'healthy'. When they are not met, we try to restore the environment to a 'healthier' state. As long as such discrepancies between the value of the indicators and the regional, national, or international guide values occur at the local level, we may be able to restore the local ecosystem. If they happen on a larger scale, recovery will be slower (Kelly and Harwell 1990), and above the regional level, changes may very well be irreversible: the change over larger surfaces is greater than the sum of the changes at a local scale.

If, for example, we clear a patch of forest for traditional farming, the values of the parameters commonly used to describe the forest (such as basal area) immediately decline. Once the garden is abandoned, however, trees will grow back because of the seeds in the soil, resprouting of stumps, and seeds naturally entering the garden area from adjacent forest patches. If we do the same for an

area of several thousand hectares, recovery will be slower. This is not only because the greater distance of the source for new entries makes it harder for all species originally removed to re-enter the area, but also because of the changed micro-climate, with an increased exposure to sun, wind, and rainfall, and thus a less favourable environment for the establishment of new plants.

In ideal cases, where much of the information is gathered in detail at the forest management unit level, scale does not influence the type of parameter we need to monitor, but rather changes the interpretation of the results that have been obtained from monitoring these parameters.

In PNG, however, this situation does not exist, and only few data have been gathered that can be used for reliable local interpretation. On a larger scale, data collected through remote sensing techniques and interpretation of aerial photographs, for example, in combination with field validation of the data, can well be used as guidelines for national and provincial planning purposes. The PNG Resource Information System (PNGRIS), and more recently the Forest Inventory Mapping System (FIMS), are based on this type of information (personal communication, John McAlpine, 1997). While these are currently the best (and perhaps the only) available tools to assist planning at the forest management unit level, extreme care should be taken with their extrapolation to smaller scales, since local variations are rarely shown, and some of the information is based on outdated maps and photographs.

The discussion in this paper, while recognising the importance of the PNGRIS and FIMS, is directed towards improving the currently existing database to the point where it can later be used for local-level planning, as well as to update and improve the information that forms the basis for these other information systems.

Sampling

Sampling method, intensity, and design influence the value of the data collected. To obtain valuable results from monitoring activities, we need to adjust the characteristics of sampling to the objectives of the monitoring activities and to the parameters being measured.

In small-scale, local studies of easy accessible forests, random samples will give more representative results than systematic sampling, without increasing the costs of sampling due to the time that one needs to spend locating the sample plots. Randomness in the timing of sampling may be very effective in the monitoring of water quality near polluting plants, although a form of stratification may be necessary because of the seasonality of weather conditions.

Sampling the vast PNG natural forest areas is a different matter. First, one needs to consider the different types of forest. The PNGRIS recognises over one hundred different types. Even then, one deals with very large areas, usually of difficult or extremely difficult access. Locating oneself in such forests is very difficult, thus making random sampling a lengthy exercise with almost

prohibitive costs. In areas that do not have the infrastructure to facilitate access, or at least geographic positioning, systematic sampling is common. Statistically, this would make it very difficult to calculate the sampling error, because the method does not fulfill the requirements for correct calculation. In practice, however, the difference between systematic and random sampling in forest inventories is not significant (Ferreira 1994, cited in Carrera 1996), so that the advantages of systematic sampling become determinant – less manpower is required, and it is easier to perform on a long-term basis because of ease of location, as well as the usefulness of systematic designs for mapping purposes. Most monitoring work in forests with difficult access is systematic rather than random (Lamprecht 1990). The construction of systematic, as opposed to random, samples places a greater demand on prior knowledge of the topography, hydrography, forest types, and other special characteristics of the landscape of the area being investigated, which themselves may have a systematic occurrence and need to be considered in the layout of systematic samples.

Sample and Plot Size

The design of the sampling plots (size, shape, orientation, and so on) usually involves finding the right balance between efficiency and accuracy, and depends very much on the objectives of the monitoring exercise. To monitor changes in the forest biomass of a relatively homogeneous forest, as measured by the basal area, for example, many small (say 0.25 hectare) plots will usually give statistically robust data on general forest growth. Once we start measuring larger and/or less homogeneous forest areas, the sample size (that is, number of plots) or plot size will have to increase in relation to the statistical variation between the plots, expressed as a percentage of the average parameter values (the coefficient of variation).

On the other hand, if we want to monitor changes in biodiversity, say by counting the number of different plant or animal species in a large natural forest area, the size of the plots should depend on local species-area curves. In Central America, for example, it was found that the species-area curves for trees became strongly asymptotic with plot sizes greater than one hectare: one-hectare plots contained about 94 percent of the species encountered in two-hectare plots. For forest biomass assessments in similar forests, using the coefficient of variance as the measure of variability, optimum plot sizes of 0.6 hectares were found (Carrera 1996).

Marmillod (1982) studied a species-rich Peruvian Amazon forest area in order to determine the optimum sample size for different parameters. The objective of this study was principally to compare different forest sites. He found that for species counts of trees from 10-60 centimetres diameter at breast height (dbh), one-hectare plots were sufficient, but for trees with a dbh greater than 60 centimetres, one would need at least five-hectare plots. To determine proper local species-area curves on which to base adequate sample size, one should enumerate the species in an area of fifty hectares. Synnott (1980)

suggests that, in general, one-hectare plots are the most practical for studying the effects of silvicultural treatments.

Parameters relating to the dynamics of the forest (such as changes in frequency distribution per diameter class after disturbances) should be studied in small plots, each representing specific development stages of the forest. Marmillod (1982) suggests that this should be done by studying larger areas in great detail, after which the forest can be subdivided into units in different phases of development. These phases are determined by average height (classes from zero to six metres) and dbh (for species with a total height above six metres). Unit sizes are determined by canopy openings after tree fall. Marmillod found them to average about 200 square metres in size. Ground cover for smaller plants, and basal area and frequency per species for plants above six metres, should be studied in each of the recognised development units.

Because of the dynamic nature of the humid tropical forest, and the presence of many phases of development in adjacent areas, it is necessary to establish plot sizes which average out the influence of individual development phases, if one intends to describe (changes in) the status of the forest. For the humid tropical forest in Peru, Marmillod (1982) suggests that plots should be at least one hectare in size. With increased size in regeneration areas, however, plot sizes may decrease. For statistical comparison of the units in the humid forest, one would need at least 3-5 units of each phase per sample, resulting in sample sizes of 3-5 hectares.

In general, plot size will also vary according to the size of the plants to be investigated: for herbs plots, they may be much smaller (four square metres is common), while for trees of commercial sizes, plots will have to be greater. In PNG forest inventories, plot sizes are usually 0.2 hectares for trees greater than 40 centimetres dbh, and 0.1 hectares for trees from 10 or 20 centimetres dbh to 40 centimetres dbh. These sizes give better statistical results, but require careful sampling design and layout, with a relatively dense network of sampling lines, to ensure that the data are representative of the forests, and that the sampling error remains at acceptable levels. However, forest inventories are directed at giving a static picture of the currently harvestable trees in the forest. Data obtained from such inventories in tropical countries are usually insufficient to determine the dynamics and health status of the forest.

Marmillod (*ibid.*) indicated that tree height should be added to dbh as a factor influencing plot size. In order to get a fair impression of the vertical structure of the forest, he suggests that we need a minimum of 0.25 hectares for plants with a total height below 15 metres, and two hectares for plants up to 38 metres in height.

Plot Design

Circular plots restrict the outside influence on the plots, and restrict the area to be allocated as border areas or buffer zones – they have a smaller periphery than rectangular plots. However, in the tropical rainforest, it is a major problem to

identify the exact boundaries of circular plots. In addition, since circular plots usually have only one permanent mark in the centre of the plot (which is clearly an economic advantage), it has been difficult to relocate the plots for subsequent measurements. Rectangular plots with four corner marks are more easily relocated.¹

Parameters that Indicate Environmental Quality

For the first criterion of the PNG Blueprint, environmental quality, and its indicator of population pressure on the forest, relevant biophysical parameters are firstly the size, type, and class of the forest areas, and secondly those parameters that help to establish changes in the quality of the ecosystems, such as number of species (flora and fauna), distribution of these species (flora and fauna), size distribution per species and for all species (flora), and age distribution (fauna). In forest ecosystems, the quality of the system depends very much on the health status of the forest. The following discussion therefore deals in more detail with parameters that describe forest health.

Conventional Parameters to Describe Forest Health

In relation to forest health, McKenzie et al. (1992) have briefly reviewed the tree parameters required to monitor forest health in their book on ecological indicators. Conventional indices are the correlation between tree age and size (height and diameter), indicating how size changes with time and how well the forest grows. Development of basal area over time is also an important indicator of forest health. For even-aged forests, plotting basal area per unit area against time would normally give us an S-shaped growth curve up to the maturity of the stand, after which point in time the basal area per hectare (ba/ha) will decline. A decline in ba/ha before maturity is an indication either of human intervention (thinning, for example) or of health problems.

However, the forests of PNG are mainly natural, uneven-aged forests. If these have not yet been interfered with, they can be considered as mature forests, and if healthy, should not show any basal area decline. An increase in the ba/ha of such forests usually is an indication of past human or natural interventions.

For this parameter, in particular, scale is important. A mature, healthy natural forest is a mosaic of smaller units, each of which may be in a different phase of development because of local and natural disturbances. If we measure a decline of the ba/ha value in one hectare, then we know something has happened in that hectare. Unless this is also recorded in many other parts of the same forest, such a decline need not indicate an unhealthy forest.

The conventional parameters used in forest health monitoring, as previously mentioned, are based on changes over time. This may be a serious constraint to

¹ This is one of the reasons why the PNG Forest Research Institute, for example, has recently changed from a circular to a rectangular plot design for the continuous forest inventory in its newly established permanent sample plots (personal communication, Forova Ozvika).

monitoring the forests of PNG, where we do not have the infrastructure to implement regular, widespread monitoring of the forest. Nor do we have adequate data from the past which would enable us to objectively measure the incidence or extent of any changes that may have occurred in the forest.

New Tree-Based Parameters to Describe Forest Health

New parameters developed are, for example, the amount of leaf area, tree growth efficiency (amount of stemwood produced per unit of foliage area), and root biomass (which is difficult to measure) (McKenzie et al. 1992).

The previously described conventional parameters used to describe forest health can also be used to derive parameters to describe the diversity of a forest, which, in itself, is an indicator of forest health (see Debinski and Brussard 1992). The advantage of diversity, as an indicator of forest health, is that it is an index, summarising the relation between two or more conventional parameters. Holdridge (1965, cited in Lamprecht 1990:49) developed an index of complexity (IC) which should be roughly constant across forests in the same ecological life zone.² The index is particularly helpful in comparing forests of known health status with unknown forests whose health status has yet to be determined. Lamprecht warns, however, that the size of the plots used to calculate the IC is relatively small, and that the indicator multiplies different units of measurement. It may, therefore, give inaccurate results (Lamprecht 1990).

Other parameters related to diversity are based on the concept of dominance – the relative space that certain species or families take up in the forest. The occurrence of highly dominant species usually indicates low diversity, and vice versa. Balslev et al. (1987) followed Curtis and McIntosh (1951) in using a number of related indicators to determine the ecological importance of species:

1. relative density (that is, number per species over total number of sample);
2. relative dominance (that is, basal area of species over basal area of sample);
3. relative frequency (that is, number of sampling units containing a species over the sum of all frequencies);
4. relative diversity (that is, number of species in a family over total number of species); and
5. an Importance Values Index (IVI) for each species (the sum of Indices 1, 2, and 3) and a separate index of Family Importance Values (FIV) (the sum of Indices 1, 2 for family, and 4).

They argued that stands in which specific indicator species had the same ecological importance could be considered as closely positioned to each other in

² $IC = 10^3 \cdot hbds$, where IC is the index of complexity, h is the mean height of the forest, b is the basal area of all trees with a dbh greater than 10 cm, d is the number of trees measured, and s is the number of tree species.

what Curtis and McIntosh (*ibid.*) called a 'vegetation continuum' – a series of vegetation units adapted to slightly different environmental conditions and without clear boundaries between them. Of the indices listed here, (1), (3), and (4) can readily be used for both timber and non-timber plant species, while for (2) and (5), a different measure of dominance than basal area needs to be established in order to make the indices applicable to plant species other than trees. For herbs, ground cover could be such a parameter. Marmillod's remarks on plot size are important here, since he found that the Peruvian tropical humid forest which he studied needs at least one hectare to develop a spatial distribution characteristic of the site, determining the ecological importance of the different forest components (Marmillod 1982). In addition, the disadvantage of the Holdridge formula (multiplying apples and pears) also applies to this method.

Other tree-based parameters to measure forest health are crown depth, crown diameter, and exposure of the crown to direct sunlight to determine (potential) vigour. In particular, the latter is relatively easily detected and recorded, and should be (Lamprecht 1990), and has been (Hutchinson 1993) incorporated into standard forest assessments. Visible signs of plant deterioration can also give useful information on the health of the forest, and is usually used when assessing forests for damage due to air pollution.

Non-Tree-Based Parameters

Since trees are generally the dominant plants of the forest ecosystem, they feature prominently in most forest ecosystem status assessments. Yet they may not always be the most appropriate indicators of how healthy the environment is. Their disappearance always means change, usually for the worse, but once ecosystem imbalances cause forest degradation and/or deforestation on a larger, easily noticeable scale, it may be too late to intervene and restore the health of the ecosystem. It is therefore necessary to be able to monitor ecosystem health by monitoring ecosystem components that are susceptible to change. These could indeed be (certain species of) trees, especially because these are usually easy to monitor – they do not fly or run away when people approach, are usually widely distributed, and can readily be measured and identified. However, there are other reasons to avoid the use of tree species for this purpose:

- Many species of trees are quite tolerant of variations in soil and climatic conditions (for example, the range of sites in which *Pometia* occurs).
- They are often exploited by people, so their abundance is likely to be influenced by human activity.
- They have long generation times, which may postpone the recognition of environmental changes that have negative effects on their offspring, such as the genetic degradation which follows from cutting the best trees and leaving the sick and slow-growing trees for future generations.

- One tree often grows through a wide range of habitats, from subsoil through soil, herb layer, shrub layer, and subcanopy to canopy and, at times, emergence. As a result, the health of the whole tree will not always be affected by changes in one of these habitats.

It is therefore imperative that we identify some other indicator species or species groups that are easy to monitor, have a wide distribution, and can be easily measured and identified. Debinski and Brussard (1992) found that small birds and butterflies were useful species groups in assessing ecosystem health, through biodiversity assessment in a national park in the USA. In many sites covering a range of habitats, they only measured species occurrence, since this allowed them to sample more sites per unit of time, gave them a good indication of qualitative differences in the species composition of the sites, and is a parameter whose measurements can be obtained with greater objectivity than others (such as the relative abundance of the species).

Researchers from the Dutch Research Institute for Forests and Nature (IBN-DLO) have been able to establish a relationship between the occurrence of a certain group of bird species and other measurable characteristics of the forest, of which the most important were tree diameter distribution, the number of dead stems per hectare, the presence of different forest development phases, the presence of native tree species, and the development of the bush layer (Hekhuis, de Molenaar and Jonkers 1994). Research undertaken in PNG, following the methods of Debinski and Brussard (1992), could establish similar relationships. While this would not directly help in monitoring forest activities, such relationships would definitely facilitate the planning and management of forest use.

The composite non-tree parameters which may be used as indirect measures of forest health include indicators of chemical change and the monitoring of associated resources (such as stream chemistry, water quality, soil conditions) which are influenced by forest health. In particular, the nitrogen cycle and its 'leaks' appear to be greatly influenced by forest health, and vice versa. Ulrich and Bredemeier (1992) indicate that one of the main driving forces behind changes in the chemical state of aerated soils is a depletion of stored soil nitrogen through the leaching of nitrate. Other cations usually leach out of the soil with the nitrate, causing chemical changes that lead to impoverishment and acidification of the soil. Logging activities in the forest often increase the leaching of nitrate. The nitrogen status of the biomass and soil, or the amount of nitrogen leaching out, may therefore be good indicators of forest health. The same authors also indicate that, in temperate forests, the ratio between the concentration of nutrient cations and the presence of acidic and/or phytotoxic species has proven to be an ecological indicator with respect to the functioning of the root systems.

Ulrich and Bredemeier's article is of particular relevance to us because it shows that an ecosystem is not just a function of the current, easily measurable status of the system, but also of the processes, such as nitrogen leaching, that

occur within the system. Unfortunately, we still do not know enough about the natural forests to come up with one or a few easily measurable parameters that reflect such processes.

Parameters to Measure Water Quality and Soil Conditions

Some parameters to measure water quality are turbidity, dissolved oxygen content, eutrofication (N and P content), and drinkability (especially coliform content). However, the monitoring of these physico-chemical parameters of river quality may not adequately guarantee the health of the forest ecosystem. Biological processes and aquatic organisms also play an important role in water quality, and may be seen as giving an indication of the sum of the physico-chemical components. They may also be better indicators of those temporary changes in water quality which might not occur at the time of sampling, and which can hardly be detected by conventional sampling methods. The size of certain aquatic populations, for example, may have been influenced by the occasional drainage of foreign matter into a river (Seager, Milne and Crane 1992).

In addition, chemical concentrations may measure up to human standards, but may not be applicable to water organisms, especially if they occur for long periods of time. Such concentrations may cause biological changes with grave future consequences, without being detected in analyses of the chemical composition of water (*ibid.*). The same authors used a combination of monitoring of stress reactions of fish (gill ventilation), macro-invertebrate community status indices, and conventional monitoring methods while investigating water quality. They found strong relationships between different ways of monitoring the quality of river water, and equally strong relationships between different methods applied in the laboratory. The incidence and significance of causal relationships need further study.

For soil conditions, we need to measure parameters such as soil fertility (content of macro- and micro-elements, carbon-nitrogen ratio, cation-exchange capacity, base saturation, soil acidity), soil water absorption capacity, water infiltration rate, erodibility, and erosivity (slope gradient, length of slope, aspect of slope, structure and texture of soil, and amount, distribution, and intensity of rainfall).

APEX Indicator Species

Of particular relevance for this indicator are data on population size, population distribution (spatial and per age class), movements, feeding habits, mating patterns and frequencies, and household size. Of these data, population distribution is probably the easiest to measure for non-plant species. The other parameters will increase in utility and importance with diminution in the scale to which monitoring is applied. It is known, for example, that many bird species move from one place to another as a result of changes in weather patterns and the related availability of food sources. If, through the conversion of forests into other vegetation types, one or more food sources disappears from the chain, this

may mean the extinction of the bird species. The smaller the study site, the more likely it is that the species being studied depends on food sources or breeding places outside the area of study. Restricting the study to certain parameters, such as species numbers within the study site, will not necessarily give an adequate picture of the significance of the site for the survival of the observed species.

Parameters that Indicate Arrangements to Enhance Conservation Practices

For the second criterion of the PNG Blueprint, arrangements to enhance conservation practices, biophysical parameters are essential to determine the size, shape, and type of a conservation area. Such parameters would include data relating to the population sizes, movements, and social behaviour of existing species. In addition, resource inventories that record information on the biophysical parameters which have already been discussed in relation to the criterion of environmental quality, describing site and forest health, will be required in order to establish the value of potential conservation areas. Of particular relevance may be data on basal area per hectare, the size distribution of the tree species, the number of dead trees per hectare, species counts of small birds and butterflies, and changes in these parameters over time.

To select relevant areas for the establishment of Biosphere Reserves, World Heritage Areas, national parks, or other conservation areas, we need data on biodiversity, preferably per geological or resource map unit. As well as data on the parameters already mentioned (relative density, relative dominance, relative frequency, relative diversity, and Importance Value Indices) at the species level, data would also need to be collected on ecosystem diversity and genetic diversity – the origin of, and relation between, species and individuals.

Parameters that Indicate Research Efforts to Assist Development of EESSTRU

For the third criterion of the PNG Blueprint, research efforts to assist in development of the economic, ecological and social sustainability of rainforest use (EESSTRU), it is the *availability of values for the biophysical parameters*, rather than the actual values themselves, which is indicative of the level of achievement.

Parameters that Can be Used to Determine the Values of Other Criteria and Indicators of the PNG Blueprint

A number of criteria and indicators do not directly require biophysical parameters for their assessment, but such parameters may still be necessary for the identification of forest areas and their primary functions, in order to formulate management plans and monitor forestry operations, and to improve education and training. More specifically, these parameters can be used to

evaluate the impact of various activities on the forest environment, and the scope for continuing the same type of forest use.

The parameters which are especially relevant for planning purposes are those which allow us to calculate the growth of trees as a source of timber (dbh, height, volume, or basal area per hectare) or of plants which are a source of non-timber products (for example, fruit production, fruiting frequency, latex production). These parameters help us to determine the sustainable level of periodic harvests. Data on forest structure are also relevant – both those which relate to the horizontal structure (species composition, diameter distribution, and development class) and those which relate to vertical structure (vertical distribution of species and development classes). The continued occurrence of indicator species, or species with special commercial, cultural, religious, or aesthetic value, should also be recorded. For determination of future land and forest use, it is also important to record climatic data (rainfall, temperature, evaporation, relative humidity, and extreme weather conditions) and their regular and irregular changes, as well as data on the soil condition in the area (drainage, fertility, slope, and erodibility). For PNG, many of these data are currently available at the Resource Mapping Unit level within the PNGRIS. However, the scale at which the information is presented may not be adequate for effective use of the data in monitoring environmental impacts at the level of the project or management unit.

The State of Knowledge on Relevant Parameters in PNG

The tool for environmental management and monitoring in PNG at present is the environmental plan. These plans should ideally provide the resource or environmental manager or management team with sufficient biophysical parameters for the purpose of comparing the situation before, during, and after the operations.

Table 15.1 shows the extent to which environmental plans have done this in the past. It compares a selection of nine recent environmental plans of timber concessions, from different parts of PNG, in respect of several biophysical parameters whose values should be known before the commencement of tree harvesting operations, if the impact of the operations on the forest environment is to be monitored effectively. It should be noted that most of the information indicated as being (partially) available in these environmental plans is in the form of lists, but without any clear indication of how these lists have been compiled, or to what extent they actually are applicable to the project under investigation. Thus 'availability' need not imply relevance (selection of sampling sites) or reliability (sampling method, intensity, and size). For most environmental plans, these are unknown. In this respect, it would be timely to start formulating guidelines for the preparation of environmental plans which not only indicate the required *content* of each plan, but also the *methods* of data collection required under different circumstances, as well as the degree of *relevance and reliability* expected of the data.

From Table 15.1, we can derive a number specific topics under which more data need to be collected in order to be able to use the previously mentioned parameters to monitor the sustainable use of PNG's forest.

Table 15.1: Biophysical parameters that have been measured as part of nine recent environmental plans for tree harvesting projects in different parts of PNG.³

	Project: 1 2 3 4 5 6 7 8 9								
GENERAL FEATURES OF PLAN									
Scale of investigations	a	-	-	-	-	-	-	-	-
Sample:									
method	p	p	p	p	p	p	p	p	p
intensity	-	-	a	-	-	-	-	-	-
size	p	-	-	-	p	-	p	-	p
shape	p	-	-	-	-	-	-	-	-
BIOPHYSICAL PARAMETERS									
Biomass:									
basal area/ha*	-	-	-	-	-	-	-	-	-
volume/ha*	a	a	a	a	a	a	a	a	a
Complexity:									
size distribution per species*	p	p	p	p	p	p	p	p	p
number of species per hectare*	-	-	-	-	-	-	-	-	-
number of families per hectare	-	-	-	-	-	-	-	-	-
species distribution	-	-	-	-	-	-	-	-	-
forest typology	p	p	p	p	p	p	p	p	p
age class distribution (fauna)	-	-	-	-	-	-	-	-	-
Forest health:									
forest growth:									
- height growth	-	-	-	-	-	-	-	-	-
- dbh growth	-	-	-	-	-	-	-	-	-
- basal area growth	-	-	-	-	-	-	-	-	-
- volume growth	-	-	-	-	-	-	-	-	-
leaf area	-	-	-	-	-	-	-	-	-
tree growth efficiency	-	-	-	-	-	-	-	-	-
root biomass	-	-	-	-	-	-	-	-	-

³ These were environmental plans for projects in the following provinces: (1) East New Britain, (2) Oro, (3) Morobe, (4) Madang, (5) New Ireland, (6) Milne Bay, (7) Gulf, (8) Western, and (9) Milne Bay.

Table 15.1 (continued).

diversity:									
- relative density	-	-	-	-	-	-	-	-	-
- relative dominance	-	-	-	-	-	-	-	-	-
- relative frequency	-	-	-	-	-	-	-	-	-
- relative diversity	-	-	-	-	-	-	-	-	-
- Importance Value Index	-	-	-	-	-	-	-	-	-
(potential) vigour:									
- crown depth	-	-	-	-	-	-	-	-	-
- crown diameter	-	-	-	-	-	-	-	-	-
- crown exposure	-	-	-	-	-	-	-	-	-
visible signs of plant deterioration	-	-	-	-	-	-	-	-	-
indicator species or species groups	p	p	p	p	p	p	p	p	p
N-cycle or other processes	-	-	-	-	-	-	-	-	-
physico-chem. water qual. parameters*	-	-	-	-	-	-	-	-	p
biological water quality parameters	-	-	-	-	-	-	-	-	-
soil fertility parameters	p	p	p	p	p	p	p	p	p
erodibility parameters	p	p	p	p	p	p	p	p	p
erosivity parameters	p	p	p	p	p	p	p	p	p
APEX indicator species:									
population size	-	-	-	-	-	-	-	-	-
population distribution	-	-	-	-	-	-	-	-	-
population movements	-	-	-	-	-	-	-	-	-
feeding habits	-	-	-	-	-	-	-	-	-
mating patterns and frequencies	-	-	-	-	-	-	-	-	-
household size	-	-	-	-	-	-	-	-	-
Ecosystem diversity:									
ecosystem types*	p	p	p	p	p	p	p	p	p
Genetic diversity:									
origin of species	-	-	-	-	-	-	-	-	-
Non timber forest products:									
presence	p	p	p	p	p	p	p	p	p
production	-	-	-	-	-	-	-	-	-

Notes: a = data available; p = data partially available (often based on literature rather than field research); * = enough data exist elsewhere in PNG to start using these parameters for monitoring purposes.

Source: PNG Department of Environment and Conservation.

The Scope for Using Biophysical Parameters for Monitoring Sustainable Utilisation of Forests in PNG

Table 15.1 clearly shows that, although some data are available to the resource or environmental manager, most of these are related to the existence of species rather than the quality and quantity of that existence, while parameters directly relating to forest health, APEX indicator species, genetic diversity, non-timber forest products, water quality, and soil conditions are hardly touched upon at all in the environmental plans currently being drawn up for forestry projects.

This does not necessarily mean that policies aimed at maintaining or improving variables such as water quality will not work. We know very well, for example, how to minimise the impact of road construction on water courses, and can monitor this achievement by setting road construction standards, as is currently happening through the development of a logging code in PNG (PNGFA/DEC 1995). Furthermore, we already know enough to be able to adhere to the established international (general) criteria and indicators of bodies such as the Forest Stewardship Council (FSC).

On the other hand, it does mean that it will not be possible to establish realistic costs of non-adherence to such guidelines, nor shall we be able to tell how much tolerance aquatic ecosystems have for disturbances, and at what point irreversible damage occurs. The possible result is that governments and environmental agencies will put as much effort into monitoring water quality, soil conditions, and biodiversity as appears to be justified by their own subjective perceptions of the cost of environmental degradation. This may be too much effort, where the actual impacts of operations are perceived to be much higher than they are in reality, or too little in those cases where the full extent of environmental damage is not realised.

It is therefore imperative, if environmental management and monitoring is to become more effective, that serious efforts are devoted to the collection of the values of at least the most relevant biophysical parameters. For the moment, these will have to be the more conventional parameters described earlier, despite their shortcomings. The costs of this data collection should be borne by those who, in the long term, will benefit most – the government, as the party primarily responsible for the management of the environment, the project implementers, as the party responsible for the impacts and therefore liable for future compensation claims, and also the local people, as those directly affected by potentially hazardous environmental changes.

At the same time, studies should be initiated in order to investigate the values of the other parameters mentioned in our discussion, and their sensitivity to different forest uses and environmental changes. Such data will help us to achieve a better understanding of the forest, and they can also be used to identify those parameters which will give us an earlier warning of impending changes, other than the one which we obtain by measuring losses in forest growth and composition.

Before embarking on a biophysical parameter crusade, however, it is necessary to identify more accurately the parameters that can effectively contribute to our store of knowledge about the environment.

Essential Biophysical Parameters

Looking at the FSC principles and criteria (FSC 1995), we see that those related to 'environmental impact' (Principle 6), 'management plans' (Principle 7), and 'monitoring and assessment' (Principle 8) contain important biophysical components. Of these, Principle 6 covers the criterion of 'environmental quality' in the PNG Blueprint, adding to it guidelines for the use of chemicals and exotic plant and animal species. In addition, it stresses the need for guidelines that aim at controlling erosion, minimising forest damage during harvesting, road construction, and all other mechanical disturbances, and protecting water resources. Principles 7 and 8 provide guidelines for the planning, implementation, and monitoring of forest management.

The Centre for International Forestry Research study mentioned in the introduction (CIFOR 1995) was aimed at formulating a minimum list of criteria and indicators of sustainable forest use in several countries, considering their relevance to the local situation, their ambiguity, their reproducibility, and their ease of detection, recording, and interpretation. The preliminary result of their study, based on a project in Indonesia, came up with a list of three criteria – the resilience of the forest ecosystem is maintained, the structure and diversity of forest ecosystems resembles those of the original forest, and ecosystem function is maintained. They also produced thirteen indicators directly related to the biophysical components of forest management (the principle of maintaining ecosystem integrity), and a number of indicators for the (sub)principle of 'sustainable yield and quality of forest goods and services', with criteria which they listed as 'availability of comprehensive forest management plans, effective implementation and control of forest management, and secure continuity of resource flow', all of which also require biophysical parameters for their assessment.

The CIFOR criteria and indicators are directed, not so much towards assessment of the forest, as towards assessment of the measures taken to prevent damage to the forest. As such, they only require the measurement of a few biophysical parameters – number of species, frequency per species, age/development stage of trees, occurrence of specific (indicator) species, basal area per hectare, and canopy surface (which is a function of crown diameter and competition). While these criteria and indicators will help to reduce the negative impact of harvesting on the forest ecosystem, and are based on what we already know of the forest and its reaction to human interference, they do not give us an idea of whether the forest ecosystem is actually maintaining itself, and whether our activities are sustainable. For that, we would need to investigate an additional range of variables relating to forest health (such as diversity and actual growth), as well as water and soil quality.

Comparison of the FSC principles and criteria, the CIFOR study, and the criteria and indicators of the PNG Blueprint does not yield any biophysical parameters beyond those which have been listed in Table 15.1. Nor is it possible, at this stage, to strike out any of the biophysical parameters as being of minor relevance, because we do not have enough information to assess the respective roles of these parameters in forest ecosystem assessment.

Those parameters marked with an asterisk in Table 15.1 are those for which records already exist in PNG (in environmental plans of mining operations, in some forest management plans, or from FRI studies), for some of which norms could be established, and which could therefore be used for monitoring purposes without further delay, even if additional information needs to be collected in order to improve on the relevance and accuracy of these norms. Records for the other parameters are totally inadequate for immediate use in the monitoring and assessment of sustainability.

For the time being, indirect methods of assessment will need to be used, as when we assess the damage caused by mechanical operations, such as harvesting and roading, by looking at the extent to which standards and codes are being implemented, this postponing the assessment of the relevance and correctness of these standards and codes under variable local conditions until better data are available.

Conclusions

While many studies need to be done to improve our knowledge of the forest ecosystems in PNG (see Table 15.1), we can already use the knowledge we have to carry out basic monitoring programmes that meet the general criteria and indicators of the FSC and CIFOR, and focus on monitoring or mitigating measures rather than measuring impacts directly. In these programmes, the PNGRIS and the FIMS can be used to classify relevant physical resource parameters for each forested area (such as slope, flooding, soil depth, and so on) in terms of likely constraints on sustainable production (personal communication, John McAlpine, 1997). This exercise can then be followed by an evaluation of the degree to which these factors have been taken into account in the forestry activities. In this process, it is necessary to keep in mind the scale at which the data were collected and their reliability. Additional knowledge of biophysical parameters is especially relevant for the task of improving the current database, and for making direct assessments of the status of the forest ecosystem, and thus for deciding whether we have taken sufficient measures to mitigate the negative impacts on that ecosystem.

The environmental plans of forestry operations, considered as depositories of biophysical parameters, have not served that purpose in the past. They are almost completely inadequate as a basis for timely assessment of actual changes in the forest environment. Monitoring of environmental impacts will require more detailed environmental plans, the costs of which should be carried by all potential beneficiaries.

In collecting field data for the specific parameters, the objective and scale of the use of the parameters should be kept in mind, and sampling method and design should be formulated accordingly. More specific guidelines or standards for data collection need to be developed in order to improve the usefulness of the environmental plans.

In environmental planning and monitoring activities, special attention should now be paid to the production of systematic species counts of both flora and fauna, identifying species per habitat and species distribution. It is already possible to incorporate adequate physico-chemical water quality data and make a start with biological quality assessments, while soil descriptions could and should be given in more detail. Finally, we ought to start looking at the interactions and processes that take place in the forest.

Postscript: Comment by John McAlpine⁴

The discussion in Chapter 15 is based on a 'blueprint for the sustainable use of PNG's forests', and an assessment of those biophysical parameters relevant to such use. The conversion of the PNG Blueprint to an operationally useful body of knowledge would entail a costly and difficult research exercise which, by its nature, could not produce results for a number of years.

Given the current rate of logging and conversion of forest areas to other forms of land use, it is essential to develop an immediately available tool to assess the likely environmental consequences of significant logging operations, especially in terms of regrowth and sustainability.

A system has been developed, using the physical resource inventory information held in the PNG Resource Information System (PNGRIS) to classify relevant physical resource parameters (such as slope, flooding, soil depth, soil drainage, and soil fertility) for each forested area, insofar as these constitute likely constraints to sustainable production. The necessary data are available for the whole country, and the assessments, being computer based, can be rapidly adjusted to take account of changing intensities and practices in logging operations. The assessments, when linked to the Forest Inventory Mapping System (see Filer, this volume), provide the National Forest Service with a means of indicating, to resource owners and the forest industry, the likely outcome of forestry operations in specific areas with regard to long-term sustainability.

At the time of writing (March 1997), the assessment procedures are being extended to include biological data. In particular, these will include forest types in special need of preservation. The PNGRIS already contains all of the Conservation Needs Assessment material developed by the Department of Environment and Conservation (see Alcorn and Beehler 1993).

Perhaps the best way to explain the use of the system is by example. The assessment of the physical resource parameters associated with the Gogol Valley forest indicated significant areas of drainage constraint if the forest was to be removed – that is, the areas would no longer be part of a well-drained alluvial plain, but would become a swamp. This assessment could have alerted managers to the need for caution or, in the event that the forest was still being felled, of the need for reforestation to take account of this fact in the process of selecting the species to be replanted. A similar assessment of the dry evergreen forests of Western Province would indicate that logging of this forest type would probably result in permanent conversion to grassland and loss of wildlife habitat. Conversely, an assessment of the physical conditions in areas of forest growing on deep volcanic-alluvial plains indicates that this environment is robust, and is probably able to withstand intensive logging operations.

⁴ Team Leader, Forest Inventory Mapping System project.

CHAPTER 16

GOVERNANCE, LAW, AND SOVEREIGNTY: ENFORCING ENVIRONMENTAL OBJECTIVES IN PAPUA NEW GUINEA

KATHY WHIMP

Background

In a democratic state, environment protection objectives are achieved by balancing public and private interests through land and resource management regimes. Although the sanctity of private ownership of land is a cardinal principle in democratic systems (Sackville and Neave 1975:18), it is also accepted that the state is entitled to interfere with those private rights for the common good.

A resource management regime consists of legal and political relationships, laws, practices, and understandings shared by participants in the system, which allow the state to regulate the exercise of private property rights in the public interest. In recent times, this public interest imperative has expanded beyond the borders of individual nations. There is now an expectation that state stewardship of natural heritage will take into account the global interest in sustainable use of a country's resources and maintenance of its biodiversity. As a result, regulation of private property rights in most Western countries has increased significantly during the last two decades.

Much of Papua New Guinea's land and resource management regime has been inherited from its former colonial administrator, Australia.¹ While there have been recent reforms in forestry, fishing, mining, petroleum, and physical planning laws, the legal and social concepts which underpin the legislation are still founded in the system of Westminster government which Australia inherited, in turn, from the power which colonised it, Britain.

Resource and Land Use Management in Australia

In Australia (as in most developed democracies), regimes for the control of land and resource use have evolved over several decades. In the last decade, as consciousness of environmental issues in the international community has increased, there has been growing pressure on all countries to ensure that

¹ The Constitution provides that the underlying law of Papua New Guinea (PNG) is based on the English common law as it was on the date of Independence. However, in practice, many of the statutes still in force in PNG were based on Queensland and Commonwealth statutes which were used as models for pre-independence ordinances and some post-independence laws.

resources are used responsibly. The Australian land and resource management regime is now a relatively complex scheme of laws and administrative arrangements incorporating the following elements:

- land use planning at state and local government levels, with enforcement through zoning and development permission requirements;
- processes for planning the use of Crown (government-owned) land;
- environmental impact assessment at state and federal levels for major projects;
- works approval and emission licensing at state level;
- industry codes and emission standards at state and federal levels;
- catchment management for important catchments such as the Murray-Darling Basin, and sensitive environments such as coastal areas and the Great Barrier Reef;
- water use management, including regulation of riparian rights;
- government ownership of subsurface minerals and petroleum, and licensing of exploration and extraction;
- government ownership of a large proportion of natural forest, and control of harvesting through planning, licensing, and codes of practice;
- protection of natural and cultural heritage, including Aboriginal heritage;
- protection of biodiversity through control of native vegetation clearance, and regulating dealings with endangered species; and
- establishment of reserves and control of activities within reserves.

Over the past two decades, Australian state and federal governments have sought to better integrate planning, development, and environmental approval mechanisms. Nevertheless, there are many different rules which substantially restrict the use of private land, and detailed procedures for obtaining approval for activities as simple as building a garden shed on a suburban block. These rules are generally followed, despite the relatively small amount of enforcement activity. In other words, there is a general acceptance in the community of the state's right to interfere in private land use in this way.

Land Use and Resource Management in Papua New Guinea

A large number of laws comprise the Papua New Guinea (PNG) land management regime. They can be loosely categorised under the following policy areas:

- disposition and use of land (*Land Act* and associated legislation, *Physical Planning Act*);

- regulation of the use of particular resources (*Mining Act* and associated legislation, *Petroleum Act* and associated legislation, *Forestry Act*, *Crocodile Trade Protection Act*, and *Fisheries Act*);
- regulation or protection of the use of the environment generally (*Water Resources Act*, *Environmental Planning Act*, *Environmental Contaminants Act*, *Prevention of Pollution of the Sea Act*, *Dumping of Wastes at Sea Act*, *Public Health Act*, *Quarantine Act*, *Animal Disease and Control Act*, and *Plant Disease and Control Act*); and
- conservation of particular environmental resources or specific areas (*Fauna (Protection and Control) Act*, *National Parks Act*, and *Conservation Areas Act*).

While PNG has many of the same laws as those which form the basis of the Australian land and resource management regime, they are not nearly so well entrenched. Many development activities in both urban and rural areas appear to ignore planning, development approval, and environmental control requirements, and there is virtually no enforcement activity. As Taylor notes elsewhere in this volume, the state has failed, at least in the forestry sector, to impose its reform agenda on dissenting customary landowners. The community in PNG appears generally to accept the legitimacy of protests, often violent, by which landowners regularly defy the wishes of the state in relation to the use of their land.

This paper suggests that PNG's land use history forms a large part of the explanation for the state's failure to achieve its conservation objectives. Land use and resource management laws in PNG have been drawn from a very different social context in which the role of the state is well established. In particular, they fail to properly accommodate the very different nature of customary land ownership. The ineffectiveness of these laws is compounded by the relative incapacity of the state to assert its will through conventional bureaucratic means. These observations have relevance for any future efforts to secure a priority for protection of the environment in the development of PNG's rich and largely undeveloped natural heritage.

The Role of the State in Resource and Land Use Management

Australian land and resource management laws are based on the English system of property law, which was incorporated into the law of the Australian colonies at settlement. Since the Norman conquest, it has been a basic tenet of English property law that the Crown (the state) is the ultimate owner of all land within the geographic boundaries of any nation over which it is sovereign. Subjects of the Crown (state) hold their title to land as tenants, but they do not own the physical substance of the land; rather they own a bundle of rights known as an 'estate', which itself comprises a property right. In the case of an estate in fee

simple (the primary land estate under English law), the ownership is for all practical purposes the same as ownership of the land itself.²

The underlying ownership – the Crown's radical title – provides the basis for the state's alienation of interests in the land, for example by compulsory acquisition, by reservation of sub-surface rights to the Crown, or by extinguishment through subsequent grants of other titles, in the case of the original native title of original inhabitants.

The sovereignty of the state over the land within its domain provided the historical basis for state intervention in land and resource management. Originally, the state took on the role of adjudicating disputes between landowners arising from activities conducted by one landowner which affected another's enjoyment of her or his land. Gradually, statutory control of land use activities in the public interest has replaced the more parochial interests protected by common law actions for negligence.³

The state is itself also a landowner with significant power. Much of Australia is still Crown land, leased for specific uses to pastoralists, farmers, and miners. Resources beneath the surface of privately owned land have generally been treated as public property. The state licenses the extraction of these resources in return for a resource rent usually known as a 'royalty'. Water is also treated as a publicly-owned resource, subject to the riparian rights of riverside landowners (Bates 1992:154).

In PNG, land has a very different character. Ownership is defined according to custom, which may differ from group to group, and disputes about land ownership can be the cause of ongoing conflict between different tribal groups. James (1985:183) describes traditional land laws as being concerned partly with defining and maintaining the rights of group members, and partly with working out the relationship of the landowning group and outsiders. Land ownership transcends the purely legal and economic arrangements which characterise Western relations with land. According to Burton-Bradley, land in PNG is, at a psychological level, 'an extension of the concept of self' (cited in James, *ibid.*).

The prominence of the social, rather than the economic, significance of land is also emphasised by Power (1994:3), who argues that landholding groups form the basic social unit across PNG. His views are given weight by the findings of the Commission of Inquiry into Land Matters (PNGDOL 1974), on whose recommendations the *Land Groups Incorporation Act* was based. The Fifth National Goal set out in the Preamble to the Constitution calls for the

² *Mabo v Queensland [No. 2]* [1991-92] 175 CLR 1 at page 80, judgment of Justices Deane and Gaudron.

³ Note, however, that the common law does not only protect private interests. The law of public nuisance aims to maintain a balance between competing interests in land use and development (Bates 1992:37).

maintenance of traditional villages and communities as viable units of the national society. Unlike many other colonies in Africa or Central and South America, colonisation generally did not disturb traditional tenure. Customary land still accounts for over 97 percent of PNG's land mass.

Customary Ownership and State Sovereignty

State sovereignty is a social and political artefact of modern society, as well as a legal one. Owners of private property in Western countries have, for a long time, accepted the 'imagined communities' (Anderson 1991) of which they are members, and the role of the state in arbitrating conflicts between individuals and exerting its power over private citizens.

In contrast, customary society is stateless; it cannot be described as a single, unified body politic (Berndt and Lawrence 1971:3). Rather, individual groups see themselves as sovereign in their own right. Traditional socio-political systems in PNG continue to function and regulate most aspects of everyday life, and indeed exert considerable influence in national life (ibid:27-9). Many villagers probably find it difficult to accord any legitimacy to the new institutions of the state, particularly if it has little impact other than the intermittent provision of goods and services. In these circumstances, it is difficult for the state to find a basis on which to establish its right to interfere in the exercise of customary land rights.

Indeed, the history of state intervention in PNG may give many landowners cause to doubt whether the state is really acting in their interests (see Holzknrecht, this volume). The pre-Independence administration afforded little opportunity for customary landowners to participate in economic exploitation of their land.

Under the 1973 *Forestry Act* and its predecessor, the *Forestry Ordinance*, the state purchased the right to harvest timber from landowners for a minor proportion of the royalties to be paid by the harvester. Even in 1976, the now independent state continued to presume its entitlement to receive most of the resource rent from forestry by legislating to transfer timber royalties to provincial governments.⁴

Early mining agreements made provision for payment of compensation to landowners, but only for disturbance to subsistence activities and for occupation of land. Water resources legislation still forms the main legal avenue to pursue claims for compensation for environmental damage from mining.⁵ Until

⁴ See the *Organic Law on Provincial Government*, Section 67.

⁵ Section 16 of the *Water Resources Act* empowers the Minister to determine compensation payments for deprivation of the use and enjoyment of land or water rights and damage to the surface of land, in consequence of the exercise of rights under a water use permit. This provision originates from provisions in Australian legislation under which landowners affected by mining can seek compensation for the disturbance to their enjoyment of land. It is suggested here that they

recently, mining agreements generally did not provide for landowners to share the royalty payments received by government for the minerals extracted (Connell 1992:37). Until 1989, landowners had no direct role in the negotiation of major resource development projects (Jackson 1991:19).

The national government's failure to adequately respond to landowners' demands for a share of the wealth of their land erupted in civil unrest in Bougainville in late 1988. Its inability to resolve the resulting seven-year conflict demonstrates the fragility of the state's grip on the maintenance of a unified polity. Since the mid-1980s, landowners have increasingly challenged the state to accord them a greater role in resource development projects and to renegotiate revenue and compensation packages in their favour (see Simpson, this volume). The state has proved itself unable or unwilling to quell violent social protests over resource developments, particularly at the frontiers of capitalist penetration where these projects are located.

A key issue in landowner disputes with the national government is the contest over ownership of natural resources. The newly-formed state based its right to receive the bulk of resource rent on its assertion of ownership of natural resources. As already noted, it even treated timber in this way, probably because forestry legislation had blindly followed the pre-Independence Australian model. Calls for the government to return natural resources to their rightful owners have increased along with landowner demands for increased revenue returns from resource exploitation. A prominent Papua New Guinean lawyer, Peter Donigi (a former President of the Law Society), has argued forcefully that the alienation of subsurface minerals to the state in PNG is unconstitutional (Donigi 1994). Speakers at a conference on constitutional issues in early 1996, including a former ministerial aide, echoed his views (*Post-Courier*, 6 January 1996). The issue here is not to decide whether they are correct, but rather to show that challenges to the state's power of interference in private property rights increasingly come from those quarters where the state would generally expect to find support for its position.

Papua New Guineans now increasingly question whether the state is acting on behalf of the people (Wolfers 1992:253) and whether it has any legitimate claim to share in the economic benefits of resource development (Parkop 1995:118). In the face of growing and substantial opposition, the question of how the state can enforce its will over its citizens, particularly in remote areas, becomes critical. In Western countries, where the role of the state is accepted, this question does not even arise.

were never intended to provide an avenue for multi-million dollar claims of the kind now made under the *Water Resources Act*.

Conservation and Development on Customary Land under Existing Laws

Controls on development are unlikely to be achieved without state intervention. While local interests may be adequately protected at the local level with proper advice (see Taylor, this volume), it is unlikely that other interests (including those of residents in affected catchments, as well as the national and global interests) will be properly protected unless the state intervenes. Furthermore, conservation objectives generally fare poorly when offered as alternatives to development, because they do not offer an obvious immediate economic benefit to the local area. It is unlikely that conservation will be achieved unless the state promotes or enforces it.

State intervention might promote environmental protection objectives in two ways. Firstly, it might set aside areas to be protected from development, or in which only certain kinds of development might occur. Secondly, it might secure conditions for development which ensure that the environment is adequately protected to whatever extent can be reasonably achieved, and which prevent risky developments from proceeding.

Protected Areas

PNG has three laws which might provide a basis for establishing protected areas for conservation purposes. The *National Parks Act* provides for the establishment of conventional state-managed reserves. Parks can only be established on alienated (non-customary) land, and it is in any case an inappropriate model for conservation on customary land because it offers no role for traditional owners in management decision making.

The *Fauna (Protection and Control) Act* allows the establishment of locally-managed Wildlife Management Areas (WMAs), and has been successfully implemented in a number of areas. However, its purposes and limitations are not well understood. Activities within a WMA can be controlled only for the purpose of protecting *fauna* in the area. The Act has a strong focus on local management, and enforcement powers under the Act are weak; the maximum penalty for breaching a WMA rule is K20 (Section 17(5)).

The *Conservation Areas Act*, enacted in 1978, is a more likely vehicle for the establishment of significant protected areas on customary land. However, it has never been implemented; and there are a number of potential problems with its implementation which have not been fully explored.

To begin with, the Act is framed on the assumption that local landowners will seek a means to control and regulate development in their area. Conservation Areas are established under the control of a ministerially-appointed local Management Committee. There is no provision for the state to set up a Conservation Area without local consent and active participation. In light of the foregoing discussion, this may be appropriate, since it is unlikely that the state could force a Conservation Area into existence against the wishes of

landowners. However, it offers little comfort where an environmental resource of national or global significance is threatened and local landowners do not share the state's concerns about its preservation.

Secondly, considerable resources are needed to establish the infrastructure which is necessary to manage a Conservation Area under the model envisaged by the Act. The boundaries of the area must be surveyed. A committee of management must be selected. The committee manages in accordance with a Management Plan developed by them and approved by the Minister. Local landowners must be mobilised to understand the kinds of decisions involved in drawing up a management plan, and to make those decisions in an informed way. Their capacity to manage the area on an ongoing basis must be developed.

Thirdly, the establishment of a body that is recognised by the state, and which has the power to control activities on customary land, is fraught with problems at a local political level. The powers of the Management Committee are likely to bring it into conflict with incorporated land groups, landowner companies, and local government in the area. It is not clear how these conflicts can be avoided or resolved, and they have the potential to deflect energy away from the business of managing outside development pressures and inwards on the local community. This has already been the experience of landowner companies in some parts of PNG.

Finally, the Act gives the Minister power to override the Management Plan. As is usual in PNG legislation, the Act does not specify any constraints on the Minister's powers. It would seem to be implicit that the Minister should only exercise this power in the public interest, but fears have been expressed that he may be compelled to exercise his powers for much less significant reasons. In these circumstances, the local Management Committee would be powerless.

Environmental Approvals for Development

In the case of most development activities, approvals are required under more than one regulatory system. These systems have quite different objectives. Mining, forestry, and fisheries projects require approval under industry-specific legislation aimed at ensuring the sustainable use of the resource and providing a mechanism for the state to collect resource rent based on the volume of resource extracted. Agricultural projects, however, are not subject to any kind of industry-specific approval as there is no licensing scheme for this kind of project.

More general approval is required under planning and environmental laws. Development activities within town areas (generally industrial development) require planning approval, broadly intended to preserve the amenity of urban areas and prevent public health risks. Outside urban (physical planning) areas, no planning approval is required.

In addition to planning approval, environmental approvals are required under the *Environmental Planning Act* for projects of a kind for which

guidelines have been issued.⁶ The Act establishes a comprehensive procedure for public scrutiny of environmental plans, and decisions by the National Executive Council (Cabinet) as to whether or not a project should go ahead. This procedure has never been formally invoked, apparently because it is considered too time-consuming and costly.⁷ Instead, use is made of a 'fast-track mechanism' which culminates in ministerial approval. Environmental plans (particularly for forestry and controversial agricultural projects) are regularly lodged after political approval for the project has already been given, and sometimes after work at the site has already begun.

The *Environmental Contaminants Act* requires the licensing of all discharge, deposit, or emission of environmental contaminants. In 1988, regulations were passed to enable pesticide use to be licensed, but no other types of contaminants are currently subject to licensing. Despite cross-referencing between this Act and the *Environmental Planning Act*, suggesting that projects with approved environmental plans still require a contaminants licence, contaminants licences are not issued in these circumstances.

Lack of a National Planning Framework

In modern states, land use decisions – concerning the establishment of protected areas and the conditions under which development will be allowed to occur – are usually taken in the context of a wider range of issues than those which bear directly on the area or development in question. Planning (the process by which these wider issues are systematically considered as part of decision making) is therefore central to effective management of natural resources. Notwithstanding the plethora of legislation which offers avenues for environmental protection, PNG lacks a framework for integrated and comprehensive land and resource management planning.

There is no centralised land use planning in PNG outside town areas declared as physical planning areas under the *Physical Planning Act*. Instead, sector-by-sector planning results in ad hoc outcomes. The Kikori Basin area in Gulf Province provides a case in point. During late 1994, a number of interest groups sought to establish priority for different land uses in the area. These included conservation interests as well as prospective forestry and agricultural developers. It was suspected that the agricultural proposal (for establishment of a large oil palm plantation) represented a backdoor means to clear-felling the valuable timber resource. In the absence of a structured mechanism to resolve these competing claims, the National Forest Authority succeeded in quarantining the area from other development options by signing up landowners in the area to

⁶ So far, only guidelines for selective logging projects have been issued, and they have not yet been enforced in relation to environmental plans lodged for the same projects.

⁷ In at least one recent large mining project, the proponent insisted that the full public scrutiny procedure should be followed, even though the environmental plan had not been formally requisitioned.

a Forest Management Agreement. By 'getting in first', it prevented the other land use proposals from proceeding.⁸

Integrated planning requires a multi-disciplinary and multi-sectoral approach to be effective. Generally, legislation will prescribe a process where different agencies of government contribute to the decision-making process and some, safeguarding particularly important interests, may be given the right to veto a project. Filer and Taylor have described the process for preparation of the *National Forest Plan* elsewhere in this volume. At the time of writing, a *National Forest Plan* had finally been prepared under threat of invalidation of newly issued timber permits. Although it involved consultation with provincial governments, it is not at all clear that the interests of other sectors were properly taken into account. So long as planning still occurs only at a single-agency level, it is not surprising that there will continue to be conflicts over land use, and the outcome of these conflicts will be resolved in the political arena rather than through more deliberative and inclusive policy processes.

Enforcement of Development Controls

The enforcement of development controls, especially licence and permit conditions and environmental approvals, increasingly brings the state into competition with landowners and developers. Sometimes landowners request assistance from the state to enforce conditions; sometimes they are allied with the developer in seeking to undermine them. In either case, the state's inability to enforce the regulations it has laid down undermines its capacity to do so in the future.

The reasons for poor enforcement are complex and interrelated. To begin with, the bureaucracy has little or no experience of prosecuting regulatory offences. *There is no pre-Independence legacy of knowledge about how to prosecute for breach of environmental plan conditions.* Indeed, the state appears to have some difficulty securing convictions in relation to criminal matters, in relation to which it has considerable experience. Problems with prosecutions include lack of adequate records to establish proof of facts on which the conviction would be based, lack of expert evidence, and lack of detail in the legislation about how, by whom, and in what court prosecutions should be commenced.

Regulatory systems are also inadequately entrenched. Inadequate monitoring, poor record keeping, tolerance of breaches, and confusion about what the conditions actually are have contributed to bureaucratic inertia, so that it is difficult to determine which breaches are most serious, and whom to prosecute first. Much of the administrative resource available is absorbed in maintenance of the regulatory system itself – answering correspondence from

⁸ Under the 1991 *Forestry Act*, clear-felling cannot take place inside a Forest Management Agreement area, so the agricultural project was effectively prevented. Arguments still continue about whether conservation objectives can be achieved concurrently with timber extraction.

approval holders and reviewing new applications for approval – rather than in monitoring and enforcement activities.

Enforcement in most regulatory systems depends largely on the willingness of those to whom laws apply to obey those laws. In the case of large multinational foreign companies, there are usually considerable persuasive influences for them to submit to the regulatory system. The risk of adverse publicity outside PNG is too great to engage in outright disobedience of environmental conditions.

However, where the rules of behaviour are ill-defined or ambiguous, there is often room for manoeuvre or renegotiation of the conditions of environmental approval. In the case of companies which are not vulnerable to public censure at home, confusion and overlap between different development approvals can provide large loopholes. Conflicts between the conditions of a logging permit and those of the environmental plan approval relating to the width of riparian buffers, for example, provide a company with a basis for defending an incursion into a buffer specified in an environmental plan approval. Officials sometime purport to relax conditions of ministerial approvals by letter, and companies rely upon these to justify non-compliance. While the government may well succeed in any action to enforce those conditions (on the basis that the official acted outside his power), the company only needs to arm itself with the basis for a half-credible argument justifying their default in order to fend off local criticism.

If the threat of prosecution for non-compliance were a real one, permit-holders and approval-holders might take more care to ensure that they were legally, and not just apparently, acting in compliance with conditions. But, as there has never been a successful prosecution under the *Environmental Planning Act*, they can assume that they are unlikely to be prosecuted as long as the breach is not outrageously flagrant.

Political Forces

A discussion of policy processes in PNG would not be complete without mention of the political activity which characterises many policy decisions. It is incorrect to suggest that the socio-political processes by which controversial land use decisions are made in PNG are not consensual. In many respects, those 'at the grass roots level' have a greater say in political decision making than do ordinary community members in many other countries.

However, the processes by which the views of some, and not others, achieve recognition in the political process serves to illustrate the lack of power of the state in ensuring that its own interests (in safeguarding the long-term national interest) are represented. The continued influence of traditional political forces – the power of the big men and their ability to manipulate decision making in order to promote the economic and social advancement of their line – appear to weaken the power of the state to advance the interests of the nation generally.

Alternatives to Command and Control

Lack of bureaucratic infrastructure, the absence of policy cohesiveness which would lend strategic purpose to environmental decision making, and vulnerability to the political will of landowners combine to weaken the power of the state to impose its will by force in the face of opposition.

In these circumstances, what options are open to the state to assert national and global interests in environmental protection objectives? Both Taylor and Simpson (this volume) have suggested that negotiated, contract-based outcomes are a more viable alternative to the imposition of regulatory mechanisms by the state. However, as Wolfers (1992:243) has observed, conflict is often the only means by which some people can make themselves heard. Even if negotiated outcomes are reached, there can be no certainty that they will be sustainable. Where restrictions on development will result in reduced income to the local area, there will always be ongoing pressure to renegotiate another, more favourable outcome.

The proposal that agreements about policy objectives should be enforced by contract raises interesting questions about the capacity of the state to enforce contracts entered into with groups of landowners. Legal conflict in contemporary Western legal systems is highly individualised (Black 1989). In general, the law refuses to deal with groups of people unless they have formally adopted an incorporated structure such as a partnership, association or company. Once that structure has been adopted, the law treats the structure as having the legal personality of an individual for the purpose of involving it in legal decisions. Decisions are binding on members of the incorporated group, but only so far as they are members.

An issue which reverberates through all resource development projects on customary land is the means by which the true wishes of landowners should be ascertained. On the one hand, principles of self-determination suggest that landowners should be able to decide that for themselves. On the other hand, an agreement entered into today by landowner representatives might tomorrow be challenged as being unrepresentative of the true wishes of the people. Such an uncertain foundation provides no basis for the investment of capital in a project – whether it involves conservation or exploitation.

Since it is unlikely that all landowners will agree, how should the conflicts be interpreted by outsiders? It is not clear that Western notions of democracy are appropriate yardsticks of 'proper' and 'fair' decision making, nor that the complaints of some members of the group about the outcome are any indication that the decision-making process was improper. In the final analysis, the state is probably unable to make the judgement that a decision-making process undertaken by a landowner group has taken place within customary confines.

It may be that some requirement for a formal structure with accountability *outside* its membership (as well as internally) is the only means by which the state can assure itself that its dealings are with a legal entity which represents all

landowners. The cloak of incorporation demanded by the Western legal system then provides the state with some protection against the conflicts thrown up by dissenting members, who can be directed back to the representative structure to resolve these issues.

While the incorporated structure will provide some certainty for outsiders dealing with a representative body, it provides no guarantee that the membership is representative or that decisions have been taken in a manner which reflects custom. Setting guidelines for incorporated bodies (Whimp 1995) may provide some safeguards, but it also risks an outside intervention with custom which is more harmful than helpful.

Enforcement of Contractual Obligations

In the final analysis, the existence of an incorporated body, or a contract to which it is a party, is no guarantee that the agreement reached will be honoured by the members of a customary group. Enforcement of contracts poses the same problems as enforcement of laws. Is there any reason to suppose that voluntary compliance will be greater where the desired outcomes have been negotiated rather than imposed?

The foregoing discussion has focussed particularly on the powerlessness of the state to impose its will. However, political theories also emphasise the concept of exchange in social relations, drawing parallels with contracts and agreements which form an essential part of the exchange model of economics, and positioning the concept of exchange as diametrically opposed to the concept of power (Hyden 1992:9). While power involves the probability that the will of one person will prevail over the will of others, exchange assumes a relationship in which the actors are on an equal footing.

Taylor's proposal (this volume) that resource development outcomes be secured by contract with local landowners fits squarely within this theoretical framework. Instead of occupying an authoritarian position in relation to the local community, the state descends into the arena and assumes a position equal to that of landowners, and then bargains an outcome in which all are winners and there are no losers.

In a forestry project, it would at first blush appear to be a relatively simple matter to achieve a situation in which all parties are winners. The state takes a revenue cut and secures undertakings about the way logging will be carried out, while the landowners receive cash benefits from realising the economic potential of their forest.

However, the position is complicated when one considers the amorphous nature of the body politic which represents the landowners as one party to the agreement. In order for a forestry project to be undertaken in a sustainable but economically viable manner, it is usually considered necessary to guarantee a wood flow over a long period of time. Will landowners who have long since received immediate cash benefits from the trees on their land (or their children)

continue to honour their obligation to permit the project to operate unimpeded, when they continue to suffer the environmental effects and social disruption it causes?

It is likely that ongoing compliance with contract obligations will ultimately depend more on the relations between landowners and government than it does on maintaining a situation in which landowners continue to perceive that the greater benefits lie in adhering to the terms of the contract. Hyden's theory of governance in developing states proposes that the intermediate concepts of authority and reciprocity provides a fruitful way to examine the interaction of state and society, while still drawing on classic ideas about power and exchange. He suggests that the improvement of political conditions in developing countries is to be sought in the realm of governance – the way in which government and the governed relate to each other.

At the core of Hyden's concept of governance, relations between state and society are characterised by reciprocity. Reciprocity is an ongoing relationship, whereas exchange is discrete and immediate. *In a reciprocal relationship, each contributes to the welfare of others with an expectation that the others will do likewise* (Hyden 1992). To establish a reciprocal relationship, actors must share a fundamental understanding about the unwritten norms on which their expectations of each others' behaviour are based. Such a relationship has much in common with the horizontal relationships in society – reciprocity is the *predominant social logic* in poor communities, where people must rely upon each other for survival (Hyden 1990).

The concept of reciprocity provides a way of understanding how the state in PNG might exercise a form of authority over the behaviour of its citizens which is not based on force. However, as previously noted, there appears to be a decline in the political authority of the state in PNG, marked by an increase in citizen non-compliance with the government's laws and policies. The failure of the state's authority suggests that it has already breached the fundamental conditions of the reciprocal relationship. As Bratton and Rothchild (1992:272) observe in relation to Africa, political leaders entered into a social compact with their followers at the time of independence. In return for obedience, they promised an increase in mass living standards. Instead, *elites violated reciprocal norms by taking arbitrary decisions, by failing to deliver goods and services, and by diverting public resources to private ends*. The response of citizens was non-compliance, first by disengaging and retreating into informal activities, and then by re-engaging in political dialogue through social protest.

If the state has already violated the norms of its relationship with its citizens, can there be any basis for assuming that a contract-based agreement is more likely to be obeyed than a law? Perhaps, finally, the effectiveness of a contract in securing environmental protection objectives is more likely to rest on the ability of the state to call to account outside parties, such as logging contractors, who rely on the contract to justify their own activities. Foreign companies are compelled by different forces to abide by the authority of the

state, even when there is widespread civilian non-compliance. Ultimately, it is these companies which provide resource owners with access to the means of economic exploitation – capital, equipment, technical knowledge, and access to overseas markets. Regulation of their activities may be a far more effective way of enforcing the state's interest in a contract.

Conclusion

In summary, it is apparent that the reasons for lack of state authority in PNG are structural and fundamental. The state will not increase its ability to impose its will on citizens overnight, by appointing more police officers or reorganising departmental structures. Rather, a much longer process of development is required in which citizens come to accept the legitimacy of the state and its right to control various aspects of the way they live. Indeed, the major issue may be to ensure that the state does in fact pursue that path, instead of short-term strategies which may have the effect of widening the gulf between state and society, and ultimately hastening the breakdown of democratic institutions. Central to this pursuit is the state's recognition that its authority rests on the will of its people.

The preceding discussion has perhaps not done justice to Taylor's proposals about the role of the state as a stakeholder in negotiated outcomes for forestry projects. His suggestion that the state should offer extension services to ensure that landowners are sufficiently organised and informed to engage in a negotiation process might be said to offer only a new form of patronage or paternalism rather than a bargaining process between equal participants. On the other hand, the restoration of reciprocal relations between the state and its citizens seems to be implicit in his argument.

At a practical level, the lessening of the state's reach into civil society has diminished both its ability to act responsively to the needs of citizens and its relevance in their lives. By re-engaging with its citizens through active involvement in a process of identifying and securing specific objectives through overt agreement, the state may succeed in regaining the ground it has apparently lost. In this way, it might legitimate its role in safeguarding larger national interests, and secure the consent of its citizens to govern them accordingly.

CHAPTER 17

PRO BONO PUBLICO?

CONSERVATION AND APPROPRIATE RESOURCE MANAGEMENT STRATEGIES IN PAPUA NEW GUINEA*

HARTMUT HOLZKNECHT

Introduction

The title of this chapter – *Pro Bono Publico?* ('For the Public Good?') – is intended to indicate that a focus on conservation and related matters necessarily has to be seen within the broader context of resource management, because conservation is only one of a number of valid resource management strategies.

Given the inherent customary resource tenure and resource use systems actively in place over almost all land and other resources in Papua New Guinea (PNG) (Crocombe and Hide 1987; Ward 1997), such resource management must necessarily be activated by, and active at, the community level. Because of this, it must also be related specifically to a particular community or resource owner grouping. Such a context must be *pro bono publico*, for the public good, and yet questions inevitably arise concerning the levels at which such 'public good' should be defined and sought. Should it only be at the level of the resource owner and the resource owner group, or are there other levels at which this 'public good' may claim equal priority? Discussion will return to this question.

This chapter has been guided by several assumptions about PNG societies and their members' general attitudes to, and exploitation of, natural resources. Some of these assumptions have necessarily had to be generalised for this presentation, so that there may be some specific cases which do not conform to all of them. Nevertheless, I believe they have a broad validity.

Assumption One is that the current customary resource tenure and use systems, operating differentially and locally across PNG, will continue for the foreseeable future. Some 97 percent of the country's land mass currently comes under one or other of these customary systems which are supported and protected by the National Constitution. The state therefore has no control over, and little to say about, these systems. However, it is quite possible that some changes may take place, in the future, in the frameworks within which these systems operate and in the ways in which they interrelate with the modern world and its activities.

* The views expressed in this paper are my own. In particular, I wish to thank Nikhil Sekhara for detailed feedback on an earlier draft of this paper.

Assumption Two notes that, in the Melanesian world, there are no areas of the kind which are termed 'wildlands' in the North American context. PNG resource owners would state definitively that there is no area of their land which is not owned, which is off limits to everyone, or which does not have a purpose or cannot be exploited in some way. Although some areas may be remote from centres of habitation and may be visited only a few times a year, nevertheless they are neither ownerless nor 'wild' in the Western and modern sense of the word. If this term is defined differently then it may be acceptable in the Melanesian context.

Assumption Three suggests that, in the PNG context, there is no conservation, if conservation means preservation for its own sake. It is evident from the reasons given by various groups of resource owners, when, for example, they apply to government to set up Wildlife Management Areas around the country, that their intention is not preservation as such, but better and more controlled management of their resources, and usually quite specific resources, within a particular area. In a customary context, this can also be achieved by general or specific 'taboos' being placed on such areas, sometimes on particular species or for certain periods of time. The more specific objective is also realised to a certain extent – in areas where these belief systems apply – by restrictions placed on an individual person's or a clan's 'totem' species.

Another point to note in respect of this assumption is that utilitarian forest management, as locally practised, will almost inevitably conflict with a more general approach to biodiversity conservation, since only a small proportion of species within any given ecosystem will have a use, and therefore a value, to the human beings within that ecosystem. Any long-term emphasis on, and maximisation of, utility will tend to lead to the loss of biodiversity (personal communication, Nikhil Sekhran).

Assumptions One, Two and Three lead to *Assumption Four*: that current resource owners, whether individually or in their customary groups, are seeking meaningful ways to re-establish and reinforce management regimes for their resources which everyone with rights to those resources will support, to which they will adhere, and from which they will all benefit.¹ In order to be successful and effective, such a search for re-empowerment depends on three additional factors:

- effective structures built upon old and known customary structures and systems;
- a community re-establishing its responsibilities and rights over resources to which customary groups have held and exercised a range of customary rights

¹ Assumption Four may be seen by some readers as a leap of faith. However, finding, adapting, and applying appropriate resource management strategies – including conservation – in the PNG context requires not just incremental steps but also leaps, lateral or otherwise, which are based on facts – on knowledge of past and present systems as well as on likely possibilities for the future.

from precontact times, and have continued to do so down to the present day; and

- access to relevant information on resource management and a capacity to integrate this information with a community's priority needs in order to develop and implement action plans.

This process necessarily implies that a community can not only establish its goals, but also develop utilitarian and sustainable activity programmes and associated projects by which to achieve those goals. Assumption Three implies the probability of conflicts between this approach and the more general pursuit of biodiversity conservation. These matters will be discussed at greater length below, along with the formulation of effective strategies for working towards conservation and appropriate resource management. There is no single approach which, if properly applied, will 'do the trick'. Ideally, a number of different but overlapping approaches need to be used in concert in any one location.

For community-level resource management – and especially for conservation in the modern and Western sense – to be effective in PNG, durable linkages have to be found between:

- social or customary interests and personal or entrepreneurial interests; and
- an improvement in community welfare or general living standards and the pursuit of personal prestige or monetary gain.

It is only in this way that a trade-off between short-term development objectives and long-term, sustainable development objectives can be properly considered and developed.

With this preamble in mind, I shall first present some relevant background information, then make a brief comment about theory and practice, and then present two contrasting approaches to planning and implementation. A subsequent discussion of institutional bases and appropriate structures leads into longer discussions of the incorporated land group process and community resource management strategies. Support mechanisms for community resource management are presented under four separate headings before I turn to specific discussion of the relationship between these management strategies and approaches to conservation in PNG. The final section attempts to bring together strategies and processes in community resource management, and provides some indications of what might be an acceptable and workable practice in the PNG context.

Background

A range of detailed background data on resources and their commercial exploitation in PNG is available in various publications for sectors such as mining, forestry, fisheries, agriculture and land (see Denoon and Snowden 1981;

Connell and Howitt 1991; Henningham and May 1992; Sekhran and Miller 1995; Howitt, Connell and Hirsch 1996; Ward and Kingdon 1996).

Customary resource tenure and resource use systems are widely known through the writings of human geographers and social anthropologists too numerous to list here. Such publications refer to many communities and wider entities across PNG.² Although the processes which link these customary systems with large-scale commercial resource exploitation projects are not so well understood, nor clearly described at present, an understanding of at least some of these processes is critical as we work towards successful and appropriate resource management strategies and, through them, begin to address the problems of biodiversity and its conservation in PNG.

Major aspects of customary resource tenure are set out elsewhere (Crocombe and Hide 1987; Holzknicht 1994b; Ward and Kingdon 1996). People living in any one locality will use and manage their resources, in most instances, according to those customary practices prevailing there, with these resources and their uses being viewed in integrated, holistic ways. All residents in a community use forested land to some degree, for example, for house construction timbers, bamboo for walls, flooring and many other uses, roofing materials, hunting of game, collection of wild foods, herbs and medicines of various kinds, and food gardens in areas of cleared forest.

In any community, one person, some, or many people will also, to some degree, be involved in cash cropping. Depending on the altitude of the locality, this may mean the cultivation or production of copra, cocoa, or coffee. These two systems can generally coexist quite well in most parts of PNG, unless very large areas of land held under custom are taken over for cash crop production and are therefore no longer available for inclusion in a fallow cycle and subsequent re-use for customary purposes. Another factor mitigating against this coexistence is a high rate of population growth, which means increasing population pressure on all resources. Such impacts vary a great deal across PNG.

A major current threat to biodiversity and conservation in PNG is the high rate of commercial forest exploitation. This threat is exaggerated by the kinds of commercial forest exploitation which are practised by foreign loggers, and by the resulting environmental and social impacts of these practices. Another threat results from the alienation of younger generations from traditional value systems, which is itself partly due to economic pressures from the inexorable penetration of the cash economy into every corner of PNG.

² Much of this work is neither transparent in style nor in vocabulary because it has been written in jargon for a professional peer group and is therefore hard to use for practical purposes.

Levels of Theory and Practice

In the PNG context, the issues of local community participation, self-reliance, and collective responsibility for a wide range of activities are of critical importance precisely because resource ownership and systems of resource use are not only locally based but also locally initiated, controlled, and practised. It is therefore at the local level that appropriate resource management strategies must be developed and implemented, and this is also the level at which major responsibilities for resource management and community development need to be accepted and addressed.

In theory, the combination of customary resource ownership and the autonomy of local societies means that these responsibilities are already addressed by local custom. In practice, however, despite the legitimisation of customary resource ownership by the National Constitution, the capacity to do so has been affected by a number of long-term forms of disempowerment which can partly be ascribed to the alienation and marginalisation of subject peoples by colonial authority.

In response to colonialism, self-government, and independence, groups and individuals in PNG began to rearticulate their social, political, economic, and religious systems with each other and with the external forces of modernity (Carrier and Carrier 1991; Carrier 1992). Some groups and individuals responded to new opportunities much more quickly than others. In every PNG society, there is an inherent tension between community and individual interests, and the dimensions of this tension change over time. So the customary resource ownership and resource use systems currently operate quite well at some levels, but not at others. Some types of leaders, most especially the elected leadership, have exploited gaps left by the overlapping of different economic and political systems, and have thus bypassed the customary limitations on the control and use of some resources. In addition, as these customary systems are affected by the high rate of population growth, which in some areas threatens to overwhelm the regenerative capacities of natural ecosystems, so the general response has been to tighten up on the categories of persons who are given temporary access to a range of resources (Meggitt 1965).

In practice, while there are a number of unifying factors at the local level, there are currently also a number of differentiated interests which work themselves out in a number of ways (some of which overlap) – through leadership contests, competition between customary groups for political ascendancy, and the breakdown of customary consultation practices.

Planning and Implementation Approaches

Many political and economic systems have developed what is basically a 'top-down' approach to planning and the implementation of planning decisions. PNG has adopted this kind of approach since gaining independence in 1975. A great deal of planning work has been done at the centre, and plans and reports have

been produced in great numbers, but somehow the implementation phase has not worked well or has not worked at all. When the provincial government system was introduced after 1977, a range of planning activities was gradually taken over by each of the nineteen provincial governments, but these activities and their implementation phases most often exhibited the same kinds of problems as were evident at the national level.

At both national and provincial levels, the assumption of a close articulation of systems which support both planning and implementation processes is clearly invalid. One of the major reasons for this false assumption is that only a very small proportion of land and resource ownership – perhaps 3 percent of the land area – lies within the control of the state, while the remainder continues to be in the hands of many small and autonomous resource-owning customary groups. Very little, if any, of the planning effort undertaken over the years since independence has involved any of the actual resource owners at any level or in any major way. Indeed, most planned programmes involving natural resources and geared towards economic development have depended to a large extent on legal avenues and extraordinary methods of subverting customary systems of resource tenure and use. Therefore, the programmes have often contradicted the systems which have existed since pre-contact times and which operate in the best interests of the majority of people holding rights to those resources. These programmes, implicitly at least, also often seek to regularise local practice under modern legal instruments (such as land leases or lease-leaseback arrangements) which are controlled by the state and therefore taken out of the hands of customary owners (see Lakau 1995). In such ways, foreign investors and local entrepreneurs have striven to acquire commercial and personal security over against the majority of customary resource owners.

This type of conventional or 'top-down' planning, sometimes also called the 'blueprint approach' (Eyben 1991), can be summarised in the following brief points:

- It is controlled by a state institution, in line with state priorities, and that is why it is a 'top-down' or 'blueprint' approach.
- It is initiated, planned and implemented externally, and often facilitated locally by one or a few individuals.
- It is non-participatory – the subject or target population of the plan is not involved in the process, but nevertheless is often required to approve the plan.
- It involves a very circumscribed (if any) acceptance of a community's views and inputs, and so little local confidence in the plan is generated.
- The main priority is to produce the plan and keep it going for the plan period.
- This approach does not, by itself, enhance the capacity of local institutions to build other structures, create new programmes themselves, or maintain those structures or programmes which a blueprint approach builds.

One observer (Standish 1996) notes that this approach has been largely responsible for destroying the democratic basis of customary PNG societies and has made them much more dependent on state handouts and top-down state direction.

This may be contrasted with a more appropriate planning and implementation process, sometimes called 'action planning' or the 'process approach' (Eyben 1991). This approach builds upon existing local structures and strengths, local knowledge, and strong local participation and involvement. This approach, which can cover a wide range of activities, may be characterised as follows:

- The process is 'bottom-up', and may best be seen as an evolving expression of a community's needs and aspirations.
- It is initiated and conducted by the people themselves, and therefore encourages self-reliance, according a central role to local institutions and populations.
- This process is a participatory process between outsiders (who act as facilitators) and insiders (people from the community itself).
- The approach supports, indeed encourages, 'empowerment' – giving people confidence in their own authority and the capacity to wield it in responsible ways.
- The planning process in this approach is more important than the plan itself. A number of spin-off benefits from the process include leadership skills, increasing self-confidence, analytical and decision-making skills, and better ways to gain access to information.

Progressively since independence, and especially in the last ten years or so, resource owners³ – particularly those living in rural areas – have expressed an escalating dissatisfaction with the increasing exclusion of themselves as individuals, groups, and communities from consultation and development processes within the country at both provincial and local levels. They feel that there are too many legal and administrative loopholes through which particular individuals are able to manipulate and cheat the majority of their people for their own individual benefit, using what are essentially group resources. A typical acerbic comment from one community representative is the following: 'The developers are foreigners and the State is only a concept. It is us, the landowners who represent real life and people' (quoted in Filer 1995:68).

³ I have used the term 'resource owner' in virtually all my writings on these issues as a descriptive and relatively neutral term (for example, Holzknicht n.d. a). The other term often used in this context, 'landowner', besides being an inaccurate descriptive term (people as individuals or as a group or category own particular *rights* to land and other resources) also carries with it a multiplicity of levels of meaning which are used in the context of political and other current discourses (see Filer 1997a).

Some practical methodologies, which are applicable to conservation and other appropriate resource management strategies, and which are based on the latter local-level method of participatory planning and development, are set out and briefly discussed in the following section.

Customary Institutional Bases and Appropriate Structures

Let us briefly consider the ways in which customary institutions approach the problem of resource management in PNG (see Holzknecht 1994b, 1996a). In most PNG societies, a person is born into a clan (patrilineal or matrilineal, depending on the practice of following a male line or a female line) or a cognatic system in which each individual has his or her own kinship network. In most cases, this is the grouping with which people are primarily identified throughout their lives, yet there is still a great deal of flexibility and variability in the choice of one's place of residence and personal associates, in the distribution of loyalties, and in the manipulation of personal relationships for one's personal benefit.

Being a member of a clan or other customary social group confers a number of actual or potential rights to different resources in a variety of contexts. In return, a person accepts the obligations or responsibilities which are linked with those rights. In customary practice, such an exchange does not produce complete and exclusive individual rights to a particular resource forever. One typically plants a garden and, when it has been harvested, this land returns to the general resource pool of the group. Social group membership is usually governed by descent from a particular ancestral line or, much less frequently, by some method of incorporating outsiders into a group. These members have what may be termed 'permanent' rights over a range of resources, and they pass these rights on to their descendants. Permanent rights to land can only be alienated in exceptional circumstances.

A significant number of other people also make use of various resources belonging to any social group, but this access is most usually mediated through the holders of 'permanent rights'. Such 'temporary' use rights are usually limited to one particular resource, and may involve a single use of that resource or may last for the duration of a single 'season'. These temporary rights are usually not transferable to other individuals, and certainly not without the approval of the permanent owners.

It should be noted here that, in some parts of the country, significantly higher rates of population increase (compared to precontact days) have affected the fallowing and regeneration cycle of natural resources, and therefore the sustainability of a subsistence way of life. Higher population densities mean that fallowing periods become shorter and shorter, and forest regrowth and the regeneration of soil fertility are dramatically affected. Many PNG societies have reacted to such a developing situation by imposing greater restrictions on the access rights of temporary users.

At present, and even under the very best circumstances, it would be very difficult, if not impossible, to record and codify every detail and variation of every right to every kind of resource for every individual in just one social group's domain, let alone cover the many thousands of patrilineal and matrilineal clans and cognatic networks across the whole country in a similar fashion. Nor are there valid reasons for undertaking such an all-inclusive exercise, since customary practice is quite capable, in virtually all situations, of taking care of such matters as they arise. The distinction between permanent and temporary right-holders is the main criterion by which group membership is determined, since the permanent right-holders are able to make major decisions about resource use and resource management without reference to one or more other persons. This distinction is neatly captured in an innovative Act of Parliament, the *Land Groups Incorporation Act* of 1974. This is an Act which can be used to assist the pursuit of appropriate resource management strategies by developing new institutions – 'Incorporated Land Groups' (ILGs) – which are still grounded in customary practice.

No claim is made here that ILGs are the most important, let alone the only, answer to local resource management problems. But because rights to resources are owned, controlled, and managed locally, ILGs should normally be seen as a major part of any strategy which uses a number of different but complementary approaches to these problems. Since 'land groups' have not been much used by the state or developers in the context of local resource management until quite recently, and largely in a restricted way, I shall describe this approach at some length here.

The Land Groups Incorporation Act 1974

In a modern PNG context, customary resource ownership and resource use systems have some weaknesses. These include the following:

- Customary social groups have no automatic recognition under modern PNG law, and therefore cannot represent themselves as they are.
- They have also been excluded from modern business activities (such as forestry), but often find that their resources have been signed away by one person or a few individuals purportedly acting on behalf of all members. In other words, modern business activities have raised some very serious issues of leadership and representation which involve the transparency of dealings and the long-term stewardship of a group's natural resources.
- There is widespread public determination that customary resource ownership and use systems in PNG must not become codified and commoditised because of the fear that each group's viability and links to ancestral lands and other resources might thus be frittered away or sold to the highest bidder.

The *Land Groups Incorporation Act* came about as a result of a Commission of Inquiry into Land Matters (PNGDOL 1973) and builds on a knowledge of the ways that PNG social groups operate. These groups have

multiple roles and operate at different levels – individual, family, lineage, subclan and clan – all of which have their different but overlapping functions. One or other of these levels has the function of controlling the major rights to land and other resources – effectively constituting the ‘land group’. A land group is that customary group of people who, by traditional right, can make fundamental decisions about their land and other resources without reference to, or approval from, any other group (Power 1994). The ideas of unity and sovereignty underlying this level of grouping are very powerful and are an important basis for building new structures.

The Act itself builds on these strong customary groups because it gives them standing under PNG state law. This recognition is subject to certain conditions which involve the methods of incorporating, registering, and operating ILGs, and transparent decision-making, reporting and consultation practices. In particular, major decisions are valid only if they are made by meetings of group members and recorded as such. An ILG can govern as much or as little as a customary group wishes it to do, by specifying the subject matter and the level of detail which are inserted into the group’s constitution. ILGs appear to work quite adequately in both patrilineal and matrilineal societies.⁴

This is, by any standard, an innovative piece of legislation, but one which has not been much used until relatively recently, when some mining companies have used it to assist in identification of resource owner groups with which they have regular dealings, and also as a way to ensure that royalty payments reach all groups which have a right to them. The Act does not register customary land, but does recognise a land group’s interest in ‘property’. Such a recognised interest in the name of the land group does not restrict its use, but should rather make it easier for outsiders to negotiate agreements with land groups to use or ‘rent’ land (or other resources) from them for particular purposes or a particular length of time. One likely outcome of the ILG process is the resolution of major land disputes, and this should also encourage various forms of development by providing greater safeguards for limited occupancy. Ultimate ownership, control, and management of resources still remain under customary practice or with the land group as part of its own ‘birthright’.

Anthropologists have long recognised the flexibility, variability, and adaptability of many structural principles as being characteristic of PNG social systems. In these quarters, there is some unease with proposals to list those ILG members who hold permanent resource rights because there is a fear that this would be a retrograde step which would rigidify and fossilise these flexible systems. There is also some concern about mapping ‘land group’ boundaries, this being an optional attachment to an ILG constitution. There may be an element of truth in such concerns,⁵ yet it is important to note that, in many

⁴ The ways in which cognatic societies in PNG are able to make productive use of this ILG approach, if at all, still need to be determined in detail.

⁵ This concern, focussing as it does on the view that the mapping of land boundaries would exacerbate past and present local land disputes and lead to fighting and bloodshed, expresses a

areas, and often in response to development proposals, local groups are adapting their own systems by intent and of their own free will (see Fingleton 1985; Ernst 1996; Filer 1997a). In many areas, some quite major aspects of resource tenure and use systems are becoming essentialised as groups adapt themselves – at least in particular situations – to what is happening around them.⁶

The Act allows a group wishing to incorporate itself as a land group to put as much or as little detail into its constitution as it wishes. For example, if a minimalist approach is preferred, then most requirements, and the ways in which they are determined and practised, are consigned to remain within the realm of custom. Whatever approach is used, there will, in practice, always be a combination of custom and ILG constitution. The group's membership principles may be written into the constitution if members decide that this is desirable. Membership lists can be reviewed and revised annually. Finally, membership is by mutual recognition, so the group may retain processes for the incorporation of outsiders and for adaptation to changing needs and circumstances.

The proposals contained within this Act are certainly no worse, and are often much better, than any of the other planned or unplanned methods of dealing with the problem at hand. Their strengths are that they build upon custom and need not emasculate or replace it. An alternative scenario would see the state legislating to take over ownership and control of all land and other resources from the present customary owners. This state control could express itself in a variety of ways. However, this alternative would act directly against the provisions of the National Constitution and, in addition, would fall foul of all customary resource owners in PNG.

Community Resource Management Strategies

Any community in PNG can resolve to adopt resource management strategies for its collective benefit, as well as the benefit of individual members. If the ILG strategy is adopted, this commits the community to a process of land group identification which begins with the identities of members holding permanent rights and with the details of a land group constitution. In addition, the boundaries and mutual relations of such groups are defined, a list is made of each group's 'property' and its contents checked with neighbouring groups, and a map may be drawn if this is desired (Holzknecht ed. 1995). What is then required is a process which not only brings the land groups in a community together, but also enables them to keep working together to establish the nature

very valid point. On the other hand, most boundaries between 'land groups' are well-known and respected, especially where Land Demarcation Committees were active during the last years of colonial administration. Where a common boundary is in dispute, this area can, by mutual agreement of the groups involved, be set aside for later adjudication and resolution of claims. Such relatively minor issues should not by themselves block implementation of strategies which find broad favour.

⁶ For similar developments in another Melanesian context, see Hviding (1993).

of the community's resources, wants, and needs, and thus establish priorities for community development. With these in place, a community can then seek development strategies appropriate to its natural and human resource base.

As some authors have pointed out, the choices for many rural communities in PNG are relatively stark and very often quite limited (see Sekhran, this volume; Orsak and Sekhran n.d.). The choice than an individual or community makes between moral incentives for sustainable development and material incentives for immediate gain is, in most cases, no contest at all. Rural PNG societies have been geared for thousands of years to seeking benefits from what is available *now* and letting the future take care of itself. This opportunistic approach is certainly evident in the manner in which many communities have been drawn, by choice or circumstance, into large-scale logging developments across the country.

At the same time, it is clear that circumstances in PNG are changing dramatically in some sectors. Population increases are impinging on the previously reliable natural cycles of fallowing and resource regeneration, and thus on the ability of many communities to look after and maintain themselves at reasonable subsistence levels. The state has virtually withdrawn itself from many rural areas. In spite of these developing problems, however, since natural resources in any given area are still largely under customary ownership and control, a concerted publicity and awareness campaign throughout the country would raise much interest in, and commitment from, communities to become involved in developing new approaches to these problems. These developments must take place at the community level because this is the level at which these resources are owned and managed.

Readers will quickly point out some apparent flaws in this argument – some of them conceptual, and some related to practical problems of implementation. Some of the apparent conceptual problems have already been discussed. In the following discussion, I shall consider some of the problems of implementation, including facilitation processes, levels of cooperation within a community, the need for natural and human resource surveys as necessary starting points, and appropriate support systems for community resource management (CRM).

Facilitation Training and Processes

A number of necessary skills are required to support the development of effective CRM systems in any community. Facilitation skills and access to appropriate kinds of information and experience top this list.

Environmental awareness programmes of all kinds, which stress the balanced requirements for sustainability, need to be developed and made available to the general public through as many kinds of media as possible – radio, television, newspapers, mobile theatre groups, film, word of mouth, and speeches at public rallies (church conferences, for example) – at local, provincial and national levels.

Following such awareness campaigns, those communities or land groups which want to be involved in this process should select one or more younger persons with certain basic requirements (such as literacy and numeracy, good character, and commitment to the community) for training as facilitators. Such a training programme, proceeding from province to province across PNG, and including supervisory assistance on a regional basis, was proposed in an AusAID consultant's report in 1995. However, this proposal has not yet been accepted or funded nationally. A facilitation training programme would prepare these selected community representatives in land group work, in the use of tried and true facilitation processes, and familiarity with frameworks within which such processes can be effectively implemented. Such trainee facilitators would also require detailed supervision and monitoring after their training is complete and they are back in their communities.

Facilitation should begin after awareness-raising measures have been undertaken, or after a community has requested assistance in the creation of its own structure and processes in relation to appropriate CRM. Facilitation begins with the establishment of ILGs (where appropriate), the conduct of natural and human resource surveys (and interpretation of their outcomes), and the formation of cooperative relationships between the constituent land groups in a community. It culminates in an amalgamation of the data from each group's reflections on its own resource information, needs, and priorities into a community resource base. This is followed by the cooperative development of appropriate strategies to achieve their agreed aims.

The successful selection and implementation of such strategies is dependent, to a very large extent, on access to relevant data. These can assist a land group or community and its facilitator by setting out the parameters within which a strategy can be useful – that is, the advantages and disadvantages of a particular approach, the implications behind it, and the various resource inputs which it requires (time, labour, transportation, processing, marketing, etc.). Some quite specific recommendations have been made about the provision of such services to resource owners across PNG (see Cotter and Wescott 1995; Holzknicht 1995b), but no resources have yet been made available to act on them.

Access to this information should also provide further opportunities to obtain specialist technical advice on other matters – to assess the timber value of part of a community's forest resource, for example, or utilise niche marketing expertise for particular non-timber forest products. Areas and groups developing CRM strategies will require access to financial, legal, organisational, conservation, and marketing specialists (see Taylor, this volume).

It is important that trained facilitators do not work in isolation. Facilitators across PNG would face similar situations in their home areas and would benefit from regular links with other facilitators. They would all need to be able to refer contentious matters to an advisory panel or person for advice on how to proceed towards acceptable resolutions. Furthermore, local facilitators would not only

be answerable to their own communities, but also to a higher level of more experienced and technically capable persons operating on a regional or national level.

This system of facilitation, and the associated emergence of recognised land groups and CRM structures, would result in a highly decentralised network of community-driven resource management groups in any one area. A likely point of contention is that such a system might be costly to administer, but this may arise from the assumption that such a network would require close central government administration and control. This assumption may be invalid because the process itself is likely to raise the energies and capacities of rural communities.

Where resource development projects, for example, are already in existence and royalties are payable to the community, the constituent groups could agree to spend some part of these payments on initiating and supporting CRM strategies and systems in that area. Where value is being added at the community level,⁷ part of the additional income derived from this process could also be devoted to the maintenance of such a system. Another avenue could be for local communities to devise policies and funding initiatives through the local government councils which are due to be strengthened as part of the current reforms of the provincial government system. Some creative and lateral thinking in each particular situation would find other such mechanisms.

How would such a system articulate itself with existing government agencies and other institutions and activities? In essence, there need be no great conflict of opinion or practice. Recognition of community-level resource management systems and their constituent elements, the ILGs (or similar units), accepts in practice what is already recognised in theory in the National Constitution. Insofar as the discussion relates to natural resources, then government agencies and other bodies, such as the proponents of resource exploitation or conservation, would all need to submit their proposals through particular channels and agents at the local community level. This would ensure that all those with an interest at this level would be well-informed and involved in reaching decisions appropriate for them. The word or signature of only one or two people, arrived at in private and without public scrutiny, for example, would not be sufficient to permit commercial exploitation of a resource to proceed.

Government agencies could obtain particular benefits from such a system. For example, a resource owner group could perform the function of monitoring logging projects on their land. In such a case, the monitors would report any breaches in the first instance to the PNG Forest Authority's locally-based project officers for immediate action. Conservation projects could proceed in the same manner, since resource owner groups have primary say over particular areas and resources. Such proprietary interests should be developed and built upon.

⁷ For example, where *wokabout somils* (Tok Pisin, mobile sawmills) are operating in a sustainable manner.

The Problem of Cooperation

It may be argued that the friction which commonly exists within a community – for reasons of history, personality, or custom (amongst others) – is such that any proposal which depends on cooperation between its component groups is doomed to failure. There is no denying the existence of differentiated interests, at both group and individual levels, in both modern and traditional contexts. On the other hand, there are usually very close ties of kinship and marriage between the clans and subclans within any one community or village, which do not automatically reduce the tension or conflict in any society, but which are still one mechanism for channelling them. In a customary sense, there is usually a great deal of cross-cutting cooperation (as well as tension) between these groups over a wide range of activities.

If the groups which are involved see that it is in their separate and combined interests to work together for certain purposes (such as those discussed in this chapter), then there is no reason to suppose that such cooperation would not be forthcoming in the context of CRM. After all, it would be both a recognition and a continuation of what currently occurs (in a customary sense in relation to resources) from place to place across PNG. The main difference is that this practice would now be officially recognised, and could then be assisted to operate more effectively and self-sufficiently, though always through the CRM structure. Another difference would be that such cooperation would now be built upon a better knowledge of the community's resource base and more appropriate strategies for the pursuit of collective goals within a sustainable development framework.

What is required for such an arrangement to be effective is agreement between all groups in any such community on the following points:

- a framework for cooperation and coordination in resource-related activities;
- an ongoing process of wide and regular consultation and joint decision making on a number of matters;
- a recognition by all participating groups of each other's equal status and each group's resource rights in that context;
- basic agreement on the needs and priorities of the community arrived at through a common process; and
- basic agreement on the strategies which need to be followed to achieve those goals.

Arriving at such basic agreements can be seen as a major task of the facilitation process that has already been discussed.

Natural and Human Resource Surveys

One thing about which members of a community will always know a great deal more than any outsider is their own natural environment – both specific elements within it and the way in which it functions at a general level (see Damon, this volume). In addition, they also know best how their community has adapted to this environment and its vagaries over a very long period of time. They may not know everything about this environment, or about the commercial value of its component parts, but they will still know more about such things as the soils, the weather, animal and bird behaviour, and the practical uses of various raw materials (see Majnep and Bulmer 1977).

With many young people going away to school, or adults taking formal employment, the chains of communication which pass this customary knowledge from older to younger generations, and also the myths, legends and stories which ground a group's rights to land and other resources, have been damaged, if not broken, in many communities. For members of constituent groups within such a community, a continuing exercise to record and critically consider all elements of their environment, or at least those parts over which they have some control, has considerable benefits in addition to the primary search for sustainable ways of life. This exercise also links up with the activities involved in defining the boundaries within and between adjoining land groups, and thereby reinforces the transfer of vital customary information between the generations.

The main aim of this survey exercise is for each land group to set out and consider for itself its own resources – human, natural, and supernatural, their critical interrelationships over time, and the ways in which changing human impacts can have dramatic and often negative effects. A clarification and understanding of the place of each land group within the community is critical for the operation and adaptation of the customary resource ownership and use systems which are protected by the National Constitution. Equally important is a better knowledge of the human resources within each land group, such as the kinds and levels of schooling or training which members possess, their work skills and experience, or their levels of literacy and numeracy. Many young people return home with new skills after leaving school or leaving a job, and these skills can be put to effective use in the long-term management and development of the community's resources.

Mechanisms of Support

In comparison with the options available to many Aboriginal communities in Australia whose members choose to manage and develop their own land and other resources (see Young et al. 1991), communities in PNG do not have access to a wide range of support systems or management programmes, provided by the state, on which they can draw for guidance and financial support.

Given this lack of balanced and neutral government assistance, communities in PNG have very little choice but to draw on their own strengths and customary knowledge base as the foundations from which to fashion new

visions for themselves and search for the means of achieving that elusive 'development' for which the whole country is searching. It is therefore little wonder that many rural communities have agreed to the major resource exploitation projects (especially timber projects) which are currently operating in PNG. They (or their representatives) have been operating on a very limited information base and have been subject to the blandishments of companies whose appeal lies partly in the gradual but inexorable withdrawal of government services and extension assistance. What little information people in these communities have received has been strongly biased in favour of commercial logging and other such large-scale commercial operations. This approach has been aided and abetted by local entrepreneurs and power-brokers who have been intent on short-term personal gains and the maintenance of unequal patron-client relationships (Holzknecht 1996b).

During the colonial and early post-independence periods, the state developed and maintained quite extensive extension networks, with officers based throughout the country. Resource owners, individually or in groups, could seek advice on agricultural matters, forestry, fisheries, and business development. Expatriate officers often served in management positions in cooperatives, and later, for a time, became advisers to indigenous managers. This system became too expensive to maintain and it gradually collapsed. Various provincial governments introduced and maintained extension officers based in districts within each province, but most officers lacked the funding and support required to properly carry out their tasks, and these extension systems have been progressively pared down or discontinued.⁸

As already indicated, CRM is highly dependent on access to information and the sharing of information between communities. This does not mean that communities or factions within them will necessarily always choose options which are the 'best' or most 'rational' – these are relative and culturally-determined terms. Such decision making is highly contextual and depends on many factors, few of which may be economic. In the end, transparent decisions, whatever they are, made by representative bodies of resource owners and based on the best available information, have to be respected, since the resources involved are theirs to control and manage, and they are the ones who must bear the consequences of those decisions, both positive and negative.

Conservation and Community Resource Management

In global terms, it is very important to find suitable and acceptable strategies to further the sustainable preservation of biological diversity in regions of high biodiversity, such as Melanesia, and in areas of special value within this region. In the PNG national context, the relevant departments and centres also recognise

⁸ An attempt was made in 1995, based on an earlier examination of possible mechanisms, to develop useful support systems to which resource owners would have access (Holzknecht 1995b). In addition, Power (1994) also presents, in detail, a number of different but related management and organisational matters as guides specifically prepared for village communities.

the importance of this goal. Yet global and national concerns will have little impact on the prevailing systems of resource tenure and use without effective and meaningful strategies for dealing with development issues at a local level.

At this local level, any strategies designed to promote the conservation or preservation of biodiversity must be part of a wider repertoire of strategies available to all CRM decision makers. In making decisions concerning the resources under their control, each CRM group and its constituent land groups and individual members would need to work through the available knowledge of relevant issues and factors.⁹ These local-level decision-making processes are bound to be manipulated, to some extent, by influential local leaders of various kinds, but a CRM approach of the kind previously discussed would at least temper individual choices with a process of group consultation and decision making in relation to major resource matters.

In the introduction, especially in Assumption Three, I indicated that there can be no such thing as conservation for conservation's sake within a customary PNG context. Nevertheless, changing circumstances within the country require that more deliberate thought be given to ways of changing this assumption and to the collaborative development of a new environmental ethic at both local and national levels.

Such changes require awareness. Awareness, in turn, requires access to more broadly accessible and meaningful information for the listener or reader. Awareness without any kind of back-up or follow-up information about resource management or development options leads to frustration and anger. Finally, appropriate local-level structures and processes, which have been developed from known customary ones, are likely to form the only reliable and long-term basis for the design and implementation of new ways of rearticulating each community's response to changing circumstances and of implementing its collective decisions in respect of group resources and individual patterns of behaviour. After a number of these structures are established, and are hopefully linked up at a regional level, they will develop dynamics of their own at this level, and eventually at the national level as well.

If the prevailing ethic, whether or not it is aided and abetted by the state and its instrumentalities, does not support environmental care and constraint, then it is self-evident that the evolution of a new and more positive ethic will require new or untried methods and approaches. Just as icebergs can, with very little warning, suddenly turn upside down and disturb everything around them, so it is self-evident that neglect of the welfare and concerns of the majority of the population could have a similar effect in PNG. This condition of neglect and despair may seem to be an unreliable basis on which to design resource

⁹ Issues and factors which are unknown to them cannot influence their decisions, even if they play an important part in the wider picture, especially for outside observers. Hence the importance placed in this chapter on access by resource owners and their groups to relevant information and advice.

management systems, but these conditions also present opportunities for lateral thinking to find meaningful structures and value systems on which to build more responsive ethical and practical systems of natural resource management which also respect customary practice.

Such a new ethic need not focus only on the contrast between utilitarian forest management and biodiversity conservation, but it must come to grips with issues regarding the definition and application of 'the public good'. At the same time, no society can be expected to adopt a single approach to the management and maintenance of such a complex creation as the natural environment and its biodiversity values.

Rural Malaise

One result of many years of state neglect is that a major malaise has increasingly become evident in PNG's rural communities.¹⁰ Like an iceberg, this malaise currently manifests itself in several forms, such as the drift of population to urban areas, the increasing levels of crime in rural (as well as urban) areas, the gradual withdrawal by the state of many basic services, the lack of new employment opportunities, tension and conflict over resource management and resource development issues, increasing disenchantment with current development initiatives, an ongoing crisis of leadership, and the rise of self-interested elites.

At a local level, many people strongly believe that they have been cut off and abandoned by the state in the race for 'development' (whatever that may mean in these contexts). They believe that their many problems go unheeded. They feel that their incessant and urgent calls for assistance, support, advice, and information are studiously ignored by the state. They feel the increasing lack of institutional support (for finance and business advice, for example) to promote business activities and community development in rural areas. They see that the questionable activities of a small number of mostly urban-based political and entrepreneurial leaders go unchallenged and, in many ways, are condoned and supported by other members of the urban and political elites. They can see their resources being sold out and removed from around them by this minority, for very little advantage or benefit to themselves, whether as individuals or as a community. On the other hand, they see that there is great benefit to the state itself (through forest levies, log export duties, etc.), to the foreign companies which have no long-term commitments to the area or its people, and finally to the small number of 'local people' who profit to the detriment of the majority.

¹⁰ Urban bias is obviously part of the rural malaise. This includes an assumption by the state that the majority of rural villagers have been – despite much evidence to the contrary – fundamentally content with their subsistence way of life. This form of wishful thinking has encouraged the main thrust of infrastructural development, capital investment, and job creation to focus on urban areas, with a corresponding and increasing neglect of rural areas, especially when the state has undergone periodic financial difficulties.

Many of these visible 'iceberg' effects, and their hidden but ominous bulk, are themselves evidence of the long-term effects of unsuccessful top-down 'blueprint' planning and implementation. They are also evidence of a long-term avoidance, by the state and other institutions, of the need to work constructively with existing customary cultural, social, and economic structures and institutions.

In contrast to these 'head-in-the sand' approaches, CRM systems place the onus for directing and controlling a wide range of related activities squarely back where it properly belongs in the PNG context – in the hands of resource owners and their own communities. This is where customary resource rights are controlled and exercised, and it is here that responsibilities must be taken and exercised. Building on known strengths and customary knowledge at this local level, by putting in place an active and responsible 'process' approach to community development and sustainable resource management, can change power relationships in major ways as it strengthens or activates local participation and involvement.

Such an approach may appear to be too piecemeal and localised, without sufficient state control, but if it is actively established, maintained, and supported across a province or a region (and especially at a national level), the cumulative effects are likely to be very dramatic within a relatively short time. For example, it could have very positive impacts on the operation of the new system of local government which is currently being introduced throughout PNG, where the effective use of local government funds will surely depend on a high degree of community participation across a range of activities – from the provision of infrastructure and community services, through the distribution of entrepreneurial benefits, to the general form of governance at a local level.

It is only such active processes which can bring about the elements of continuity, commitment, and surety which are needed in a community before effective long-term resource management strategies can be developed for the benefit of all. Only in this way can communities make effective long-term decisions about the importance of conservation, whether for its own sake or in the form of controlled, low-key, adaptive forms of use.

Effective Approaches

Given the regional variation in systems of resource tenure and use across PNG, there can be no single approach which will serve to resolve all the various problems of resource management. It might be considered that this chapter has given undue emphasis to an approach based on 'incorporated land groups'. However, this approach alone, of those discussed here and elsewhere, is firmly based on known, preferred, and appropriate customary structures of resource management, even if there are bound to be some local contexts (as in cognatic societies) where this approach may not be applicable or effective.

The ILG approach by itself, while subsuming a number of disparate elements (constitution, decision-making processes, membership criteria,

genealogies, 'property' lists, land boundaries, and optional map), needs to have ongoing linkages with other institutions and practices if it is to function effectively. There is a need for training programmes, awareness-raising measures, reliable record keeping, natural and human resource surveys, and access to various other kinds of information and technical expertise. This implies the further need for a wide range of approaches which address one or more of these supporting elements while adding to the process as a whole.

Even within the general ILG approach, there could be as many variants of a basic ILG constitution as there are land groups wishing to incorporate themselves through this process. Other than a basic number of clauses, each group can include as much or as little detail as it wishes on a range of issues, and those which are not included will naturally remain to be arranged and resolved according to customary practice. Nevertheless, what such an approach does strongly promote is a return, under new conditions and pressures, to a more responsive ethic of self-governance and self-reliance at this local level. Such a new ethic would not only be responsive to the needs and demands of individual members, but also to the needs of community maintenance and development within the framework of the state.

One form of consultation which has proved effective in the PNG mining and petroleum sector is that of the 'development forum' (West 1992). This type of forum brings together all the 'stakeholders' who have an interest in the development of a particular resource in order to negotiate a set of agreements relating to the development, including a 'benefit package' for resource owners and local communities. This approach could be modified for application in other sectors, such as forestry, or for the development of an appropriate environmental ethic to deal with various forms of resource development in a single catchment or other geographical area.

Pro Bono Publico?

The question raised in the title of this chapter is partly the question of *which* 'public good' should take priority in determining the approaches or strategies to be promoted and implemented for better resource management. At one extreme is the idea that the state should assume ownership and control of all the relevant resources, and establish its own management and development priorities on this basis. At the other extreme is the idea that customary resource owner rights take precedence over all else, even if this means that one resource owner group collects all the royalties from a development project on its land, so that its members are comparatively wealthy, while a neighbouring group, having no commercial resources, receives no such benefits. The distinction is basically between the interests of the state (or society) as a whole and those of each customary group considered as a sovereign entity.

Since customary practice and associated resource rights are recognised in PNG to the extent of covering some 97 percent of the country's land area, and these customary rights are enshrined in the National Constitution, the first of

these extreme cases clearly does not apply. Indeed, any attempt by the state to take over customary rights or move towards individual tenure systems have been and will be fiercely resisted.¹¹ The tendency, since independence in 1975, has been to give increasing recognition to such customary rights and to bring resource owners, their constituent customary groups, and related commercial entities further into the negotiation of development projects, especially in the mining and petroleum sector.

The middle ground between these two extremes, which takes account of wider local, regional and national (even global) interests, remains largely unexplored and untried in the PNG context except (ideally) by the state. One attempt was made through the Forestry Development Guidelines, which were developed as part of a major restructuring of the state's bureaucratic control of the forest industry, which proposed that trust funds be set up to manage resource owners' financial benefits from logging projects, and so encourage prudent and economically productive use of such funds (PNGMOF 1993a, 1993b). One aspect of this proposal was that part of this income should be used for the purposes of wider local or regional development programmes, thus ensuring that a wider population would benefit from a specific resource development project, and not only the members of one or more specific resource owner groups.

Precedents for a similar approach already exist in the mining and petroleum sector, where the companies have recognised (perhaps reluctantly) that their development activities not only have an impact on communities in the immediate vicinity of a project, but also on communities much further away, especially those located downstream (for example, in the Ok Tedi and Porgera cases). In these cases, however, benefits to which these more remote communities have access are disbursed by the mining company or the state, and not by customary resource owners.¹²

'The public good' must be contextually determined and reviewed from time to time on a number of different levels. A very strong argument can be presented, in the political, economic, and social climate currently prevailing in PNG,¹³ for giving first priority to the establishment of effective local-level resource management structures and systems. This can also be seen as an important first step in the establishment of a new national environmental ethic. With these elements in place, and the renewed confidence and self-reliance

¹¹ There were riots in 1995 in a number of urban areas in response to proposals by the state (and supposedly by the World Bank) to explore new ways of registering customary land (see Lakau 1995).

¹² It is important to note here that most of PNG's mineral resources, unlike the nation's forest resources, are legally the property of the state, and not of customary groups, even though the state has increasingly recognised the existence of a 'landowner' interest in their development.

¹³ This is marked by a dramatic fall in state-funded and state-supported services and infrastructural development and maintenance in most non-urban areas, and by the non-representative ways in which individuals have been signing away resource rights to developers without proper consultation and approval by resource owners as a whole.

which will be engendered in this process, the wider question of 'the public good' can then be tackled. A lead from the state and its instrumentalities through considered public stances on environmental and local development issues (and especially through the implementation of its notional commitment to a National Sustainable Development Strategy) would go a long way to providing guidance to local-level resource management initiatives. Since the state presently has control over such a small proportion of the resources within its boundaries, it can best lead by active example and persuasion.

Conclusion

If it is accepted that resource owners in PNG have the final say over resource management and development matters through their customary institutions, as this chapter argues is both necessary and beneficial, then resource owners must have the most important seat at the table in any discussions relating to conservation.

The contrast between utilitarian forest management and biodiversity conservation is not necessarily appropriate when the real question lies in the value which resource owners place on their natural environment. The question must be focussed on 'their own' local environment and resources because those of another area belong to other people. Although utilitarian forest management may, in the long term, tend to lead to a loss of biodiversity (personal communication, Nikhil Sekhran), in the short term and in the PNG context, I believe it would lead to an increase in the values placed on indigenous knowledge systems which have been passed down by word of mouth from generation to generation, and on the search for locally developed ways of managing such resources so that benefits can be maintained over the longer term. In that event, the values placed on forests and their constituent species by resource owners will also increase markedly, and there will be a growing reluctance to sell off timber resources for large-scale commercial logging in return for a mere pittance.¹⁴ Without such a change in local evaluations of these resources, there will be no future for conservation or for biodiversity.

This chapter has presented a general case for appropriate resource management strategies in PNG, focussing, in particular, on local-level resource management. By focussing on this local level and on the importance of locally derived, but newly amended, customary structures, the chapter has attempted to bring the question of resource management and evaluation of all resources, and the allocation of rights and responsibilities, back to this all-important grassroots level, at which a new environmental ethic must take root if it is to be effective.

¹⁴ In this respect, a range of research and development activities currently taking place in Amazonia (Holmes 1996a, 1996b; Holmes and Walker 1996; Walker 1996a, 1996b) may hold some important lessons for PNG.

CHAPTER 18

PROCESSES FOR EFFECTING COMMUNITY PARTICIPATION IN THE ESTABLISHMENT OF PROTECTED AREAS:

A CASE STUDY OF THE CRATER MOUNTAIN WILDLIFE MANAGEMENT AREA*

ARLYNE JOHNSON

Introduction

Community-based conservation which engages the participation of rural resource owners in sustainable management of their natural resources is presently seen as one of the most promising methods for protected area establishment, although little systematic analysis of the methods and effectiveness of this approach has been conducted (Brandon and Wells 1992; Western and Wright 1994).

Brown and Wyckoff-Baird (1992:14) describe the possible participation by communities in protected area management as a continuum which can range from 'limited input in decision-making and control, to extensive input into decision-making and ultimately stewardship of the resources'. Over the past two decades, the realisation that community participation was a significant variable in determining the success of rural development projects (Midgley 1986; Oakley 1991) has also influenced the field of natural resource management in developing nations. Across the world, prior to 1970, protected areas were managed by national governments which denied access to traditional resource users, yet did not have the capacity to effectively manage the natural resources or, more importantly, to enforce rules to conserve the resource base (Wells and

* I would like to recognise and commend the many resident field staff, researchers and volunteers who have contributed their respective talents to the Crater Mountain Integrated Conservation and Development (ICAD) Project over the years. They include Yerger Andre, David Bickford, Robert Bino, Steve and Kristi Booth, John Ericho, Chris Filardi, David Gillison, Catrina and John Hiller, Jamie James, Laura Johnson, Andrew Mack, Ron and Donna Merlina, Ross Sinclair, Beth Thiel, Douglas and Anita Weisberger, Brian Wolcott and Deb Wright. The Crater Mountain ICAD Project is supported by funding from the Biodiversity Support Program – a consortium of the World Wildlife Fund, the Nature Conservancy and the World Resources Institute – with funding from the United States Agency for International Development, the John T. and Katherine T. MacArthur Foundation, the Wildlife Conservation Society, the Lix Claiborne and Art Ortenberg Foundation, the South Pacific Division of the Nature Conservancy, the GFF Small Grants Programme, the Japanese Small-Scale Grants Assistance Programme, the Pacific Area Tourism Association, and the British High Commission in Papua New Guinea.

Brandon 1992). Today, most efforts by developing nations to manage protected areas make some allowance for the importance of community participation in protected area management (Wells and Brandon 1993), but the form and intensity of participation in each case varies significantly (Midgley 1986; Paul 1987; Oakley 1991; Wells and Brandon 1992).

One widely-used definition which is used to describe 'community participation' in rural development projects (Paul 1987:2) states that it is 'an active process by which beneficiary/client groups influence the direction and execution of a development project with a view to enhancing their well-being in terms of income, personal growth, self reliance or other values they cherish.' Cernea (1985, cited in Wells and Brandon 1992:42), describes local participation in protected area management 'as empowering people to mobilise their own capacities, be social actors rather than passive subjects, manage the resources, make decisions, and control the activities that affect their lives'.

The 'instruments' used to promote this participation fall into two categories – agents of change and institution building (Wells and Brandon 1992). Agents of change are those individuals associated with external agencies or within the communities whose presence catalyses local involvement in the development process (Paul 1987). The strengthening of existing community institutions, or the development of community organisation, is seen as a means which will provide for continuity of the process that has been established (Midgley 1986; Furphy 1994).

The worldwide trend from traditional state control to increased involvement of communities in the management of conservation areas which border on, or are included in, their lands has led to coining of the term 'community-based conservation'. Western and Wright (1994:7) described this as an approach that 'reverses top-down, centre-driven conservation by focusing on the people who bear the costs of conservation.... [C]ommunity-based conservation includes natural resources or biodiversity protection by, for and with the local community'. Little (1994:348) adds that community-based conservation has *two outcomes* – 'the maintenance of habitats, the preservation of species, or the conservation of certain critical resources *and* ... improvements of social and economic welfare'. It is the additional development outcome which distinguishes this approach from traditional protected area management. Projects which are designed to *link* biodiversity conservation in protected areas with socio-economic development in adjacent communities are termed 'integrated conservation and development' (ICAD) projects (Brandon and Wells 1992; Brown and Wyckoff-Baird 1992).

While attractive in theory, the actual mechanics of linking biodiversity conservation with rural development *as well as* encouraging community participation in the process has proven to be elusive, extremely challenging, and has yet to be realised in most cases which are characterised as community-based conservation projects (Brown and Wyckoff-Baird 1992; Wells and Brandon 1992; Western and Wright 1994).

- It is not simply a matter of relying on the traditional conservation beliefs of indigenous residents within and near protected areas. Traditional practices alone are often not sufficient to sustain viable populations of flora and fauna under the present-day scenario of increased human population and pressure on the natural resource base (Brandon and Wells 1992; Western and Wright 1994).
- Community participation alone cannot be idealised as a given solution to conservation challenges. Midgley (1986:35), in a historical review of community participation, reminds us that communities are not homogeneous and that they 'suffer from conflicts, rivalries, and factionalism'. He states that 'a clearer understanding of these problems would allow a more realistic assessment of possibilities and prepare workers more adequately for the problems they will face'.
- For many reasons, local participation is known to be time consuming and, in many cases, the threats to conservation of biodiversity are often imminent and urgent (Brandon and Wells 1992; Little 1994). The challenge of providing tangible community benefits which are derived from the conservation of biodiversity often takes time. In the interim, community participation may be limited.

Given these considerations, it cannot be assumed that most communities will sustainably manage resources on their own (Little 1994) or that natural resources can be managed by the state through 'proclamation alone' (Bromley 1994). The art of crafting the mechanisms which will provide for biodiversity conservation *and* rural development *through* community participation is the challenge facing today's conservation practitioners. Bromley divided the challenge into three parts:

- to create the means or 'mechanisms' for discussing, reviewing and assessing the values of biodiversity conservation;
- to permit those values to be expressed in policies which incorporate incentives for conservation; and
- to implement enforcement procedures to provide assurance that conservation actually results.

'A community-based conservation programme with any hope of success will contain *all three elements*' (ibid:345).

The recognition of customary land tenure in Papua New Guinea (PNG) provides a unique policy environment where some degree of participation by rural communities is obligatory for the establishment and management of a protected area. In a survey of ninety-nine parks in thirty-eight countries around the world, there were only 21 percent in which local people had legal title to all or part of the reserve (Zube and Busch 1990). Traditional landowners in PNG retain guaranteed ownership of their land and maintain an unprecedented level of

control of the resources on their land. Successful conservation in PNG, more than anywhere, will have to rely on landowner management.

This paper presents an analytical framework to assess the aspects of community participation which have been used in the effort to establish the Crater Mountain Wildlife Management Area in PNG. The results of the Crater Mountain case are compared to other community-based conservation initiatives. Lessons are drawn for conservation practitioners about the realistic use and constraints of community participation for establishing protected areas in light of the PNG experience.

The Crater Mountain Wildlife Management Area

Biological Significance

The Crater Mountain Wildlife Management Area (WMA) encompasses approximately 2,700 square kilometres, of which 98 percent is covered by primary forest ranging from the lowland rainforest of the Purari River (50 metres asl) on the Great Papuan Plain to montane cloud forest on the slopes of Crater Mountain (3,100 metres asl). A diverse collection of flora and fauna indicate that the Crater Mountain biota is very species-rich and, as such, constitutes a natural resource of national and global importance (Alcorn and Beehler 1993).

National Legislation

Crater Mountain was gazetted as a national Wildlife Management Area on 14 October 1994. The *Fauna (Protection and Control) Act* of 1976 provides for the establishment of WMAs to be declared by the Department of Environment and Conservation (DEC) upon request by the customary owners of the land. The landowners submit to the national government a legal description of the boundaries of the area to be gazetted as the WMA, a list of the clan leaders who will sit on the local Wildlife Management Committees, and the rules which the Management Committee establishes for use of natural resources in the WMA. The boundaries, committees and laws are reviewed by the DEC, and if not conflicting with any other national laws, are gazetted by the national parliament and recognised as the governing body and laws of the conservation area.

Despite their title, WMAs can be more accurately described as multiple-use areas whose objectives are to encourage sustainable use of subsistence resources by customary landholders, protect biodiversity, gain formal recognition of tenure and resource ownership, provide sustainable opportunities for income generation, protect cultural values, and provide for scientific research and educational opportunities (Hedemark and Sekhran 1995).

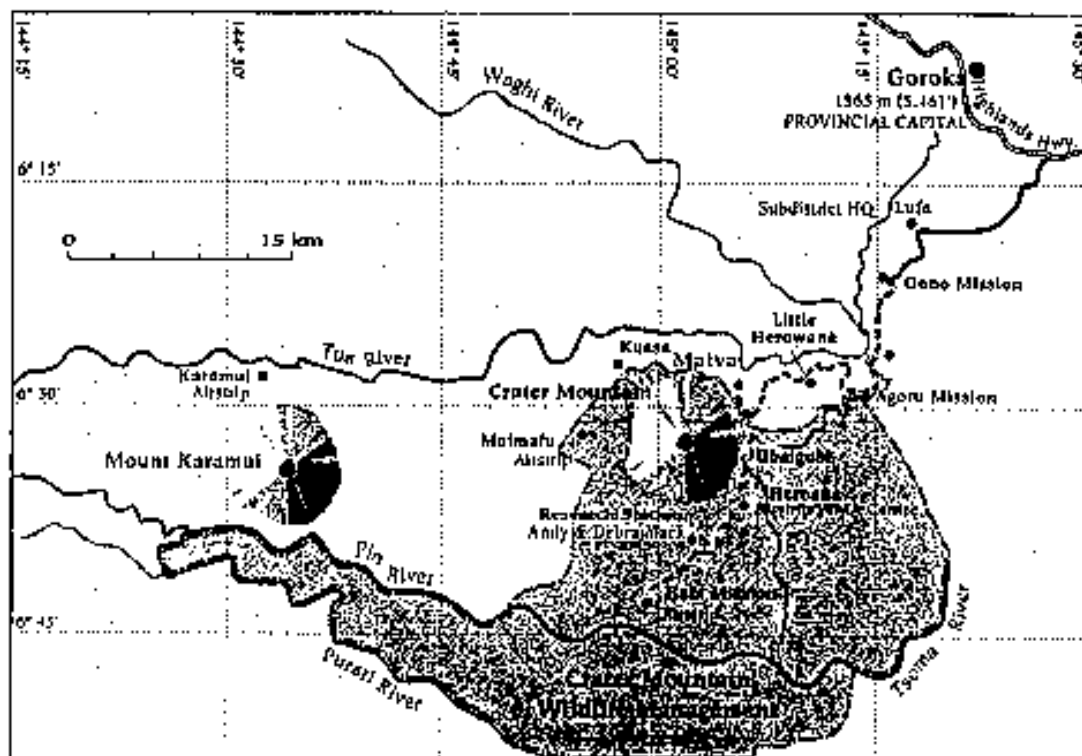
Given these objectives, PNG legislation does provide a fertile foundation for attaining the three elements for successful community-based conservation as identified by Bromley (1994). Communities can actually establish a protected area if they feel that the biodiversity which they own has some value to them if it

is conserved. Through their management committees, communities can create the policies which provide incentives to practise sustainable resource use, and they can prosecute individuals who violate the rules. However, given the heterogeneous nature of local communities, and the traditional lack of collaboration among clans over a large geographic area in PNG, how can we expect communities to be able to progress beyond the establishment of small, isolated protected tracts without further technical assistance? Will WMAs remain as 'paper parks', where gazettal takes place but no mechanisms are put in place to realise the conservation goal? Despite the existence of favourable legislation, it has been found throughout the world that most communities cannot be left alone with the expectation that they will be able to 'defend and conserve their resources in a sustainable fashion' (Little 1994:349).

Community Profile

Crater Mountain WMA covers the territories of two language groups, the Gimi and Pawaia speakers, and parts of three provinces – Chimbu, Gulf, and Eastern Highlands. Approximately 3,000 Gimi occupy the northern half of the WMA area, and are concentrated in an arc that runs through the villages of Herowana, Ubaigubi and Maimafu (see Map 18.1). The only road access is to Ubaigubi on the northern boundary of the WMA, with access to the remainder of the communities by grass airstrips. The southern half of the WMA is inhabited by approximately 600 Pawaians who have settled around an airstrip to create the village of Haia.

Map 18.1: Crater Mountain Wildlife Management Area.



The Gimi villages in this area are traditional highland 'big-man' societies. Each clan has one or more 'big-men' who maintain their positions through their skills as politicians or fight leaders. The Gimi are subsistence farmers who practise shifting agriculture or swidden farming. The Pawaian are semi-nomadic people whose primary subsistence is obtained through hunting and gathering with limited short-term cropping. Pawaian society is built around the immediate family. They are true forest-dwelling people, travelling around their land in small bands which usually number less than twenty. Crater Mountain landowners are responsible for their own land which may be days away from the airstrip where they are settled. Use of the forest is restricted to the principal landowner and his immediate family. Others require permission before they are allowed to cut, hunt or trespass. As with any village violations, cases are reviewed by a village court composed of community representatives who hear public testimony on the case, pass judgment, and verify the fines imposed on offenders.

Approximately 80 percent of the men and 50 percent of the women in the WMA speak Tok Pisin. Only 30 percent of the WMA residents are actually literate in Tok Pisin, and less than 1 percent speak English (James 1996). Government-sponsored community schools have been present in Maimafu, Herowana and Haia for only the last two to six years, and may offer the standard grades from one to six if teachers and funding are available. There is a rudimentary aid post in each village and at least one tradestore which sells basic supplies such as salt, rice, candles and canned fish. Outside of the research, ecotourism, and handicraft enterprises, cash income is earned through the sale of coffee or the products of hunting.

Threats to Biodiversity

Land use impacts on biodiversity include sago plantings, sweet potato garden plots, and the cutting of wood for fuel or local timber use. Hunting for subsistence and commercial purposes has already extirpated some species of game species in some regions of the WMA. Cuscus and tree kangaroo populations are seriously depleted. Cassowary populations are still strong, but the high rate of removal of cassowary chicks suggests a significant population crash might occur in a few years with the death of the existing adult populations (personal communication, Andrew Mack, 1995). An increasing human population in the region will continue to have an escalating impact throughout the area. The delivery of community services (education and health) to rural areas in PNG is hampered by their remoteness and the corresponding lack of infrastructure required for socio-economic development. One of the few options which seems to exist for the satisfaction of community cash needs and the development of infrastructure in these areas is the sale of natural resources such as minerals or timber. Hence the need for alternative forms of cash-generating activity.

PNG national government policies and rules regarding resource extraction in national protected areas could have a significant impact on biodiversity in the

area. The southern lowlands of the WMA, on the north side of the Purari River boundary, are included in the PNG Forest Authority's designation of Turama Extension Timber Permit TP2-12A, Forest Management Area (FMA) Block 3. Logging in this timber permit area is scheduled to begin in the near future (PNGFA 1996). In the northwestern quarter of the WMA, Exploration Licence 1115 is the subject of exploration work by the Australian mining company BHP (*Post-Courier*, 30 August 1995, 15 February 1996).

Crater Mountain ICAD Project

The Crater Mountain Integrated Conservation and Development (ICAD) initiative informally began in 1982 with the first attempts to establish a national protected area while addressing the socio-economic aspirations of the local landowners through the development of environmentally sensitive enterprises. Since its initiation, the primary goal of the project has been the long-term conservation of biodiversity in the Crater Mountain area through the integration of conservation and development components to achieve the product of a functional national WMA as described under the national legislation. The Wildlife Conservation Society (WCS), an international non-governmental conservation organisation within the New York Zoological Society, was the first conservation agency to sponsor researchers and fieldworkers in the project area as early as 1975. The WCS was also instrumental in the establishment of the national non-governmental organisation which is called the Research and Conservation Foundation of PNG (RCF) in 1986, and which now functions as the lead agency in the Crater Mountain project. Over the years, numerous national and international governmental and non-governmental agencies have provided financial and technical assistance to the RCF and the WCS in the implementation of the project.

The effort to establish a national WMA had very informal beginnings which developed from contact between expatriate scientists and the landowners in the area. It is important to note that these personal relationships were, for more than a decade, the means by which gazettal of the WMA and establishment of fledgling eco-enterprises in research and eco-tourism developed. It was not until 1993, with the achievement of formal gazettal of the Gimi and Pawaian lands as a national WMA, that the ongoing activities took on the official title of a 'project' with the following documented objectives (RCF/WCS 1995):

- to increase the average annual per capita income of clans (landowning groups) from the establishment of locally-owned research and eco-tourism enterprises in the WMA;
- to increase the level and range of understanding and skills of community residents who work in the research and eco-tourism enterprises in the WMA;
- to increase the number of decisions and actions which integrate the results of enterprise, biological, and socio-economic monitoring programmes in a WMA management plan; and

- to increase national involvement and human resource exchange within the WMA as teachers, trainers and consultants work towards conserving its natural resources.

The first two objectives had been informally in place since the first discussions with the Gimi tribe in the 1970s. The last two objectives evolved later with the realisation that the establishment of environmentally-sound and sustainable businesses was not possible without a process for assessment and for increased national involvement at all levels. Today, the emphasis of conservation efforts in the Crater Mountain area is on building the capacity of local communities and their organisations to assume the principal role of managing the operations in the WMA. As such, the project is an ambitious effort to engage an extremely high level of community participation in management of the conservation and development components of the WMA.

Agents of Change and Community Institutions in the WMA

Field Researchers

Expatriate scientists were among the first outsiders to spend extended periods of time with WMA communities. Their concern for the unique biodiversity and cultures of the area was the impetus for their ongoing informal dialogue with Crater communities about mechanisms for establishing and operating the WMA and the associated eco-enterprises. The length of stay and local impact of field researchers has varied over the last two decades; some have stayed only a few weeks or months, while others have developed long-term friendships with members of Crater communities, some returning for intermittent periods of up to twenty years. Most field researchers have shown respect for the cultures of the WMA and an obvious admiration and enthusiasm for the WMA's unique natural resources. Most have been diligent workers who have enthusiastically lived and laboured in their fieldwork alongside residents of the WMA who were their assistants, guides and companions.

A significant example of such relationships is found in the involvement of an Australian photographer, David Gillison; who has worked with the Gimi tribes since 1973. In the early years of his work, he returned for consecutive seasons to his field site near Ubaigubi village, where his original interest in the recording of Gimi ritual theatre led him to the forest with Gimi men to document the displays of the birds of paradise from which they said that the cultural theatre had evolved (Gillison 1983). These interactions solidified a strong mutual respect and commitment between Gillison and community members, which gave rise to the first informal discussions with Gimi villagers about the status of these unique birds and the mutual concern for their physical decline and the loss of the associated traditions.

A similar relationship between community and scientist evolved in the southern half of the WMA, where biologists Andy Mack and Deb Wright came to work on Pawaian land near Haia in 1987. In the process of building a research station and conducting five years of fieldwork, they engaged in ongoing

dialogue with Pawaiian community members about the uniqueness of Crater's natural resources and the land use options which the Pawaiians were considering. Along with Gillison, Mack, and Wright came numerous field assistants who later came back to do further studies of their own. In this way, a unique 'family' of scientists has evolved, who live and work with the Gimi and Pawaia on various studies of natural resources in their forests.

Fieldworkers

From 1984, the project began to place resident and intermittent fieldworkers as trainers in the WMA. They were both expatriate and national, and included biologists, teachers, small business development advisers, and rural community development workers. The focus of their work has been on providing technical assistance to village counterparts in business, community development and WMA management. Expatriates initially played a central role in project implementation at the local level, but as of 1995, they have been in volunteer and advisory positions only, with national staff or community counterparts directly responsible for field implementation. As with the scientists, most resident fieldworkers who have stayed for periods of two years or more have formed close friendships with Crater Mountain communities.

Business trainers in the position of tourism lodge managers were first present in Ubaigubi from 1983 to 1986. In 1990, the project began to utilise United States Peace Corps (USPC) rural community development volunteers as field trainers. The USPC programme requires that the village provide bush material housing for the volunteer in return for the technical assistance which they receive. The volunteer is initiated into a development philosophy wherein his or her role is to train and support village counterparts, and not to lead and do work for the community that it does not want to do for itself. Since 1990, seven USPC couples have served in WMA communities, and volunteers are still working with the project in three of the five WMA villages.

In 1993, the WCS placed the first resident field coordinators and scientists on the project staff in the WMA. While the USPC volunteers continued to work with small business and community service committees, the field coordinators were assigned to strengthen and assist the clan leaders who sat on the newly-formed WMA management committees. The coordinators also live in village housing and spend much of their time in community meetings, as well as on the trails of the WMA. As the first field coordinator, Jamie James became known and admired by the communities for his capacity to briskly patrol the rugged country between all five WMA villages. James was followed by two national biologists, John Ericho and Robert Bino, who have been equally well received and respected as mentors to Crater Mountain communities.

Community Committees/Institutions and Village Coordinators

Community committees are composed of clan representatives whose selection and responsibilities vary with the function of the committee. The institution which governs the general operation of the WMA, and also the research and/or

eco-tourism business in each community, is known as the 'management committee' of that community. It is responsible for composing the laws of the WMA, enforcing the rules and assessing land use practices. The institution which governs operation of the handicraft businesses in Herowana and Ubaigubi is called the 'handicrafts business committee'. In some cases, community workers called 'village coordinators' or 'station managers' have been selected from or by the committees to carry out specified duties. These individuals are often community leaders who have originally volunteered for a leadership role or have previously worked with field researchers at the site.

Methods for Assessing Processes and Outcomes of Community Participation in the Crater Mountain WMA

In this section, I shall briefly describe the processes that have been used for engaging community participation and the resulting extent of participation which has been achieved in the Crater Mountain ICAD project from its informal inception in 1982 up to the present. To assist in this assessment, an analytical framework was developed (see Table 18.1). It is modelled after Shripton (1989, cited in Oakley 1991), who used the method to assess the community participation aspects of health care and nutrition projects. The framework identifies seven indicators which represent aspects of community participation which must be present to some degree in order to establish a functional protected area which is actually managed by the landowner communities. These are:

- *Needs assessment and action choice*, which indicates the extent of community involvement in determining the need for, and the choice of, an action in some aspect of the operation of the WMA.
- *Training and agents of change*, which indicates the extent of technical and management training which the community is receiving in order to build a capacity to operate some aspect of the WMA. Agents of change may include any external fieldworkers from an agency associated with the project area or community members from within the WMA who have been used to influence the level of community participation.
- *Organisational structure and institutional presence*, which indicates the extent of development of community organisation and institutions involved in some aspect the operation of the WMA, and which also shows how well the organisation incorporates and represents the existing power structure of the community.
- *Leadership*, which indicates the extent of community leadership (ranging from none to a few individuals to full community representation) which is active in the operation of some aspect of the WMA.
- *Management*, which indicates the extent of management actions (assigning duties or coordinating the work of others) being conducted by community leaders and/or institutions in the operation of some aspect of the WMA.

- *Resource mobilisation*, which indicates the extent of funds or in-kind services which are being contributed by the community, its leaders and/or institutions, to the operation of some aspect of the WMA;
- *Monitoring and evaluation*, which indicates the extent of community involvement in the collection, utilisation, and dissemination of information to evaluate the operation of some aspect of the WMA.

With the exception of *training*, which is an indicator of external input, it is felt that all indicators of community participation must approach Level 5 if operation of the WMA is to be sustained over the long term without continued external inputs.¹

The framework is used to specifically assess and rank the presence and extent of community participation in two aspects of the operation of the WMA over the history of the Crater Mountain project. These two aspects are community involvement in:

- WMA development, or management of the WMA itself, meaning the processes of establishing the WMA and its operating policies and procedures as related to natural resource use; and
- eco-enterprise development, or management of the eco-enterprises, including handicrafts, research, and eco-tourism, within in the WMA, and the processes for starting and maintaining such economic enterprises.

These two areas were selected for analysis as they represent the change over time in the level of community participation in the 'C' (conservation) and the 'D' (development) components of the ICAD formula for establishing a functional WMA. A discrete analysis for WMA and eco-enterprise operations was conducted for each of the four principal communities in the WMA – Ubaigubi, Herowana, Maimafu, and Haia. Each has a unique community profile and history of involvement in the development and management of the WMA. Because of the informal beginnings of the Crater Mountain project, indicators of participation were not predetermined and have not been formally monitored over the entire length of the project, as recommended (Oakley 1991). Descriptions and assessments of participation processes have been derived from the historical trail of written records, reports, minutes, and personal communication from community members and project staff.

¹ The conceptual framework ranks resident trainers as the most desirable (Level 5). While this is seen as desirable as a 'means' to community participation, it should not be viewed as the 'end'. As the community reaches high levels of participation in the other indicator areas (action choice, organisation, leadership, etc.), it is expected that community participation will provide for sustainable operation of the WMA, while the need for training correspondingly declines.

Table 18.1: An analytical framework for judging community participation aspects of ICAD projects.

Indicator	1. Nothing/narrow	2. Restricted/small	3. Mean/fair	4. Open/good	5. Wide/excellent
Needs assessment and action choice	None	All done by outsiders with no community involvement	Done by outsiders, but discussed with community representatives	Assessment by community, outsider helps in analysis and action choice	Community does assessment, analysis, and action choice
Training and agents of change	Limited technical and management training for CC and CW(s)	Technical and management training at remote institutions with little on-site training	Intermittent on-site training and management training by visiting trainers	Ongoing on-site technical and management training by resident trainers	Short local training courses plus regular on-site training by resident trainers
Organisational structure	No organisational structure present on site to support activity	New organisational structure has limited links with community	New organisational structure has become very active	Active cooperation with existing comm-unity organisations	Existing community organisations involved in controlling activities
Leadership	One-sided organisational support dominated by project staff	CW(s) working independently of social interest groups or community support structure	Organisational support functioning under the leadership of independent CW(s)	CC active and taking initiatives in combination with CW(s)	CC fully represents variety of interests in community and controls CW(s)
Management	CW(s) supervised by outsider or project staff	CC present, but any CW(s) independent of CC, and both dependent on project staff	CC self-managed but does not supervise CW(s)	CC self-managed and involved in supervision of CW(s)	CW(s) responsible to, and actively supervised by, CC
Resource mobilisation	No resource contribution by community; any CW(s) externally funded	Funds and contributions collected, but CCs have no control over spending, and CW(s) externally paid	Funds and contributions collected; CCs have control of spending, but CW(s) externally paid	Funds and contributions collected; CCs have control of spending; CW(s) voluntary or partly paid by CC	CC raises funds or collects contributions, and controls allocation of money, including payment of CW(s)
Monitoring and evaluation	No formal information system in place for evaluation of conservation and/or development processes	Information collected by, or sent to, outside experts but not fed back to CC	Information collected by CW(s) who are monitoring conservation and/or development processes	CC receives relevant information from CW(s), and is aware of project progress, problems, and benefits	CC disseminates information so that community is aware of project progress, problems, and benefits

Note: CC = community committee or institution identified to manage an activity in the community (e.g. protected area management, business management, etc.); CW(s) = community worker(s) (i.e. one or more community leaders who take action on a project activity independent of, or in collaboration with, a community committee or institution).

Results: The Crater Mountain Story

Community Participation in Development of the WMA

In this section, the processes for engaging community participation in the development of the WMA are described. The extent of community participation achieved in each WMA community by utilising these processes was ranked according to the framework (see Table 18.1) and is shown in Figure 18.1. Results are shown separately for each WMA village. The years of assessment for each community begin from the time of arrival of the first fieldworkers/researchers.

Training and Agents of Change in WMA Development

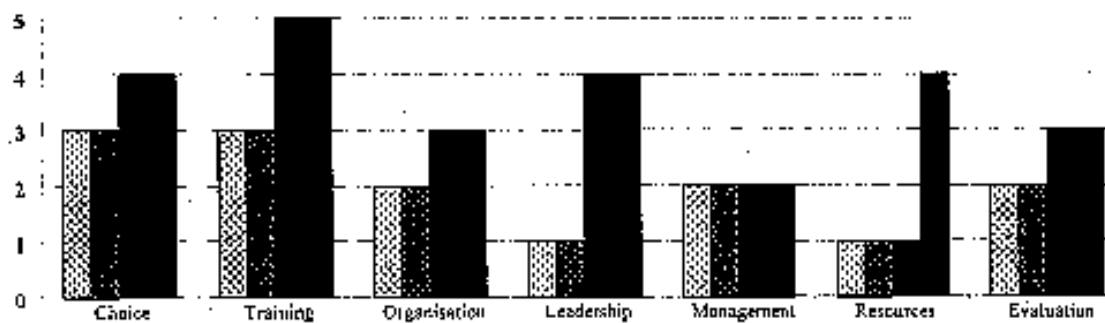
From 1982 to 1992, intermittent fieldworkers and researchers met with communities to introduce the WMA concept and assist in the establishment of WMA committees. David Gillison worked closely with the Gimi communities in the north, while researchers Andy Mack and Deb Wright were engaged in dialogue with the Pawaians to the south. The first resident fieldworker, Jamie James, arrived in 1992 to conduct ongoing on-site technical and management training in WMA development. In 1995 and 1996, the first national resident fieldworkers, John Ericho and Robert Bino, were placed in the WMA communities of Maimafu, Herowana, and Haia. Intermittent assistance from field researchers is still ongoing.

Needs Assessment and Action Choice

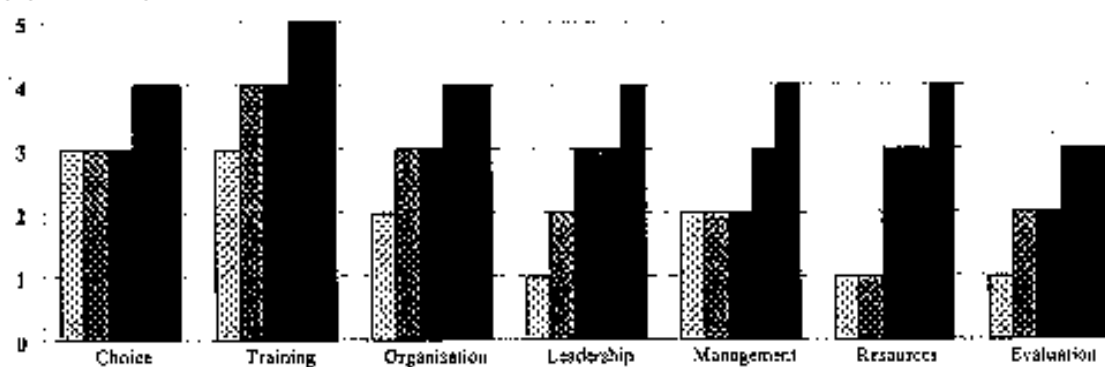
From 1982 to 1992, the process leading up to gazettal of the lands of Crater Mountain as a national WMA consisted of numerous meetings and conversations between the researchers and the landowners. For the most part, the need to protect the unique biodiversity of the area was an externally driven assessment which was discussed with local communities. The possible exception to this was in Ubaigubi village, where clan leaders volunteered the assessment that culturally important birds of paradise were declining because of overhunting by the young men. The leaders voiced this concern to Gillison who became instrumental in initiating talks with DEC and various international donors, which in turn led to the introduction of the WMA concept to the clan leaders.

Figure 18.1: Crater Mountain community participation in WMA development from 1993 (grey) to 1996 (black).

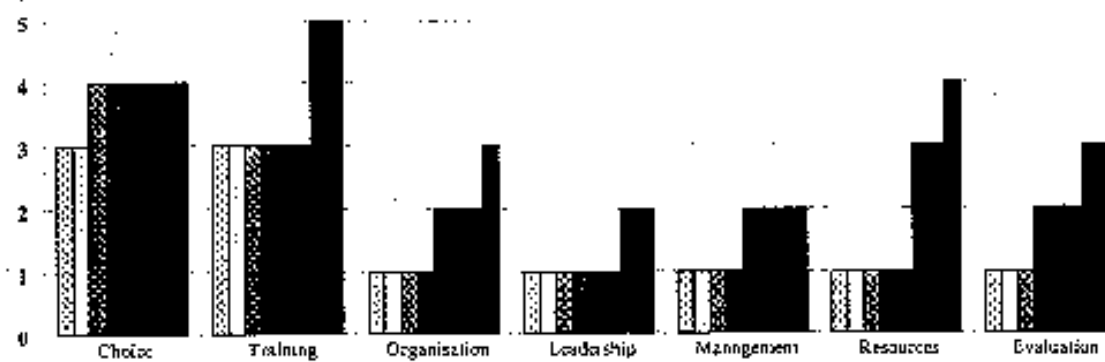
(a) Maimafu



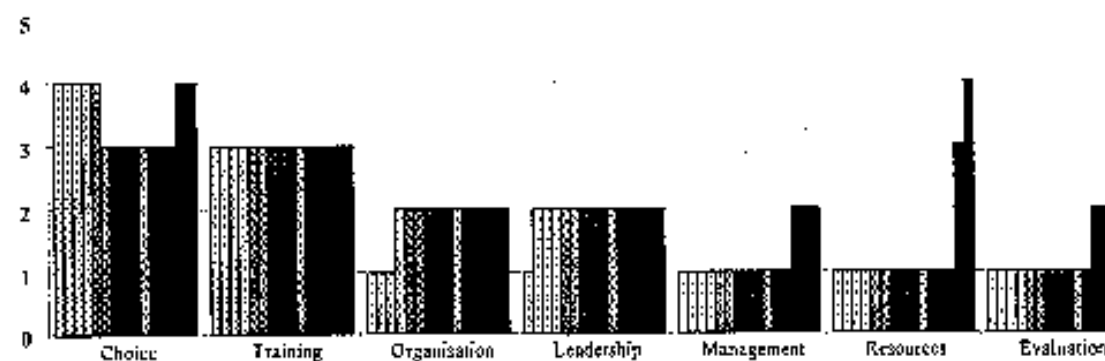
(b) Herowana



(c) Haia



(d) Ubaigubi



To engage communities in the planning process for the WMA, Gillison made numerous patrols to hold informal meetings in the men's houses and with individual families, as well as formal meetings with 'big men' from several Gimi clans. During these forums, the idea of creating a WMA was introduced and discussed. The neighbouring Pawaians heard of the meetings between Gillison and the Gimi, and discussed their interest in possible involvement in the WMA in conversations with researchers Mack and Wright. Based on the Pawaiian interest, representatives of the RCF and the DEC made a brief helicopter visit to Haia to request the names of clan leaders who would be interested in serving on a WMA committee. When gazettal of the WMA was achieved, a resident fieldworker, Jamie James, was placed in the WMA to hold regular meetings with the newly-formed management committees to develop the laws and enforcement procedures.

The result of this process has been that community participation in the choice to establish the Crater Mountain WMA has ranged from 'fair' (Level 3) to 'good' (Level 4) (see Figure 18.1). What began as an external assessment of the need to establish the WMA later evolved into a community action choice to proceed, although the communities' reasons for taking this action were different from those of the RCF and the WCS. The reaction of most communities to the discussion about establishment of the WMA was that they hoped it would quickly bring development in the form of cash income, employment, and an improvement in services (health, education, and transportation infrastructure) which the government had still failed to deliver to these remote areas. Gimi landowners, worried about the encroachments of neighbouring clans, also saw WMA gazettal as a means to gain formal recognition of their land ownership. The Pawaians, with a much lower population density and isolated from the rest of the country, came to fieldworkers and researchers seeking advice about how to deal with the rumours of all sorts of 'development'.

During the numerous meetings between fieldworkers and clan leaders in all parts of the WMA, the rhetoric from the RCF and the WCS was that they wanted to achieve the conservation of natural resources, but recognised the development needs and desires of the communities. For that reason, they proposed the adoption of the WMA multiple-use strategy, in which they hoped to be able to assist the communities to implement development activities that were also compatible with conservation of biodiversity. In general, there was, and continues to be, confusion and misunderstanding on the part of the communities about the substance and method of what the WMA will actually deliver in the form of cash income, employment, and community development.

Organisational Structure and Institutional Presence

The process of establishing WMA management committees began after clans indicated an interest in including their lands in the proposed WMA. Based on national legislation, a representative of each landowning clan must sit on the management committee. In community meetings with fieldworkers, clans were asked to nominate their representatives. No formal social mapping was

conducted by the RCF or the WCS. Identification of clans was volunteered during the meetings and through the acquaintance of field researchers with clans based on their years of affiliation with the WMA communities. The first management committee, representing seven Gimi clans, was organised with the assistance of Gillison in 1986. Committees were established to represent a total of twenty-one clans in all four WMA communities in order for official gazettal to take place, although there was still considerable confusion on the part of the landowners about what a WMA was, and what the role and responsibilities of the committee members were. It was recognised by the RCF and the WCS that a resident fieldworker was needed to assist the committees in their development. James worked with all the committees in the WMA by constantly patrolling between the communities over the next two years. The rugged terrain and lack of radio communication between sites meant that James could only organise meetings with committee members at each site once every three months. A significant portion of his work was done by informally talking with people while walking and living with them on patrol. With the lag in time between meetings, James found that committees did not function well, and were often at a stalemate over any action or decision prior to his return visit. Based on this assessment, the RCF and the WCS placed four resident field staff in the WMA, one in each of the major villages. John Ericho and Robert Bino have brought considerable cultural insight to the task of developing the capacities of joint clan committees, and they have worked with biologists Chris Filardi and Ross Sinclair, who have provided on-site technical support in protected area planning and management.

At present, the twenty-one clans are represented by sixty-four members in four communities. The Gimi representatives are the 'big men' of each clan. Within clans, there are subgroups who have had to be consulted by the clan leader before land use decisions can be made. Originally, these individuals also sat on the committees until the latter became too large for effective decision making. As an alternative, each 'big man' selects a younger man from his clan to also be present at meetings. The younger man will normally speak Tok Pisin as well as the Gimi vernacular, and may have a wider range of experience in activities outside of the traditional life of the WMA. The Pawaians do not have traditional clan leaders, but elect two representatives of each landowning clan as voting members of the management committee. Since the Pawaians are semi-nomadic, it often happens that the two representatives will not both be in attendance at the same time.

The result of this process has been that community participation in management committees in Crater Mountain has moved from 'minimal' to 'restricted' (Level 2) or even 'good' (Level 4) in some villages (see Figure 18.1). Only the Herowana committee could be categorised as becoming active when it hosted the first Annual WMA Meeting in 1993 and began to meet regularly with James. With continued technical assistance, the Herowana committee has assumed a more powerful role in the community and can now be considered as approaching Level 4. It has incorporated two female leaders of community women's groups onto the management committee and is considering inclusion

of representatives from community government, the school, and the health centre in order to strengthen connections to other community institutions.

Other communities remain at Levels 2 and 3 in organisational development and continue to be quite dependent on field staff for assistance. All committees are holding intermittent meetings, are involved in designing WMA rules and enforcement procedures, and are involved in discussions over procedures for dealing with land use issues such as WMA entry fees and mineral exploration leases. Some have taken action to enforce WMA laws over the illegal harvesting of wildlife, access for research activity, and unauthorised mineral exploration.

Leadership

The process of fostering leadership in the development of the WMA was undertaken by field staff working with individuals who initially came forward with an expressed interest in WMA establishment. From 1982 to 1992, these were community members who had either worked for Gillison at his research site or became friends with him during his patrols to other Gimi villages. In Haia, they were individuals who had assumed leadership roles in fieldwork with Wright and Mack. Later, one or two from each village were jointly selected by the field staff and the community to officially serve as village coordinators and work with James on committee organisation and development after WMA gazettal. Initially, the village coordinators received a stipend from the RCF for this work, but they often had difficulty in securing community cooperation and support under this arrangement because of other people's jealousy, even though they were elected representatives of the committees. Stipends for coordinators were discontinued and some individuals ceased their involvement. For those who remained, traditional clan loyalties have hampered their capacity to effectively represent and work with the many clans present in each community. Even for individuals who have sincerely attempted to work with all clans, considerable suspicion by others in the community remains an obstacle. In Pawaian culture, the additional customary absence of 'big-man' leadership and formal organisation puts considerable stress on those individuals who stand out from the rest of the community.

The result is that community participation in leadership in WMA development relied on the intermittent external fieldworker in the early years of the project (Level 1) (see Figure 18.1). Two communities, Herowana and Maimafu, seem to be approaching Level 4 by having a management committee and a designated village coordinator who are beginning to work together in WMA operations. Because of cultural and historical differences, Haia and Ubaigubi still lack this unified leadership, and it is mainly individuals who play a prominent role (Level 2).

Management

The process of building the management capacity of the management committees had its beginnings in 1986, when Gillison worked with the first committee of Gimi clans to define their seven operating rules for the proposed

WMA. Discussion and implementation of the rules did not proceed further until the placement of James and the first WMA annual meeting of all twenty-one clans in Herowana. In the quarterly committee meetings that followed in each community, James would assist members with discussion about what actions needed to be taken by the committee on WMA laws or their enforcement, and with assigning the coordinator to take action on behalf of the committee. These procedures are revisited at each annual meeting, whose venue rotates among the WMA villages. With the placement of Ericho, Bino, Filardi, and Sinclair, most committees now meet on a monthly basis. With some assistance, minutes are kept and committee procedures are being practised and slowly understood by the members. Landowners have come up with a preliminary designation of land use zones for protection of biodiversity through restricted use, and for the practice of subsistence activities (James 1995), but these remain to be mapped and the conservation implications further discussed with the assistance of field staff.

The result is that community participation in management is as yet 'minimal' at most sites (see Figure 18.1). With the exception of Herowana, all management committees are still reliant on resident fieldworkers to advise them (Level 2) when they conduct meetings. The Herowana Management Committee, which has benefited from more experience and training, is now capable of holding independent meetings and directing the actions of the coordinator at times (Level 4). Previously, the coordinator was working independently of the committee, as the members were not clear about their own roles or the means to direct his action. The Herowana Management Committee has collected fines over violations related to five of the seventeen WMA laws (see Appendix) since October 1995. In Haia, they have collected fines over one violation and taken action on two others. WMA laws remain in the early stages of development, they await review by the DEC, and some require modification where they violate existing national policies.

Resource Mobilisation

The process of encouraging resource mobilisation by the community for development of the WMA has been especially challenging. The costs of WMA operation have evolved to include stipends for coordinators and ordinary committee members, travel for members to conduct committee business, and the hosting of WMA annual meetings. Village coordinators in most WMA communities were originally externally funded by the RCF and the WCS, being paid a wage for work with researchers which indirectly compensated for their involvement in development of the WMA. To reduce this dependence on outside support, efforts were made by the RCF and the WCS to assist communities to generate funds internally. Since 1994, field staff have worked with management committees to develop mechanisms to collect fees to finance WMA operations. Funds are now collected through a 10 percent surcharge on all expenditures made by clients of WMA eco-enterprises (researchers and tourists who pay for accommodation, guides, carriers, and research assistants), WMA entry fees for researchers and tourists, and fines collected for violation of WMA laws by WMA residents or visitors. In addition, in-kind community

contributions of land, labour, or bush materials are requested before any external input is considered by the RCF for WMA infrastructure development.

As a result of these mechanisms, management committees now have the potential to be self-supporting. The focus of training is now on guiding the committees in principles of financial planning and reinvestment so that all funds are not simply disbursed as stipends but are utilised for committee operation, maintenance of infrastructure, and socio-economic development in the community. This is being done by field staff in the regular meetings with committees as they discuss the implications and possibilities of each action and expenditure with the committee members.

The result of this process has been that community participation in resource mobilisation in the form of funds or in-kind services which are being contributed by the community to the operation of the WMA has increased in all communities (see Figure 18.1). This began in 1994, when the committees began to control expenditures but village coordinators were still paid by external agencies (Level 3). In 1996, the coordinators can be partially paid by the management committee or they can work voluntarily, but they are not subsidised by external funding (Level 4). None are currently paid by their committee, although some coordinators are also involved in management of WMA eco-enterprises from which they continue to receive some wage through the business, which offsets their current voluntary work with the management committee.

Monitoring and Evaluation

The process of engaging the community in the collection, utilisation, and dissemination of information to evaluate the operation of the WMA and the status of biodiversity conservation is still in an informal stage. Fieldworkers assist management committees to record minutes of each meeting. Decisions about WMA operations are documented and reviewed at each consecutive meeting. WMA laws have been translated into Tok Pisin and posted by each management committee to encourage review and comment. To involve communities in evaluation of biodiversity, resident fieldworkers and researchers in Haia worked with the community coordinator and community members to implement the beginning of the Trained Local Observer (TLO) programme. Landowners in the WMA can now receive certification in, and work as, 'trained research assistants' (TRAs) or 'trained local observers' (TLOs). The former are qualified to work on a research project under the supervision of a guest scientist or student in the WMA, while the latter have been trained to a level where they can independently conduct simple repetitive monitoring of selected species. Fifteen TLOs have received preliminary training in the monitoring of selected mammals, birds, plants, and amphibians. Three are now monitoring amphibian populations in the southern end of the WMA as an indication of ecosystem health. Three others are involved in an orchid inventory project with the PNG Forest Research Institute. None of them have yet reached the stage of formally feeding this information back to the management committees, although this practice is expected to evolve.

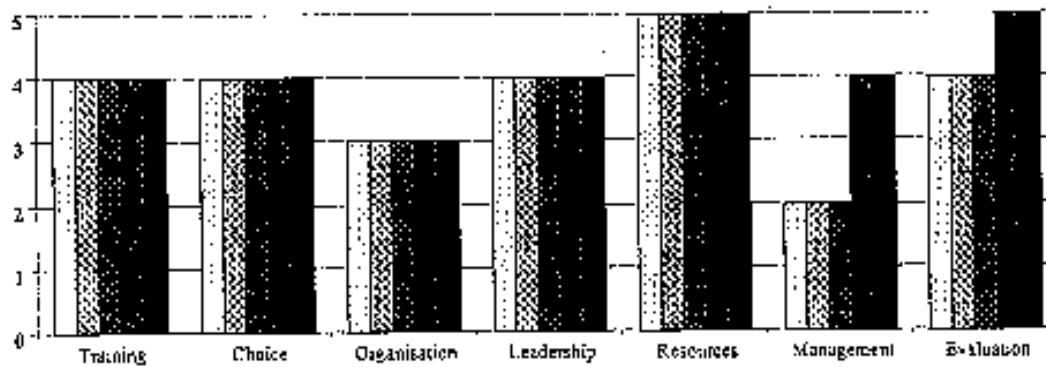
The result of this process has been that community participation in evaluation of the operation of the WMA has grown from 'nothing' to 'fair' (see Figure 18.1). In 1992, resident fieldworkers and researchers began to consistently document the conservation status and operations of the WMA, although there was as yet no mechanism to involve community workers in the documentation process (Level 2). Since 1995, community members have become more involved in the collection and discussion of information related to the operation of the WMA and the status of its natural resources through the processes described (Level 3).

Community Participation in Enterprise Development

In this section, I shall describe the processes for engaging community participation in the development of eco-enterprises in the WMA. The extent of community participation achieved in each WMA community by utilising these processes has been ranked according to the framework (see Table 18.1) and is shown in Figures 18.2 and 18.3. Results are shown separately for each WMA village and each business. As in the previous section, the years of assessment for each community begin with the time of arrival of the first trainers.

Figure 18.2: Crater Mountain community participation in handicraft enterprise development from 1992 (grey) to 1996 (black).

(a) Herowana



(b) Uhaigubi

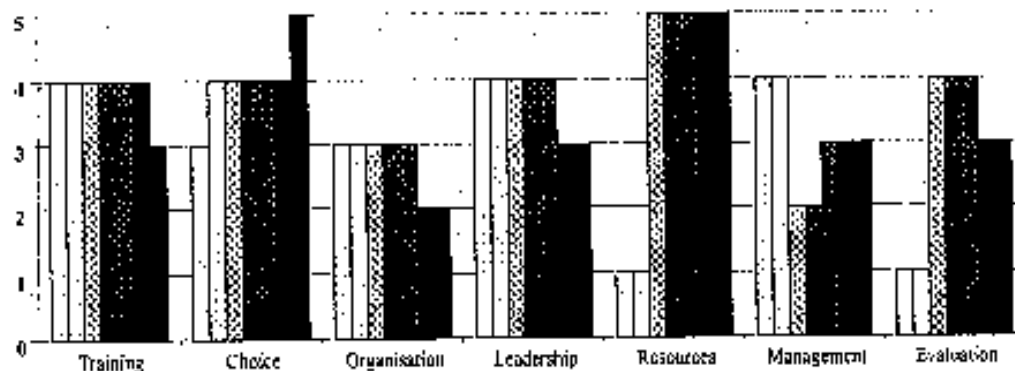
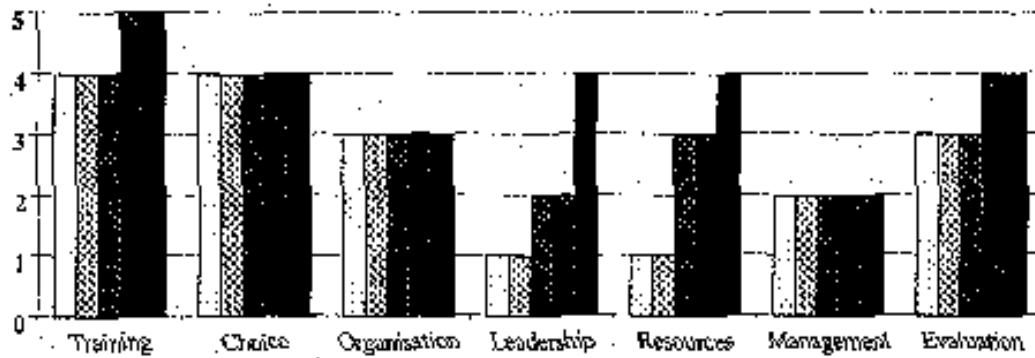
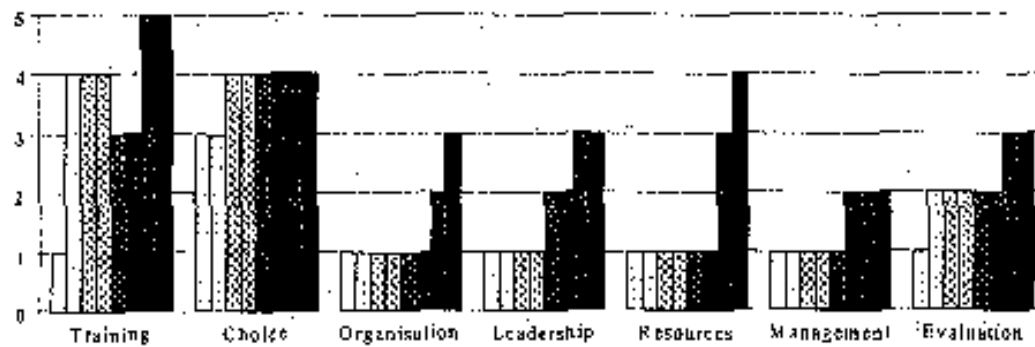


Figure 18.3: Crater Mountain community participation in tourism and research enterprise development from 1992 (grey) to 1996 (black).

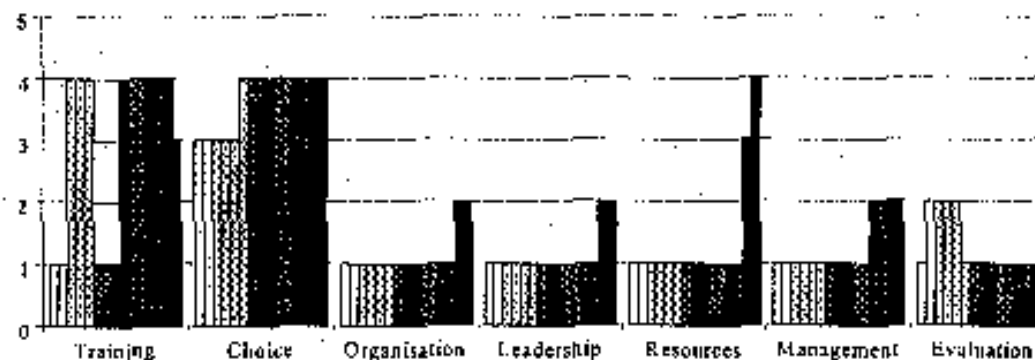
(a) Herowana



(b) Haia



(c) Ubaigubi



Handicraft businesses have been established in the communities of Ubaigubi and Herowana, beginning in 1990 and 1992 respectively. They specialise in the production of traditional New Guinea highland products, including fighting shields, spears, bows, stone axes, *mumu* bowls, *bilum* string bags, and more. These are marketed domestically and internationally through village stores and mail order. Research and/or eco-tourism businesses have been established and tested in three WMA communities. They have included the

Ubaigubi Eco-tourism Lodge (1984-1986), the Ubaigubi Rutanabi Guesthouse (1995-present), the Crater Mountain Biological Research Station (CMBRS) at Wara Sera near Haia (1989-present), and the Crater Mountain Biological Research Station (CMBRS) at Herowana (1992-present). All facilities feature permanent structures with cooking and accommodation for three to ten visitors. Research clients include scientists in the natural and social sciences, both expatriate and national, from student to professor. Tourism clients are typically bushwalkers or natural history enthusiasts, including birdwatchers and orchid specialists, as well as generalists. Marketing is still informal and primarily conducted by word of mouth from previous visitors.

Training and Agents of Change

Rural community development volunteers from the United States Peace Corps (USPC) were engaged to conduct on-site resident training in Ubaigubi from 1990 to 1995. The USPC model for small business training was transferred to Herowana in 1992 to establish the Herowana handicrafts business. Additional training workshops have been organised with the assistance of handicraft buyers in Port Moresby and Goroka.

Methods of training in eco-tourism and research have been highly variable. In Ubaigubi, resident expatriate lodge managers initially provided community guide, cook, and manager training. Training ceased from 1986 until 1989, when USPC volunteers arrived to provide training for the handicrafts enterprise, some of which was applicable to the potential eco-tourism business. In Herowana, some training was provided by the USPC volunteers, but most was dependent on fieldworkers assigned to other tasks, such as biological research or work with WMA management committees. These staff provided on-site and short local training courses for selected community members as eco-tourism guides and research assistants, and in eco-tourism product development. At the CMBRS at Haia, field researchers served as the resident trainers by providing Pawaians with experience as research assistants. Additional training workshops in the WMA have used Awareness Community Theatre techniques for role-playing tourism and research scenarios. Outside of the WMA, selected community members have attended workshops in eco-tourism product planning and study tours to guesthouses, research stations, national parks, museums, and herbariums.

Needs Assessment and Action Choice

Handicrafts. The process resulting in establishment of the Ubaigubi handicrafts business was initiated by Gillison, who was seeking alternative forms of income generation for WMA communities after the collapse of the eco-tourism lodge in Ubaigubi in 1986. The idea was introduced by USPC volunteers Steve and Kristi Booth, and was embraced by a community committee which worked with the Booths and later volunteers to develop the business. Other WMA communities assessed the successful business activity in Ubaigubi and approached the RCF with a request for assistance to establish a similar venture. The RCF responded with the placement of USPC volunteers in Herowana in

1992, and in Haia and Maimafu in 1996. The result of this process has been that community participation in the choice to establish the handicrafts enterprises in the Crater Mountain WMA has been quite high (see Figure 18.2).

Research and eco-tourism. The process of initiating the first eco-tourism lodge venture in the WMA in the early 1980s was also based on an assessment by Gillison, along with representatives from the WCS and private entrepreneurs in Goroka who met with community representatives to discuss plans for the business. In Haia, the CMBRS was established by Wright and Mack in 1989 with the permission of the Pawaian landowners, through external financial support and assessment of the need for such a station. The Pawaians were pleased with the employment, and requested external assistance to further develop the enterprise when Wright and Mack completed their studies. As with the handicrafts, the surrounding communities heard of the business activity and approached the RCF and the WCS with similar requests for more activity. In response, the CMBRS in Herowana was initiated in 1992, and some accommodation units are in the planning stages at Maimafu. The result of this process has been that community participation in the choice to establish (and discontinue) these businesses has been quite high (see Figure 18.3). In Ubaigubi, the lodge proved to be financially non-viable after three years of operation, as it was dependent on external marketing and management, and transportation was costly. Community capacity was not sufficient to maintain or even downsize operations when the external institutions withdrew subsidies for the operation in 1986. The community elected to disassemble the lodge and discontinue the business despite outside advice that they should reconsider some aspects of the operation.

Organisational Structure and Institutional Presence

Handicrafts. The process of establishing the Handicraft Business Committees was undertaken by field staff who asked each clan to nominate a representative to serve on the committee. The committee then underwent a five-year period of training in which they met once each week with USPC volunteers to practise and design systems for obtaining and pricing products from artisans in the community, and to conduct bookkeeping, banking, and communications with clients. Volunteers were largely responsible for locating the initial markets for the products. As the capacity of the committee to carry out these tasks has increased, field staff have gradually reduced their involvement in the operations each year. The result has been that community participation in the committees has ranged from 'restricted' (Level 2) to 'fair' (Level 3) (see Figure 18.2). In Ubaigubi, the committee disbanded in 1995 after internal conflict over misappropriation of funds by a committee member. The Herowana committee continues to be very active (Level 3). Both businesses market handicrafts from most households in their respective communities. Over 190 artisans from all seven clans participate.

Research and eco-tourism. The process of establishing the institutions for managing eco-tourism and research businesses in the WMA began only after the

enterprises were operating for some time. All were operated by fieldworkers or researchers until 1994, when an effort was made by the RCF to begin to transfer management of these businesses to the WMA management committee present in each community. The result of this process has been that community participation in an institution responsible for operating the research and eco-tourism enterprises is still very limited (see Figure 18.3) and remains heavily dependent on external assistance.

Leadership

Handicrafts. The process of fostering leadership in the handicrafts businesses was undertaken by field staff working with the community-selected committee to develop their collaborative capacity to operate the business. Every committee member was trained in all tasks that the committee must perform, so that all tasks could be performed equally well by all members of the group. When a dominant clan leader on the committee misappropriated funds from the Ubaigubi business, a system of checks and balances was built into the Herowana financial accounting system such that three or more members must be involved at some point in each transaction. When the procedures of the Herowana committee have been questioned by the community, field staff have assisted the committee in determining and practising appropriate responses.

The result of this process has been that community participation has been good (Level 4) in Herowana where the committee members exhibit confidence in their capacity to understand and operate their business systems (see Figure 18.2). In Ubaigubi, the committee has dissolved but the single manager is apparently competent to operate the business (Level 3).

Research and eco-tourism. The process of developing community leadership in these businesses is just beginning, as management functions are transferred from project fieldworkers and researchers to community members. Field staff are now holding meetings with the management committees and their coordinators in each community to define and develop appropriate systems for operating the business. The result is that community participation remains restricted (Level 2) (see Figure 18.3). Businesses that were once externally run are now run collaboratively with individual community leaders on the management committees, and only recently expanded to involve others on the management committee in Herowana in 1996 (Level 4).

Management

Handicrafts. The process of building the management capacity here required that volunteers be present on site to provide weekly lessons in basic English and Tok Pisin so that orders could be read and processed, in the basic arithmetic required for accurate accounting, and in elementary banking procedures, letter writing, phone calling, pricing, and product development. Additional workshops in pricing and quality control have been provided by artefact dealers from Port Moresby and Goroka. The result has been that management in Herowana has progressed from its original dependency on project fieldworkers (Level 2) to

primarily self-management with intermittent assistance (Level 4) (see Figure 18.2). All external technical assistance for the Ubaigubi business was withdrawn in 1995, and the business continues to function under community-level management.

Research and eco-tourism. The process of building the management capacity of community leaders or institutions in the operation of the WMA research and eco-tourism enterprises has involved a variety of training methods. Random community members have been elected to attend workshops in and outside of the WMA in eco-tourism product planning, and have participated in project-sponsored study tours to guesthouses, research stations, national parks, museums, and herbariums. Selected individuals have also completed elementary courses for research assistants and tourism guides offered by staff and researchers in the WMA. The management committee in each community governs the work of researchers in the WMA by vetting the letters of request from each scientist who wants to work in the WMA. The committee reviews the research protocol and grants permission for the selected procedures and time of visitation. A concerted effort is now under way to identify and strengthen the core group of clan representatives who are establishing the procedures to better manage the finances and logistics of this business. The result has been that community participation in management remains restricted (see Figure 18.3). Although workers have received training, the management of the business is theoretically conducted by committees, but is actually reliant on a single community worker who maintains the structure and coordinates eco-tourism guides, research assistants, and other visitor services in the village. The community worker is often not working closely with the committee and is dependent on project staff for assistance (Level 2).

Resource Mobilisation

Handicrafts. The communities achieved an encouraging level of resource mobilisation without start-up funds from the RCF or the WCS. The committees initially worked on a voluntary basis, and proceeds from the first sales were sufficient to cover their subsequent costs of operation. Proceeds from sales are managed by the committee with the help of the volunteers, and are used to pay artisans, committee stipends, business expenses, and contributions to a community fund. Sales in Herowana have increased substantially, with proceeds in the last year equal to the total of the first three years of operation. The Ubaigubi handicrafts business is also self-sufficient financially. Community participation has been excellent (see Figure 18.2) because funds were immediately available to compensate committee members and artisans for their work.

Research and eco-tourism. In these businesses, the process of resource mobilisation has been more difficult since start-up and maintenance costs are much greater. Fees for the use of research stations and guesthouses were first collected by the management committees at rates determined by each respective community. Community workers who coordinated the businesses and

maintained the stations were paid a wage by the RCF and the WCS. In 1995, uniform pay rates and laws for eco-tourism and research activities for the entire WMA were ratified and documented at the WMA annual meeting by representatives of each management committee. The formalised protocol for fees and laws now provides the instruments which each committee uses to collaboratively govern the eco-tourism and research enterprises of the WMA. The subsidy for community workers by the RCF and the WCS is being withdrawn over a two-year period, and station and guesthouse managers will become volunteers or will be paid by the management committee. Community participation in resource mobilisation has increased as they have had funds from the business to do this (see Figure 18.3).

Monitoring and Evaluation

Handicrafts. The level of community participation in evaluation has been dependent on the capacity of the business committee's members to be engaged in the maintenance and analysis of the business records and feedback from buyers. Originally, record keeping was primarily done by the volunteers, but the responsibility has gradually been assumed by the committee members or (in the case of Ubaigubi) by the sole manager of the business. In Herowana, the records have been used over the last two years to respond to community criticism and concerns over the distribution of benefits or destination of proceeds, and handicraft buyers have been brought in to meet with artisans and managers. The result of this process has been that community participation in evaluation has risen from 'restricted' (Level 2) to 'fair' (Level 3) or 'excellent' (Level 5) (see Figure 18.2).

Research and eco-tourism. Community participation in evaluation of this business is accomplished through financial records and feedback from visitor evaluations. The involvement and capacity of community members to assist with maintenance of accurate records for this business has been limited because of lack of technical assistance from field staff, which is only now beginning to be provided. Each tourist or scientist who visits the WMA is asked to write an informal evaluation of WMA facilities and services. These are returned to the fieldworker at each site, who presents them for discussion at the management committee meeting. The result has been that community participation, originally dominated by external review (Level 2), has been expanding over the last two years to involve individuals and committees (Level 3) (see Figure 18.3).

Discussion

Action Choice

Customary land tenure in PNG precludes the rating of the action choice indicator to be anything less than fair (Level 3). Some community involvement will be obligatory before any actions related to land use can be implemented. As shown at Crater Mountain, community discussion alone seems to have little bearing on whether an action choice initiative will flourish (as shown in the history of

Ubaigubi Lodge and WMA establishment in the 1980s). We have found that the constraints of community conditions in Crater Mountain² mean that considerable community education must take place before community assessment of actions, especially as related to business development, can really be practised. As in other remote sites in PNG, where limited government services and infrastructure are present, residents are normally very eager to elect for an action which they feel will result in socio-economic development, despite the fact that they probably have little understanding of the implications or requirements of the action (Sekhran 1996).

Congruent with the recommendations of Midgley (1986), undue haste in constructing facilities for an eco-enterprise or a physical base of WMA operations does not guarantee further community involvement. Even though community representatives participated in the original discussion of the action choice, they have not had the technical capacity to continue their involvement in the subsequent steps of implementation without assistance. Not surprisingly, in other community-based conservation initiatives, if the technology being utilised or the maintenance demands of the initiative were beyond the capacity of the landowners, their participation dropped off (Little 1994). The history of the Ubaigubi Lodge is an illustration of this point. Local capacity was not sufficient to maintain the activity at the stage when external support was withdrawn. The results were misunderstanding, loss of confidence, resentment, and scepticism on the part of the community.

Results at Crater Mountain do suggest that an initial affirmative action choice on the part of the community, followed by demonstration and years of discussion, may be necessary to result in community understanding of the action choice and a possible commitment to it. Even if the demonstration was unsuccessful, as in the case of the Ubaigubi Lodge, follow-up discussion of its story and the lessons learned by the action choice have been instructive to all communities around Crater Mountain which contemplate similar enterprises. Another demonstration site, the Crater Mountain Biological Research Station at Haia, though managed entirely by external field researchers, was a model for demonstrating what a research station is and how it operates. The extremely positive reaction of the Haia community led to their request for more research business. It is unlikely that this affirmative action choice meant that Pawaians then thought that they could manage the operation, but rather that they wanted this type of employment to go on being offered in the area. It will probably take much more time and fieldworker presence to build the confidence and capacity for significant community participation in operation of the station. This is consistent with the results of conservation initiatives in Africa, where a lengthy first phase of external management was necessary in the more complex operation of game reserves (Kiss 1990).

² That is, low to non-existent formal education and lack of experience in the modern cash economy outside of the WMA boundaries, resulting in 'cargo cult' tendencies and unrealistic expectations.

While the complexity of the action will dictate the length and intensity of external involvement, Uphoff (1985) suggests that, when working with communities which may not be accustomed to involvement in development programmes, as at Crater Mountain, it is necessary not only to discuss with the people whether a project activity will be undertaken or not, but also to engage in an ongoing dialogue about the specifics of *how* the community envisions itself participating in the proposed activity. Because actions at Crater Mountain, by this project and others, have involved external initiation and management, and local people still lack significant experience, we find that people are often 'waiting for action', and still have considerable difficulty conceptualising their role in 'taking action'.

A potentially relevant case from El Salvador involved communities in a dialogue which discussed the 'rights and obligations' of participants to prepare them for what to expect in the future of the project (Paul 1987). The discussions covered physical, financial, social, and organisational aspects of the proposed project. Although this is probably still too conceptual for direct use in projects like Crater Mountain, it provides a useful framework for the ongoing dialogues which discuss the roles of external agencies and the WMA communities. To increase community capacity for understanding the complexity of action choices, we have found that study tours, in which landowners travel outside of the WMA, are very influential. Where few people have travelled beyond their home village, a trip to talk with landowners in another part of PNG, about land use or eco-enterprise development, has removed misconceptions which field staff say might otherwise have taken much longer to achieve. This type of hands-on experience, including internships and workshops in technical and management skills, has proved invaluable in most rural development projects (Midgley 1986).

Training

Given the isolation and educational level of Crater Mountain communities, we feel that the investment we have made in training has been necessary in order to engage community participation as an 'end' to ongoing sustainable operation of the WMA. At this stage in WMA development, the intermittent presence of fieldworkers has not proven sufficient to assist in the development of the embryonic institutions in the WMA. During the lengthy absence of a fieldworker from a site in the WMA, confusion or conflict has arisen. The committees have lacked the confidence and experience to take action or to make rulings on topics related to the operation of the WMA or the eco-enterprise. *This is complicated by the fact that collaborative management of the WMA and its enterprises requires cooperation between clans that may have been traditional enemies.* A resident fieldworker must still be present to 'walk' most of the committees through the motions of conducting a meeting, delegating responsibility, identifying action, making a law, writing letters, or resolving conflict.

The potential impact of a resident trainer is reflected in the greater extent of community participation in the handicrafts enterprises as compared with the WMA eco-tourism and research enterprises (see Figures 18.2 and 18.3). This can partly be attributed to the greater complexity of these service industries when compared with small-scale manufacturing and trading, but it is also partly a reflection of the history of community training for each respective business. The USPC Rural Community Development model for community capacity building was used to establish the handicraft businesses. A committee was elected specifically by the clans to run each business and work as counterparts to the USPC volunteers. They meet regularly with the volunteers who have assisted them in developing a specific methodology for operating the business. Until recently, there was no designated resident small-business or development trainer assigned to the eco-tourism and research businesses. These businesses have been run on a rather *ad hoc* basis by the management committee, which has not received any specific training as a business committee, but functions more as a governing body for policy and law in the WMA. The systems for record keeping, marketing, and managing the enterprise have been random and uncoordinated. These results indicate that an appropriate fieldworker must be assigned to any new community institution to help the members develop their capacity to operate the institution. This is consistent with the findings of Paul (1987), in a survey of World Bank projects, who noted that the selection of appropriate fieldworkers suited for specific training tasks was instrumental in successful community participation initiatives. When comparing the overall development of community participation in WMA operations, Herowana and Maimafu have made the most progress (see Figure 18.1), even though Haia and Ubaigubi have been 'involved' in WMA activities for longer. The constant presence of resident trainers in Herowana and Maimafu in the past two to four years, who have been assigned to working specifically with the management committees on WMA operations, may have had this impact.

Although it is understood that fieldworkers are present only to demonstrate practices and to work alongside the committees, workers must constantly guard against the risk of encouraging community dependence on them. As confirmed in most rural development work (Oakley 1991; Wells and Brandon 1992; Uphoff 1995), this has required the presence of field staff with considerable patience, sensitivity, neutrality, the capacity to listen, and to teach a task instead of doing it for people. As anywhere, the cooperation, trust, and respect of rural landowners at Crater Mountain has had to be earned through demonstrated commitment and long-term presence (Wright and Mack 1993). This has been one of the strengths of the Crater Mountain project to date, where a committed group of associated individuals maintains contact with each other and the communities during, and long after, their presence in the WMA. Despite internal successes and failures, and the comings and goings of individuals, there has been a consistent institutional presence through an RCF and/or WCS field representative for the past fourteen years. This has provided the environment for staff to work with communities to continue the dialogue about the successes and failures and to learn from the mistakes.

Organisation

The management and business committees are new institutions in the Gimi and Pawaian cultures. Although most are based on traditional clan leadership or representation, the necessary collaboration of a large number of traditional clan enemies in the Crater Mountain WMA committees is a relatively novel and unprecedented phenomenon. It is only with the development of WMA airstrips in the last 10-20 years that clan groups have been clustered in such close proximity as to constitute villages. Suspicion and fear of personal harm from another clan is not uncommon. Pearl (1994:213), in a review of the conservation efforts at Crater Mountain, aptly described the situation as 'unruly, contentious, rumour-filled, open-ended, and slow – but broadly consultative, inclusive, and potentially, uniquely effective'.

In addition to the challenges of new levels of organisation at Crater Mountain, field staff also report the breakdown of the traditional authority structures, as has been documented in other developing societies (Kiss 1990; Bromley 1994). The older clan leaders are not always seen as competent in the ways of modern society, while younger people struggle, and are restless, for change. In some communities, this has further weakened the power of the management committees which, by tradition, have been comprised of older clan leaders. Amongst the Pawaians, the traditionally limited scale of cooperation, due to their semi-nomadic behaviour and low population densities in large expanses of forest, is an inherent problem. Given these constraints, it is not surprising that institutional development throughout the WMA has been slow and uncertain.

Although committees for community management of protected areas have been set up in many parts of the world, few have yet demonstrated the capacity to act independently of external assistance (Wells and Brandon 1992). While this is not particularly encouraging for projects like Crater, where we are in the very early phases of institution building, it suggests that we will probably need to make a long-term commitment to resident assistance for the near future followed by intermittent field visits for a much longer period.

Leadership

We have seen that, as the tangible results of time invested in an institution and its activity materialise, the extent of community participation in the form of leadership does increase. Oakley (1991), in a review of rural development projects, found that participation often evolves in this manner. Businesses or activities which take a long time to reach fruition, and are very hard to get started and maintain, will require some degree of external leadership. This can be seen in the handicraft business, which has had the capacity to earn money almost immediately and where levels of participation grew quickly, while in the tourism and research business, growth is slow and requires considerable up-front investment. Establishment of the latter business has required more outside intervention before the community has gained the ability or desire to take an

active leadership role. Equally elusive is the concept of benefits derived through the long-term investment in biodiversity conservation.

The indicators of leadership show that, in many activities at Crater Mountain, there have been independent leaders, rather than active groups or committees of people who have taken leading roles in WMA establishment. Most of the independent leaders work without the support of the entire community, which is not surprising in light of clan rivalries, and appear to have a variety of motives. For some, the ulterior motive is financial or political benefit, for the leader personally or for his clan, while for others it appears to be a sincere interest in the activity. In either case, the resulting community jealousy, leading to lack of involvement from other community factions or the dependency on just one individual to carry out any activity, has led to problems. In Ubaigubi, a charismatic individual was instrumental in dissolving the handicrafts committee, resulting in current management by a sole individual. While the business still functions, the reliance on a single manager places it in some jeopardy, as projects with single charismatic leaders are known to have a higher risk of failure (Midgley 1986). In Haia, the traditional lack of leadership in the culture has led to dependence on one young man for most WMA operations.

To encourage involvement from a wider spectrum of the community in WMA operations, field staff have attempted to widen the dissemination of training and information opportunities. Because communities are not homogeneous, and traditional Melanesian authority structures can hoard information as a form of power, dissemination can be a challenge in its own right (James 1996). In Hecrowana, the longer and more extensive presence of resident staff has countered this constraint by encouraging the involvement of both young and old clan representatives on committees, by disseminating information through women's groups and female representatives on community committees, and by offering repeated training sessions in different areas of the village to provide opportunities for more clans to attend. This is consistent with Orsak's (1996a) recommendation for 'flooding' communities with information to reduce the tendency to restrict information flow. Amidst this complexity, the challenge remains to cultivate leadership while encouraging community participation without provoking jealousy.

Management

Although most community institutions are still dependent on project staff for assistance in carrying out their management duties, there is now a sufficient number of visitors coming to the WMA (approximately 250 in the last year) to raise the number of issues on which the committees must act. Each transaction or event provides another opportunity for the committee or the designated coordinator to practice management skills. This involves collection and distribution of revenues, record keeping, work assignments, enforcement of rules, and collection of fines.

This activity has engaged people in the practice of the WMA procedures, such that some are becoming familiar with the implications of the rules they have made for operation, and are beginning to question some practices. The annual WMA meeting has proven to be an invaluable forum, where representatives of each community can vote on changes in the standardised procedures of WMA operations and enterprises. The indication that people are questioning existing procedures is also an indication that they are being used and thought about; they are not merely symbolic.

As the value of biodiversity is realised, the reasons and incentives for enforcement of management rules are becoming clearer for WMA residents. An example of this occurred in 1995 in respect of a rule which was made at the WMA annual meeting, that no biological materials could be taken out of the WMA by a non-resident without permission from the management committee. Later that year, a new species of orchid was discovered by one of the landowners involved in a parabiological orchid inventory project with the Forest Research Institute in Lae. The orchid was named after the landowner, who was obviously impressed that something previously undescribed by science was found in the Crater Mountain forests and may have the value to attract clients of the research and tourism enterprises. A trekker was later apprehended leaving the WMA with orchid samples which were confiscated by the local management committee. It is unlikely that landowners would previously have perceived the value or the threat in ways which would have resulted in disciplinary action.

Management in the form of equal distribution of benefits such as training and revenue-earning possibilities are a constraint in all WMA procedures. Community institutions struggle to fairly distribute these benefits, despite the traditional clan nepotism which gives work and training opportunities to fellow clan members. This is still an area that requires careful external refereeing by the resident field staff. It may prove to be one of the biggest management problems for the committees, yet one that will be critical to providing appropriate incentives to sustain community participation if a sufficient quantity of land is to be involved in the establishment of a viable conservation area.

The community dilemma over the distribution of benefits is not an issue which is unique to Crater Mountain. The revenues from community wildlife farms and lodges in Africa have been distributed in a number of ways, depending on community and enterprise profiles (Kiss 1990; Metcalfe 1994). Although the emphasis is often on equal distribution, one of the Campfire ventures in Zimbabwe distributed wildlife income in accordance with land area enrolled in wildlife protection. This model may have application to Crater Mountain. Business income is now distributed to the workers with a surcharge for committee managers and overhead costs. In the future, shares may be held by WMA residents in a community company portfolio of Crater Mountain eco-enterprises. If eco-enterprises are dependent on the presence of biodiversity, should the number of shares in the Crater Mountain companies reflect the land area assigned to conservation, rather than to some other land use such as hunting, gardening, or coffee production? Because some residents (especially

the Pawaians) own larger blocks of land, these individuals would then secure a disproportionate share of revenues, but it is likely that viable populations of flora and fauna, and especially the seasonal movements of vertebrates, will depend on the existence of large contiguous blocks of undisturbed forest.

Resource Mobilisation

All community institutions associated with WMA operations or enterprises are now collecting revenues of some sort to finance their activities. The more complex businesses, such as the research stations, still receive subsidies from external agencies for manager stipends, although this practice will be discontinued as the income of the enterprise increases. Resource mobilisation has proven to be another big challenge for the Crater Mountain project. The communities in the WMA have only recently acquired their present identity, and all individuals identify with their clan or lineage instead of the village as a whole. Hence there is no tradition of pooling village resources to invest in a community venture. Compensation for labour, materials, or expertise is requested from any individual outside of the immediate family. Any favours granted are catalogued in a mental record of debts as favours owing.

In this cultural environment, it has been difficult for field staff to initiate community contributions towards a collective action without some sort of compensation being given to the individuals involved. For the project to directly employ village members or provide monetary compensation for some action associated with WMA operations or enterprises, without any matching contribution from the community or the individual, goes against all mainstream development theory, which has shown that these actions are not sustainable, that they lead to dependency and tend to discourage local 'ownership' of the activity (McNeely 1988; Little 1994). For example, the successful Annapurna project in Nepal has required a minimal 50 percent community contribution to any project activity and has refrained from any cash compensation (Wells and Brandon 1992).

The earliest research activities in the villages of Ubaigubi and Haia were conducted prior to the organisation of an ICAD project initiative. WMA residents were employed in what were, essentially, externally managed operations. It has proved difficult to encourage community participation in protected area establishment by turning local people from labourers into business managers in the WMA enterprises. With the lack of experience in business and the cash economy, committees are not eager to part with a portion of their earnings on the maintenance or overhead costs of business or WMA operations. On the other hand, their frugality does have some participation benefits. As external agency subsidies for community research station managers have decreased, management committees have had to consider their capacity and need to assume some of these costs. As a result, their level of participation in management has increased significantly as they scrutinise the work of the manager for the justification of his wages as a share of their potential earnings.

In this way, the project has made shaky progress in evolving from a beneficiary to a participatory system. The most successful activities are those which are now actively generating revenues which can readily be used to pay for labour and other costs. Constraints still exist in enterprises such as eco-tourism, where a guesthouse must be built before revenues can be collected. Individuals are very reluctant to participate in construction without being paid for their labour, but there are insufficient funds to cover these initial costs. Contributions of labour are not readily offered, because direct returns to the individual cannot be seen or assured. In addition, Crater Mountain residents are still dependent on a demanding schedule of subsistence activities. A day spent on a business enterprise is a day spent away from gardening. In an effort to avoid direct cash payments, while making allowance for cultural constraints, the project must provide indirect incentives to break these stalemates.³

Monitoring and Evaluation

The participation of local committees in monitoring their enterprises is fairly good, since all records are maintained by committee members. The handicraft enterprises have progressed to the stage of actually managing that data and utilising it to report to the larger community. Since jealousy and suspicion of neighbouring clans is a common problem, evidence of income and distribution of benefits is important to combat misunderstanding and misinformation. The records are also important because the provision of material benefits can be meaningless if the community fails to realise that they are growing (Midgley 1986).

The presence of the research enterprise at Crater Mountain for many years has provided a unique potential for selected community members to be actively involved in the collection of data on the presence of, or change in, biodiversity in the WMA. The interactions of communities with scientists has been important in community realisation of the uniqueness of their resources. Over the last two years, scientists and visitors to the WMA have been asked to submit comments on their findings and experiences to the management committees in an attempt to encourage feedback to the WMA governing body.

The Trained Local Observer (TLO) programme (Sinclair 1995; RCF 1996) is the beginning of an ambitious effort to build local capacity to conduct biological and socio-economic monitoring, as required, to guide the management committees in WMA operation. While individuals still retain significant information about their natural resources, the limited level of literacy restricts the number of individuals who qualify to participate in the programme.

Conclusion

The Crater Mountain project is a combination of 'top-down' and 'bottom-up' initiatives (Hough and Sherpa 1986). The early existence of external

³ One technique is to provide rice for lunch on workdays for community structures.

intervention was tempered by the obligation to involve the resource owners in the creation of the initial demonstration sites. The lessons learned from this creation provide the tangible evidence and incentives that fuel the fledgling participation of communities in all aspects of the WMA operations. In PNG, this is a delicate balancing act whereby all clans must take the lead and get some benefit in the negotiations which move them all towards a common goal. The process of engaging participation will necessarily be slow.

The presence of twenty-one clans in neighbouring communities within the WMA has brought some benefits, though it has also been a challenge. We see that communities, and the clans within them, do learn from one another as they compete for the self-esteem which arises from improved performance. At the same time, through their annual meetings and collaborative training ventures, they are increasingly aware of their mutual dependence in the creation of a viable product. If cultural constraints do make themselves felt in one community, as they did in Ubaigubi, the project has not been obliged to withdraw from the area, since it can continue to provide technical assistance to a nearby community or clan, and wait for the invitation to return.

Crater Mountain is a remote and far-flung site with high training needs. Paul (1987) identifies levels of complexity in the three components of community participation – intensity, agents, and objectives. Based on his three-dimensional framework, the level of commitment required to achieve the complex combination of empowering communities to eventually initiate action, as sought after in the Crater Mountain WMA, will require an extremely high level and lengthy commitment on the part of the external agencies involved. Such projects need high levels of investment in human and financial resources to provide the technical assistance which can facilitate community participation (Wells and Brandon 1992; Sekhran 1996). Once in place, the process requires commitment. ICAD projects which exist for less than five years without a secure source of funding, but which utilise taxing, innovative, and experimental procedures, have been shown to be ineffective in achieving their objectives (Wells and Brandon 1992). Funding constraints increase the difficulty of an already difficult task. While the government of PNG provides such unique legislation for the empowerment of local resource owners to establish national protected areas, it does not currently provide the technical assistance to landowners which would enable them to implement this ambitious agenda. In the most recent draft of the DEC Strategic Plan (PNGDEC 1996), this task is assigned to non-governmental organisations operating in the country. If NGOs are thus assigned the challenging task of providing technical assistance to develop a system of protected areas in PNG, and have demonstrated their capacity to do so, they should be considered for financial or logistical support from the government in order to carry out the mandate.

Communities in the Crater Mountain WMA are balancing subsistence living with entry into the cash economy. Time available to participate in training, business, and WMA management is limited by the demands of

traditional subsistence and cultural obligations. The structure of businesses and governing institutions must take this into account.

Community participation, as the 'means' to establish a protected area and the 'end' to sustain it, is only one facet of the challenge to achieving biodiversity conservation. Most protected areas, if established through community-based management, will only persist in a conducive national policy environment that does not undermine community efforts by providing incentives which decrease biodiversity value and encourage production versus conservation (Wells and Brandon 1992; Little 1994). The fledgling laws and systems which currently govern the Crater Mountain WMA are only beginning to address the internal threats from non-sustainable subsistence practices within the WMA. They are certainly not at a point where they can withstand the fragmentation that would result from the external threats of competitive land uses, such as large-scale extraction of mineral and timber resources. It will be imperative that national policy be aligned with the current community-based conservation initiative in the Crater Mountain WMA if it is to persist as a national protected area.

This chapter comments only on the level of community participation in the operation of a national protected area. It does not attempt to answer the question of whether community participation will actually achieve the project's goal of biodiversity conservation. It is still a theoretical process and, to date, there is no proof that participation will enhance the achievement of conservation objectives. Yet in PNG, as in many other areas of the world, integration of conservation and development through community participation is accepted as the current means to protected area establishment (Brandon and Wells 1992; Little 1994). A monitoring and evaluation plan to collect quantitative data on the project goal and each objective of the Crater Mountain ICAD project was designed in 1995, and is currently being implemented (RCF/WCS 1995; Ericho, Bino and Johnson 1996). When in place, the indicators will provide a more systematic assessment to answer this question.

Appendix: A List of Laws passed by WMA Management Committees at the Third Annual Meeting, 4-6 October 1995.

The following seventeen 'laws' were passed by local management committees from the villages of Haia, Herowana, Maimafu, and Ubaigubi in the Crater Mountain WMA at a meeting held in Maimafu on 4-6 October 1995. The following rules apply to the entire area enclosed in the boundaries of the WMA unless otherwise stated.

1. No hunting of Birds of Paradise. Few Birds of Paradise can be killed for special occasions only. Before birds are hunted permission must be granted by the appropriate Landowner [Management] Committee (MC). *Fine for infringement: K40 or 2 months imprisonment. Fine is paid as follows: K10 to whoever reports the infringement, K30 to MC.*
2. The following species are unconditionally protected from all hunting and killing: (i) New Guinea Harpy Eagle; (ii) King Bird of Paradise; (iii) Ragiana Bird of Paradise. *Fine for infringement: K40 or 2 months imprisonment. Fine is paid as follows: K10 to whoever reports the infringement, K30 to MC.*
3. No-one may enter an area set aside for conservation for the purposes of hunting, food collecting, cutting, or gardening. No-one may remove plants or animals from these areas (except for the purposes of research and with the permission of the appropriate MC). *No fine.*
4. No-one may enter another person's land for the purposes of hunting, food collecting, cutting, or gardening. People who pass through the land of others cannot leave trails. *Fine for infringement: K50 or 2 months imprisonment. Fine is paid as follows: K10 to informer, K10 to MC, and K30 to landowner. Infringements are reported to the MC in the area it occurs. This MC writes to that of the infringer. It is the responsibility of the MC of the infringer to pursue the matter in court.*
5. All approaches to researchers and tourists concerning pay, conditions, fees, labour or any disputes must go through the appropriate coordinator. *Fine for infringement: K5. Fine is paid as follows: K5 to MC.*
6. All sales of crafts must go through the Artefacts Committee. *No fine.*
7. No-one can steal from a researcher or tourist. Anyone caught stealing must return the stolen goods and pay a fine. *Fine for infringement: K50 or 2 months imprisonment. Fine is paid as follows: K10 to informer, K10 to MC, K30 to researcher/tourist.*
8. No-one can lie to or mislead a researcher. *Fine for infringement: K50 or 2 months imprisonment. Fine is paid as follows: K10 to informer, K10 to MC, K30 to researcher/tourist.*

9. People who are not traditional landowners in the CMWMA cannot do the following: (i) buy land; (ii) build a house; (iii) begin a business; (iv) hunt; (v) cut trees.
10. All forms of mineral, oil and timber prospecting or exploration are banned in the CMWMA (except for land of the Kuasa Hauslain [near Herowana]).
11. No-one may hunt with slingshots, bows and arrows or shotguns near villages in the CMWMA. *Fine for infringement: landowners K10, outsiders K20. Fine is paid as follows: K5 to informer, K5 (K10) to MC, K5 to landowner (in the case of outsiders).*
12. No-one can hunt with a home-made or unregistered shotgun. *Fine for infringement: K100 or 6 months imprisonment. Fine is paid as follows: K30 to informer; K70 to MC.*
13. No-one can buy or sell shotgun cartridges. *Fine for infringement: K20 per cartridge. Fine is paid as follows: K10 to informer, K10 to MC.*
14. No researcher, tourist or company may remove any forest/river/land resource, use any idea, technique or information from the CMWMA without the permission of the MC. Any profit made from any products derived from the above must be shared with the people of CMWMA. All researchers and/or companies entering the CMWMA must sign a legally binding document to this effect.⁴
15. No-one may consume, transport or grow illicit drugs in the CMWMA. No landowner may consume, sell or transport alcohol. Tourists and researchers may not supply alcohol to landowners and must consume alcohol in privacy. *Fine for infringement: alcohol K20, drugs K30. Fine is paid as follows: K10 (K15) to informer, K10 (K15) to MC.*
16. No playing cards for money or other gambling is allowed. *Fine for infringement: K10 per person playing. Fine is paid as follows: K5 to informer; K5 to MC.*
17. No wild animal products (except bits of pig) are allowed to be used in the manufacture of crafts for sale.

⁴ This does not refer to crafts and produce sold for resale [A.J.].

CHAPTER 19

BIODIVERSITY ON A TIGHTROPE:

INCENTIVES FOR RAINFOREST CONSERVATION IN PAPUA NEW GUINEA

NIKHIL SEKHRAN

Introduction

Tropical forests cover some 70 percent (or some 34 million hectares) of the land area of Papua New Guinea (PNG). These forests are remarkably species rich: scientists claim that between 5 percent and 7 percent of the world's flora and fauna are contained in them and in the coral reefs that fringe the coastline (Miller et al. 1994). All in all, PNG may harbour as many as 20,000 species of ferns and flowering plants, some 190 species of mammals, 200,000 to 400,000 insect species, 750-plus species of birds, and 500 species of reptiles and amphibians (ibid.). Many of these species are endemic to the New Guinea area, and many of them have a restricted distribution within it. Not surprisingly, then, the country's conservation management record is a global concern. This record has been poor in recent years.

Land tenure systems in PNG vest property and use rights amongst a range of right-holders living in local communities. Use allocation is dictated by the private interests of these communities or, more likely, by power-brokers within them. Conservation may yield wider public benefits, but is increasingly perceived by local communities as an activity opposed to their private interests. The point at issue is that biodiversity management usually requires certain uses of the forest to be excluded or restricted in order to provide for the survival requirements of flora and fauna. However, an opportunity cost arises if landowners must forego the benefits of certain land uses which are incompatible with conservation needs.

As PNG's forest owners are incorporated into the cash economy, their value systems are shifting. Many of the benefits that forest owners do obtain from conservation¹ are today being discounted in these people's decisions because

¹ These benefits are substantial. Ecological services, conditioned by species and ecosystem diversity, underpin the productivity of subsistence systems. These provide for the sustenance of the rural populace and support the formal economy by subsidising the nutrient and energy budget of labour (Pernetta and Hill 1981). The nation's formal economy is increasingly dependent on forest resource extraction, particularly timber harvesting. The farm sector – PNG's long-term economic backbone – is also conditioned by ecological services which have a contributory value to

they do not take a monetary form. Reinforced by forest owners' high time preference for current income rather than future benefits, this calculus tends to favour current extractive uses of forests over conservation. Economists have argued that this situation, mirrored elsewhere in the world, is unlikely to change unless local stakeholders begin to appropriate a greater proportion of the economic value of biodiversity in money terms (see Sekhran 1994b).

A commonly held view in conservation circles is that property rights are necessary, indeed often sufficient, to provide forest owners with a conservation incentive. This view appears reductionist, at least when applied to the PNG situation. Here, notwithstanding surety of tenure, a conjunction of socio-political, economic, and institutional factors combine to foreclose conservation options. There are few workable means of regulating private land use in the public interest. This is compounded by the fact that the option of establishing National Parks on public land is not available – the necessary land alienation is simply an untenable prospect. Conditioned by these various factors, forest management has a short-term focus. The message from the field appears to be that property rights alone provide an insufficient incentive for biodiversity conservation.

The question, therefore, is how to convert non-monetary conservation benefits into cash incomes for landowners. How can landowners be compensated for the opportunity costs associated with conservation management? Many conservationists and economists argue that material incentives are essential as a conservation tool, but what form should incentives take? This paper searches for answers.

In order to locate the discussion in the appropriate policy context, the first two parts of this paper provide an overview of the threats to forest biodiversity and the stakeholder interests that motivate them. The third part then examines the leeway for arresting these trends by developing material incentives. Rather than weighing in with a lengthy stakeholder analysis, this chapter focuses on the forest owners who are the primary stakeholders. Two types of incentives are discussed:

- development support through integrated conservation and development (ICAD) initiatives; and
- transfer arrangements such as conservation management rental schemes.

It is shown that a number of social, economic and political factors create hurdles that will need to be overcome if conservation objectives are to be attained using either of these methods. So far as conservation policy is concerned, the jury is still out in the search for workable mechanisms.

final production (Sekhran, Hedemark et al. 1994; Sekhran, Saulei et al. 1994). Moreover, an 'option' value for species and habitats could potentially be capitalised in the future.

The Causes of Papua New Guinea's Conservation Dilemma

The Short-Term Forest Management Focus

Many of the processes that underpinned environmental transformation in the past continue today. There is a tendency, for instance, for landowners to manage forest resources for short-term social and economic purposes rather than for long-term objectives. This reflects the situation which existed in the past. As Bulmer (1982:63) has argued:

there is little evidence that Papua New Guineans were or are very different from the majority of humanity who have not been greatly concerned with the long-term conservation of their natural environment. What they were, and still are concerned with, very directly ... are the present and immediately foreseeable yields of their crops and catches and the amount of time, effort and care needed to produce them. To these we must now add concern for cash.

In the pre-contact era, given that human lifespans were short, and that communities lacked the technological means to control their environment, the focus on the short term is not surprising. Since human population densities were low and technology was fairly basic, the ability of communities to imprint the forest environment was limited.² Today, however, as these parameters change, the management of forest resources to meet short-term needs can cause a severe erosion in their quantity and quality. The new-found concern with cash and the subsequent commoditisation of the forest resource are having especially damaging results.

Population and Subsistence

The policy debate on forest management has tended to focus on the political economy of the logging industry. There have been few efforts to address farming systems and subsistence – the other significant causal factor in forest degradation – possibly because their impacts are difficult to mitigate.

Allen (1993) has described the systemic impacts of subsistence practices on the forest environment.³ In the generic model, population pressures place increasing demands on swidden horticultural systems, reducing fallow periods. This, in turn, depletes the farming system's nutrient base, impacting on vegetational succession. This causes forest conversion, first from high bush to

² Nonetheless, this is not to argue that there were no anthropogenic impacts. References to the inherent conservationist ethos of pre-contact communities are simplistic, regardless of views often articulated by some green groups. As Bulmer (*ibid.*) attests, conservation outcomes in antiquity were most probably the product of circumstance (the conjunction of factors outlined above) rather than intention. Throughout PNG, there is considerable evidence of environmental manipulation. The deforestation of the central highland valleys is an obvious example (Powell 1982).

³ It should be noted that the tremendous variation in subsistence systems makes generalisation difficult.

low bush, and then to tall, and subsequently, in severe cases, short grass. Soil erosion, as the cover diminishes, begins to take a mounting toll, accelerating the nutrient loss process and increasing the danger of irreversibilities. The problem is that the rate of agricultural innovation may be insufficient to compensate for this, leading to a vicious cycle of ecological degradation that is difficult to stem.

Subsistence pressures are, at least in part, fuelled by population growth. With an average population growth rate between 2.2 percent and 2.3 percent, the PNG population will reach some eight million by the year 2025. This will give a mean density of some seventeen people per square kilometre. Although still low by global standards, the pressures will not be uniform nationwide. In some areas, rural-urban migration will continue to provide a safety valve for populations that cannot be supported by local environments. However, population growth in marginal highland areas is likely to place additional pressures on the highlands fringe as people spill over upland ridges to colonise virgin forest. These pressures are a function of growing population densities, but the same effect may arise from the concentration of population in the vicinity of large-scale developments such as mining projects, or along major highways.

Esther Boserup (1965, 1981), in her discussion of the stages of agricultural development, suggests a linkage between population growth and farming intensification. Her argument is that as populations grow and fixed environmental resources diminish on a per capita basis, farming intensification is fuelled through technological change. However, this may not hold in areas where virgin forest is available for clearance. For the purposes of budgeting labour time for work, custom, and leisure, farmers may calculate that it will be less burdensome to continue to shift ecological frontiers rather than innovate.⁴ The techniques available for farm intensification – ditching, mounding, soil conservation, fencing, and mulching – are all labour demanding. As Bulmer (1982) argues, the work effort involved in clearing new forest land for agriculture is substantially less than that involved in intensifying agriculture in grassland fallows. Farmers may deliberately opt to clear forest for gardens, even though they may otherwise value the forest environment.

This does not mean that farming intensification is not occurring in PNG – only that, in some areas, the rate of forest clearance exceeds that of innovation.

The introduction of firearms into remote areas has increased subsistence pressures on native fauna (see Majnep 1982; Filer 1994). This has caused the extirpation of large fauna in some areas. Pressures on fauna have been compounded by the commercialisation of the rural economy, particularly for species coveted for food and/or traditional purposes. Other new technologies, such as chainsaws, make forest clearance less labour-intensive and less dangerous. As these technologies become more accessible, the ability of communities to modify their environment increases.

⁴ This is hardly unique to PNG (see Harrison 1993).

Logging and Land Use Conversion to Permanent Agriculture

Large-scale logging is a threat to biological diversity in accessible rainforest areas. These are mainly lowland forests, which also exhibit the greatest biodiversity. The problem, from a biological perspective, is that the methods of logging which are employed are often needlessly destructive of ecosystem processes. Conventional practices tend to cause unnecessary damage to residual trees and leave excessively large forest gaps, particularly along skid trails. These gaps tend to be colonised by vines which then smother regeneration.

The biophysical factors that influence forest regeneration are rarely, if ever, accounted for in the decision to allocate timber permits. These include, *inter alia*, topography, temporal rainfall patterns, soil characteristics, and altitude. Species protection requirements are not being addressed, partly because of a lack of understanding of ecological needs. Without baseline information, ongoing monitoring and evaluation and active species management measures, even on a pilot basis, there is a considerable danger of logging contributing to the local extirpation of species.⁵

Agricultural conversion also contributes to permanent forest conversion. Pressures for conversion are often high in areas that have already been logged. Local communities typically receive royalty earnings from logging for only a short period. During this time, they may become accustomed to the windfall income earned and other benefits. The cessation of royalty payments tends to create an incentive for them to seek alternative income sources, including those derived from permanent agriculture.

More recently, there has been a spurt of project proposals for the establishment of so called 'agro-forestry' projects. These involve clear-felling of forest lands and the establishment of tree crop plantations. Many of these proposals may be designed to circumvent the *Forestry Act* in order to gain easier access to timber stands.

Summary

The actual forest area affected by the above mentioned pressures is open to argument. Annually, more than 100,000 hectares are probably affected by logging operations, some 10,000 hectares cleared for agriculture, and some 10,000 hectares affected by urban growth and infrastructural development. Additionally, perhaps 200,000 hectares (including both primary and secondary forest) are affected by subsistence activities (Unisearch 1992; Filer 1994).

The data on subsistence pressures are especially questionable. Part of the problem is that, until recently, these data were extrapolated from a 1961-62 study on indigenous agriculture that had never been updated (Fereday et al. 1994). The standard errors for study statistics were high – over 25 percent for

⁵ For a survey of the problems associated with wildlife management in (timber) production forests, see Frunthoff (1995).

estimates of land areas under cultivation. Thirty years later, these data are yet more suspect, particularly as farming systems are undergoing rapid transformations.⁶

Other problems in estimating the magnitude of the human impact on forests derive from the fact that the national aerial photographic record is outdated; with surveys last performed in the early 1970s. Finally, at this time, existing forest concession boundaries have not been digitised on the PNG Resource Information System (PNGRIS) – hampering efforts to measure conservation trade-offs (personal communication, Mike Hedemark⁷).

Only 2.8 percent (13,000 square kilometres) of PNG's land mass has any conservation status attached to it. This comprises four national parks, four provincial parks, and twenty-six wildlife management areas (WMAs). Most are 'paper parks', subject to a multitude of internal and external pressures. Some 80 percent of the total protected area network consists of three sites: the Tonda and Masa WMAs in Western Province (the latter in the coastal zone), and the Crater Mountain WMA at the junction of the Chimbu, Eastern Highlands and Gulf Provinces. It is important to note here that the conservation legislation does not prevent logging or other ecologically exploitative options from being pursued in WMAs (personal communication, Kathy Whimp⁸).

Conservationists thus face the multiple challenges of expanding the protected area system, improving the management and protection of current sites, and introducing active landscape management measures to manage species and habitats outside protected areas.

Social and Economic Pressures: A Brief Stakeholder Analysis

A stakeholder analysis is useful in unravelling the root causes of the conservation problem. However, such assessments are complicated by the enormous local variation in cultural, social, and economic circumstances prevailing in PNG. The following discussion attempts to draw conclusions from the overall socio-political landscape – locally specific examples are provided elsewhere in this volume. Three stakeholder groups are briefly investigated: landowners, the state, and the logging companies.

Landowners: Differentiated Stakeholder Interests

Some 97 percent of land in PNG is held by customary landowners. Their perceptions of proprietary rights for land holdings, their current and future welfare demands, and their sense of broader social responsibility (outside their kin groups) are critical to the conservation stakes. But landowners are a difficult stakeholder category to write about because there is enormous internal social

⁶ The PNG Mapping Agricultural Systems Project is presently plugging data needs in this area.

⁷ Project Biologist, PNG Biodiversity Conservation and Resource Management Programme.

⁸ Legal Adviser to the AusAID-funded DEC Strengthening Project.

differentiation within landowner groups, and because other stakeholder groups with different interests (politicians, for example) are also landowners. There is an obvious danger of misconstruing landowner interests by treating them as a unitary category (Holzknecht 1996a).

How might we reconcile the considerable variation in custom, forms of tenure, and decision-making structures with the need for simplicity in constructing a model? In short, although there is tremendous variation in forms of land tenure, land is generally controlled by kinship groups with membership determined largely through descent (Fingleton 1993). Members are entitled to the use of a range of clan resources. An individual's influence over decision making is codified by custom and economic standing. Power is conditioned by custom, leadership qualities, age, and gender, but also by the ability of an individual to build strategic alliances with external players and establish systems of patronage and reciprocal obligation (see Standish 1992; Saffu 1996). The balance of power tends to be vested in a smaller subset of the kinship group – traditionally the senior men.

A key issue for conservation is the ability of vested interest groups to dominate the local policy and decision-making process, wielding power to suit their own personal agendas. The experience in Bougainville and elsewhere shows that this is rarely durable. In time, new interest groups tend to emerge and stake a claim to resources (Filer 1990). In the immediate term, however, a small group of individuals can hold the balance of power and make decisions which are not necessarily in the broader and longer-term social interest of the local community. Such 'big men' may make this tenable by exercising customary and economic power and/or withholding information from other clan members.

Landowners: Demands for Income and Services

A key issue is that landowners' demands for income, infrastructural development, and services are creating enormous pressures to capitalise on forest resources for the purposes of generating income. The inability of many rural communities to participate in the formal economy tends to lead to an enormous sense of alienation from perceived national and international economic processes. This leads to frustration. Many landowners have an oversimplified perception of development, and lack an understanding of its determinants. 'Development' has increasingly come to mean a capacity for capturing rent (or 'cargo'), as if it reflected an inalienable right to goods and services delivered from the outside (see Filer 1997a).⁹ Resource development

⁹ Why is this a problem? One issue is that rental income is limited; as populations grow and target incomes increase, this return is unlikely to satisfy local needs. The danger is that utilisation of the forest resource base beyond its regenerative capacity may erode future welfare potential by foreclosing wider sustainable uses. The forest's regenerative capacity may be exceeded either by overharvesting a given resource beyond biophysical sustainability thresholds or by managing it to sustain a single benefit flow (i.e. timber). Landowners tend also to capture only a fraction of the

projects, by making royalty payments to landowners, tend to reinforce this ideology.

Landowners: The Pressing Challenge

A major challenge for PNG, as a young nation, is to seek workable instruments to reconcile private and social cost-benefit equations for forest use. Decisions on land use are being made at the local level, based on private costs and benefits, regardless of the external social costs. In general, landowners are appropriating (in money terms) only a portion of the net value of conservation. Many of the benefits obtained, including subsistence-related and indirect use benefits, are non-monetary. Given the growing demand for cash incomes, these benefits are being discounted. The inability of forest owners to capture (in money terms) a greater portion of the total economic value of the forest resource is one of the factors that is leading them to commit it to a single use, such as logging, rather than broader conservation management.

The evidence from the field is that landowners are not naive regarding the potential social and environmental impacts of logging (personal communication, Rob McCallum¹⁰). Rather, they regard this as an acceptable sacrifice in return for infrastructure, services, and cash incomes.

There are few regulatory instruments currently available to delimit land use options on customary land and internalise the external costs of such use. The legitimacy of the state and its systems of governance are increasingly being questioned by landowners. The argument runs as follows. The state is a remote entity to many landowners. In isolated areas not penetrated, or already abandoned, by government services, it is not even particularly relevant. The ability of the state to regulate land use is constrained by both capacity-related and geographical factors. In the colonial era, the state's authority was accepted by landowners in return for government services (Allen 1993). Today, however, where these services are not forthcoming, or where police actions aimed at maintaining law and order have caused local resentment to increase, the role of the state is being increasingly questioned (*ibid.*). The inability of government agencies to meet the high expectations of landowners (for goods and services) reduces the state's jurisdiction over land use.

Importantly, the willingness of the state to exercise whatever authority it can wield (by excluding areas from logging in the National Forest Plan, for instance) is constrained as a result of political imperatives.

overall returns from extractive development. Owing to their limited skills, experience, and management ability, current development models tend to be driven by external agents. In the longer term, as capacity and structural constraints are addressed, community-led development could potentially offer greater dividends, at the local level, than those which are being harnessed today. However, current resource allocation is mitigating against these opportunities being realised.

¹⁰ Conservation Area Management Adviser for the Lak ICAD project, United Nations Development Programme.

It is now obvious that it is very difficult for conservation to compete with logging pressures in the short term. This is because the scale of landowners' current windfall earnings from logging is so high, even though it is still true that they capture only a fraction of gross timber sales. This is illustrated in Table 19.1, which compares the returns to landowners from various land uses. Estimates of annual income derived from sample farm budgets are given. The last column discounts cash flows at a rate of ten percent to derive an amount for net present value (NPV).

Table 19.1: Returns from various land uses per hectare, at 1994 prices.

Activity	Volume	Output Price	Net Income	NPV for 10 Years
Logging	22m ³	K180/m ³	K334	K304
Hybrid cocoa	290kg*	90t/kg*	K117*	K567
Chillies	570kg*	90t/kg*	K516*	K2,840
Galip	100kg	15t/kg	K15	K90

Note: Galip nuts are collected from the natural forest.

Sources: Conservation Resource Centre (logging data); Kandrian-Gloucester Integrated Development Project (agricultural data). Statistics marked with an asterisk are to be taken as averages.

An important point to note when analysing these figures is that logging, in contrast to the alternatives, requires landowners to make few financial and sweat equity inputs. Logging also involves minimal labour drudgery. It imposes few opportunity costs in terms of communities' time-budget allocations for leisure and customary purposes. However, logging income is, in effect, a 'once off' payment, while the other activities provide an ongoing flow of income.

The State: Treasury Needs

Increasingly in recent years, forest policy has tended to be driven by fiscal needs. Budgetary shortfalls have prompted policy makers to increase the scale of current forest production in order to meet revenue targets. Export tax yields from forestry have grown substantially since 1989, when the proportion of total government income earned from log exports was 1.67 percent (K11.5 million). In 1994, some K147 million was appropriated, amounting to more than 12 percent of aggregate income, and in 1995, K138.2 million was earned from this source (Internal Revenue Commission, unpublished statistics).

In the 1996 budget, the government replaced the old taxation system, which charged differential rates based on species, to a value-based system. The new tax system, imposed *ad valorem*, is banded, with cumulative marginal rates applied based on price.¹¹

The forest industry, not surprisingly perhaps, has strongly opposed the new system. The high marginal tax rate applied on high log prices probably accounts

¹¹ There are six f.o.b. price increment bands (see Filer, this volume).

for much of the criticism. At a price of around K180 per cubic metre, the state's share of income under the new system is roughly equivalent to that under the old one. Long-term log price trends are expected to be strongly positive (Gresham 1995).¹² In the longer term, given this prognosis, the proportion of the absolute rent captured by the state may be expected to rise at the expense of developers.

Why then does the state persist in committing forests to logging at levels that cannot be sustained, and condone damaging logging practices that will probably reduce harvest opportunities in the future? The projections suggest two things:

- firstly, that the state places very high implicit discount rates on future income – opting for current harvesting at the expense of the future; and
- secondly, that policy makers may lack an understanding of long-term market trends and determinants.

The answer probably lies in a combination of both these factors.

The major concern is that, as the returns from forest depletion are not being capitalised in human and human-made asset formation, but rather are being allocated to consumption, it cannot be argued that one form of capital is simply being replaced by another. This argument is often used in Southeast Asia to justify unsustainable harvest levels. Owing to the dearth of opportunities for diversification, PNG's economy will almost certainly continue to depend on its natural resource sectors, including the forestry sector.

The State: Political Cycles

The role of the state as a custodian of PNG's forests, in the public interest, is greatly complicated by political imperatives and cycles. Politicians face immense pressures from constituents. The large number of candidates in any given race tends to cause electoral promises to be inflated in the campaign season (see Dorney 1990). The costs of contesting and holding a seat have escalated (*ibid.*). In the 1992 election, of 109 sitting candidates, 59 were not returned. Politicians are painfully aware that unless they respond to demands from their constituents for material rewards (in return for loyalty), the chances of them being unseated are high. The conjunction of these factors provides a substantial incentive for current income 'maximisation' and, in some cases, malfeasance. To some extent, this explains political antipathy towards radical restructuring of the forest sector, and also towards conservation.

Logging Companies: Rent Seeking

Logging costs in PNG are notoriously difficult to decipher. The 1991 Forest Revenue Study (Shedden Agribusiness 1991) estimated that costs ranged

¹² Preference shifts in European and North American markets towards boreal timber sources will be strongly offset by the buoyant demand from emergent markets in the Pacific rim.

between K16 and K60 per cubic metre, at a time when the PNG kina was roughly on par with the US dollar.¹³ Actual costs are correlated strongly with production efficiency, the distance of logging coupes from log ponds, and site topography. Given a current harvest cost of K60 per cubic metre, and ignoring the possibility of cheating, gross returns to the industry are probably in the order of 25–30 percent on f.o.b. sales (see Duncan 1994; Sckhran, Saulci et al. 1994), although these statistics are hotly contested by the logging companies.¹⁴

While these margins may seem high, the very substantial risks in investing in PNG need to be taken on board. Frequent political perturbations, abrupt changes in tax structures, and landowner disputes all mitigate against the industry taking a long-term view of forest management.

Finally, Asian multinational logging companies, the main industry players, have little reason to apply high environmental standards to their operations. This is partly because they lack an active, politicised conservation constituency at home.

The amalgam of these factors tends to result in an impetus for short-term rent seeking.

Incentive Mechanisms

The first two parts of this paper have documented the underlying causes of PNG's (forest) biodiversity conservation problems. A conjunction of interests and factors is responsible. These are especially acute for 'non-use' options, eliminating preservation as an option. Most conservationists accept that conservation in PNG must be predicated on a concept of 'use it or lose it'. Opportunity costs may best be addressed, they argue, by developing a framework of incentives. One aim would be to ensure that forest owners receive, in tangible terms, a greater portion of the total economic value of biodiversity.¹⁵

¹³ Devaluation has since caused a shift in relative prices between imported and domestic inputs. Because sales are for the most part dollar-denominated, the effect of the devaluation on the industry has probably been slightly positive.

¹⁴ From an economic perspective, we are concerned with the costs of production of an efficient operator. This needs to be weighed against the industry's actual costs.

¹⁵ The question arises as to how to define a fair incentive. Given that total economic value is largely comprised of non-monetary values, an empirical basis for defining compensation amounts based on economic values *per se* is lacking. Although a number of methods exist by which to uncover non-monetary benefits that derive from biodiversity, a number of factors impede their application in PNG (Sckhran 1994b). In defining compensation amounts, it should also be realised that a bidding game is being played. Local communities capture a host of direct and indirect use benefits from natural environments and they are likely to ascribe at least a minimum value to these. But outside interest in conservation tends to provide an inducement for landowners to hid up the price for the resource (or fail to disclose their own values) in order to maximise rent capture.

Several potential incentive mechanisms exist. Two possible measures are detailed in the following discussion. The analysis shows that there are a number of hurdles, some of which have already been described in the first two parts of this chapter, which have to be crossed first before these measures are likely to work.

Integrated Conservation and Development (ICAD) Projects

The current strategic approach to the establishment of a protected area system in PNG is to promote alternative land use methods and income-generating opportunities over ecologically damaging options. The objective is to establish a nexus between conservation objectives and the social and economic welfare needs of local communities. Material incentives provided to achieve this objective may include:

- support for the development of income generation schemes consistent with conservation;
- funding for social infrastructure and services; and
- the payment of access fees (for research or tourism).

Under this strategy, development support may be provided, as an incentive for conservation, through the vehicle of discrete integrated conservation and development (ICAD) projects. Several such projects are presently being implemented, supported by a range of government, non-government, and donor bodies. There is no single ICAD strategy, and these projects cover a wide spectrum of approaches to such matters as community entry, engaging community participation, definitions of 'development', and education and awareness activities. Although it is still too early to draw concrete lessons from these implementation efforts, it is clear that a number of factors presently appear to hamper the realisation of ICAD objectives.

Landowner demands, for example, can greatly stretch limited project resources, particularly in areas where alternative options, including logging, exist. An ICAD project in Lak, New Ireland, was challenged by landowners to match income generated from an existing logging project which the ICAD was attempting to replace with 'eco-development'. This was imposed as a precondition for their participation in the conservation effort. However, the fact was that 'eco-development' options, by reducing annual harvests of forest products to ecologically sustainable extraction thresholds, resulted in a loss of current income. This served as a substantial disincentive for conservation, and was exploited to the full by the logging contractor and individuals who stood to lose if the logging venture was displaced. Many of these individuals based their decision to oppose the conservation initiative on their private cost-benefit calculus, ignoring broader long-term community welfare issues. The systems of

These values need to be factored into the analysis of opportunity costs associated with conservation.

patronage established to support logging proved especially difficult to compete against. The message that 'eco-development' would serve to increase long-term income was met with short shrift (personal communication, Rob McCallum).

A major problem is that community expectations from development, led by a small faction of interest groups, are very high. Perceptions of development as 'cargo' or rent, rather than a long-term process of social change, are widely held. Self-help models are poorly understood and seem unattractive when compared to the prospect of rent capture. Expectations are being constantly driven upwards through exposure to outsiders, including tourists, city dwellers, and the media. The welfare gap which exists between urban areas and other enclaves, including mining areas, and the forest hinterland is obvious to landowners, and this often leads to a sense of frustration on their part. The gap also serves to fuel development expectations, as communities strive to close it.

Developers tend to play to the local landowner gallery by promising income, employment, services, and infrastructure in return for resource access rights. Though these promises may often be false, they seem attractive, especially when immediate rewards (cash, travel perks, and other benefits) are provided. The structure of access agreements further reinforces incentives for extractive forest use by making provision for the developer to provide social and economic infrastructure. The effect is to perpetuate, amongst forest communities, a culture of dependency on outsiders. These precepts of development, once they have taken hold, are difficult to shift.

ICAD projects generally have funding to provide technical assistance, training, information, and other catalytic support. With this, they aim at catalysing community-led development, by placing the onus for development initiatives on local stakeholders, rather than externally motivated models. However, communities which are accustomed to receiving rents may expect ICAD projects to *deliver* development rather than just providing support for it. A substantial change in such attitudes is required if ICAD projects are to work.

Early Rewards Schemes

One means of addressing these pressures is to provide early rewards to landowners. These are tangible immediate incentives (social infrastructural provision and other development support) to reward 'desirable' forest uses.

The problem is that such schemes may undermine the very long-term development process that ICAD projects are attempting to support. By sending the inadvertent signal that development is rent capture, they may work as a disincentive for work effort, which, in turn, is a prerequisite for successful community-led development. The danger is that this may set an unfortunate precedent for future project interventions. Furthermore, unless 'rewards' are linked to conservation outcomes, future relationships between the community and conservation advocates are likely to be damaged.

Buying Time

As already discussed, pressures that underlie habitat loss are rooted in short-term socio-economic and political needs and demands. Long-term planning time horizons, essential as they are to resolve these issues, are a luxury for many ICAD projects which are wrestling with immediate concerns. Time is a commodity in short supply.

Can the state intervene to foreclose landowners' forest use options? Given the dislocation of the state from civil society, and the consequent limited impact of state decrees on land use, the answer is probably 'no'. The interests of the state in resource development also work against such an option. Technically, however, the government is able to foreclose timber extraction as a resource use option by insulating areas from timber production under the National Forest Plan. Such zoning would not remove other pressures on the forest base, but it would serve the purpose of 'buying time' in order to resolve these problems.

High Costs of Social Services

Although service provision may be considered as a form of material incentive, none of the existing ICAD projects are designed and capitalised to provide for services. The costs of providing education and health care in rural PNG are high. The government's ability to increase service coverage is limited by fiscal factors, and ICAD projects have little leverage capacity to negotiate government service provision. Thus far, apart from basic literacy extension, none of the existing ICAD projects have included service provision in their programmes.

Structural Constraints to Micro-Enterprise Development

If income generation is a landowner priority, then ICAD projects will need to provide support for micro-enterprise establishment. A number of structural constraints impede viable enterprise establishment. These are reviewed in Sekhran (1996) and are summarised here:

- PNG's internal markets are small. This stems partly from the fact that rural incomes are low, and partly from the fact that minor forest produce is often available for consumptive purposes directly from the wild.
- The fragmentation of internal markets affects distribution and marketing costs. Fragmentation occurs as a result of the spatial distribution of human population concentrations and the dearth of economic infrastructure to create or access markets. This has implications for minimum scale economies.
- International markets have quality control requirements, professional service expectations and delivery needs that are difficult to service. These require extensive discipline, which is difficult to achieve. The lack of understanding of market determinants, structural factors, costs, skills, and experience with the workings of the formal economy are all constraints.

- Information failure causes a lack of understanding amongst rural entrepreneurs of the determinants of markets. This is partly a consequence of the remoteness of markets from points of production and the lack, or poor functioning, of information systems.
- High input costs, including those for electricity, distribution, marketing, communications, and security, tend to reduce competitiveness and margins.
- High rural wage rates, skill shortages, and low productivity increase overheads and reduce business development opportunities. Successful small businesses often have intensive business management inputs; many employ expatriates (including volunteers), but this has adverse implications for sustainability.

The conjunction of these factors affects the viability of micro-enterprises, and therefore constrains the ability of ICAD projects to meet their central objective. Though there are considerable opportunities in terms of potentially saleable products (see Sekhran, Saulei et al. 1994), demand-side bottlenecks exist. This requires time to address.

Work Effort Disincentives

A major factor to be considered is that community-driven small business activities require considerable work effort, labour drudgery, and opportunity costs in terms of time foregone for customary activities, relative to royalty-generating options such as large-scale logging. This affects the economic calculus of communities and has a bearing on motivation.

Reconciling Custom with Enterprise Management and Capitalisation Needs

Brooks (1996), in a review of lessons learned from the past history of small business development in PNG, argues that a principal reason for the failure of micro-enterprises is the repeated attempt to apply Western business models to the village economy rather than seeking an indigenous paradigm. She makes a distinction between Western linear business models, where asset formation fuels long-term business growth, and cyclical models of enterprise in Melanesia. In the latter case, the catalyst for community mobilisation and work effort is a short-term customary objective (an example would be the need to create an agricultural surplus for a bride price payment).

Brooks (ibid.) further argues that it is critical to recognise the customary obligations of communities and the need for individual members to budget time to meeting these. In other words, time needs to be budgeted for both customary activities and business needs. A related issue is the need for community entrepreneurs to service their multi-strand relationships with other community actors. Sociocultural norms in Melanesia oblige wealth creators to distribute assets amongst clan members. These obligations are ignored at the peril of the entrepreneur. Yet there is a fundamental trade-off between the necessity of servicing business needs, maintaining and building the capital base of the enterprise and investing sweat equity, and customary obligations. Demands on

wealth may be based on community perceptions of wealth rather than on an objective basis taking account of liquidity.

Brooks' review also found that, for many business projects, community involvement in the process of defining project objectives was limited (*ibid.*). A related factor is that few community members are aware of the reasons (for example, market factors) which explain why given decisions are made or need to be made. A challenge for ICAD projects is to develop methods to perform feasibility investigations at the village level – challenging stakeholders to broaden their perspectives on the fundamentals of business management.

The problem, of course, is that businesses, despite their customary demands, operate in a 'Western' business environment that emphasises quality, reliability of delivery, and credit discipline. Brooks' solution is to build community support for the objectives of micro-enterprise establishment through awareness raising and dedicated training programmes which aim at developing problem-solving, planning, and critical thinking skills. This later needs to be followed up with extension support at the field level. She cautions, in the process of achieving this, against dissociating business development from the broader community development context.

Conservation and Development Linkages

An important point is that, ultimately, durable linkages between development support and conservation need to be built. Worldwide, the performance of ICAD projects on this account has been poor (Wells and Brandon 1992). The existing ICAD projects in PNG are all grappling with this challenge. Solutions are likely to embody a mixture of community-level checks and balances, partly through building and empowering local institutions to be responsible for conservation management.¹⁶

Other Strategies

A major lesson is that, if community-led development is not an available option (for the reasons already outlined), then a strategy of attracting responsible, ethically guided companies to operate sustainable development enterprises for profit may need to be employed. These could provide a rent to local stakeholders.

However, the climate for business investment in PNG poses challenges to this strategy. The returns from the business activity will need to be sufficiently high to attract investors and cover risk premiums payable on capital markets. There is a problem in providing long-term surety. The interest rates applied by financiers to cover risk currently mitigate heavily against the future. The scale

¹⁶ Holzknicht and Power suggest the establishment of Community Representative Management Committees (CRMCs) or Village Development Committees (VDCs) consisting of representatives of kinship groups that hold land and forest resources (see Power 1994; Holzknicht 1995a, 1996a). This approach aims at reconciling custom and tenure systems with formal management needs.

of operations necessitated to cover premiums would probably be high, and a large baseline resource base is necessary to ensure that harvesting is ecologically sustainable at these levels. There are thus enormous hurdles to overcome.

There is a further caveat. The line between the provision of development support in this form and the payment of conservation transfers is blurred. One of the principal arguments in favour of community-led small business development revolves around the idea that, by making sweat equity and capital investments, local communities will have a greater responsibility for, and commitment to, productive development (as opposed to rent-seeking). The prediction is that conservation will be achieved through development only if development is feasible. But this requires, in addition to resolving production, marketing and other problems, that communities are disciplined, make sacrifices, temper their expectations, and take responsibility for development activities. Without such responsibility, development is unlikely to be sustainable.

It is unclear for now, given the peculiar exigencies of PNG's social, economic, political, and institutional fabric, whether the ICAD process will succeed in meeting conservation imperatives; and yet the process will no doubt continue to be the focus of efforts because the alternatives appear even less workable at this time. Notably, the alienation of land to form National Parks and inviolate areas is not on the agenda. It remains politically and financially untenable, especially given the political awakening of landowners' attachments to land and the nature of the existing balance of power between them and the state. Even if small parcels of land are protected in this fashion, the experience with existing parks on state land is that the previous owners of land maintain an ongoing interest in the land so alienated, failing in some cases to accept that property rights have been transferred. This presents the obvious danger that the whole process may later be re-litigated.

Problems with Accessing Large Areas for Conservation

The biological sciences suggest that, in order to serve as viable species storehouses, protected areas need to be large (see Schafer 1990). Beehler (1993) argues that, in PNG, sites need to be at least 8,000 square kilometres in size. The problem is that no single landowner parcel is likely to be of sufficient size to meet these needs. The larger the area of interest for conservation, the greater the number of owner-stakeholders involved. Each of these groups will have a bounded resource set – they will seek to meet certain social and economic objectives within the constraints which this imposes (Sekhran 1996). Because the marginal opportunity costs of foregone uses are high, individual clans may be willing to apportion a part of their landholding to conservation, but not the entire parcel. Thus we see a situation in PNG today in which a number of landowner groups have expressed an interest in conserving a portion of their landholdings, but these holdings are generally too small to provide for long-term conservation.

A zoning plan that commits land to production and strict preservation within a multiple-use management framework will have significant

distributional implications. Opportunity costs would be imposed disproportionately on those clan groups which have jurisdiction over inviolate zones, while the benefits would be captured by those clans which control zones of extraction. Landowners' perceptions of the gains and losses that apply to them will determine the degree to which they agree to participate in management.

A transfer mechanism would need to be found to ensure a spread of benefits within any conservation management area between all prospective stakeholders. Orsak (1996b) provides a strong word of caution in this context:

Rural villagers aren't clamouring to embrace the concept of local taxation for the common good. Until they do, using economic benefits from one area or group to secure the protection of large, contiguous habitat areas is not going to work.... Incentive sharing will have to wait until villagers have embraced the kind of macro land use planning that is essential for conservation.

Conservation Rents

Another option, where stakeholder demand for income is high and the ICAD process is unable to catalyse viable small business development, is to establish a conservation interest in land through payment of a conservation management rent. The aim would be to create a market in the multi-functional characteristics of biological diversity, and thus an incentive for broader conservation. In essence, conservation rents may be construed as a transfer mechanism to pay landowners not to commit land to ecologically destructive land use options.

Conservation management rents may take several guises. They may take the form of annual cash payments, subsidies for service delivery, or a combination of these. Some schemes have established conservation trust funds.¹⁷ These are conservation endowments, the proceeds of which may be used to rent virgin forest. Funds may be generated through national government budget appropriations, the private sector, bilateral and multilateral donor bodies, and through debt-for-nature swaps, carbon offset initiatives, or other innovative financing deals (see Dixon and Sherman 1991). Thus there is no single model, although the broad objectives of the various schemes are similar.¹⁸

Conservation rents may be calculated from estimates of the consumer surplus obtained by beneficiaries of biodiversity conservation who do not face the full costs of provision – particularly communities in the developed world. Alternatively, the opportunity costs faced by local stakeholders in pursuing conservation management options may be used as a proxy. They may also be

¹⁷ For an overview of current environmental funds, see IUCN/NC/WWF (1994).

¹⁸ Some schemes, such as the 'Buy an Acre' of rainforest scheme, aim at securing title over land (ownership) for conservation purposes. For obvious reasons, this is simply unworkable in PNG.

arbitrarily calculated on the basis of a predefined rent.¹⁹ Regardless of the modality, the key is to ensure that the linkage between the service (conservation management) and the payment is transparent, and to find mechanisms to enforce the compact. Herein lies the rub.

The arguments for and against transfers have been articulated elsewhere (Sekhran 1994b) and are summarised here.

To reiterate, one factor underpinning the biodiversity management problem is that local resource stewards are only capturing a portion of the total economic value of conservation. Their economic calculus is based on a comparison of relative private and social costs and benefits. Cost factors, including opportunity costs, bear heavily in this calculus. The benefits are discounted because they are not captured by the community, being enjoyed by other actors or by future generations. They are also discounted because they are non-monetary, or because the systems linkages between ecological health and human welfare are poorly understood. One solution to address this is to ensure that communities secure money values for benefits not previously capturable.

Global communities, it could be argued, obtain conservation benefits – including existence, recreational, and future use benefits – without facing the costs of provision, which instead fall disproportionately on the providers of the service (Wells 1992). They thus obtain a consumer surplus for conservation management. The utility obtained from conservation, however, would be lost if conservation values are eroded through ecologically exploitative forms of development. This loss would be manifested through a loss of existence values, option use benefits, and potential adverse eco-system feedbacks. *Ipsa facto*, there are substantial economic and moral justifications for this constituency to pay for the provision of conservation services.

More affluent communities are likely to be more concerned with future welfare than poorer communities, PNG's landowners included. Transfers would share the burden for natural resource stewardship with those who have the ability to pay. Questions arise, however, concerning the willingness of affluent communities to pay unless compelled – regardless of their ability to pay. Similar uncertainty exists over the amounts that they would be willing to pay. Ensuring that funds flow during recessions will be especially problematic.

PNG concerns are likely to be remote from the interests of affluent societies. TV documentaries and other forms of mass media are likely to raise public consciousness of conservation issues, but willingness to pay is probably subject to what we may term a diminishing cognitive effect. Willingness is correlated highly with perceptions of the issues at hand, and perceptions, in turn, are likely to become dimmer as time progresses. Conjecturally, as virgin forests become more scarce and the costs associated with a loss of biological diversity

¹⁹ A recently negotiated compact between the government of Vanuatu and customary landowners in Erramango pays a standard rate of Vatu 100 (approximately US\$1) per hectare per year, the set rate for 'unimproved' agricultural land in Erramango (see Tacconi and Bennett 1995).

become more compelling, willingness to pay for habitat and species protection will rise.

A major problem is that a poorly constructed transfers framework will create or reinforce a 'handout mentality' amongst local communities. This would serve to increase dependence on outside assistance and reinforce the perception that development is an externally driven process.

Several questions regarding the modality and mechanisms for the distribution of funds are likely to arise. The task of ensuring equity and inhibiting social stratification will pose a considerable challenge for fund managers.

The greatest challenge, given the current socio-political environment, will be to ensure that landowners maintain their end of any compact, and do not renege on the deal at some indefinite future period, when other land use options may appear more lucrative.

The incapacity to provide surety for conservation investments also affects investment in ICAD projects. The inability to secure the given service for which the payment is scheduled makes investment very risky. Without surety, and appropriate institutions to guarantee agreements and uphold contracts, it is questionable whether PNG will be able to attract sufficient financial resources for conservation management deals. In short, given the nature of the global marketplace, funds will flow to those countries that can guarantee the requisite conservation outcome.

Conclusions

Despite a property rights regime for forest resources that should theoretically provide an incentive for conservation management, PNG faces compelling constraints to the achievement of biodiversity management aims. This paper has documented a plethora of contra-conservation factors. It has also shown that strategies to address opportunity costs are hampered by a combination of factors. Thus, material incentives alone, regardless of the method employed, are unlikely to deliver the desired long-term conservation outcome.

Many conservation practitioners have recognised these problems and are seeking to address them through a process of education and advocacy at the community level. The idea is that a degree of attitudinal change is necessary at the local level in order for conservation to work. This process is deemed necessary prior to providing development support.

Such a strategy would require that a relationship of trust first be established with local communities. Careful attention needs to be paid to community entry processes, conflict resolution, awareness, and advocacy. Projects must directly tackle the problem of high expectations and challenge communities to rethink their development strategies. The basis of responsibility needs to be taught and reinforced at the local level. There is no short cut here. Unless communities

take the lead in organising themselves, and mobilising human and financial resources for development, conservation is unlikely to be achieved.

This strategy has intuitive appeal, although the jury has yet to reach a verdict on its efficacy. This can only be tested by the passage of time.

At the same time, the conjunction of contra-conservation factors implies that some areas of high biodiversity value will not be conserved using the vehicle of ICAD projects, but will rather be committed to extractive development. Social feasibility studies must form part and parcel of the design stage of conservation projects. Such studies may serve to alert conservation practitioners to both existing and emergent problems in the area of interest proposed for conservation management so that interventions may be appropriately designed. It makes sense to target assistance only at those areas and communities where the chances of successful outcomes appear likely.

The problem is, however, that contra-conservation factors are often most compelling in merchantable lowland tropical rainforest. One solution would be to recruit more ethical industry players into commercial logging ventures in such areas, who could then apply active species management areas in logging coupes.

Despite their shortcomings, it is likely that, at least on an experimental basis, conservation management rental arrangements may need to be tried in selected areas as an alternative to ICAD strategies. The policy lesson here is that conservation practitioners will need to be inventive in designing and applying interventions, and will need to be open to a broader range of strategies than currently appears to be the case. At the same time, every effort needs to be made to identify the likely weaknesses of given strategies and devise, as far as practicable, appropriate mitigation measures.

The process of effecting a given intervention, whether an ICAD project or a covenant agreement, will, to a large extent, define the outcome. Given the short-term exigencies that plague conservation efforts, there is often a tendency to short-stop this process. This is a mistake.

In the final analysis, the present raft of conservation initiatives will flounder unless at least some of the perverse conservation incentives that currently hold are neutralised. Without strong support from the executive and regulatory arms of the state, discrete conservation-focused actions will continue to be frustrated. Although the compelling task of addressing landowners' private objectives remains, at least the complexity of the task of finding a mutual concession between stakeholders will be somewhat eased. Such a strategy would, at the very least, buy time.

CHAPTER 20

NATURE CONSERVATION IN IRIAN JAYA: A COUNTERPOINT TO PAPUA NEW GUINEA?*

JOHN M. LEEDOM

Introduction

In an assessment of conservation policy and practice in Papua New Guinea (PNG), it seemed timely to include a comparative chapter on the Indonesian province of Irian Jaya. The 141st meridian artificially divides a single biogeographic and cultural region into two political territories which are almost equivalent in size.¹ On either side of this border, the governments of PNG and Indonesia have pursued contrasting policies on the establishment of conservation areas on customary land. In PNG, the establishment of conservation areas legally requires the participation and consent of local landowners. In Irian Jaya, on the other hand, the state has the legal authority to allocate customary land to nature conservation regardless of the wishes of its traditional owners. Has nature conservation been easier to achieve in Irian Jaya because of these differences in national systems of land tenure?

At first glance, it appears that it has. Since the late 1970s, the Indonesian government has legally declared twenty-three protected areas in Irian Jaya, covering some 63,000 square kilometres, or about 15 percent of the province (KLH 1992). The PNG government, in comparison, records the existence of thirty-four protected areas in its territory, but they encompass a much smaller area: 13,000 square kilometres, or about 2.8 percent of its terrestrial area (Sekhran, this volume). On paper, then, Indonesia has dedicated about five

* The idea to do a comparative analysis of conservation programmes in PNG and Irian Jaya arose out of conversations between myself and Nikhil Sekhran, and was encouraged by Colin Filter. The International Institute for Environment and Development generously funded a field visit to Irian Jaya in January 1996, enabling me to gather documents related to the planning and management of conservation areas and to make brief visits to Wasur National Park and the Arfak Mountains Strict Nature Reserve. I am especially grateful to the staff of the WWF Irian Jaya Programme, especially Ron Liley and the staff of the library for providing me with documentation on conservation projects. I would also like to acknowledge the assistance of WWF staff in arranging tours of Wasur National Park and the Arfak Mountains Strict Nature Reserve. *Terima kasih banyak*. Many thanks are due to Megan Passey for being my *pengikut* in Irian Jaya and for being a constant source of support. Finally, I am also extremely grateful to Peter Redfield for his editorial advice. The views that I express in this chapter are my own and do not necessarily express the views of IIED, WWF, or anyone else cited here.

¹ PNG has an area of 462,243 km², while Irian Jaya has an area of 421,981 km² (BPS 1994:42).

times more land to nature conservation in the western part of New Guinea than PNG has done in the eastern part.

On the ground, however, there is little evidence that recent conservation initiatives in Irian Jaya have been more successful in protecting biological diversity than have parallel initiatives in PNG. First of all, there are significant differences between the nature reserve system as it was designed by conservation biologists and the nature reserve system as it was gazetted by the government (FAO/UNDP 1981; Petocz and Raspado 1984, 1989). Secondly, the Department of Forest Protection and Nature Conservation (PHPA) is, at present, actively managing only four of the twenty-three legally protected areas. The rest remain essentially unmanaged. Lastly, the logging, mining, and commercial fishing industries have continued to expand, while Indonesian immigrants from other islands have continued to arrive in the province. This increase in industry and population has not only made increasing demands on land and natural resources; it has also led to increasing conflict over access to them.

In this chapter, then, I provide a review of the accomplishments and frustrations of twenty years of conservation initiatives in Irian Jaya.² I propose that conservation has not been – nor will it be – any easier to achieve in Irian Jaya than in PNG. Rather than facilitating the orderly establishment of conservation areas, the assertion of state control over forests and other natural resources has sparked competition between a variety of unequal actors – the state, large timber companies, Indonesian migrants, indigenous Irianese – over access to land and resources (Barber, Johnson and Hafild 1994:13). Such competition (and conflict) has not only made it difficult to develop effective conservation institutions and management strategies in legally declared reserves; it has also led to ecological degradation outside of them.

I begin the chapter with an overview of the national policy context which shaped conservation initiatives in Irian Jaya. I then review the history of the nature reserve system as it moved from the stage of intensive planning to the stage of implementation. In the last section, I examine how contemporary conservation initiatives, which adopt the model of Integrated Conservation and Development (ICAD) projects, have attempted to establish effective conservation management in five high priority reserves. To a certain extent, these projects are succeeding, but they leave little cause to be optimistic about the future ecology of Irian Jaya as a whole.

The Legal and Institutional Framework for Nature Conservation under Indonesia's New Order

The contemporary conservation laws and institutions of Indonesia have their roots in the Dutch colonial period, but it has only been in the past thirty years

² Previous chapters in this volume (by Whimp, Johnson, and Sekhran) have already discussed the current status of conservation initiatives in PNG, and I do not propose to add to their discussion here.

that Indonesia has developed a comprehensive conservation policy. The Dutch colonial administration enacted Nature Protection Ordinances and established about 100 Nature Reserves in the late nineteenth and early twentieth centuries (IUCN 1992:49-50). After Indonesia attained independence in 1949, the state inherited the reserve system and adopted the colonial conservation legislation. For the most part, however, the reserve system remained unmanaged, and the nature protection laws unenforced, during the years of President Sukarno's 'Guided Democracy' (from 1949 to 1966). It was not until after the consolidation of Soeharto's New Order regime (instituted in 1967) that the state once again elaborated laws and institutions dedicated to nature conservation.

Conservation Policy under the New Order

Since the establishment of the New Order regime, policies affecting the conservation of biological diversity – especially in forests – have passed through three phases.³ In the first phase, which started in the mid-1960s, the state asserted its control over natural resources and used them as a low cost source of capital to stimulate economic growth and consolidate its political base. Revenue from the export of oil, for example, was used to fund massive investments in infrastructure and human resources; revenue from the export of timber, meanwhile, helped to reduce the country's dependence on oil (World Bank 1994:35). While these policies helped Indonesia to attain high rates of economic growth in the 1970s,⁴ most of the benefits of this growth accrued to an urban elite while the costs have largely been borne by peasants and tribal peoples in the rural areas of the Outer Islands (Bresnan 1993:283-7; Hill 1994; World Bank 1994; Barber, Affif and Purnomo 1995:12). In the first phase, then, the government showed no overt concern for the environmental impact of its development projects, nor did it articulate specific conservation policies (GO/IIED 1985:45; Hardjono 1991, 1994).

In the second phase, which started in the mid-1970s, the government developed a parallel policy framework which emphasised the need to strike a balance between socio-economic development and nature conservation. In 1971, the government established the Department of Nature Conservation and Wildlife (PPA) as a subdivision of the Department of Forests. In 1974, it reached an agreement with the Food and Agriculture Organisation of the United Nations (FAO/UNDP) to undertake a joint-review of the nation's conservation needs. The review resulted in the publication of an eight-volume National Conservation Plan in 1981. This proposed revisions and additions to the national system of nature reserves, identified conservation priorities, and made recommendations for the development of conservation management strategies

³ I have adapted this periodisation from Barber, Affif and Purnomo (1995:17); see also Barber (1989:122-125).

⁴ The economy grew at an annual rate of 7 percent between 1965 and 1980 (Bresnan 1993:283).

and institutions (FAO/UNDP 1981; Sumardja, Harsono and MacKinnon 1984:217).⁵

In the second phase, then, the focus of conservation practice lay in making a space for nature reserves in the large-scale land-use planning undertaken by other government agencies. The ministries of Transmigration and Agriculture, for instance, were pressuring the Department of Forests to yield forest land for conversion to other uses (GO/IIED 1985b:3; Hardjono 1991:8-9; Tjondronegoro 1991:27). Conservation practice was not yet oriented towards the establishment of nature reserves on the ground, although the World Wildlife Fund was sponsoring projects in a number of high priority parks (Blower and McNeely 1977).

In the third phase, which started in the mid- to late 1980s, government conservation policy came increasingly to focus on the problems of managing conservation areas effectively. The 1980 World Conservation Strategy and the 1982 World Congress of Parks (held in Bali) initiated a profound shift in thinking about conservation management in Indonesia. Whereas the approach to conservation management in the past had largely relied on protecting reserves from peasant encroachment, participants at the World Congress advocated a strategy of involving local communities in the management of conservation areas and assisting them in making sustainable use of natural resources at a more general level (McNeely and Miller 1984). Over time, the ideas expressed at the Bali conference were transformed into a new model of conservation management, generally known as 'Integrated Conservation and Development' (Wells and Brandon 1992). This model called for the involvement of local communities in the management of protected areas instead of their exclusion from land which they might well regard as their own. It also called for the improvement of community welfare through the promotion of new agricultural techniques and the development of sustainable economic activities in 'buffer zones' – that is, areas immediately adjacent to reserves. By pursuing these activities, ICAD projects aimed to reduce local dependence on land and resources in the reserves, and also to provide local communities with a financial incentive to comply with the demands of conservation management. In other words, they identified *poverty* as a major constraint to effective conservation management, and sought to develop interventions which addressed this problem.⁶

⁵ When the FAO/UNDP project began in 1974, there were about 160 legally established Nature and Game Reserves, totalling about 3.8 million hectares, in Indonesia (Blower and McNeely 1977:89; IUCN 1992:51). By 1982, the government had gazetted 133 additional reserves, bringing the total area under legal protection to '11,267,540.06 hectares' (Sumardja, Harsono and MacKinnon 1984:214). Reserves which the government had recently gazetted in Irian Jaya accounted for about half of this increase.

⁶ A recent article in the flagship magazine of the WWF Indonesia Programme defined the core philosophy of the ICAD approach as follows: 'The basis for effective conservation and nature

Since the late 1980s, ICAD projects have become the dominant model for conservation management in Indonesia. Projects are now under way in a number of National Parks and Nature Reserves throughout the archipelago (see Barber, Affif and Purnomo 1995). They are being supported by the Asian Development Bank, the World Bank, USAID, the World Wide Fund for Nature (WWF), Conservation International, and the Nature Conservancy (BAPPENAS 1993:25).

Conservation-oriented Legislation

There are two main forms of legislation in Indonesia:

- 'basic laws' (*undang-undang*), which contain general statements of principle on a particular subject; and
- decrees (*keputusan*) or regulations (*peraturan*), by which particular government departments or agencies apply these basic laws to their respective areas of jurisdiction.

As a result, 'there is always an inevitable time lag before a basic law begins to take effect ... [and] the legal framework on any legal area is open and continually developing' (Fox 1994:3).

For most of the period under consideration, the *Basic Forestry Law* of 1967 has provided the substantive legal framework for conservation policy, although its main intention was to open the forests of the Outer Islands to commercial logging. The law asserted the state's control over all forests in its territory, as well as the resources which could be found in them. It directed the Department of Forests, under the authority of the Minister of Agriculture, to define official forest areas in Indonesia and then to prepare a General Plan specifying the location, availability, and prescribed use of these forests throughout the country.⁷ The forest estate was then to be divided into four categories of use: 'Production Forests', 'Protection Forests', 'Nature Conservation Forests', and 'Recreation Forests' (see Table 20.1). These categories largely prescribed where and how forests could be used. The undocumented property rights (*adat*) of peasant and tribal communities were recognised only to the extent that they did not conflict with the uses mandated by the state. The law stated that 'traditional rights as well as individual rights to obtain advantage from the forests must not interfere with the goals stated in this law'.

protection is no longer merely the management of nature. Instead, it is the management of people in their interactions with nature.' (*Conservation Indonesia*, 8(2):10, 1992)

⁷ Article 1 defined 'forest' as 'an area grown with trees, forming one unity with nature and its surroundings, and determined by the Government as forest' (cited in GI/IED 1985).

Table 20.1: The national system of forest classification mandated by Indonesia's *Basic Forestry Law* of 1967.

Forest type	Prescribed use
1. Production Forests (<i>Hutan Produksi</i>)	Forest designated for the exploitation of forest products to meet the needs of the community in general, and especially the needs of development, industry, and export.
2. Protection Forests (<i>Hutan Lindung</i>)	Forest designated for the protection of watersheds and the prevention of soil erosion.
3. Nature Conservation Forests (<i>Hutan Suaka Alam</i>)	Forest designated for the protection of native flora and fauna in their natural state.
(a) Strict Nature Reserve (<i>Cagar Alam</i>)	No management of human interference that changes the character of the soil, flora, or fauna in any way, or affects its pristine condition, is permitted. Access is for scientific purposes only subject to written permission from the PHPA.
(b) Game Reserve (<i>Suaka Margawatwa</i>)	No activities are permitted that damage the flora, fauna, or landscape that could detract from the value of the reserve. Provision is made, however, for hunting, subject to written permission from the Ministry of Forestry, and also for the development of forest-based industries, such as the collection of forest products, grazing of livestock, or fishing, subject to a permit issued by the provincial governor.
4. Recreation Forests (<i>Hutan Wisata</i>)	Forests for the use of domestic and foreign tourists.
(a) Hunting Forests (<i>Taman Buru</i>)	Managed specifically for organised hunting and fishing.
(b) Recreation Parks (<i>Taman Wisata</i>)	Maintained for outdoor recreation.

Sources: GOI/IIED 1985; IUCN 1992.

This scheme was apparently modified by *Basic Law No. 5* of 1990, on *The Conservation of Living Resources and Their Ecosystems*, which revoked the Nature Protection Ordinances dating from the Dutch colonial administration and revised the categories of protected areas that had been established by the *Basic Forestry Law*.⁸ Significantly, the new Act defined the meaning of 'conservation' (*konservasi*) largely in terms of wise management and sustainable use rather than protection. Article 2, for example, stated that 'conservation of living resources and their ecosystems shall be based on the principle of harmonious and balanced sustainable utilisation of living resources and their ecosystems'.⁹

In keeping with this principle, *Basic Law No. 5* revised the types of protected areas as they were defined by the *Basic Forestry Law* to allow for greater flexibility in conservation management (see Table 20.2). The class of 'Sanctuary Reserves' included the earlier categories of 'Nature Reserves' and 'Game Reserves'. These areas were designated for the preservation of plant and animal species, and prohibit any and all activities that would lead to a change in their natural integrity. The class of 'Nature Conservation Areas', on the other hand, included three types of area whose function was both 'to preserve the diversity of plant and animal species' and 'to provide a sustainable utilisation of living resources and ecosystems'. 'National Parks', for example, were to be managed through a multi-use zoning system which comprised a 'core zone', a 'utilisation zone', and other zones as required (Article 32).¹⁰

The passage of *Basic Law No. 5* marked a shift in conservation policy which reflected the shift that had been taking place in conservation practice since the mid-1980s. In the third phase, as previously described, the focus of conservation practice shifted from reconciling conservation needs with the land use demands of other government agencies to reconciling the requirements of conservation management with local community patterns of land and resource use. *Basic Law No. 5*, in other words, was enacted to create a legal framework for the establishment of ICAD projects.

⁸ This was the second basic law to deal specifically with environmental matters. *Basic Law No. 4* of 1982, on *Basic Provisions for the Management of the Living Environment*, established the general goal of achieving a 'harmonious balance' between human beings and their natural environment, and called for further legislation on the protection of 'organic natural resources' (see Fox 1994).

⁹ Fox (1994:2) notes that the new law contained a concept of 'sustainable utilisation' (*pemanfaatan secara lestari*) which was radically different from the idea of 'utilisation' (*pengusahaan*) contained in the *Basic Forestry Law*. The latter was primarily concerned with asserting the government's rights to control the commercial exploitation of the forest.

¹⁰ Core zones (*zona inti*) were defined as areas that were strictly protected, where activities which would modify their natural integrity were prohibited. Utilisation zones (*zona pemanfaatan*) were defined as areas which could be developed for recreation and tourism. Other possible zones included wilderness zones, traditional use zones, rehabilitation zones, and so forth.

Table 20.2: Types of protected areas according to Indonesia's *Basic Law No. 5, 1990*.

Area type	Prescribed use
1. Nature Sanctuary Areas (<i>Kawasan Suaka Alam</i>)	A specific terrestrial or aquatic area having sanctuary as its main function in order to preserve the biological diversity of plants and animals as well as the ecosystem that supports them.
(a) Strict Nature Reserve (<i>Cagar Alam</i>)	A Nature Sanctuary where the only permitted activities are research and the development of science, education, and management to protect the breeding stock. Management shall be by the government in an effort to preserve the species diversity of plants and animals.
(b) Game Reserve (<i>Suaka Margawata</i>)	A Nature Sanctuary that has a high species diversity and/or unique animal species, in which the habitat is managed by the government to ensure the continued existence of these species.
(c) Biosphere Reserve (<i>Cagar Biosfer</i>)	A Nature Sanctuary of native, unique, and/or degraded ecosystems, where all natural components need to be protected and sustained for research and education.
2. Nature Conservation Area (<i>Kawasan Pelestarian Alam</i>)	A terrestrial or aquatic area whose main function is to preserve the diversity of plants and animals as well as to provide a sustainable utilisation of living resources and ecosystems.
(a) National Park (<i>Taman Nasional</i>)	A Nature Conservation Area which possesses native ecosystems and which the government manages through a zoning system for research, science, supporting cultivation, recreation, and tourism.
(b) Grand Forest Park (<i>Taman Hutan Raya</i>)	A Nature Conservation Area which is intended to preserve a collection of a variety of indigenous and/or introduced plants and animals for research, science, education, breeding enhancement, recreation, and tourism.
(c) Nature Recreation Park (<i>Taman Wisata Alam</i>)	A Nature Conservation area mainly intended for the purposes of outdoor recreation and tourism.

Sources: Translation of original law; IUCN 1992.

A third scheme of spatial classification has more recently been enunciated in *Basic Law No. 24* of 1992, known as the *Spatial Use Management Law*. This law divides all land into two general categories – ‘Protection Areas’ and ‘Human Utilisation (or Cultivation) Areas’ – and distinguishes four types of ‘Protection Area’: ‘Protection Forests’, ‘National Forests’, ‘Wildlife Sanctuaries’, and ‘Headwater Areas’. However, the significance of this law rests primarily in the classificatory powers which it grants to the governors of individual provinces, and the rights of consultation and compensation which it grants to local communities.¹¹

In the remaining sections of this chapter, I suggest that the shifts in government policy and legislation described here are concretely reflected in the evolution of the conservation effort in Irian Jaya. Whereas conservation practitioners once focussed on their competition with other government departments for control of forested land, they are now increasingly concerned with the competition for land and resources which is taking place within reserves and adjacent areas.

A Note on Conservation Institutions

As previously mentioned, the Indonesian government first established the Department of Nature Conservation and Wildlife in 1971, as a subdivision of the Department of Forests, which itself was under the authority of the Minister of Agriculture. In 1983, the Department of Forests was elevated to a separate ministry, and the Department of Nature Conservation and Wildlife was renamed the Department of Forest Protection and Nature Conservation (PHPA). Most, if not all, of its functions and responsibilities remained the same.

In the provinces, the PHPA operates through a regional structure of district offices called *Balai Konservasi Sumber Daya Alam*, or KSDA. KSDA officers in Irian Jaya are under the authority of the regional office in Ambon, and are assigned to one of two subregions – Jayapura and Sorong.

The PHPA first established an office in Irian Jaya in 1980. Since then, KSDA officers have devoted most of their time and energy to monitoring the illegal trade in wildlife at the airports and seaports. There are only a few who are assigned to posts in the field or who make regular patrols. At present, there are just over one hundred KSDA staff in Irian Jaya (Petocz and Raspado 1989; personal communication, Ron Liley, 1996).

¹¹ According to Fox (1994:15), certain provisions of *Basic Law No. 24* represent a potentially significant departure from the *Basic Agrarian Law* of 1950, which has generally been taken to deny the validity of customary land rights, because they allow for compensation to be paid ‘not just for loss of land rights (*hak atas tanah*) but also for the loss of management rights over natural resources such as forest (*hak pengelolaan sumber daya alam*).’

Conservation Planning in Irian Jaya, 1976-1984: Getting the Government to Recognise a Boundary

Nature conservation began on a unique footing in Irian Jaya. It did not start as a popular movement against the environmental excesses of industry, nor as a project to halt and reverse a process of ecological degradation. Instead, nature conservation began as a voice in government planning for the large-scale development of Irian Jaya's terrestrial resources. Between 1976 and 1984, a group of conservation biologists associated with the FAO/UNDP Nature Conservation and Wildlife Management Project and the WWF Indonesia Programme helped the government to design a system of nature reserves for Irian Jaya. In this role, they carried out a quiet but vigorous debate with other government departments over the location of large-scale development projects. 'Irreversible decisions,' one of the consultants wrote, 'about the location of reserves in unknown or poorly known terrain had to be made in the early 1980s so that land not set aside for reserves could be made available to timber leases and other development projects' (Diamond 1986:501).

Biological Diversity

The conservation biologists who worked in Irian Jaya in this period were awed by the province's ecological variety and biological richness. Thomas Schultze-Westrum, who led the first WWF mission to Irian Jaya in 1978, described it as 'the largest stronghold of virgin tropical rainforest in Southeast Asia [whose] surrounding sea harbours the richest marine life on earth' (1978a:86). Ronald Petocz, who established the WWF office in Jayapura in 1980, described Irian Jaya as 'one of the world's last real storehouses of pristine nature'. It was 'a land ... with a multitude of spectacular, diverse, endemic and exotic forms of plant and animal life' (1982:429).

The range of habitats and the diversity of plant and animal species in Irian Jaya – as in the rest of the New Guinea region – is indeed staggering. The island of New Guinea is sufficiently large and topographically varied to have functioned as a 'miniature continent' in recent evolutionary history. In Irian Jaya, the Central Dividing Range, which reaches altitudes high enough to support glaciers, carves the province into three distinct lowland districts: the northern coastal plains and foothills, the southern coastal plains, and the western lowlands and mountains of the Bird's Head Peninsula. Within these lowland districts, moreover, there are several isolated mountain ranges: the Cyclops, Foja, and Van Rees ranges rise out of the northern coastal plains, while the Kumawa, Fakkak, Tamrau, Arfak, and Wandamen ranges cover much of the Bird's Head Peninsula. There are also many offshore islands, some of which are situated on the Sahul Shelf, and were thus connected to the New Guinea mainland during glacial periods, while others were not. Such a rugged and varied landscape has encouraged the speciation of plants, birds, and mammals entirely within its own boundaries (Gressitt 1982; Diamond 1986:331). Out of a total of 643 recorded bird species in Irian Jaya, 269 are endemic to the New Guinea region. Similarly, of the 174 mammal species which have been

recorded, there are 47 endemic marsupials and monotremes, and 53 endemic bats and rats (Petocz and Raspado 1989:31).

The conservation biologists believed that the combination of Irian Jaya's ecological richness and lack of economic development presented them with a unique role to play in the future of the province. 'For once,' Ronald Petocz emphatically stated, 'conservationists are here in time to help secure this [biological] diversity rather than play the all too common role of reclaiming and rehabilitating what is left over from exhaustive resource utilization' (WWF 1982:429). As the same author remarked in a subsequent publication:

Few places remain where a planner can select the most important biogeographic elements and structure a comprehensive protected area design without having to compromise with the development that has arrived there first (Petocz 1984:8).

If the biologists could persuade the government to set aside areas for a provincial system of nature reserves, they could prevent ecological degradation before it occurred. In so doing, they would also demonstrate the value of nature conservation as an alternative form of land use. If they succeeded, they felt that Irian Jaya could become Southeast Asia's most important arena for conservation initiatives (Schultze-Westrum 1978; Petocz 1982, 1984a; Diamond 1986).

Ecology, Economy, and Demography in Irian Jaya in the 1970s

In the early 1970s, the biota of Irian Jaya had indeed remained intact. This was because population densities had remained low while the extent of the cash economy was still small and highly localised. In 1971, the provincial census enumerated about 923,000 individuals. Indigenous Irianese accounted for about 96 percent of this population, and the vast majority lived in rural areas where production was oriented towards subsistence and ceremonial exchange, and where trade was carried out by barter. Monetised economic activity was mostly confined to the coastal towns and their immediate hinterlands, where recent Indonesian immigrants were dominant (Garnaut and Manning 1974:105-6). On the north coast there were three major towns: Jayapura with a population of 14,500, Manokwari with 11,500, and Sorong with 5,900. Of the other two major towns, Merauke (6,100) was situated in the southeastern corner and Biak (10,600) on the island of the same name in the northwest (*ibid*:64).

Even in the towns in the early 1970s, there were few commercial enterprises engaged in the export of goods. The transfer of government from the Netherlands to Indonesia in 1963 had provoked the withdrawal of the major banking and trading companies, while the coastal shipping service ceased to operate effectively (*ibid*:32). The skeleton of roads, airstrips, and ports which the Dutch had left behind also deteriorated as a result of pilferage and removal to other parts of Indonesia. The decline in trade, capital, infrastructure, and transport provoked a significant drop in the smallholder production of tropical tree crops by indigenous Irianese (*ibid*:86).

Similarly, there were only a few resource-based industries which were well-established in the early 1970s. Oil production by Petromer Trend was taking place in the Manokwari-Sorong region. A handful of Japanese fishing boats, meanwhile, were trawling for prawns in the Arafura Sea and fishing for tuna off the coast of Sorong. The only significant new development at this time was the Freeport copper mine, located just below the equatorial glaciers of the Carstensz Range. Construction of the mine, town site, and port facilities to support the operation began in late 1967, while the first exports of copper concentrate took place in 1972 (Wilson 1981). The timber industry had not yet made inroads into the province, despite the recommendations of the United Nations Development Programme (Richardson 1968; UNDP 1968) that forestry held great promise. The problems posed by the diversity of local tree species, and the continuing accessibility of the rich dipterocarp forests of Kalimantan, kept Indonesian logging companies away until the mid to late 1970s (Garnaut and Manning 1974:71-81; Manning and Rumbiak 1989a:31-35).

The late 1970s were, however, a time of significant demographic and economic transition in Irian Jaya, stemming largely from the increasing political and economic integration of the province with the rest of Indonesia after the UN mandated Act of Free Choice took place in August of 1969.¹² Irian Jaya was formally declared to be a province, and a governor was appointed. In 1971, the Indonesian rupiah became legal tender. The government also embarked on an ambitious development programme with the assistance of the United Nations Fund for the Development of West Irian – FUNDWI (UNDP 1968; Garnaut and Manning 1974:20-31; Manning and Rumbiak 1989a:1-16).

The development effort initially focused on the rehabilitation of physical infrastructure and telecommunications. Marine port facilities and airstrips were improved, while regular shipping services connecting the towns to other major ports in Indonesia were established. The Department of Public Works and the military began to construct the Trans-Irian Highway and extend the road networks in urban areas. The government also placed a high priority on extending primary schooling into the rural areas, where the vast majority of Irianese lived (Manning and Rumbiak 1989a:10-16).

In the late 1970s, following this development of Irian Jaya's physical infrastructure, the government became increasingly concerned to open the province to large-scale resource exploitation and to the resettlement of landless peasants, most of whom were to be brought from Java under the Transmigration Programme. Thus, if conservationists saw Irian Jaya as one of the world's last great wilderness areas, the Indonesian government saw the land and resources of the province as assets to be exploited for Indonesia's future economic development. National and provincial planners alike saw the province as a large,

¹² In August 1969, the Indonesian government organised assemblies in each district of Irian Jaya and asked them to vote on the question of whether or not they wished to remain a part of Indonesia. Their decision was unanimous, but whether it truthfully reflected the opinion of the majority of the indigenous population has been a matter of significant controversy (see UN 1969).

sparsely populated land mass, with extensive and largely unexploited natural resources, and with a great deal of vacant land which had considerable agricultural potential. On the one hand, its natural resources could make an important contribution to national economic growth; on the other hand, its unoccupied lands could help relieve overcrowding on Java and Bali (Manning and Rumbiak 1989a:45-6; see also PIJ 1987).

Planning the System of Nature Reserves

It was in this shifting political and economic context that expatriate conservation biologists associated with the FAO/UNDP project and the WWF programme began, in 1976, to collaborate with the Department of Nature Conservation and Wildlife (PPA). Their role in the government's larger planning effort was to recommend which areas of Irian Jaya should be closed to development for ecological reasons. Over the following eight years, they submitted a series of reports to the Indonesian government with detailed recommendations for the establishment of nature reserves in Irian Jaya. The initial proposals were vague and sketchy in their delineation of boundaries, but these were gradually refined on the basis of new reports from field biologists and increasingly accurate maps.

While the conservation biologists submitted a number of different proposals over the years, they all basically built on the pioneering work of Schodde (1973). Schodde established three important principles of reserve design through his analysis of the distribution of vegetation types and bird species in New Guinea. First, he noted that the lowland rainforests, which held the core of the island's terrestrial fauna, were 'a complex of biotypes', depending on the altitude of the forest, the age of its trees, and its structure. Second, he noted that altitudinal transects, from the north and south coasts into the Central Dividing Range, contained a much broader spectrum of plant and animal communities than latitudinal ones. Thirdly, he noted that there were a great number of biogeographical sub-communities in the isolated mountain ranges of the northern coast. Thus, an ecologically representative system of nature reserves would include cross-sections of the biotic communities on the northern and southern escarpment of the Central Dividing Range, and portions of the outlying mountain ranges and offshore islands (Schodde 1973:142; see also Diamond 1984; Petocz and Raspado 1989).

The subsequent designs for nature reserves in Irian Jaya incorporated and built on these insights.¹³ In 1977, after a brief visit to Irian Jaya, John Blower made the first recommendations for such designs, largely drawing on Schodde's observations. Rather than proposing potential nature reserves, however, Blower simply recommended that eleven areas be surveyed for consideration as nature reserves (FAO/UNDP 1977). The following year, the team of Van der Zorn (FAO) and Mulyani (PPA) surveyed two of the areas, proposed that they be declared as nature reserves, and recommended twelve additional areas for further

¹³ This chronology is based principally on Petocz and Raspado (1989:44-53), and also on reports collected in *The World Wildlife Fund Yearbook, 1978-1984*.

consideration (FAO/UNDP 1978). A short time later, Thomas Schultze-Westrum, acting as a consultant to the WWF Indonesia programme, presented a plan for a system of eighteen nature reserves, covering an area of about 48,000 square kilometres (1978a, 1978b). Then, in 1980, Ronald Petocz (WWF) and John MacKinnon (FAO/UNDP) collaborated in the production of a plan which included thirty-seven protected areas with a total area of about 70,000 square kilometres (FAO/UNDP 1981). Petocz then restudied the boundaries of the proposed reserves in 1981 and 1982, using aerial photographs and satellite imagery. He recommended changes to the boundaries of a number of areas in a report on thirty-one reserves, which he submitted to the government in 1983 (Petocz 1983). These proposals were then included in a comprehensive volume which described the biogeographical reasoning behind the reserve design and further recommendations for coordinating 'the integration of conservation and development' in Irian Jaya's planned future. The volume was published in an English edition (Petocz and Raspado 1984) and an Indonesian edition (Petocz and Raspado 1987). The most recent nature reserve design is composed of a total of fifty-nine protected areas of different types and encompasses some 82,000 square kilometres, or about 20 percent of the land area of Irian Jaya (Mitchell 1987; Petocz and Raspado 1989:51).

How then did the government respond to these proposals? According to Petocz, two documents have made a particular impact on government decisions (Petocz and Raspado 1989:44-52). The first document was a map produced by the Department of Forests' planning (*bina*) programme in late 1977 and early 1978. It depicted fifteen conservation areas that were based partly on the recommendations of Blower (UNDP/FAO 1977) and partly on limited fieldwork carried out by PPA teams. This became the key planning document from the perspective of the Minister, who proceeded to legally declare eleven out of the fifteen listed areas between 1978 and 1982 (see Table 20.1).

The second document which directly influenced government planning was a map which John MacKinnon and Ronald Petocz prepared in the last six months of 1980 'to meet a government planning deadline' (*ibid.*). MacKinnon and Petocz based the plan on a reassessment of previous proposals, new reports from recent field surveys (Diamond 1980, 1981), and existing maps of Irian Jaya which Petocz considered to be inadequate. This plan was subsequently published as Volume Eight of the *National Conservation Plan for Indonesia* (FAO/UNDP 1981). It was also incorporated into the *Consensus Forestry Land Use Plan for Irian Jaya* (TGHK).

The TGHK maps were produced by provincial planners throughout Indonesia in the early 1980s. *Government Regulation Number 33 of Forestry Policy Planning*, which was passed in 1970, had instructed the Department of Forests to prepare Forest Land Use Plans in accordance with the functional categories mandated by the *Basic Forestry Law* (Barber 1989:134-6). The law was not immediately implemented. By the late 1970s, however, a central planning document was urgently needed because of the growing competition between government departments for new project sites (GO/IED 1985b:3;

Hardjono 1991:8-9; Tjondronegoro 1991:27). Thus, in the early 1980s, the Minister of Agriculture issued instructions to provincial administrations to prepare Consensus Forestry Land Use Plans (TGHK), under the direction of the Department of Forests, in order to establish a standard reference point for government planners.¹⁴

During that period, provincial planners met to compare the land requirements of different government agencies. For this purpose, they drew on the available information, including 'very generalized topographic maps' (RePPProt 1990:167) and their own personal experience, to allocate forests to the categories of 'Nature Conservation Forest', 'Protection Forest', 'Limited Production Forest', 'Normal Production Forest', and 'Conversion Forest'.¹⁵ The Department of Forest Inventory and Land Use Planning (INTAG) then drew a series of maps, at a scale of 1:500,000, which depicted the distribution of forest types, intending that these would subsequently inform the large-scale land use planning of all government departments. By the time the planners completed this exercise in Jayapura, INTAG had mapped about 406,000 square kilometres of state forest areas in Irian Jaya. This meant that about 96 percent of its terrestrial area was thus placed under the legal jurisdiction of the Department of Forests (Barber, Johnson and Hafild 1994).

By the end of 1982, then, the Minister of Agriculture had completed gazettal procedures for sixteen conservation areas in Irian Jaya, with a combined area of 46,034 square kilometres (see Table 20.3).¹⁶ He had also approved the TGHK, which included an additional eighteen conservation areas with a combined area of 33,038 square kilometres (see Table 20.4).¹⁷ However, it is not clear whether the reserves included in the TGHK have any binding legal status. Some reserves, such as the Bintuni Bay Nature Reserve, were subsequently included in logging concessions granted by the Forestry Department. A substantial proportion of the areas listed in Tables 20.3 and 20.4 would have to be regarded as marine parks, rather than forest parks, but existing legislation does not allow for effective restrictions to be placed on the commercial exploitation of marine resources. It should also be noted that the TGHK allocated most of the remaining terrestrial area of Irian Jaya (about 322,797 square kilometres, or 78.6 percent of the province) to 'Conversion Forest' (28.7 percent), 'Protection Forest' (21.1 percent), 'Normal Production Forest' (17.3 percent), and 'Limited Production Forest' (11.5 percent).

¹⁴ For a general account of the TGHK process in Indonesia, see Ross (1984). For an account of the TGHK process in Kalimantan, see Potter (1991).

¹⁵ 'Limited production forests' are those in which timber production is constrained by the requirement to prevent erosion, and therefore represent an overlap between 'normal production forests' and 'protection forests'. 'Conversion forests' are those available for conversion to other uses.

¹⁶ This figure does not include the 32 square kilometres covered by the four *Taman Wisata* ('Recreation Parks'), which are not regarded here as 'conservation areas' in the strict sense.

¹⁷ This total also excludes the 259 square kilometres covered by another five *Taman Wisata*.

Table 20.3: List of reserves in Irian Jaya gazetted by proclamation, 1978-1992.

Name	Type*	Area (ha)	Date
Lorentz	CA	2,150,000	25 January 1978
Pegunungan Cyclops	CA	22,500	26 January 1978
Wasur	SM	210,000	2 May 1978
Rawa Biru	CA	4,000	2 May 1978
Pulau Dolok/Kimaam	SM	600,000	13 July 1978
Teluk Yotefa	TW	1,650	12 August 1978
Nabire	TW	100	11 January 1980
Gunung Meja	TW	500	12 January 1980
Enarotali	CA	300,000	11 February 1980
Pulau Sabuda/Tataruga	SM	450	11 February 1980
Pulau Waigeo	CA	153,000	7 May 1981
Sorong	TW	945	7 May 1981
Pulau Anggremeos	SM	2,500	30 June 1981
Pulau Batanta Barat	CA	10,000	30 October 1981
Jayawijaya	CA	800,000	30 October 1981
Pulau Salawati Utara	CA	57,000	4 January 1982
Wasur (extension)	SM	98,000	4 January 1982
Pulau Biak Utara	CA	11,000	8 April 1982
Pulau Supiori	CA	42,000	21 July 1982
Pulau Yapen Tengah	CA	59,000	12 October 1982
Pulau Misool Selatan	CA	84,000	12 October 1982
Wasur (status change)	TN	423,810	24 March 1990
Teluk Cenderawasih	TN	1,453,500	24 March 1990
Pegunungan Arfak	CA	68,325	11 August 1992
TOTAL		6,328,280	

* CA = *Cagar Alam* ('Strict Nature Reserves'); SM = *Suaka Margasatwa* ('Game Reserves'); TW = *Taman Wisata* ('Recreation Parks'); TN = *Taman Nasional* ('National Parks').

† The area for Wasur is not counted twice in the total.

Sources: Petocz 1983; Petocz and Raspado 1989; PHPA 1995.

Table 20.4: Additional protected areas included in Irian Jaya's *Forestry Land Use Plan* (TGHK), 1982.

Name	Type	Area (ha)
Cenderawasih	SM	1,898
Mamberam/ Pegunungan Foja	TN	1,442,500
Sungai Rouffer	SM	310,000
Pegunungan Wandamen/Wondiwoi	CA	79,500
Pegunungan Tamrau Utara/Selatan	CA	441,500
Pegunungan Arfak	CA	45,000
Pulau Pombo	CA	100
Pegunungan Kumawa	CA	118,000
Pegunungan Fakfak	CA	51,000
Sungai Kais	CA	122,000
Danau Bian	SM	50,000
Parieri	TW	2,000
Pulau Superiori	CA	44,500
Pulau Numfor	CA	1,500
Pulau Turtle/Mapia/Sayang	SM	1,547
Raja Empat	CA	2,976
Beriat	TW	12,350
Klamono	TW	10,000
Teluk Bintuni	CA	450,000
Wagura-Kote	CA	15,000
Kumbe Merauke	CA	126,810
Sungai Seram	TW	1,000
Gunung Meja	TW	500
TOTAL		3,329,681

Source: RePPProt 1986.

Reappraisals

Since the gazettal of the sixteen nature reserves and production of the *Forestry Land Use Plan*, there have been two major reviews of the protected area system which have revealed some fundamental flaws in the location of several reserves and problems in the delineation of boundaries for many of the others. The first was carried out by Petocz in 1981 and 1982, and the second was carried out by RePPProt (the Regional Physical Planning Programme for Transmigration) between 1984 and 1986.

Petocz restudied the boundaries of thirty-one reserves on the basis of aerial photographs and satellite images which were made available to him at the Geological Mapping Unit in Bandung. He subsequently redelineated the boundaries of thirty-one reserves at a scale of 1:250,000 and 1:500,000, and submitted them as a report (Petocz 1983). Petocz proposed major boundary

revisions for five of the reserves which had already been fully gazetted. First, he recommended that the area of the Lorentz Strict Nature Reserve be decreased from 2,150,000 hectares to 1,560,250 hectares. The boundaries of the reserve then included densely populated highland villages and the mine, town, and other sites associated with the huge Freeport copper mine. He also recommended that its status be changed to that of a National Park (*ibid*:1). Second, he suggested that the present Enarotali Strict Nature Reserve (300,000 hectares) should be replaced with a new reserve in the Weyland Mountains in the western extremity of the Central Dividing Range. He pointed out that the Enarotali Strict Nature Reserve had been gazetted to protect the Paniai Lakes, but they were subsequently found to support few, if any, endemic fish and water plant species. Furthermore, he argued, the area adjacent to the lakes was densely populated, while the ecology around them had been extensively modified. As a result, the Enarotali Reserve was of little or no significance for nature conservation (*ibid*:6). Third, he also recommended that the Pulau Biak Utara Strict Nature Reserve be relocated and reduced in size, from 11,000 to 6,690 hectares. The established reserve, he noted, was 'located outside the limits of the only primary forest left on Biak Island which houses a unique endemic fauna' (*ibid*:26). Fourth, he recommended that the size of the Pulau Waigeo Barat Strict Nature Reserve be reduced from 153,000 hectares to 116,950 hectares in order to exclude settlements along the coast. Finally, he proposed that the Yapen Tengah Strict Nature Reserve be increased in size from 59,000 to 83,000 hectares to include coverage of lowland and coastal habitats, the latter of which included important leatherback turtle nesting grounds. However, the Department of Forests has not taken any further action since Petocz submitted these recommendations (PHPA 1995).

The second major review of the protected area system was carried out between 1984 and 1986 by the Regional Physical Planning Programme for Transmigration (RePPPProt) in association with advisers from the UK Overseas Development Administration (Petocz and Raspado 1989:52). RePPPProt undertook a major study of the land resources of Irian Jaya in order to establish a firm basis for the planning of future transmigration sites (RePPPProt 1986, 1990). Utilising the most recent information from aerial photography (1976, 1977) and remote sensing, RePPPProt produced a more accurate set of topographic base maps, which included visible land use and vegetation types.¹⁸ RePPPProt then replotted the boundaries, and remeasured the areas, of the agreed forest use categories which had appeared on the 1982 TGHK map, and found that the new sums differed from those in the original plan. They also found that the TGHK had misallocated some forests to the 'Production', 'Protection', and 'Limited Production' categories because of incomplete and inaccurate data on rainfall, slope, and soils.

¹⁸ RePPPProt reported that the maps, for the most part, 'have a planimetric accuracy not worse than 500 m' (1986:19).

The results of these revisions are shown in Table 20.5. The difference between the areas shown in the final two columns reflects the difference between:

- the process of recalculating the areas enclosed within the original TGHK boundaries; and
- the process of revising the 'site index' which was used to distinguish between forest types, and then using the revised site index to redraw the boundaries themselves.¹⁹

Table 20.5: TGHK forest classification for Irian Jaya, 1983-86.

TGHK category	TGHK 1983		RePPPProt 1		RePPPProt 2	
	km ²	(%)	km ²	(%)	km ²	(%)
Nature Reserves	83,118	(20.2)	73,027	(17.6)	80,237	(19.3)
Protection Forests	86,485	(21.1)	109,169	(26.3)	156,808	(37.8)
Limited Production Forests	47,323	(11.5)	45,893	(11.1)	20,598	(5.0)
Normal Production Forests	71,235	(17.3)	77,242	(18.6)	60,291	(14.5)
Conversion Forests	117,754	(28.7)	96,401	(23.2)	88,631	(21.4)
Total Classified Areas	405,915	(98.8)	401,732	(96.8)	406,565	(98.0)
Unclassified Areas	4,745	(1.2)	13,068	(3.2)	8,235	(2.0)
Total Area of Province	410,660	(100.0)	414,800	(100.0)	414,800	(100.0)

Source: RePPPProt 1986, 1990.

The government has also failed to take action on RePPPProt's proposals for revision of the existing TGHK categories. Many discrepancies therefore remain between the protected area system as it was planned and the protected area system as it exists in law and on paper.

Ecological, Economic and Demographic Change in the 1980s

While the government only partially acted on the recommendations of its consultants in the early 1980s, there have been many other processes of change which have profoundly affected the ecology of Irian Jaya over the same period. First of all, other government departments have proceeded with their plans to establish new projects on lands outside, and in some cases even inside, the nature reserve system. In 1989, Petocz noted that eleven of the twelve approved logging concessions included areas which overlapped with gazetted and proposed reserves (Petocz and Raspado 1989:77-78). Logging was also being undertaken in reserves which had been approved in the TGHK, such as the

¹⁹ The 'site index' was a simple formula which took account of slope, rainfall intensity, and the potential for soil erosion in a given area. Thus 'production' and 'conversion' forest was to be located on land with a site index less than 175, while 'protection' forest was to be located on land with a site index greater than 175 or on slopes greater than 45 degrees (Ross 1984).

Bintuni Bay Strict Nature Reserve.²⁰ Similarly, the government continued to grant concessions for oil and mineral exploration. A large part of the lowland area of the proposed Lorentz National Park (now a Nature Reserve) has been designated as available for petroleum exploration, and the Phillips oil company has established a number of exploration camps in its southern plains and swamps (PHPA 1995). Petroleum concessions also overlap with the proposed Mamberamo-Foja National Park, the Bintuni Bay Nature Reserve, and the Danau Bian Game Reserve. The government has also recently awarded a 26,300 square kilometre exploration concession in the Central Dividing Range to Freeport Indonesia for possible extensions of its mining operations (PHPA 1995).²¹ Much of the concession area falls within the boundaries of the Lorentz Nature Reserve. There is also a nickel prospect in the Cyclops Nature Reserve and a mining concession which overlaps with the Waigeo Island Nature Reserve. Meanwhile, the Department of Public Works has continued to plan roads that would traverse the proposed Lorentz and Mamberamo National Parks (Pctocz and Raspado 1989:82; PIJ 1993:39). There are also reports that the Research and Technology Minister, B.J. Habibie, has 'an ambitious plan to dam the Mamberamo river and create industrial areas in an enormous swath of swampland to the west of Jayapura' (Loveard 1996:45; see also PIJ 1993: 50-1).

The demography of Irian Jaya has also changed dramatically since the early 1970s. In 1971, the national census enumerated about 923,000 individuals. Only 4 percent of these people had been born outside the province, and 84 percent resided in the countryside (Manning and Rumbiak 1989a:24). By 1990, the population had increased to about 1,649,000 (BPS 1994:41). Out of this population, about 21 percent had been born outside the province, and 25 percent were living in the coastal towns and their immediate hinterlands. The population of Irian Jaya, in other words, has become increasingly urban and increasingly composed of recent Indonesian immigrants. Since 1964, the government has officially settled about 180,000 transmigrants, mainly in close proximity to the towns of Merauke, Jayapura, and Manokwari (Manning and Rumbiak 1989a:54; BPS 1994:51). In addition, large numbers of immigrants have come to Irian Jaya, under their own initiative, from Sulawesi, Java, and the Moluccas. On the basis of the net numbers of passengers who have arrived at various ports, Manning and Rumbiak estimate that the number of 'spontaneous' migrants has steadily increased during the 1980s. In 1980 and 1981, 3,500 persons were arriving annually. In 1983 and 1984, the figure had increased to between 4,500 and 5,000, and by 1985, had reached over 8,500 new arrivals per annum. In 1985, the Imsini passenger liner service established a regular route from Java to Jayapura via Eastern Indonesia and Sorong (Manning and Rumbiak 1989b:23).

²⁰ See the reports entitled 'Revealing Marubeni Operations in Bintuni Bay' (*Setiakwan*, 3:28-9, 1989) and 'The Tragedy of Bintuni Bay' (*Setiakwan*, 4/5:62-3, 1990).

²¹ A recent article by Thomas O'Neill in *National Geographic* (Vol. 189(2):29, 1996) has reported that geologists have identified seventy-five 'target areas' for potential mine sites.

Government spending on the salaries of civil servants and development projects has also spurred an extended phase of 'remarkably rapid' economic growth in Irian Jaya since the early 1970s (Manning and Rumbiak 1989a:2-7; PIJ 1993).²² Both directly and indirectly, government spending has underwritten the growth of trade and markets in the towns, and has also increased employment in the construction, transportation, and service sectors. Migrants from other parts of Indonesia have, for the most part, monopolised stalls in the urban markets, retail stores, and the privately owned buses which are the primary means of transport for most people. They have also filled the majority of jobs created by the construction and service industries. At the same time, the economic linkages between the urban centres and the rural areas have remained weak, with subsistence production still the predominant activity of the vast majority of indigenous Irianese.

Finally, industries focussed on the extraction of natural resources, especially minerals, timber, and fish, have grown tremendously in Irian Jaya since the mid-1970s. The Freeport mine, for example, steadily increased its production after the slump in copper prices ended in the mid-1970s. Between 1986 and 1990, the Freeport company exported copper, gold, and silver worth an average of about US\$269 million each year. In 1995, the figure reached US\$1.76 billion, approximately 1 percent of Indonesia's total GNP (Bohane 1996).

The production of timber products has also rapidly risen after falling off briefly in the mid-1980s. Between 1980 and 1984, annual log production averaged 427,479 cubic metres; then log production dropped to 244,035 cubic meters per year between 1985 and 1989, as the Indonesian government instituted a ban on log exports. By 1989, however, annual production began to increase again, and reached a level of 1.2 million cubic metres (from thirty-two active logging projects) in 1991 (PIJ 1993:114). The provincial Forestry Department has recently approved twelve more additional concessions, bringing the total number of concessions to forty-four, and the area committed to timber production to 107,152 square kilometres, which is slightly more than one quarter of the terrestrial area of the province (YPMD 1994).

The timber industry has also been actively gearing up to move into the production of finished timber products in Irian Jaya. In the early 1990s, PT Kayu Lapis, one of the ten largest producers of plywood in Indonesia, constructed one of Asia's largest plywood factories in Sorong with the assistance of loans from the Asian Development Bank and the Canadian Development

²² The National Statistical Bureau recorded a total of 67,757 civil servants in Irian Jaya as of March 1994 (BPS 1994:79). The number of military personnel is unknown. The central government was able to fund development programmes and pay for a large civil service in Irian Jaya, in part as a result of the oil boom which began in other parts of Indonesia in 1973 or 1974 (see Mackie and MacIntyre 1994:14) and in part by foreign aid and loans, which had reached a peak of 25 to 30 percent of government revenues in the late 1960s (Hill 1994:93-97).

Agency.²³ The national government is also offering generous financial incentives to investors to develop an additional ten sawmills, thirteen plywood factories, two mangrove chip mills, one sago processing mill, and four pulp mills capable of producing 2 million tonnes of pulp per year (PIJ 1993:115).

Lastly, the scale of commercial fisheries has also increased substantially. Between 1986 and 1991, catches of saltwater fish off the northern shore of Irian Jaya increased from 39,243 tonnes to 93,000 tonnes (PIJ 1993:96). Meanwhile, the haul from prawn trawling in the Arafura Sea increased more modestly from 3,110 tonnes in 1986 to 3,470 tonnes in 1990.

Thus, if little action has been taken since 1983 to establish new protected areas in Irian Jaya, the general conservation situation has significantly changed. The growth in population and the expansion of extractive industries have begun to profoundly alter the landscape and ecology of the province. In addition, these two processes have also precipitated increasing conflicts between the state, indigenous Irianese, and Indonesian migrants over land and access to resources. So the demographic and economic context was changing rapidly as conservation practitioners began to formulate and implement management plans for high-priority reserves in the mid-1980s. In the next section, I examine the way that conservation practitioners are grappling with the social and economic changes which have taken place in Irian Jaya over the past thirty years.

Conservation Management, 1984-1996: Getting the Local People to Recognise a Boundary

The introduction of management strategies and institutions into protected areas in Irian Jaya has lagged far behind the pace of natural resource exploitation, the establishment of new settlements, and the conversion of forest to agricultural uses. While many reserves were gazetted in the late 1970s and early 1980s, the WWF and the PHPA did not begin to establish permanent offices in the province until 1980. In addition, the design and legal recognition of nature reserves had taken place without the knowledge and participation of most of the indigenous communities in the region (Petocz and Raspado 1989:43,57,75). Thus, in many ways, conservation practitioners were starting from scratch in their attempts to build up local conservation institutions and encourage conservation practices.

²³ Reported in *Environesia*, 4(3/4):16.

Table 20.6: WWF/PHPA conservation projects in particular parts of Irian Jaya, 1984-1996.

Area	Status	Key habitats	Flagship fauna	Coop. inst.	Year init.	Mng. plan	Perm. post
Cyclops Mountains	CA	Rainforest, moss forest, grassland and swamps	273 species of birds, 86 species of mammals	PHPA, WWF, YPMD, Ford Foundation	1985	Yes	Yes
Arafak Mountains	CA	Lowland rainforest, montane moss forest	333 bird species, incl. 5 endemics; 69 mammalian species; birdwing butterflies	PHPA, WWF, YBLMD	1986	Yes	Yes
Cenderawasih Bay	NMP	Exceptional coral reef systems, turtle nesting beaches, bird nesting islands	Dugong, giant clams, hawksbill and green turtles, saltwater crocodiles	PHPA, WWF, World Bank	1986	Yes	Yes
Wasur and Rawa Bicu	TN	Eucalypt grassland and savannah; lowland rainforest, swamps, and tidal mud flats	400 species of birds, incl. migratory waders and waterfowl; large pop'ns of wallabies and rusa deer	PHPA, WWF, World Bank, local NGO	1990	Yes	Yes
Lorentz	CA prop. TN	Complete spectrum of habitats, from alpine equatorial glaciers to coastal mangroves of Arafura Sea	123 species of mammals, 411 species of birds, including many endemics	PHPA, WWF, GTZ	1990	No	No
Jauraba Medi Turtle Beach	prop. CA	Coastline, turtle nesting beaches	Leatherback turtles	PHPA, WWF	1993	Yes?	Yes?
Yapen Tengah Island	CA	Lowland, hill, and lower montane rainforest	143 bird species, incl. two endemic species of birds of paradise, leatherback turtle nesting beaches	PHPA, WWF	1993	Yes?	No
Biak Supiori & Biak Utara Is.	CA	Lowland and hill rainforest	Unique avifauna, incl. 82 bird species, with nine endemics	PHPA, WWF	1993	Yes?	No

Sources: Petocz 1983; Petocz and Raspado 1989; WWF 1996.

Once the overall design of the nature reserve system was completed in the mid-1980s (Petocz and Raspado 1984), the WWF/PHPA programme in Irian Jaya shifted its attention to developing management strategies for a handful of high priority reserves.²⁴ Table 20.6 provides a list of all the reserves where the WWF, in conjunction with the PHPA, have been active in conservation management. It should be noted that the nine reserves listed in this table are the only ones where there has been an attempt to introduce some form of active protection and management. All the other reserves in the protected area system remain essentially unmanaged. They are, in other words, paper parks.²⁵

In this section of the chapter, I provide brief case studies of the types of management strategy which conservationists have used in their attempts to establish nature reserves on the ground. We shall see that conservation strategies have called for 'participatory' approaches to conservation management, and for the development of local alternative industries which are compatible with the goals of biodiversity conservation. In this way, conservation area management in Irian Jaya has been related to the increasing popularity of ICAD projects in international circles.

*'The Fastest Disappearing Habitat in Irian Jaya'*²⁶

The joint WWF/PHPA programme produced the first management plan for a protected area in Irian Jaya in 1985. It was for the Cyclops Mountains Nature Reserve, which was legally established in 1978 (see Table 20.4). The official boundaries of the nature reserve encompass some 22,500 hectares of rugged terrain which culminate in three peaks over 1,500 metres in elevation just a short distance from the coast. As a result, the reserve includes a variety of habitats, from grasslands and swamps to lowland rainforest and moss forest. Biologists have recorded 273 species of birds and 86 species of mammals in the reserve.

The Cyclops Mountains are the site of a wilderness area that is surrounded by a rapidly growing city. Since 1980, the population of Jayapura and its two suburbs, Abepura and Sentani, has increased at an annual rate of about 5.5 percent, and now numbers around 200,000 (Manning and Rumbiak 1989a:22). While most of the increase in population can be attributed to the arrival of new migrants from elsewhere in Indonesia, some of it can also be attributed to circular migration from the central highlands, particularly the area around Sentani. There are members of both migrant groups expanding the area under shifting cultivation adjacent to the reserve. Residents of the town enter the reserve to poach for game, to collect firewood and rattan, to make charcoal, and

²⁴ In 1986, Ronald Petocz left his post as the director of the programme and was replaced by Arthur Mitchell. In 1987, the World Wide Fund for Nature inaugurated a new project, No. 3770: 'Implementation of Conservation in Irian Jaya'.

²⁵ The Indonesian government itself recognises that its national system of nature reserves exists largely on paper. See the statements in KLH (1992:25) and BAPPENAS (1993:22).

²⁶ This description is based on Ratcliffe (1985); Mitchell, de Freitas and Poffenberger (1990).

to raise pigs. Commercial collectors enter the reserve to gather exotic orchids and to net birds for the domestic and international wildlife trade.

The goal of the management strategy was to stabilise the boundary of the reserve in order to prevent any further clearance of forest from taking place. The plan recommended that the boundaries of the reserve be moved, increasing the total area to about 36,800 hectares. But it also recommended that the precise locations of the boundaries needed to be determined in consultation with local communities, especially by the traditional owners of land which had been enclosed by these boundaries.

A secondary goal was to promote alternative, ecologically friendly sources of cash income. Thus, it prescribed the establishment of 'buffer zones' adjacent to the boundary of the nature reserve where tree crops, such as cocoa, could be cultivated more intensively for sale in town. These buffer zones were thus to act as a buffer between agricultural land and primary forest.

In 1986, the WWF/PHPA programme, in conjunction with the provincial Forestry Service, the Ford Foundation's Social Forestry Programme, and the Irian Jaya Rural Development Foundation (YPMD), began implementing the management plan. The project staff identified the land transfers taking place between customary landowners and immigrants from the highlands as the greatest potential threat to the reserve. They observed that, when land was sold to outsiders, or where a clan had sold land through unorthodox procedures, rightful ownership became a matter of dispute. They believed that the lack of clear boundaries between the land of each tribe or clan made it 'difficult to determine community responsibilities for management'. So they reasoned that legitimising traditional land tenure – giving 'clear title' to 'communal lands' – was the key to improving forest management in the areas in and near the reserve.

The first phase of the project began when the project staff selected a ten-member forestry field team – mainly comprised of young men – from the three villages that were chosen to participate in the pilot project. This group then underwent a period of training aimed at enabling them to act as effective community organisers for the social forestry project. Their training emphasised the use of discussion group methods and practical field exercises such as rapid sketch mapping techniques. After their training, the field staff returned to their home villages, where they began discussions with the leaders and clan members of their community about their patterns of forest use and their land requirements. It was expected that they would then help their communities to formulate forest management plans which they would subsequently formalise in consultation with government agencies (Mitchell, de Fretes and Poffenberger 1990:244).

In 1990, Mitchell, de Fretes and Poffenberger reported that the field staff on the social forestry project had made substantial progress since 1986 with 'community organizing, nursery and agroforestry plot establishment, and reserve boundary identification' (ibid:249). Nonetheless, they also noted that the project had experienced a difficult first year because 'heavy bureaucratic involvement' had made the task of managing the project 'cumbersome and unnecessarily

complicated'. In addition, the lack of adequate coordinated supervision and follow-up training had led to apathy among their field staff. As a result of this experience, the social forestry programme then sought to stabilise the boundary by somewhat different methods. In the early 1990s, conservation management increasingly relied on the direct control of encroachment, land sales, and illegal hunting and logging in the reserve.

According to Ron Liley (personal communication, 1996), the WWF/PHPA programme in the Cyclops has yet to secure the boundary of the reserve. Indonesian and highland migrants continue to acquire land adjacent to the reserve and clear it for cultivation. Other forms of encroachment have also occurred. There are reports that the military has built a golf course in the reserve, and that illegal logging and quarrying for rock continues to take place. For these reasons, Liley also believes that the Cyclops Mountains may represent the fastest disappearing habitat in Irian Jaya.

*'The Most Unique Marine Area in Indonesia'*²⁷

In the early 1980s, the WWF Irian Jaya Programme proposed the southwest corner of Cenderawasih Bay as Irian Jaya's first marine reserve (Salm, Petocz and Soehartono 1982; Petocz 1983). The proposed reserve was to include about 500 kilometres of shoreline around the Kwatisore Peninsula, 2,500 hectares of islands (including those in the Kepulauan Auri chain), 80,000 hectares of coral reef, and over 1 million hectares of open ocean.

The reefs and the islands are the chief justification for the reserve. The reefs are composed of a remarkably diverse collection of over 145 species of coral (67 genera), where relatively abundant populations of endangered species such as giant clams, horse hoof clams, and Triton's trumpet can be found. Hawksbill and green turtles nest on the beaches of the islands in the Kepulauan Auri chain, as do many species of marine birds. The surrounding marine area, meanwhile, supports diverse and abundant populations of estuarine, mangrove, reef, and pelagic fish. There are also significant areas of seagrass beds which are home to dugongs, and estuarine areas populated by saltwater crocodiles.

In 1985, the WWF Irian Jaya programme sent two marine biologists, Lucy Gilkes and Eve Adipati, to the adjacent town of Nabire to design a management plan for the proposed marine reserve. Although the area had been approved 'in principle' by the Forestry Department in the 1982 TGHK, it had not yet been formally declared in the government's gazette. It was not until 1990 that the Minister of Forests declared the Teluk Cenderawasih National Marine Park in accordance with the provisions of the 1990 Conservation Act. There remains some confusion, however, over the actual legal status of the Marine Park (PHPA 1995).

²⁷ The title is taken from Petocz and Raspado (1989:64). This description is based on Gilkes and Adipati (1987), Petocz and Raspado (1989:44), and Ron Liley (personal communication, 1996).

Gilkes and Adipati framed the management strategy for Teluk Cenderawasih in terms of what they called 'community participatory resource management'. In 1986, there were about 10,300 people living alongside the boundaries of the reserve. The vast majority were indigenous Irianese belonging to three main tribal groups. The exploitation of marine resources constituted a vital component of the local subsistence and cash economy. Gilkes and Adipati (1987:2) therefore proposed that the management strategy should respect their customary resource rights and subsistence practices, but ensure that their usage of marine resources remained ecologically sustainable.

Gilkes and Adipati identified the activities of non-local fishermen as posing the greatest threat to the proposed reserve. Some of them came from other islands in Cenderawasih Bay, such as Yapen and Serui. Most, however, were from Southern Sulawesi. While local people would not allow them to harvest resources in close proximity to their villages, they were not able to exercise control over their activities in areas further away. Furthermore, local people were harvesting resources themselves in order to sell to the non-local fishermen, who then resold them in the market. In brief, Gilkes and Adipati suggested, there was open access to the resources of Cenderawasih Bay, and in the absence of regulation, the resources would soon be exhausted.²⁸ In this regard, the conservation situation in Teluk Cenderawasih resembled that in the Cyclops Mountains.

The management plan therefore proposed three main interventions. Firstly, it proposed that the state should entirely prohibit outside fishermen from entering the Marine Park, this being viewed as an essential first step towards introducing sound resource management. Secondly, it proposed that the PHPA develop a system of multiple use zones in the park which would regulate the access of local villagers to marine resources. The proposed zoning system included a 'sanctuary' zone and a 'wilderness' zone, where access would be limited to the requirements of rest and safety while at sea, a 'limited-use' zone, and a 'traditional-use' zone, where local villagers could continue to harvest resources in a way that complied with their 'traditional' fishing techniques. Finally, it suggested that WWF/PHPA take action to increase local control over the sale of marine produce in the regional markets. While the plan offered few specific suggestions about such measures, it nonetheless assumed that itinerant traders were promoting unsustainable rates of harvest by underpaying local villagers for fish, giant clams, sea cucumbers, and other marine produce. If the local communities could capture more of the actual market price for such produce, they would limit their harvests to more sustainable levels.

However, the recommendations of the management plan were not implemented immediately after its completion in 1987. Between 1988 and 1992, neither the WWF nor the PHPA maintained a presence in the area. As a result,

²⁸ They also noted that there was often conflict between outside fishermen and local villagers over access to islands, reefs, and fishing areas in Cenderawasih Bay.

the local communities largely 'forgot' about the proposed marine reserve (personal communication, Gayatri Liley, 1996).

In 1992, the WWF re-established an office in Nabire with a small staff. At that time, they attempted to start up a cooperative to market salted fish to urban areas in Irian Jaya as a way of cutting out the immigrant merchants. However, this venture failed after a short time because of poor business management and the return of local fisherman to the illegal exploitation of giant clams. One unfortunate consequence of the failure of the cooperative is that villagers in the area have come to believe that the WWF is just another business which wants to profit from their resources (*ibid.*).

In 1993, a team of consultants visited Teluk Cenderawasih briefly to propose revisions to the management strategy. The consultants were part of a national project, financed through a loan by the World Bank, to devise twenty-five year management plans for seven national parks in Indonesia.²⁹ The consultants' plan suggested that the proposed multiple-use zoning system be replaced by a two-zone system: a 'sanctuary zone' running north to south down the middle of the bay; and a 'use zone' near the coast for local communities to use for fishing. Once the plan was tabled, the PHPA asked the WWF to revise the plan and adjust it to a more flexible system of zones.

In 1995, the WWF/PHPA secured a significant grant from the Dutch branch of the WWF to proceed with the implementation of the zoning system and to make a renewed effort to gain the support of local communities for the reserve. However, implementation of the zoning system proposed by the WWF continues to be delayed. While the national government has approved the status of Teluk Cenderawasih as a National Marine Park, and regards it as a high priority area for conservation planning and management (BAPPENAS 1993), it has not formally recognised the legitimacy of a particular zoning system. As a result, conservation management was still (in January 1996) largely confined to joint patrols by the PHPA and the Fisheries Department to check the permits of vessels fishing in the park. The PHPA has the legal authority to prosecute those who harvest species which are either protected or not listed on the fishing permit, but they do not have the authority to prosecute fishermen for fishing in the proposed 'sanctuary zones' (personal communication, Gayatri Liley, 1996).

The gains that have been achieved, since 1992, in protecting the National Marine Park can be attributed more to the enhancement of the PHPA's ability to enforce restrictions on resource use by outsiders and local villagers than on the success of 'community participatory resource management' in winning the support of local villagers for sustainable fishing practices. In the case of Teluk Cenderawasih, unlike the Cyclops Mountains and other reserves discussed in the following sections, local communities have played little part in defining the boundaries of the marine park or its various zones.

²⁹ Wasur National Park was also included in the consultancy.

*'The Place We Guard'*³⁰

The third nature reserve in which the WWF Irian Jaya programme has been actively involved is the Arfak Mountains Nature Conservation Area. It is located in the district of Manokwari in the Bird's Head region, on a rugged, isolated mountain block.

The conservation area encompasses some 64,000 hectares of lowland, foothill and lower montane forest. The highest peak in the range, Mount Huiembou, attains an altitude of 2,820 metres, just twelve kilometres from the coast. Biologists consider the Arfak Mountains to be of exceptional conservation importance because of the presence of a wide variety of bird species, including endemic birds of paradise and parrots, and sixty-nine species of mammals. The mountains are also the centre of diversity for the giant birdwing butterflies (*Ornithoptera* spp.) as well as the site where the first zoological expedition to New Guinea was undertaken by d'Albertis and Beccara between 1872 and 1873 (Petocz and Raspado 1989:60).

The history of the legal status of this area is complex. The Dutch colonial administration had originally declared a 10,000 hectare reserve in the Arfak Mountains in 1957. In 1982, the reserve was included in the *Consensus Forest Land Use Plan* (TGHK), but the status of the reserve remained ambiguous. In 1992, the Minister of Forests declared it a *Kawasan Konservasi* ('Nature Conservation Area') under the 1990 *Conservation Act*.

In 1986, the WWF began a joint project with the PHPA subsection office in Manokwari – or KSDA – to develop a management system for the proposed reserve. After about eighteen months of fieldwork, Ian Craven and Yance de Fretes completed work on a management plan in 1987 (Craven and de Fretes 1987). Implementation of the plan began the next year, and by January 1996 it had arguably become the most successful conservation project in Irian Jaya.

The Arfak Mountains, like the Cyclops, are increasingly an island in a sea of settlements and cocoa or rubber plantations. In 1987, Craven and de Fretes (1987:30-1) reported that the five subdistricts immediately adjacent to the reserve contained a population of some 74,816. The population of Manokwari District as a whole reached 135,643 in 1991, and was growing at an annual rate of 4.37 percent (PIJ 1993:23). In addition, there are three indigenous tribes who traditionally lived within, or in close proximity to, the conservation area, both in the mountains themselves and on the coastal slopes. These are the Hatam, Meyah, and Soub. Apart from two Soub clans, however, only the Hatam are reported as traditionally controlling land in the reserve (Craven and de Fretes 1987:33-34). In 1988, there were about 14,708 Hatam who lived in settlements near the reserve boundaries.

³⁰ This account is based on descriptions contained in the management plans, and also personal communications (1996) from Yopic Muskita and Jenny Foster-Smith.

Hatam settlement patterns in the mountains have changed dramatically since the early 1960s. Traditionally, Hatam lived in small isolated hamlets on the spurs and ridges of the range. Some thirty years ago, American missionaries from TEAM (The Evangelical Alliance Mission) established a small mission station in an upland valley known as Minyambou. Since that time, Hatam have moved down from the hamlets in the mountains into the surrounding valley, where there is now also an airstrip. In 1987, World Vision International completed a six-year development project in the valley which resulted in the construction of a small hydroelectric dam, a water supply system, a Bible school, and a modern health centre. The current settlement of Minyambou, with its ordered rows of houses clustered around an airstrip, bears more resemblance to a country town in the United States than it does to a pre-colonial Hatam settlement. While it is not representative of all settlements in the Hatam area, missionary and government influence have nonetheless resulted in the amalgamation of settlements throughout the mountains.

Over the past three decades, the flora and fauna of the Arfak Mountains have been threatened by three patterns of activity: the expansion of transmigration settlements and agricultural plantations in the coastal lowlands; the extensification of shifting cultivation in the highland valleys; and the collection of birds and butterflies for the illegal wildlife trade. While the expansion of shifting cultivation was not considered to be a major threat in 1987, Craven and de Fretes (1987:46) still thought that it could become so if it continued without regulation. In 1991, Craven observed (1991:12) that vegetable gardens established on recently cleared plots were the principal source of cash income for people in the western area of the reserve,³¹ and were therefore consuming an ever-increasing area of land. The people of Minyambou and Makwam, for example, were expanding the area under cultivation to grow vegetables for sale to shops, restaurants, and markets in Manokwari. By the beginning of the 1990s, shifting cultivation, alongside the illegal trade of birds of paradise, parrots, and butterflies, constituted the greatest threat to the conservation area.

The objective of the Arfak management strategy was to establish a boundary 'chosen, recognised, and respected by indigenous peoples and the government' (ibid:3). The first step involved organising committees composed of local, indigenous leaders in all of the Hatam communities located within, or adjacent to, the conservation area. These committees, which were organised for the most part by indigenous church leaders, were made up of influential people who could exercise some authority over the community of customary landowners. The WWF/KSDA team organised a total of fifteen committees in the conservation area, each of which represented the physical and social boundaries of a group of traditional landowners who were willing to work together. In such a way, the WWF/KSDA team was able to divide the conservation area into fifteen territorial units, which Craven named 'nature

³¹ The produce is sold to markets and restaurants in Manokwari.

reserve management areas' (NRMAs). The aim of organising the committees was for them 'to use the traditional tribal system to defend the conservation area as they would their own tribal land' (Craven 1990:2). In a publication intended for a Canadian audience, Craven and Nash claimed that 'the Hatam word for conservation area translates as "the place we guard"' (1989:43).

Between 1988 and 1992, these committees worked with the WWF/KSDA team to define a boundary between land for gardening and land for conservation (Craven 1989:5). This process was a protracted one, and involved some compromises between the boundary proposed by the WWF/KSDA on altitudinal, habitat, and species considerations, and the committee's own assessments of the present and future needs of their communities. The negotiation and marking of the western boundary was largely complete by 1991.

Meanwhile, the official government department charged with delineating boundaries on the ground, BIPHUT (the Department of Forest Inventory and Mapping), proceeded to erect posts along the eastern boundary, as it had been defined by Petocz (1983), without any community input. According to Craven (1991), the delineation of this boundary alienated local Hatam communities and has contributed to their lack of support for the conservation area. They have largely ignored the boundary and have even removed the boundary markers. By 1992, however, the WWF/KSDA had renegotiated the location of boundaries in the eastern segment of the reserve. In early 1996, the WWF/KSDA were claiming that the location of the conservation area boundaries had been finalised by using this participatory method (personal communication, Yopie Muskita, 1996).

The next step in the management strategy called for the WWF/KSDA team to negotiate a set of land and resource use restrictions with the Hatam through the Nature Reserve Management Committees. The original management plan had prescribed a system of five zones in the conservation area, each representing a different level of restriction on access and use: 'sanctuary zones', where no disturbance or appropriation of wildlife would be permitted; 'traditional use zones', where the Hatam could continue to hunt using 'traditional' methods; 'rehabilitation zones', which had already been degraded but were now included in the conservation area; 'rights of way', which comprised the paths traditionally used by indigenous people to travel from the mountains to the coast; and finally 'community development zones', located on the boundaries of the reserve and to be used for the establishment of small-scale sustainable industries and agroforestry. However, shortly after the implementation of the management plan had begun, the WWF/KSDA team was compelled to acknowledge that the zoning system was too complex, and even impolitic, because the whole area of the reserve consisted 'in reality and in practice' of traditional Hatam hunting lands. Thus, the entire conservation area has come to be viewed as a 'traditional use zone' where hunting by Hatam people using bows and arrows is not restricted. The WWF/PHPA secured agreements with the nature reserve management committees to recognise and enforce other restrictions in the traditional use zone, but the only ones which are actively enforced are those

which deal with the taking of resources from another village's land, with the building of houses and establishment of gardens, and with collecting birds of paradise and butterflies (Craven 1991:5).

Another problem which developed during the implementation of the management plan was the lack of legal authority which the nature reserve management committees exercised over outsiders. While members of their own communities might respect the rules which the committees established for their areas, outsiders had little reason for doing so. In order to address this problem, the WWF/KSDA team worked to secure local government support for the committees and the management system. To a certain extent they have succeeded. Under present arrangements, the committees can report infringements of reserve regulations by outsiders to the KSDA office in Manokwari, or to the District Head (*Bupati*), and expect that they will receive assistance in stopping and prosecuting trespassers.

The Arfak Mountains management strategy also advocated the development of alternative sources of cash income for the Hatam who customarily owned land in the conservation area. The most important initiative has been the promotion of 'butterfly ranching'³² in the 'community development zones' adjacent to the conservation area.³³ The WWF/KSDA team believed that butterfly ranching could provide the Hatam with an important financial incentive to support the conservation area: 'by ranching forest dependent species the economy becomes dependent on the presence of the forest' (Craven and Nash 1989).

The WWF initiated the butterfly ranching scheme in the western areas of the reserve in 1989, and later, in December 1992, helped to establish a local non-governmental organisation, Yayasan Bina Lestari Bumi Cenderawasih (YBLBC), to manage the farming and marketing of the birdwing butterflies. In early 1993, YBLBC began to purchase pupae from Hatam ranchers and sell them to international collectors through a semi-state owned forestry company. However, YBLBC hopes to manage marketing and exports on its own eventually.

Several problems have afflicted the butterfly project. First of all, YBLBC has faced problems of over-production. In its first two years of operation, the business sustained a large loss when it felt compelled to purchase large numbers of pupae from enthusiastic ranchers. A second problem is that YBLBC has faced long delays in obtaining the necessary CITES³⁴ permits to export the

³² Butterfly ranching involves cultivating the vines on which the caterpillars feed and pupate. When the pupae are close to maturity, they are removed and transported to town, where they emerge under controlled conditions. The butterflies are then promptly killed and mounted for sale.

³³ This industry was already well-established in the Manokwari area. Chinese and Indonesian merchants in Manokwari have paid Hatam to collect butterflies for domestic and international markets since 1971.

³⁴ Convention on International Trade in Endangered Species. It takes many months to obtain export clearance under the conditions of the convention.

butterflies overseas. This has added to the cash flow problem, since YBLBC purchases pupae well before it is able to export them. In April 1995, however, the Arfak butterfly project received a three-year grant of US\$179,000 from the Biodiversity Support Program³⁵ to establish the trading agency on a firm basis. Since the project started, 1,185 families have earned about US\$48,000 from sales of pupae to the agency.

The WWF/KSDA Arfak project has also facilitated the establishment of a wholesale cooperative in Manokwari to supply small trade stores in the Hatam area. The trade stores developed out of community organisation and information centres which were established by the leaders of the nature reserve management committees. The cooperative was named ACEMO, which is an acronym of the names of all the Hatam subtribes. It sells such items as rice, cooking oil, kerosene, salt, soap, and soft drinks to its members for resale. By January 1996, there were a total of 370 trade stores registered with the cooperative. The YBLBC reports that about 70 percent of the income from the sale of pupae has been reinvested in the purchase of trade store goods from the cooperative. The profit that is being earned by the cooperative is being saved in the bank, and will be used as a source of funds for Hatam children who gain entry to high school. Individual trade store owners keep their own profits (personal communication, Jenny Foster-Smith and Yopie Muskita, 1996).

On the whole, the management strategy for the Arfak conservation area has achieved some tangible results over the past decade. A reserve boundary was delimited in consultation with the local committees, regulations were drawn up and agreed upon, and the committees have some juridical authority to enforce the regulations. In addition, the butterfly ranching scheme has succeeded in generating modest levels of income for local families, while the cooperative has so far been a major success.

Irian Jaya's First National Park³⁶

Wasur National Park is located in the southeast corner of Irian Jaya and borders the Tonda Wildlife Management Area in neighbouring PNG. It encompasses over 400,000 hectares³⁷ of extremely flat terrain and includes large areas of eucalypt-clad savannahs which are unique to this part of New Guinea. There are also significant stretches of lowland forest, swamps and tidal mud flats. Over 400 species of birds can be found in the park, including important populations of migratory waders and waterfowl. The park also shelters significant numbers of wallabies and rusa deer.

³⁵ The Biodiversity Support Program is a consortium of the Worldwide Fund for Nature, the Nature Conservancy, and the World Resources Institute, with funding from the United States Agency of International Development.

³⁶ This description is drawn from PHPA/WWF (1992); Barber, Affif and Purnomo (1995:38-45); and Zulfira Warta (personal communication, 1996).

³⁷ The WWF remeasured the official boundary maps for the park with an electric planimeter and calculated the area to be 413,810 hectares.

The forests of the Wasur and Maro River areas were first declared as a Game Reserve by the Ministry of Agriculture in 1978. The permanent lake in the centre, Rawa Biru, which is the major source of water for the town of Merauke, was declared as a Nature Reserve at the same time. In 1982, the Minister of Agriculture increased the size of the reserve by about 98,000 hectares, and in 1990, the Minister of Forests reclassified the area as a National Park.

The main source of threats to the ecological integrity of the park stem from the rapid expansion of the town of Merauke and the chain of transmigrant settlements along its western border. Merauke itself contains a population of some 44,000 people, while more than 19,000 people live in transmigrant settlements across the Maro River. The growth of the town has also stimulated organised poaching of rusa deer and wallabies by outsiders who come equipped with jeeps, motorcycles, and guns. It has been estimated that deer meat sold in the Merauke markets (coming from adjacent areas as well as Wasur itself) constitutes about 80 percent of urban meat consumption (PHPA/WWF 1992). Until 1990, moreover, the game reserve remained essentially unmanaged.

There are also about 2,500 people who live within the boundaries of the national park, approximately 1,700 of whom are indigenous Marind, Kanum, Marori, and Yei. The government has recognised that the Marind and Kanum peoples continue to have the right to live in the park.

In January 1991, the WWF Irian Jaya programme, in conjunction with the subdistrict office (KSDA) of the PHPA, initiated a project to develop a management plan for the national park.³⁸ Over the next two years, project staff carried out research in the park, including habitat and biological surveys, land tenure studies, a demographic and economic census, and feasibility studies of tourism and eucalypt oil as small-scale industries (PHPA/WWF 1992:65). This research formed the basis of the management plan, completed at the end of 1992. A team of consultants funded by a World Bank loan were then commissioned to draft a twenty-five year management plan. The draft was completed in March 1994, and revisions are still being made by the KSDA/WWF staff.

Like the management plans for other reserves in Irian Jaya, the Wasur prescription focussed on delineating boundaries that will be recognised and respected by the government, migrant settlers, and indigenous people. However, Wasur is unique in having indigenous communities actually residing in the park – small villages on the frontier of a rapidly growing city. But rather than identifying the expansion of the town and its economy as the major source of threats to the park, the management plan identified the poverty of its residents as the single greatest threat. The plan stated that the motivation behind hunting and

³⁸ The current local management authority is the Subseksi Konservasi Sumber Daya Alam (KSDA) Merauke which comes under the authority of the KSDA Irian Jaya. Funding came from the Dutch government until 1992, when the Dutch branch of the WWF stepped in and assumed financial responsibility for the project.

logging, the wildlife trade and land sales is 'the continual search for cash to buy food, clothes, education, housing and medication' (ibid.).

The plan proposed a four-part strategy to address both the need for conservation management and the need for improving the welfare of park residents. The initial move involved the establishment of institutional mechanisms for boundary control, through which park residents and local authorities could restrict access to the park by outsiders. The aim was to provide the customary landowners with a monopoly over the game (rusa deer and wallabies) in the park, thereby increasing their incomes and making the hunting more manageable. The second step involved the WWF/KSDA negotiating a multiple-use zoning system with park residents. Then, to administer the park, the plan proposed a three-tiered structure of management authorities, comprising the local KSDA office, Village Park Councils, and a Park Resident Advisory Body. Village park councils were to be composed of influential park residents who could act as intermediaries between their communities, the KSDA, and the local government. The councils would negotiate the location of zone boundaries, provide input into framing regulations, and keep the KSDA and local government authorities informed about any infringements. The fourth and final step involved the establishment of small-scale industries in 'utilisation zones' to provide park residents with an alternative and ecologically sustainable source of cash income.

How, then, have these initiatives fared?

Since 1992, there has been some progress in implementing boundary control. The WWF/KSDA established a guard post on the Trans-Irian Highway, which cuts through the middle of the park. There has been a slight increase in the numbers of park staff (funded by the WWF). Experiments have been made in allowing park residents to use traditional methods for hunting deer and pigs. These have involved the issue of tickets to park residents at the guard posts in order to allow the transport of deer and pig meat to town. Park authorities have also been involved in organising local transport for this purpose. The plan noted that, in the first stage of implementation, this assertion of control over a key park resource for the exclusive use of residents was the single most important factor in increasing community support for the national park.

Progress with regard to the establishment of a three-tiered structure of management authorities beyond the guard force has been slow. In 1995, the WWF staff still thought that the concept was workable but might take a decade to achieve (Barber, Affif and Purnomo 1995:44).

Evaluation of the success of the proposed zoning system would also be premature. The plan and subsequent documents (PHPA 1994) mapped a system of five different zones, including a 'village zone', a 'utilisation zone', a 'traditional use zone', a 'low-intensity use zone', and a 'core zone'. The establishment of the boundaries of these zones, and the restrictions on activities within them, were negotiated by the KSDA/WWF and park residents between 1992 and 1994. The 'traditional use' zone covers the entire park, and permits

the indigenous residents to continue their 'traditional activities' within it. The definition of 'traditional activities' was one focus of the research conducted in 1992, and came to include the establishment of small garden plots and hunting by pre-contact methods (such as fire), which is now seen as a key practice in maintaining biological diversity.

In conjunction with local partners, the WWF has also begun to implement the plans for two small-scale industries in several of the villages in the park area. The WWF team has established aromatic oil distilleries in a few villages, as well as a marketing cooperative in Merauke which sells oil to buyers in Java. This has succeeded in generating a modest amount of income for park residents. However, some trees have also been cut down and some areas over-harvested. Like the butterfly project in Arfak, the enterprise as a whole is running at a loss.

Efforts have also been directed at promoting tourism in the park. Three guesthouses have been built in different village locations, and itineraries are being established for travellers. The project has also tried to establish safeguards to ensure that income goes directly to park residents rather than outside entrepreneurs. As tourists are required to hire transport and guides through the WWF office in Merauke, the trips are relatively expensive, but profits over costs are channelled back through the village management councils to pay for community needs.³⁹ Although the number of park visitors since 1992 has been small (perhaps 600), WWF staff are actively seeking to expand the enterprise.

Since the WWF Wasur programme began in 1991, it has accomplished a great deal in terms of establishing beneficial relationships between park residents and park authorities. The project has strengthened the boundary protecting the park from encroachment by residents of the neighbouring town and transmigration settlements. It remains to be seen, however, if small-scale businesses will succeed sufficiently to function as a substitute for more destructive efforts to generate cash income. More troubling, however, are the effects of national development policies which continue to promote the Merauke area as a site for new transmigration settlements, forestry projects, and the expansion of rice cultivation. As the town of Merauke grows, the stress on the resources of the park must correspondingly increase. In this setting, it would not be surprising if the indigenous communities continued to ally themselves with conservation practitioners in an effort to protect their land and resources in a region where they have already become marginal players.

*The Troubled History of the Proposed Lorentz National Park*⁴⁰

Since the late 1970s, a section of the southern escarpment of the Carstensz Mountains in the Central Dividing Range has been a high priority area for

³⁹ In January 1996, the price for tours ranged from about US\$72 to US\$300 per person per day. Most of the income derived thus far has been spent on secondary school fees.

⁴⁰ This account is based on Jim Schweithelm (personal communication, 1996).

conservationists. This is because the region includes the highest peak in southeast Asia, Mount Jaya (4,884 metres), the permanent snowfields below it, and a 'complete spectrum of alpine, subalpine, montane, lowland and swamp forests [extending down] to the coastal mangroves of the Arafura Sea' (Petocz and Raspado 1989:58). In other words, the region comprised a complete altitudinal transect of all of the major habitats of the southern region, which are home to a substantial proportion of all the known species of Irian Jaya. In this area, biologists have identified 123 of the 172 mammal species, and 411 of the 643 bird species, within the proposed boundaries of the reserve.

The Dutch are credited with making the first attempt to create a nature reserve in this area. In 1919, they legally declared a 300,000 hectare area from the equatorial icefields to the southern coast, bracketed by the Noord West and Lorentz rivers. In 1956, however, the Dutch colonial administration abolished the reserve because of the unresolved land rights of indigenous people who lived within it (Petocz 1989:44; Smith 1993:17-18).

In 1978, the Indonesian government re-established the Lorentz Strict Nature Reserve following the recommendations of the FAO/UNDP report (1977). The boundaries of the reserve encompassed some 2.15 million hectares. They enclosed not only the entire Freeport mine and Timika township, but also some of the densely populated communities of the highlands. The tribal lands of five tribal groups were included in the reserve, as well as a number of settlements with a population numbering well over 10,000 people (Manembu 1991). In 1980, a joint WWF/PHPA team recommended that the boundaries be changed to exclude the mine site and associated operations, as well as most of the highland villages, thus reducing the size of the reserve to 1.48 million hectares (Petocz 1983). They also recommended that the status of the reserve be changed to that of a National Park to allow for a more flexible approach to conservation management. In 1992, the Forestry Department and the Department of Mines submitted another proposal for boundary changes which repeated those that had been recommended in 1980, along with a few modifications along the southwest boundary (Smith 1993:18). However, the government has not yet officially recognised the proposed changes. The Lorentz legally remains a Nature Reserve with the same boundaries as those that were drawn in 1978.

In the mid-1980s, the Lorentz area was considered a high-priority reserve for development as a National Park (Petocz and Raspado 1989:58). The International Union for the Conservation of Nature even proposed that the Lorentz be included on its list of World Heritage sites. But, despite the interest amongst the international conservation community in the fate of this large 'pristine area', the WWF Irian Jaya programme had difficulty raising funds to start an active project.

The reasons for the lack of international donor interest in the Lorentz are unclear, but can probably be attributed to two major issues which affect the reserve. Firstly, the Indonesian government does not seem to be particularly committed to the reserve, because there are large prospects of subsurface

minerals in the central mountains and oil in the coastal lowlands. The *Basic Mining Act* of 1968 clearly states that these natural resources are the property of the state, and that their exploitation takes precedence over all other forms of land use. When Freeport finished mining the Ertzberg cap in 1989, the Indonesian government granted it a second concession of 2.6 million hectares, much of which falls within the boundaries of the reserve (see McBeth 1994).

Secondly, the central highlands have historically been the scene of a great deal of social unrest since the Indonesian takeover in 1963, and more recently, since the construction of the Freeport mine in the early 1970s. The construction of the mine displaced a number of indigenous communities, while the direct disposal of tailings from the mine into the Ajkwe and Minanjeri rivers has greatly increased sedimentation rates and forced the rivers back into a network of shallow braided channels.⁴¹ Lowland vegetation in the vicinity of these channels has died back – in some places for 30 kilometres from the source of the river (PHPA 1995). Traditional landowners do not receive any direct royalty payments from Freeport, while compensation for the loss of land and resources over the past thirty years has been extremely limited.⁴² It is therefore no surprise that the highland area around the mine has been a major centre of OPM activity and of repeated military reprisals since the mid-1970s (see Osborne 1985). The prospects for the development of new mining and oil ventures in the region, and the threat of continuing social unrest and violence, have probably helped to dissuade international agencies from investing in the management of the nature reserve.

In 1990, however, the WWF secured funding to launch a pilot project in the reserve which resulted in the production of two reports. The first report provided an ethnographic overview of four of the tribal groups whose traditional lands were included in the reserve, and offered a partial assessment of their attitudes towards the establishment of the national park (Manembu 1991; see also Cook 1995). The second report explored the tourism potential of the Lorentz Reserve (Smith 1993). It took the WWF another four years to secure additional funding for the next phase of the project. The Asian Development Bank deferred a request for funding, while there were repeated breakdowns in negotiations with the Freeport mine to establish a 'Friends of the Lorentz' committee which would have involved Freeport, the PHPA, the WWF and other NGOs, and which would have included joint financial support. In 1995, the WWF finally secured funding from the Dutch branch of the WWF, the German aid agency GTZ,⁴³ and the Biodiversity Conservation Fund. The goal of the project was to develop a draft management plan by the end of a two-year period, and then to line up additional funding for its implementation.

⁴¹ On average, the mine has discharged between 100,000 and 160,000 tonnes each day since the beginning of the decade (PHPA 1995).

⁴² See also the reports in *The Ecologist*, 25(6), 1996; *Tapol Bulletin*, No. 132, December 1995; and *Indonesia Reports*, No. 325, April 1996.

⁴³ Gemeinschaft für Technische Zusammenarbeit ('Technical Cooperation Agency').

The project started in mid-1995, with the aim of devising strategies to increase the interest of indigenous communities in the idea of a national park. As in the case of Cyclops and Arfak nature reserves, the core strategy to win such support was 'participatory mapping'. In the second half of 1995, conservation practitioners were involved in locating customary land boundaries. They also began to consult with local communities, to collect oral histories, and to make sketch maps. Again, the collaboration between conservation practitioners and indigenous groups in the participatory mapping process had a number of goals. These included the acceptance of reserve area boundaries, developing a mutually agreed zoning system, and raising awareness for nature conservation (Momborg 1994). More significantly, however, 'participatory mapping' was also aimed at strengthening customary land rights.

In January 1996, two staff members of the WWF Lorentz project, along with members of a Cambridge University biological expedition to the reserve, were taken hostage by a faction of the OPM. The leader of the faction, Kelly Kwalik, had long been organising acts of sabotage against the Freeport mine.⁴⁴ Kwalik believed that, by taking Western hostages, the rebels would draw international attention both to the activities of Freeport and to the OPM's quest for independence from Indonesia.⁴⁵ The hostage crisis dragged on until the middle of May, when an elite Indonesian military unit under the command of Prabowo Subianto, Soeharto's son-in-law, freed the hostages in a military raid. Two of the Indonesian hostages were murdered, but the Western hostages escaped unharmed.

The OPM action in this case did not succeed in raising sympathetic international attention to their cause. Instead, it was either condemned by governments or passed unnoticed in the world's major media. The Indonesian government responded by stepping up the presence of the military in the Timika area. The OPM action also dealt a severe, if not irreversible, setback to the WWF Lorentz project.

Conclusion: Drawing and Enforcing Boundaries

In this chapter, I have provided evidence that conservation initiatives have not been easier to achieve in Irian Jaya than in PNG, despite the differences in national systems of land tenure. I have pointed out that the Indonesian government has only partially acted on the recommendations of its consultants, and has only just begun to implement conservation management in a handful of

⁴⁴ Kwalik reportedly participated in the sabotaging of the pipeline that carried copper and gold sludge down to Timika in 1977 (the incident is described in Osborne 1985:69). An Australian journalist who interviewed Kwalik in the interior of Irian Jaya in 1995 reported that 'the issue of compensation and equity seems central to Kwalik and the tribes he represents' (Bohane 1996:34).

⁴⁵ It is ironic that the OPM took this particular group hostage. In November 1995, nineteen environmental groups signed a petition which charged Freeport with 'massively altering the landscape, irreparably damaging the rich biodiversity of the area, and harming the health and sustenance of local indigenous communities' (McBeth 1996:28).

high priority areas. Even in the areas where conservation management is being implemented, conservation practitioners are finding that they must first address the competition for land and resources which is taking place between the state, indigenous Irianese, and recent Indonesian immigrants.

From the perspective of conservation practitioners in PNG, the strategies that their counterparts in Irian Jaya have developed to manage conservation areas are liable to present something of a paradox. From their perspective, the legal protection of customary land rights in PNG has created numerous, seemingly intractable obstacles to nature conservation. In Irian Jaya, on the other hand, conservation practitioners have viewed state recognition of customary land tenure as an essential precondition for successful nature conservation.⁴⁶

The paradox disappears, however, when we recognise the obvious: that the status of ethnic Melanesians in the political economy of these two nation-states is fundamentally different. 'Melanesians' in Irian Jaya comprise a small, marginal ethnic minority in a nation of over 200 million people, where the state controls the allocation of permits for, and the revenue from, the exploitation of timber, subsurface minerals, and oil. The Irianese, in other words, are not in a position to negotiate a 'rent' for 'their' natural resources. Their material interest in land and resources is more likely to correspond with the conservationist's interest in the protection of nature. In PNG, on the other hand, the 'Melanesians' are an indigenous citizenry divided into numerous customary landholding groups which can negotiate rental incomes and demand compensation or royalty payments for the exploitation of natural resources. Their material interest in conservation or exploitation varies in accordance with their ability to command local resources. We may therefore say that 'Melanesians' in Irian Jaya constitute an ethnic 'class', while 'Melanesians' in PNG do not.

Nevertheless, the differences in the 'class positions' of Melanesians in PNG and Irian Jaya, and the differences in national systems of forest tenure, have not led to predictable differences in the outcomes of conservation projects. In Irian Jaya, putative state control of forests has facilitated proposals for the establishment of conservation areas. It has also, to some extent, facilitated their legal declaration. But it has not meant that either the state or indigenous communities have found it easier to recognise the boundaries of nature reserves on the ground.

⁴⁶ 'The key to conservation area management in Irian Jaya is a boundary chosen, recognized and respected by the indigenous people and the Government' (Craven 1991:3).

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